# INTERTYPE HAND BOOK

# INTERTYPE HAND BOOK

*A Brief Manual of Instruction*
*For Users of the INTERTYPE*

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**ERECTION**
**OPERATION AND**
**MAINTENANCE**

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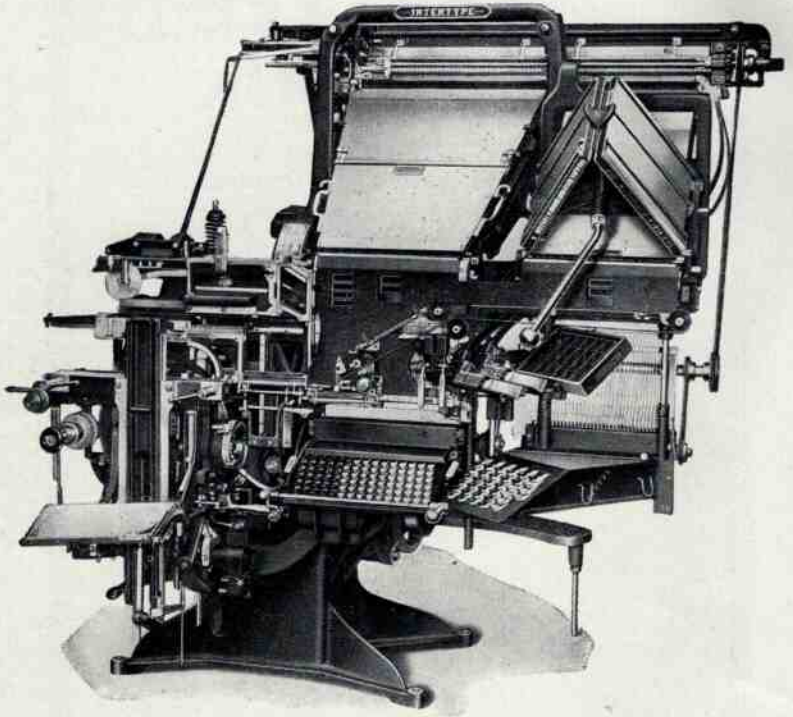

MODEL F-4 S.M. MIXER

# INTRODUCTION

The purpose of this booklet is to give our customers some idea of the procedure necessary when installing a new machine, the proper methods to use in making operating changes, and suggestions for keeping the machine at all times in first class operating condition.

We have also included in these pages suggested causes for various troubles that may perplex the operator who is none too well versed in the correct handling of the machine.

It will be apparent to the average person, after having read this book, that nearly all of the troubles enumerated can be avoided by paying attention to the maintenance routine which suggests that certain things should be done at certain intervals.

The Intertype like any other piece of fine machinery requires a certain amount of routine care. The attention of those in charge of machines is therefore directed to the fundamentals which it is necessary to know in order to secure maximum results with minimum effort. Many distinctive features and appealing conveniences are incorporated in the construction of the machine to perfect and simplify it, and to materially lessen the work of the operator and machinist.

Considerable stress is given to the matter of cleanliness and the discreet use of lubricating agents. It must be understood that these two items are important factors to good ma-

chine service. On the other hand it is not necessary to make cleaning and oiling a drudgery. Regularity of cleaning to avoid excessive dust and dirt accumulation and judicious application of oil only at the proper places should become a habit. *Daily* polishing of spacebands, cleaning of pot crucible, well and plunger, and wiping the metal pot mouthpiece are also essential.

There are a number of adjustments on the machine, all of which are important and must be maintained. Constant tampering and alteration every time something seems to be wrong will not be required on a machine that has been properly adjusted when erected. Many times the fault is not with the adjustments but is due to some neglect or abuse such as forcing the machine to cast overset lines, poor lock-up of metal pot or excessive dirt or oil accumulation. Know first whether adjustments are right by periodical inspection or checking, and if correction is necessary, know how to apply it without unnecessary tampering.

We have aimed to give our customers the benefit of a useful and instructive service manual in as brief and complete form as possible. We urge its use as a ready reference and welcome the opportunity to assist in the solution of any of your typesetting machine and composing room problems.



## MACHINE ACTIONS

1. A line of matrices and spacebands is assembled in the assembling elevator through manipulation of the keyboard keys.
2. The line in the assembling elevator is raised by the operator to a point between the long and short fingers of the delivery slide.
3. The delivery slide is released as the upward movement of the assembling elevator is completed and conveys the line of matrices to the first elevator, at which time the machine automatically starts.
4. The first elevator descends, carrying the line of matrices to a position between the vise jaws and in front of the mold; the justification lever descends; the mold disk is turned to carry the mold from the vertical or ejecting position to the horizontal or casting position.
5. The mold disk moves forward toward the line of matrices, leaving a space of .010" between the mold and the vise jaws.
6. The vise closing lever raises, closing the left-hand vise jaw.
7. The justification lever rises, pushing upwardly on the justification block, which raises the long spaceband wedges and expands the matrix against both vise jaws in preparation for final justification.
8. The justification levers descend, relieving the spacebands from the upward pressure of the justification block.
9. The vise closing lever descends, slightly opening the left vise jaw, to relieve the side pressure during alignment of the matrices.
10. The first elevator rises slightly, lifting the matrices so that their lower lugs are aligned against the shoulder of a groove in the mold face. This is called vertical alignment.
11. The metal pot advances and pushes the mold against the line of matrices. This is called facewise alignment.

12. The pot recedes, relieving the line of matrices from the pressure of the mold.

13. The vise closing lever rises, moving the left vise jaw inwardly to the exact width of the type line to be cast; at the same time the final justification of the matrix line takes place, the justification block being pushed upwardly against the long spaceband wedges to spread the line to its full width.

14. The metal pot is pushed forward against the back of the mold, forcing the latter against the aligned and justified line of matrices and spacebands.

15. The pump plunger is caused to descend into the well of the metal pot crucible, forcing a stream of molten metal through the throat of the crucible, through the mouthpiece, and into the mold, thus forming the slug.

16. The metal pot and the mold retreat, drawing the face of the slug from the matrices and spacebands. The upward pressure on the first elevator (action 10) is relieved, releasing the lugs of the matrices from the strain of alignment.

17. The mold disk stops and the pot continues to retreat, which separates the mouthpiece from the base of the slug.

18. The mold disk is revolved three-quarters of a revolution, carrying the mold with the slug in it past the back knife, which trims the base of the slug; the mold stops with the slug in a vertical position in front of the trimming knives, ready to be ejected; at the same time the first elevator rises, conveying the line of matrices to the transfer channel. The second elevator descends and positions itself upon the transfer channel.

19. The elevator transfer slide finger pushes the line of matrices into the transfer channel where the matrix teeth engage the grooves of the second elevator bar. The transfer slide then moves back to permit the second elevator to lift the matrices from the transfer channel, leaving the spacebands in the channel. The spacebands are returned to their box by the spaceband transfer lever.

20. The ejector blade advances and pushes the slug from the mold, between the trimming knives, into the galley.



21. The first elevator descends to its normal position to receive another matrix line; at the same time, the second elevator is lifting the first line of matrices to the distributor box; the distributor shifter is moved outwardly to shift the matrices into the distributor box.

22. The justification lever rises slightly, actuating the slug lever, which pushes the slug into its proper position in the slug galley.

23. The ejector moves back to normal position; the distributor shifter pushes the line of matrices into the distributor box, where the matrices are lifted one by one into the distributor screws; these screws convey the matrices along the distributor bar to a point directly above their respective channels, where they drop through the channel entrance into the magazine.

During actions 5 to 13 the delivery slide returns to its normal position, ready to receive another line of matrices from the assembling elevator. If the operator has the second line ready before the first elevator descends after transferring the first line, he raises the assembling elevator as before and the delivery slide automatically holds the second line in the delivery channel until the first elevator is ready to receive it. This permits the assembling elevator to be lowered so composition of the third line can be commenced.

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## MAGAZINES, MOLDS, SPACEBANDS

Only one form of main magazines is made for standardized Intertype machines, that is, a ninety channel magazine that will carry any two-letter font of matrices made, and the majority of fonts from 18 point to 42 point of one-letter condensed. The matrices are at all times automatically locked in the magazine by the escapement at the front and the shutter at the back. When shifting a magazine out of operative position, the magazine shutter at the upper end is automatically closed and the shutter for the magazine placed in operative position is automatically thrown open. The construction of the magazine is so simple as to require no devious explanation, and beyond care in attending

to the escapements to know that at all times they are operating freely, and to use no oil on them, attention to it may be dismissed.

## SPLIT MAGAZINES

Another type of magazine is called a split, the combined sections of which (upper and lower) are equivalent to a regular magazine. This magazine accommodates sets of display matrices usually from 12 point and up to the larger sizes. The upper half of a split magazine is similar to the upper part of a regular main magazine. The small strip-like lid attached to the upper half can be lifted before changing magazines so as to observe whether there are any matrices projecting above the top of the split. Split magazines, if used on Equipments A, B, C or E, are 90-channel, and if used on Equipment D, will be 72-channel.

## SIDE MAGAZINES

The matrix channels of side magazines run straight and parallel the length of the magazine, instead of at an angle as in the main magazines, and they have a capacity of about eight matrices per channel, or 200 per set. The escapements used in the side magazines are exactly like those for the main magazine. All side magazines are split. Those now made can be used for composition of large display faces up to and including 60 point face, having a maximum letter width of one-half inch, with maximum matrix lugs .090″ thick. Faces for display in smaller sizes can also be used in side magazines, or the magazines may be equipped to carry special characters for various kinds of intricate composition requiring a large number of mathematical signs and figures.

**Side Magazine No. 1** has 34 channels. This unit is a single magazine equipment. The magazine is removable for changing from one to another by simply lifting from the machine. The escapements retain the matrices at the lower end, but the magazine must not be inverted when lifted from the machine as it is not fitted with a shutter to keep the matrices from sliding out through the top.

**Side Magazine No. 1a** has 30 channels and is interchangeable with No. 2 Equipment below. This unit is a single magazine equipment. The magazine is removable for changing from one to another by simply lifting from the machine, the same as Side Magazine No. 1.



**Side Magazine No. 2** equipment is interchangeable with No. 1a equipment and consists of three side magazines of 30 channels each, mounted in triangular form upon a frame. A lever placed in a convenient position enables the operator to lift up the counterbalanced frame holding the three magazines, and revolve the frame so that the desired magazine may be turned to the bottom horizontal position. The lever may then be lowered and the magazine will be in operating position.

**Side Magazine No. 3** can be added to any Standardized Intertype at the factory or in any composing room. For Intertypes A, B, C and D side unit No. 3 is furnished with one or three magazines; for Intertype E (Mixer) two or four magazines.

The full side unit applied to the Mixer machine gives four magazines on the side. Including the two main magazines this makes a total of six magazines on the machine ready for use. The full side equipment for Intertypes A, B, C and D consists of three 30-channel magazines mounted in triangular form upon a tripod frame. A lever placed in a convenient position enables the operator to lift up the counter-balanced frame holding the three magazines; the frame is then revolved so that the desired magazine is turned to bottom horizontal position. When the lever is lowered the magazine will be in operating position. On Equipment E Intertypes, a fourth magazine is mounted in a frame directly under the No. 3 tripod and receives its matrices from the lower distributor. The matrix width and capacity ranges from the smallest matrices made up to and including the maximum width matrix (one-half inch) with 60 point face.

## SIZES OF ESCAPEMENTS

### For Main Magazines, A, B, C, D, E and X

| Char. | Chan. No. | Size | Char. | Chan. No. | Size | Char. | Chan. No. | Size |
|---|---|---|---|---|---|---|---|---|
| e | 0 | .047 | ffl | 31 | .087 | Em Lead | 60 | .087 |
| e | 1 | .047 | Em Space | 32 | .087 | E | 61 | .087 |
| t | 2 | .047 | Comma | 33 | .037 | T | 62 | .077 |
| a | 3 | .057 | Period | 34 | .037 | A | 63 | .087 |
| o | 4 | .047 | : | 35 | .047 | O | 64 | .077 |
| i | 5 | .037 | ; | 36 | .047 | I | 65 | .057 |
| n | 6 | .057 | ? | 37 | .057 | N | 66 | .087 |
| s | 7 | .047 | En Space | 38 | .047 | S | 67 | .067 |
| h | 8 | .057 | ( | 39 | .037 | H | 68 | .087 |
| r | 9 | .047 | \| | 40 | .037 | R | 69 | .087 |
| d | 10 | .057 | Quote | 41 | .037 | D | 70 | .087 |
| l | 11 | .037 | ! | 42 | .047 | L | 71 | .077 |
| u | 12 | .067 | Hyphen | 43 | .037 | U | 72 | .087 |
| c | 13 | .057 | Thin Space | 44 | .037 | C | 73 | .067 |
| m | 14 | .087 | ) | 45 | .037 | M | 74 | .087 |
| f | 15 | .047 | En Leader | 46 | .047 | F | 75 | .077 |
| w | 16 | .087 | Apostrophe | 47 | .037 | W | 76 | .087 |
| y | 17 | .057 | * | 48 | .047 | Y | 77 | .087 |
| p | 18 | .057 | 1 | 49 | .047 | P | 78 | .077 |
| v | 19 | .057 | 2 | 50 | .047 | V | 79 | .087 |
| b | 20 | .057 | 3 | 51 | .047 | B | 80 | .077 |
| g | 21 | .057 | 4 | 52 | .047 | G | 81 | .077 |
| k | 22 | .067 | 5 | 53 | .047 | K | 82 | .087 |
| q | 23 | .057 | 6 | 54 | .047 | Q | 83 | .077 |
| j | 24 | .037 | 7 | 55 | .047 | J | 84 | .057 |
| x | 25 | .067 | 8 | 56 | .047 | X | 85 | .087 |
| z | 26 | .047 | 9 | 57 | .047 | Z | 86 | .067 |
| fi | 27 | .057 | 0 | 58 | .047 | @ | 87 | .087 |
| fl | 28 | .057 | $ | 59 | .047 | lb | 88 | .087 |
| ff | 29 | .067 | | | | & | 89 | .057 |
| ffi | 30 | .087 | | | | Em Dash | 90 | .087 |

## MAGAZINE ESCAPEMENTS

To remove an escapement pawl, remove the wire guard, release the end of the spring from the escapement pawl, and remove the pawl. Clean with fine emery cloth and then polish with graphite. Use no oil on escapements.



## MOLDS

The Intertype machine has the most versatile mold system of any known line-casting machine. It has been developed with great care, since it is recognized as the part of the machine subjected to the hardest usage. The theory of the Intertype design lies in standardizing the mold base so that, once positioned, it will not have to be removed from the disk. All changes of line and face are then made on the mold body itself. This has been accomplished by the invention and use of perfectly interchangeable Mold Liners and Caps, as follows:

The standard mold cap U-329, unless otherwise specified, is always furnished on machine orders. Any standard thickness of liner is usable with this cap.

## RECESSED MOLD CAP RANGES

Intertype mold standardization provides complete flexibility due to the absolute interchangeability of parts, and to the patented features of the recessed mold caps which permit the use of flat liners. The universal adjustable body and the .020″ high cap accent body are adaptable to the interchangeable use of any mold cap (with exception of the low slug mold cap).

Mold liners from 5 to 12 points are used to produce slugs up to 36 points, according to the depth of recess in the caps.

All recessed and head-letter caps, as regularly made, will cast any em or half-em measure up to 30 ems. This is accomplished by shifting the mold cap to locate a rib in the cap over the end of the left-hand liner. The mold cap dowel is elliptical in shape and the right-hand liner has two dowel holes. Setting the cap dowel in one of the two intersecting liner dowel holes will make it possible to properly match the end of any left-hand liner put on the mold body.

## DESCRIPTION OF CASTING RANGES POSSIBLE WITH INTERTYPE STANDARDIZED RECESSED MOLDS

The different recessed mold caps are designated by letters, according to their body-casting ranges. For instance, the recessed cap A will cast slugs from 10 to 14 points in size. The cap is recessed 4 points. To find the proper liner size to use in order to get the body size, subtract 4 points from the point size of the slug. If it is desired to cast a 10-point slug, subtract 4 (the depth

of the recess in the cap) from 10 (the size of the slug to be cast) which is 6, the point size of the liners to be used with recessed mold cap A to cast 10-point slugs.

**Recessed Cap B.**—The next size mold cap is recessed cap B, having a casting range from 12 to 18 points. The cap is recessed 6 points. If 12-point slugs are to be cast, subtract 6 (the depth of the cap recess) from 12 (the point size of the slug) which will give 6, the proper point size liners to cast a 12-point recessed slug from recessed cap B.

The first-style first elevator slide filling piece or the new-style stop bar must be used with molds having recessed caps from the B cap for 18-point faces on up to 60-point caps.

**Mold Cap F** is not recessed, but has an extra thick lip and is used for hangover advertising figure composition, and only has a casting range from 10 to 12 points in body size. The G cap is similar to the F cap except that it is recessed.

**The .020" High Cap Accent Body** is used for composition in those languages which require accented capital letters. The aligning grooves in the mold face are set up several thousandths to make room for the accents. Of course, thicker liners are used to compensate for the amount the aligning grooves are elevated over the regulation mold body aligning grooves.

### LETTER SYMBOLS FOR RECESSED CAPS

**A** Recessed, 10 to 14 points.
**B** Recessed, 12 to 18 points.
**C** Head Letter, 18 to 24 points.
**D** Head Letter, 24 to 30 points.
**E** Head Letter, 30 to 36 points.
**F** Advertising Figure, 5 to 12 points.
**G** Advertising Figure, recessed, 10 to 12 points.
**H** Advertising Figure, 3-line 8-point.
**I** Advertising Figure, head letter, 3-line 12-point.
**J** Advertising Figure, head letter, 12 to 18 points.
**K** Head Letter, high cap accent, 36-points (.050").
**Q** Head Letter, high alignment, 42 to 48-points (.140").

### COMPARISONS WITH AMERICAN POINT SYSTEM

Em—.166 2/3 inches.
Cicero—.178 inches.
Fournier—.16476 inches.



Petit—.1115 inches.
Point—.014 inches.
Didot—.0148 1/3 inches.
Point Fournier—.01373 inches.
The Cicero is a unit of measurement used in Europe.
A point, American system, measures .014 inches.
An em, American system, measures .1666 inches.
A point, European system, measures .0148 1/3 inches.
An em, European system, measures .178 inches.

Therefore, a 30-em slug in America would be equivalent to a 28 Cicero.

### ADVERTISING FIGURE MOLD CAPS

Advertising figures from 5 to 30 point are punched in regular (normal) position on the matrix. No special parts are necessary to use advertising figure matrices other than proper mold caps. Figures from 5 point to 30 point will cast with the figure mold cap F. Figures above 30 point require a special mold cap. Mold caps can be furnished for three-line matter.

### WARPED MOLDS

Molds can be warped through careless handling of the machine. A warped mold is one in which either the body or cap has been thrown out of true line by the sudden application of excessive heat. Sometimes the cap alone will warp while the body will remain straight. A warped mold makes adjustment of the back trimming knife a difficult matter. The knife can only be set as close to the mold as the warped part will permit. Naturally, the mouthpiece will not always fit the shape of the back of a mold in this condition and fins will appear at the foot of the slug which cannot be trimmed by the back knife. In most cases the slug will be above .918" high. When the back side of the cap alone is out of line with the body, a fin will appear along the rib side of the foot. It is also possible to warp a cap so that the body of the slug will be gouged by the right side-trimming knife; a fin of metal may also appear at the end of the slug (rib side) because there is an open space between the mold cap and left-hand liner.

Molds can be thrown out of true when a frozen mouthpiece is thawed with a hand gas torch and the one doing the job neglects to pull the mold slide out and away from the metal pot, so as to keep heat from the gas flame away from the mold and disk.

Casting slugs with metal at too high a temperature has something to do with the matter. Keep the thermostat properly adjusted to control the temperature—between 525 and 550 degrees is about right. Do not screw up the nuts on the mold cap bolts too tight. Remove burrs from the liners and do not permit little metal bits or dirt to lodge between the liners and mold body or cap.

To determine whether a mold body or cap is warped, remove from the machine, and while holding up to the light, place a steel straight edge or a piece of straight brass rule against the part you have reason to believe is out of order.

Intertype molds are manufactured with great care and precision, but it is impossible to make them in such a way as to withstand the excessive heat generated by a hand gas torch, or excessive metal temperature.

Molds should be accorded the care and attention that fine workmanship and material deserve.

If it is necessary to have a mold repaired, send it to the nearest Intertype Agency.

### FRONT MOLD WIPER

The front mold wiper bracket is mounted on the right-hand mold disk locking stud block. The wiper is caused to wipe the mold faces by a spring as the mold disk revolves. There is a leather piece at the top of the wiping felts, to prevent the felts curling upward. If new felts are needed at any time, soak them in gasoline after application to the bracket and rub in some dry graphite. Never use oil or grease on the front mold wiper. Hook a cord through the loop of the spring when returning to its place over the hook on the bracket. This makes engagement of the spring with the bracket hook an easy matter.

The 42-em front mold wiper consists of a round felt attached to a flat disk. The felt has flat contact with the mold face and is free to revolve upon its spindle. The spindle passes through the vise cap to the front of the machine, where a cotter pin limits the contact of the felt with the mold. Taking out the cotter pin permits the wiper to be removed from the machine. A spring under the head urges the wiper felt against the mold. Like the 30-em wiper, never use oil or grease on the felt, but saturate with gasoline and rub in dry graphite. The wiper felt disk is similar to the felt used in the back mold wiper.



### BACK MOLD WIPER

The first-style back mold wiper is positioned in the mold slide stud arm under the back trimming knife. It is accessible for removal by taking a mold from the disk. Ordinarily the felt can be cleaned and lubricant applied by removing a mold cap and the liners, which will expose most of the wiping surface.

The new-style back mold wiper is made so that the cup containing the wiping felt is positioned under the mold disk stud bearing back of the disk. The wiping felt can be inspected by removing the cup which is simply snapped under the flat spring where its two studs engage holes in the spring. The felt is wound spirally, edge up and extends outwardly from the cup. The new-style wiper will not need attention as often as the first-style wiper because of the increased wiping area.

Give the wiper attention once a week. Common machine oil and graphite, or stick mold lubricant, which is obtainable from this company, can be rubbed into the felt after scraping off any smooth or caked substances. Roughen the felt and apply fresh lubricant. This treatment will keep the backs of the molds polished and prevent any metal accumulations so that a workable contact of the mouthpiece with the molds will be maintained. However, as mentioned on other pages of this book, carefully avoid applying an excess of the lubricant, because, as the molds heat from casting, the oil or grease will be thinned and flow to the front of the mold and contaminate the matrices. Like the assembler and distributor bearings, careless oiling of the back mold wiper can be the source of an untold amount of trouble by fouling matrices which may cause them to stick in the magazine.

A little judgment in the amount of lubricant applied to the back mold wiper felt, the assembler and distributor bearings, will prevent the necessity of cleaning magazines and matrices outside of regular cleaning periods.

### SPACEBANDS

The length of the spaceband is about four inches. It consists principally of two parts, the long wedge or "band" and a sleeve with lugs or ears. The sleeve is dove-tailed and slides in a slot in the band or long wedge. Spacebands must always be put in the machine with the sleeve or short section to the right. The reason for this is that the rear or casting edge of the sleeve is about .001" thicker than the front edge, so as to provide a tight lockup of the

spacebands and matrices during the cast. The sleeves are also slightly hollow in the middle as an additional safeguard for tight casting lockup. If spacebands are turned with the short sleeve to the left of the band or long wedge part, hair lines may appear in the print and the matrix side walls will be ruined.

### THICKNESSES OF SPACEBANDS

Seven thicknesses of spacebands are made, ranging from the extra thin type (T-668) to the extra thick (T-656). The various types of spacebands are listed below with a minimum and maximum measurement in each case. The minimum measurement represents the thickness of the spaceband with the sleeve at the top of the wedge. The maximum measurement represents the thickness of the spaceband with the sleeve at the bottom of the wedge. The difference between the minimum and maximum measurement represents the expansive range of the spaceband.

| | | Minimum | Maximum |
|---|---|---|---|
| T- 668 | Extra thin | .028″ | .092″ |
| T-1768 | Extra thin | .030″ | .0835″ |
| T- 401 | Thin | .032″ | .096″ |
| T-3711 | Ideal thin | .032″ | .1175″ |
| T-2932 | Ideal | .037″ | .1225″ |
| T- 400 | Thick | .0375″ | .1015″ |
| T- 656 | Extra thick | .048″ | .144″ |

In general extra thin spacebands should be used for small type composition, thin spacebands for sizes above 10 point, and thick spacebands for headletter composition. For display work extra thick spacebands are widely used. The extra thick spaceband has an expansive range of .0855″, or slightly more than 6 points.

### LUBRICATING FIRST-STYLE RELEASING PAWL SPRING

For a time spaceband boxes were provided with a releasing pawl spring of the compression type, working in a pocket, and with a small pilot plunger between the spring and pawl. This device requires occasional lubrication and it is necessary to remove the box in order to put a small grease pill inside the spring coils. Once in six months remove the box from the machine and put the pill of graphite grease within the releasing pawl spring coils. This will provide sufficient lubrication.

The new style releasing pawl spring is of the extension type. It should have sufficient tension to throw the lower end of a spaceband from the banking pin to the front of the box so the spaceband can drop of its own weight. An occasional drop of oil on the releasing pawl pivot is essential.



### POLISHING SPACEBANDS

During every eight-hour run or fraction of that time, it will be necessary to polish the spacebands on a pine board having graphite sprinkled over its surface, for two reasons: First, to remove a small oxide stain on the sleeve at the casting point, and second, to provide lubrication for the long sliding wedge of the spaceband so as to reduce friction between the sleeve and the wedge, and the matrices.

A pine board about one foot long and six or eight inches wide is suitable. Renew the board when a slight depression shows from the rubbing of the bands. The board can be mounted in a box for cleanliness.

The stain or oxide accumulating at the casting edge of the sleeve must be removed. First scrape off any metal that may have stuck at this point. Use a piece of brass rule. Tools made of harder metal should not be employed for this purpose as they will injure the face of the sleeve.

Use nothing to polish spacebands but Dixon's No. 635 dry graphite. Other polishing agencies have been experimented with in the past, but graphite is the best for the purpose. Shun powdered soapstone, flour of mica and other so-called polishing compounds. These have their proper uses but are not suitable for polishing spacebands. Rest assured that the Intertype Corporation, with its experimental department constantly searching for new methods and devising new ways and means of improving the machine, will announce any process that will help to better its product.

Always return spacebands to the machine with the short sleeve facing to the right.

### EFFECT OF NEGLECTED SPACEBANDS

The Intertype Corporation has stressed the importance of polishing spacebands daily in order to remove the small stain or oxide spot that appears on the casting edge of each sleeve after the machine has been in use for several hours.

In reading the foregoing text it can be readily understood that the pressure exerted by the justification springs upon the spacebands causes a very tight seal between the casting edges of the

matrices and spacebands contained in the line. If the oxide stain, or even worse, metal is permitted to accumulate upon the casting edge of the sleeve, owing to neglected polishing of the spacebands, the delicate matrix side walls will be crushed in, and hair lines will appear between the letters. Spacebands must be thoroughly polished every eight hours by rubbing vigorously while laid flat upon an even pine board having some dry graphite sprinkled over its surface. Then the sleeve or short wedge of the spaceband will not injure the matrix walls, and the long wedge will have lubrication to provide easy justification. Spacebands receive severe usage and the strain imposed during justification requires that they get this small but important amount of attention daily.

### JUSTIFICATION SPRINGS

Some attention should be given to the tension of the justification springs. When the machine leaves the factory, the spring tension is adjusted for wide composition. The fluted collars are adjustable and can be turned with the hands to secure more or less tension of the springs. After regulating the spring tension suitable to the general range of work executed on the machine after installation, it is rarely, if ever, necessary to readjust the fluted collars. The spring pressure should not cause the justification bar to bend spacebands when only one or two are used in a line. On the other hand, a wide matrix line, containing seven or eight spacebands, with about one and one-half ems to justify, should be fully expanded against the vise jaws when the justification levers make their first stroke. Stop the machine at the point where the spacebands have been driven up by the first stroke of the justification block; grasp a spaceband near either end of the matrix line, and if it cannot be pulled up readily, the spring tension will be correct.

If, at any time, you have reason to believe that the justification springs are not driving the spacebands up with sufficient force, it is well, before changing the justification spring tension, to see that the adjustment of the first elevator downstroke banking screw, and the forward thrust adjustment of the mold slide are in proper shape. Once in a while some obstruction, such as a loosened mold body screw, might interfere with proper justification of the spacebands at the time the matrix line is being justified.



If it is necessary at any time to remove the justification lever springs, slip a spike or piece of rod in the hole in the bottom of the sleeve, then turn the machine over until the high stroke dip, or depression, of the justification cam is positioned directly over the lever cam roller. Raise the lever by hand, and the assembled rod can be lifted from its seat in the base of the machine. When replacing the springs, return the heaviest one to position under the first justification lever (the one nearest the keyboard). Transposing the springs will cause justification troubles. The vise closing and justification spring is made from the lighter wire.

### VISE CLOSING SPRING OPERATING LEVER

On the 42-em Intertype, a means of increasing the tension of the vise closing lever spring is furnished. It requires a great deal more pressure to justify a full 42-em matrix line with twenty-five spacebands than a 30-em line having fewer spacebands. For this reason, a lever called the vise closing lever spring operating lever is pivotally mounted on a bracket on the base. Depressing the lever with the foot, until it engages the guide will raise the collar and compress the vise closing lever spring about one inch. The spring operating lever should be released from the guide before doing short-measure composition.

## INSTALLING THE MACHINE

Any competent line composing machine machinist can install an Intertype, but it is not recommended that a novice undertake the work, even with the help of the following suggestions, unless thoroughly familiar with machinery in general. This statement is made only because it is important that the work be done right, not because the machine is extremely complicated or its erection a very difficult matter. Many Intertype purchasers have erected their own machines, without previous experience, but such an undertaking is not generally recommended.

### PRELIMINARY SUGGESTIONS

If the Intertype Corporation is to erect the machine, telegraph or telephone to the General Offices, or to your local Agency, immediately upon its arrival. Have the machine taken to your shop,

and determine where you wish to have it placed. If possible, locate the machine in a well lighted and well ventilated place, giving due regard to necessary working space and to the other factors mentioned below.

### FLOOR SPACE

The net floor space occupied by a single machine is about 25 square feet (5′x5′). The overall floor space, including working space and chair space for the operator, should be at least 76 square feet (9′ 6″ front to rear and 8′ wide). In the case of a row of machines side by side, allow at least 6′ 8″ width for each machine. Allow 2′ extra for a machine equipped with the side magazine unit. In any case, allow as much room for working space as is conveniently possible.

### DOOR WIDTH

A minimum door width of 3′ 6½″ is required to permit the passage of the largest of the mechanisms as shipped. A width of 2′ is sufficient if the machine is completely stripped down, but this entails considerable extra expense and loss of time.

### FOUNDATION

The net weight of Equipment A is 2550 pounds; Equipment B, 2595 pounds; Equipments C and D, 2645 pounds; Equipment E, 2710 pounds. Weight of Side Magazine Unit about 400 pounds. The floor under the machine can be of wood or concrete, but should be level, smooth, free from vibration, and capable of supporting a load of 150 pounds per square foot. If necessary, the floor can be strengthened by additional posts beneath, or laying another floor of 2″ planks over the first and crosswise of the joists. A wooden floor can be covered with sheet zinc or iron, if desired.

### CONCRETE FLOORS

When Intertypes are placed on a concrete floor there is liability of trouble from the fine dustlike particles that are constantly wearing off the surface of the concrete unless the floor is protected in some way. Concrete dust is full of minute crystals of silicate from the crushed stone. These crystals have sharp edges and are very injurious to fine machinery.

Provision should be made in some way against conditions of this sort. There are a number of solutions that can be used to



paint concrete floors which not only eliminate the dust that will eventually injure machinery but provide a cleaner and more healthy composing room.

### POWER

The source of power must be capable of giving a uniform speed of 66 revolutions per minute to the machine driving pulley or gear wheel. In the case of individual motor drive, it is advisable, where possible, to bring all wiring through the floor in conduit, making connection to motor or motor bracket. Each motor should have a separate circuit and fuse cut-out, and all wiring should be of a size to carry without heating 25% above the normal current rating as stamped on the motor. Electric equipment must conform in all respects with the code of the National Board of Fire Underwriters and with local statutes.

### GAS METAL POT

If the machine metal pot is to be equipped with a gas burner with which to melt the metal, see that your line gas meter is of sufficient capacity for the number of machines to be installed, allowing 15 cubic feet of gas per hour for each machine. The piping should, if possible, be run through the floor, and the following sizes should be used: for one machine, ½″; two machines, ¾″; three machines, 1″; six machines, 1½″; twelve machines, 2″. Outlets to each machine from the main supply line should be ⅜″ pipe. On lines over 1″ a drip cock is advisable at the lowest point, especially if there is a possibility of freezing.

### GASOLINE METAL POT

**First Style Burner.**—If gasoline is to be used for heating, the gasoline tank should be of at least one gallon capacity and provided with a shut-off valve. The tank can be located in any convenient place, if possible about 10 feet from the machine and about 8 feet above the level of the burner. The tank should be connected with the burner by a ¼″ or ⅛″ pipe, and this pipe should have a shut-off valve at any convenient point near the burner. The Intertype gasoline heater has a mouthpiece burner as well as a main burner. Complete instructions for operating the first style burner will be sent on request.

The Reliance Gasoline Burner equipment is now furnished instead of the first style gravity feed type burner. This burner has proven to be the most satisfactory design obtainable and is thoroughly recommended wherever gas or electricity is not available. Complete instructions for installing and operating the Reliance burner equipment are furnished with orders.

### ELECTRIC METAL POT

If electricity is to be used for melting the metal, the equipment should be installed and connected according to the manufacturer's specifications. Due regard must be given to the requirements of the Board of Fire Underwriters and to local statutes. When the pipe or conduit is brought through the floor and connected to the machine, there should be at least 2 feet of pipe between such connection and the nearest elbow or junction box. A clearance of ½" around the pipe is advisable.

A special circular and directions are issued for wiring and operating electric pots.

### VENTILATION

It is well to provide for proper ventilation, by installing a hood over the metal pot of the machine, to carry away any fumes that may arise from the gas burners. Molten type metal creates no fumes. A ventilator may consist of a 2" pipe with a 3" flare or hood over the metal pot chimney, the pipe running to a convenient outlet. For a single machine such provisions are usually considered unnecessary.

### UNPACKING THE MACHINE

Read the following instructions before starting to erect the machine.

Remove all grease from cams, mold, disk, vise frame, and all other surfaces where it has been used. This grease or petroleum distillate is put on only to prevent rusting: it is *not* a lubricant and will gum up if not removed.

If possible, move the large packing case into position of erection before opening it. First remove the cover and take out the distributor bracket and step. Then remove the sides and skids and place the base of the machine in the position desired. Unpack the other cases, keeping small parts together and cleaning all



grease or paint from the bearing surfaces. After you have made sure that all bearing surfaces are clean, and that any burrs caused by damage in transit have been removed, you are ready to proceed with the erection of the machine.

### ASSEMBLING THE MACHINE

The following procedure is for Equipments A, B, C and D, although most of the instructions will also apply to the E (Mixer) Machine.

Apply the intermediate bracket.

Apply the distributor bracket.

Apply the distributor bracket tie.

Apply the back step.

Apply the motor bracket and switch.

Remove the switch box cover. Fasten the box to the base of the machine near the starting lever, with the screws supplied for that purpose. Replace the switch box cover and handle.

Cut the wires holding the vise frame and front levers. Remove the safety pin banking screws and apply the locking screws to the vise frame, turning them in until the shoulder is almost, but not quite even with the stud banking surface (never beyond). Reinsert safety pin banking screws.

Apply the magazine frame and cradle and magazine shutter fingers.

Place the assembler driving belt on the assembler driving pulley; lift the face plate nearly into position; twist the assembler belt once and place it on the assembler pulley; locate the face plate by means of the dowel pins and draw it gradually to its seat with the bolts supplied for this purpose.

Place the keyboard in position and start the large bolts; tighten the bolt in the intermediate bracket, and then tighten the large bolts; then loosen the bolt in the intermediate bracket and again tighten it (this is to prevent springing the bracket).

Apply the matrix tray.

Apply the channel entrance frame bracket.

If the machine is a B or a C, apply the channel entrance frame.

Apply the channel entrance operating lever.

Apply the channel entrance operating lever connecting link.

Apply the first elevator cam, with the hub and set screw on the inside toward the bearing.

Apply the first elevator auxiliary lever. Lift the first elevator lever, if necessary, to properly apply this part.

Apply the metal pan.
Apply the pi stacker bracket.
Apply the pi stacker.
Apply the pi stacker to bracket.
Apply the pi chute.
Apply the sorts tray bracket.
Apply the sorts tray.
Apply the copy hooks.

Apply the assembling elevator operating lever and connect it with the assembling elevator.

Insert the spaceband keyboard rod and connect it with the spaceband box operating lever.

Apply the assembler entrance and stationary front guide.

Apply the assembler chute spring. This can best be adjusted after the machine is in operation.

Apply the assembler front cover.

To remove and clean the distributor bar, release and lift the back distributor screw, loosen the bolts holding the bar, tip the bar forward slightly and remove it, being careful not to injure the distributor screws or the combinations on the bar. Clean the bar with gasoline or benzine and replace it, also the back screw, and bring into correct position by the timing pin on the gear.

Release the safety pawl and back the machine until the second elevator lever descends part way; open the channel entrance, place the distributor in position, and bolt it securely to its seat.

Apply the distributor box.
Apply the distributor shifter lever.
Apply the distributor shifter and connecting link.
Apply the font distinguisher.
Apply the second elevator.

Take off the left-hand first elevator slide gib. Do not disturb the right-hand gib, as it is adjusted and doweled to align the first elevator. Place the first elevator slide in position. Replace the left-hand gib and connect the link to the first elevator lever, turning the eye-bolt if necessary until the first elevator jaw and the delivery channel are in line.

Apply the elevator transfer slide.



Connect the delivery slide lever and the delivery slide with the delivery lever link.

Apply the electric light holder.

Put on the main driving belt, keyboard belt, and pi stacker belt.

Put on the distributor belt and cross it once.

Place the motor on its bracket; mesh the pinion with the driving gear, allowing paper clearance—.003″ to .004″—between the motor driving gear and the motor pinion; then bolt the motor to the bracket.

In case of a two or three-magazine machine, open the channel entrance and pull down the magazine cradle in order to apply the magazines. After applying the magazines, return the cradle to operative position, and close the channel entrance.

In case of a two or three-magazine machine, pull down the magazine cradle (with the channel entrance open and the cradle in such position that the top magazine would be in operation), put on the magazines, return the cradle to operative position, and close the channel entrance.

## STARTING

Make the electric, gas, or gasoline connections, and light the burners.

Oil the machine at the proper points, and when the metal in the pot is melted turn the machine over once by hand before starting it under power.

The machine may turn over hard when new, but if it sticks do not try to force movement; locate the trouble and remedy it before proceeding further.

When satisfied that everything is correct, turn on the power and permit the machine to turn over several times before running matrices into the magazines.

See that the motor is properly meshed with the driving gear, the motor armature turns freely and the bearings are filled with oil before starting.

Withdraw the keyboard locking wires (the upper wire on each side of the center of the end of the keyboard).

Run matrices into the magazine or magazines and begin composition.

# MAKING OPERATING CHANGES

It is well to become accustomed to making machine changes in a certain definite order. Even experts are liable to forget something unless the same routine is so invariably followed that it becomes a habit. The order suggested below can be altered if desired, but whatever order is adopted should be followed every time a change is made. It must not be assumed, because there are several things to attend to in making a complete change, that such a change is a difficult matter or that it requires considerable time. Even on a single-magazine Intertype the complete change can be made in less than two minutes, and on multiple-magazine machines much less time is required. The simplicity and ease of Intertype changes are important advantages.

**Mold, Liner and Ejector.—Don't forget to change the ejector.** Whenever changing a mold or a liner, always change the ejector blade or check which blade is set. In this way, damage to liners will not occur, because of a forgotten ejector blade.

**To change the body (thickness) of the slug,** without changing the measure (width) and without changing the matrices, it is only necessary to change the mold liners and vertical trimming knife.

**To change the measure (width) of the slug,** without changing the body (thickness) and without changing the matrices, it is only necessary to change the mold liner, ejector, assembler slide, delivery slide long finger, vise jaw, and the line stop. If only a few lines are required, change only the assembler slide, delivery slide, left vise jaw, and the line stop, and then cut off the blank ends of the slugs in a power saw-trimmer or an ordinary lead-and-rule cutter.

**To Make a Complete Change** of face, body and measure, it is necessary to make all of the following changes:

1. Mold liner and ejector blade. (Make these two together.)
2. Assembler slide.
3. Delivery slide long finger.
4. Knife block.
5. Line stop.
6. Left vise jaw.
7. Font distinguisher.
8. Magazine and matrices.



**Change Mold Liners.**—If a mold carrying liners for the body and measure desired is already in the disk, it is only necessary to turn the disk around until the proper mold is in operating position. If it is desired to change the liners, lower the vise to first position, turn the mold disk around until the mold is in casting position, loosen the two nuts on the swivel bolts at the ends of the mold cap, swing back the swivel bolts, lift the mold cap on the prongs of the special wrench furnished for the purpose and take out the liners; put in liners of the size required (constant or right-hand liners have two holes), replace the mold cap, and turn the mold around into operating position. Always tighten the swivel bolt nuts to a snug fit only—not too tightly. See that the liners, mold body and cap are clean and free from bits of metal before putting them on the mold body. Occasionally, polish the mold body and cap to insure easy ejection of the slugs and a good lockup of the mold and the pot mouthpiece. If the mold wipers are kept in good condition accumulations of metal on the molds will be minimized.

**Change Ejector.**—To change the universal ejector, push down on the locating lever under the mold slide shifter lever dial, move the shifter lever until the required length of blade is indicated by the dial and release the locating lever which will return to its former position to lock the setting. See that the locating lever engages properly by shaking the shifter lever, otherwise the ejector will not operate and the machine will stop at the point of ejection.

**Change Assembler Slide.**—To change the length of the line, merely press the finger piece on the adjusting block, and move block until indicator registers with the desired mark on the scale.

**Change Delivery Slide Long Finger.**—To change the length of line, first position the assembler slide, then lift the latch on the delivery slide long finger block and move the long finger to the position required by the setting of the assembler slide.

**Change Knife Block.**—To change the knife block, simply lift the locking latch and revolve the large screw until the proper body size is indicated on the dial; then release the latch and lock knife in position.

**Change Line Stop.**—Set the line stop in the first elevator jaws to the measure or length of slug to be cast.

**Change Left Vise Jaw.**—To set the vise jaw for the desired measure or width of slug, pull out the adjusting knob at the left of the vise frame and turn it until the measure required is indicated by the proper mark on the gauge rod, then allow the knob to spring back into position.

**Change Font Distinguisher.**—On Equipments A, B, C, D and X, fit the operating lever into the proper notch in the indicator plate, according to the point size of the matrices to be used. On E machines, change the font selector sector in selector block under the distributor box.

### CHANGING MAGAZINES

**Equipment A.**—Throw back channel entrance. Pull magazine frame back and downward. Remove magazine. Place another on the frame, and rock it back to operating position. Close channel entrance.

**Equipment B.**—Throw channel entrance to open position. Turn magazine frame operating lever back so top magazine will be in operating position. Tilt the frame backward from the rear of the machine and lift off the magazine to be changed. After substituting magazines, tilt the frame forward again, turn frame operating lever, except in case the upper magazine is to be used, then close channel entrance.

**Equipment C.**—Throw the channel entrance back. Turn the magazine frame operating lever or "cradle crank" as it is sometimes called, until the upper magazine is in operating position. Raise the magazine frame cradle latch and lower the cradle. Lift off the magazine and replace with another. Lift the cradle up and turn frame operating lever until magazine to be used is in operating position. Close the channel entrance.

**Equipment D.**—The same in all respects as changing magazines on Equipment C, except that in case there is a split magazine in the cradle top the split is changed by merely lifting it from the machine, when the cradle is in any of its three positions.

**Equipment E.**—Throw the channel entrance auxiliary stop. Pull the channel entrance open, until it rests upon the stop. Lower the magazine frame until the safety hook catches in distributor bracket. Remove the magazine. After replacing the magazine, lift out safety hook and raise the frame to operating position. Close the channel entrance and throw the auxiliary stop to the



left. It will be noticed that as the magazine frame is lowered when changing magazines, the shutters for both upper and lower magazines close almost instantly. One cam works the shutter and a link connects levers for both magazines.

**Model X.**—To remove the top magazine, open the channel entrance and close the upper magazine shutter by pulling out on both shutter finger stops or catches. This will permit the shutter fingers to rise, whereupon the shutter will close. The magazine may then be lifted out of the frame from the front of the machine. It will be noted that the sides of the cradle are cut out to provide for a good hold on the magazine when changes are made. To remove the lower magazine, first remove the upper magazine as directed above, then shift the lower magazine to operating position by the magazine frame operating lever; close the lower magazine shutter by tripping the two shutter finger latches which hold the lower shutter down through the medium of the left and right-hand shutter fingers, after which the lower magazine may be lifted out of the frame from the front of the machine. When a split magazine is used on the upper deck, the split magazine support lies across the frame supporting the upper end of the lower split (split magazine), and must be lifted out before changing the lower magazine.

### HANDLING MAGAZINES

Always place a main magazine in the rack or storage place lower end up. Do not bump or jar magazines unnecessarily. It is possible to spring them, which will interfere with the free dropping of matrices. In case of split and side magazines always handle them with the lower end down. These types of magazines are not equipped with shutters as are the main magazines.

## ADJUSTMENTS

**Twin Channel Attachment.**—Adjust the keyrod lever operating lever, after loosening the two binding screws, until the top of the keyrod registers equally with both lower case "e" escapements, when the keyrod is caused to move from one escapement to the other by the action of raising the assembling elevator.

**Matrix Delivery Belt.**—To be kept tight enough to run without whipping. Adjust by idler pulley stud nut.

**New Style Assembler Entrance Guide Plate.**—To be adjusted so the lower edge of the plate will project over the top edge of the assembler casting and at the same time the upper edge of the plate must be a trifle lower than the bottoms of the matrix channels in the magazines. Adjust with two headless screws under holes in the plate after loosening the screws holding the assembler entrance guide to the machine face plate. The first style guide plate is fixed and is not adjustable.

**Spaceband Box.**—The spaceband retaining block is to be set so the end of the block will cover half of the second spaceband just before the first one is released from the banking pin. Depress the spaceband key and turn the rubber roll shafts slowly by hand until the first spaceband has advanced and is supported by the banking pin. Adjust the block to cover half the second spaceband.

**Assembler Slide.**—The slide finger is adjustable by a screw in the left end of the slide so that the maximum space between the finger and the star wheel will be about a thin space less than the vise jaws. Assemble a line about 12 or 15 ems wide with one spaceband. When the spaceband justifies, the top of the wedge should rise to a position where it will be about even with the top of the first elevator jaws. The operator should then send in no lines which cause the star wheel to stop revolving.

**Assembler Slide Brake Operating Lever.**—The adjusting screw in the eye of the assembler slide brake operating lever to be adjusted so there will be about 1/64″ space between it and the brake thumb piece when the assembling elevator is raised and before the delivery slide is released. This lever, through the assembling elevator, releases the brake from the assembler slide so it can be returned to normal position when the assembling elevator is raised to trip the delivery slide.

**Assembling Elevator Counter-Balance Spring.**—The spring is connected at one end to a lug of the assembling elevator lever at the left side of the keyboard, and at the other end engages an adjustable screw hook in the keyboard frame. Turning the hook will regulate the ease with which the assembling elevator can be raised and lowered.

**Delivery Slide Return Stroke.**—When the delivery slide is returned by cam No. 10 it should travel 1/16″ past the delivery pawl. Adjust by split arm on the delivery slide lever shaft back of the column. One method of setting the return stroke of the



delivery slide consists of stopping the machine when the high point or crown of the delivery cam (cam No. 10) has traveled opposite the roller of the delivery slide split arm; push the roller against the cam crown after loosening the arm screws and then tighten the screws slightly; then turn the machine ahead until the cam crown has passed the arm cam roller about 1/16″, or in other words, so there will be 1/16″ light between the sloped part of the crown and the arm cam roller; then loosen the split arm screws and tap the roller against the cam; then tighten the split arm screws again. This will result in proper overmotion and proper position of the delivery slide on a waiting line.

**Delivery Slide Casting Stroke.**—The slide should go far enough to the left to bring the short finger 13/32″ inside the first elevator jaws. Adjust by screw at extreme left side of the face plate.

**Delivery Slide and Automatic Stopping Pawl Plate.**—The delivery slide automatically starts the machine in motion when the operator sends in a line. The plate on the automatic stopping pawl should be set out far enough away from the pawl so the roller in the delivery slide lever split arm will strike the plate and push the pawl clear of the upper stopping lever 1/64″.

**Delivery Slide Speed Regulation.**—The delivery slide, when first starting should leave normal position quickly and as it approaches the delivery channel, should slow down or cushion so that on a waiting line it will enter the delivery channel softly and without jar. This is regulated by the vent in the air cushion cylinder at the back of the machine column. If adjusting the vent does not secure control of the speed of the slide, probably air escapes from between the leather piston packing and the cylinder wall. In this case replace the leather, or pack the old one out with muslin washers under the packing ring, to expand the leather against the inside cylinder wall.

**First Elevator Link Eyebolt and Auxiliary Lever.**—Remove the link from the machine and adjust the upper eyebolt until the space between the top of the link casing and lower edge of the hole in the bolt measures ⅞″; adjust the lower eyebolt until the space between the lower edge of the link bushing and the upper edge of the hole in eyebolt is ⅝″. Return the link to position on the machine and adjust the first elevator auxiliary lever adjusting screw while the machine is in normal position until the grooves in the first elevator jaw are slightly lower than the grooves in the delivery channel. The auxiliary lever adjustment

is an assembling adjustment and should not be altered unless the adjusting screw has worked loose or has been tampered with. For all ordinary purposes the adjustment immediately following will suffice to align the grooves.

**First Elevator and Delivery Channel.** — Occasionally the grooves in the first elevator jaw may not align with the delivery channel grooves. Lift the flat tongue spring and turn the link at the bottom of the first elevator slide until the grooves in the first elevator jaw are slightly lower than the grooves in the delivery channel. Then release the spring.

**First-Style First Elevator Slide Gibs.**—There are four gibs to support the first elevator slide. These gibs position the slide so the elevator jaws will be parallel with the mold grooves; they also position the slide so there will be about .005″ space between the elevator jaws and the delivery channel while the machine is in normal position, and they must be positioned to permit the first elevator to descend smoothly from transfer position.

To obtain the parallel alignment of the elevator jaws with the mold, run the machine ahead until the elevator is seated upon the vise cap; open the vise jaws to 30 ems; place a new thin pi matrix, one at each end of the first elevator jaws; disconnect the mold cam lever from the mold slide and pull the mold slide forward upon the locking stud blocks. While the first elevator is held up by hand, each matrix should be held snugly by the jaws. If one matrix is loose, adjust the lower gibs.

**New-Style First Elevator Slide Gibs.**—The right-hand gib, is made in one long piece, and is doweled to the vise frame. Set the left-hand gib to permit .005″ play between it and the slide.

**First Elevator Downstroke or Banking Screw Adjustment.**—When the first elevator banks upon the vise cap, the tops of the lower back matrix lugs should be about .010″ lower than the underside of the aligning rail in the mold groove. When the mold has advanced and the elevator rises before the cast, it forces the lower back matrix lugs upwardly against the underside of the aligning groove in the mold. This action aligns the letter characters of the matrices, the back screw, in the top of the slide upon which the first elevator banks should be set so there will be about .010″ space between the screw and vise cap when the elevator has been forced up for alignment. To make this adjustment correctly, send in a 30-em line containing *all new matrices,* or a



matrix line containing three or four *new and unused pi matrices* at either end. This adjustment can only be made effectively when the mold disk locking studs and the two stud blocks in the vise frame are unworn. If the studs and stud blocks are worn, the mold will be lifted up during justification of the matrix line when the justification block strikes the spacebands. Due allowance must be made if it is absolutely necessary to make the adjustment under these conditions, otherwise the advancing mold will shear the tops of the lower matrix lugs and destroy their letter alignment. To determine whether the mold disk locking studs and stud blocks are worn to the extent that there is an upward movement of the mold disk during justification of the matrix line, pry up *gently* against the teeth of the mold disk while the disk is in forward position, but without spacebands in the 30-em matrix line.

It is very seldom necessary to readjust the first elevator banking screw, and the adjustment should be thoroughly studied before attempting it.

**Vise Automatic Stop Rod.**—This adjustment is made by the front screw in the top of the first elevator slide; when the first elevator is resting by its banking screw (the rear one) upon the vise cap, the vise automatic stop rod adjustment screw (the front one) will depress the stop rod so the pawl will clear the advancing mold disk dog or plunger about 1/64″. To determine the condition of this adjustment run the machine ahead until the first elevator rests upon the vise cap, and stop the machine; pull the mold slide forward by hand to watch how close the dog comes to the stop rod pawl without striking it. This adjustment is of extreme importance. If anything (such as an overset matrix line) obstructs the full downstroke of the first elevator upon the vise cap, the machine should be stopped by the vise automatic. See that the stop rod spring has enough tension to pull the rod up sharply when depressed by hand. Also see that the striking edges of the rod pawl and the dog have not been rounded from too frequent use.

**First Elevator, Transfer Stroke.**—When the first elevator rises to transfer, its position is regulated by the adjusting screw at the bottom of the slide. The adjusting screw is turned to raise or lower the position of the slide, until the teeth of a new pi matrix in the elevator jaws register with the teeth of the second elevator

bar. Matrices must be transferred from the first to the second elevators without friction.

**First Elevator Jaw Line Stop.**—The line stop is used to prevent end matrices at the left side of a line falling from the jaws while the first elevator is rising to transfer position (or while recasting from the same line), and is held from moving by a friction clamp or detent. When changing from a wide to a narrow measure the line stop should be pushed inwardly. When changing from a narrow to a wide measure, no attention need be paid the line stop.

**Vise Jaws.**—The jaws should be set so the type face will be even with each end of the slug. The right-hand vise jaw is adjusted by the screw in the top of the knife block. The left-hand vise jaw is adjusted by the screw in the vise closing block.

**Mold Slide Forward Thrust.**—When the mold slide has been moved forward previous to spaceband justification and before the pot has advanced there should be .010" space between the mold and the vise jaws or matrix line. This .010" space between the mold and matrices will insure freedom to permit the spacebands to expand and completely justify the matrices tightly between the jaws. This adjustment is made with the eccentric pin in the mold cam lever. To make the adjustment, remove the first elevator back jaw, disconnect the pot pump plunger pin; run the machine ahead until the first elevator is seated upon the vise cap; stop the machine before the mold disk has advanced toward the vise jaws; close the left-hand vise jaw; insert three or four one-inch strips of paper (measuring .010" thick) between the vise jaws and mold; turn the machine ahead with the friction clutch arm by hand until the hardened steel shoe in the cam crease has contact with the mold cam lever cam roller. At this point the mold will have advanced against the strips of paper and the closed vise jaws. Pull upwards on the strips by hand; they should drag slightly. Adjust the eccentric pin in the mold cam lever in case the strips pull up without friction. The pin is held in position by a jam nut which must be loosened before adjusting the pin by the special flat end wrench furnished with the machine. This adjustment should be made with the front first elevator jaw in position between the vise cap and the vise jaws, in order to furnish a support for the jaws which are a loose fit. The object in removing the first elevator back jaw is to make the space accessible for placing the paper strips between the vise jaws and mold face.



**Mold Cam Safety Lever.**—Before this adjustment is made, check the forward thrust adjustment of the mold slide which brings the mold face within .010" of the vise jaws; also check the 15/32" and 1/32" clutch adjustments. After these three adjustments have been placed in good order, back the machine a trifle, and open the controlling lever. This is the equivalent of the machine being in action. Test the condition of the adjusting screw in the forked lever which contacts with the lower end of the mold disk safety stop lever, by passing three or four strips of paper or a feeler gauge .010" thick between the adjusting screw and the mold disk slide safety stop lever. This safety lever functions to shut off the machine in case anything interferes with the normal forward thrust of the mold, for example, in case the operator turns up a display mold and has neglected to throw the alignment stop bar on the vise cap in position.

**Mold Turning Cam.**—The two shoes, set in the side of the mold turning cam hold the mold disk locking studs properly in front of the stud blocks on the vise frame just after the segments have finished turning the mold disk to casting and ejecting positions and before the studs have engaged the stud blocks. The adjustment of the shoes should be made to permit as little play as possible between the square block on the bevel pinion and the shoes when they are in engagement with each other. The shoes are adjusted by removing the two binding screws in each shoe and turning the bushings in the cam.

**First-Style Mold Driving Pinion Shaft Friction Clamp.**—Adjust screw in clamp just enough to cause the leather lining to bind the shaft and bring the mold disk to a stop without running past the stud blocks and without chattering at casting and ejecting positions. The new-style friction disk or brake has no adjustment.

**Back Knife.**—The back trimming knife should be adjusted to trim off all ventage sprues and jet projections from the bottom of the slug. Adjust by two square-head screws. Never permit the knife to press against the mold. The knife should always be set up as near the mold as possible without touching it in order to obtain type-height, which is .918".

**Pump Stop Pot Block.**—A number of machines, before the introduction of the new mold cam safety lever, were equipped with a pump stop pot block which functioned by preventing the downstroke of the plunger when the operator sent over a matrix line

on the high alignment or duplex rail with the two-letter attachment in position. The position of the block upon the pot cover is adjustable so that when the plunger is normally making its casting stroke, the pump stop lever catch block on the pot pump lever will just clear the pump stop pot block. When a matrix line is resting upon the high alignment or duplex rail in the first elevator and the two-letter attachment is swung over so the first elevator will also be held up in high alignment position, the lower back matrix lugs will impinge against the mold face and the metal pot will not make its full forward stroke in locking against the mold. The pump stop pot block on the pot cover will not then advance far enough forward to permit the pump lever to make its casting stroke. In this way a front squirt will be avoided.

**Pump Stop.**—The pump stop functions when the matrix line is not fully justified or when the machine is being run around idle. To make this adjustment accurately, first loosen the check nut holding the position of the adjusting nut on the operating rod, disconnect the pot pump plunger pin, open the vise jaws; run the machine ahead until the first justification lever (the one that operates the pump stop) is at its highest stroke, stop the machine and turn the adjusting nut until the pump stop lever is within 1/32″ of striking the stop pin in the bracket. Do not permit the pump stop lever to strike the stop pin. Adjusting the nut in this manner will cause the pump stop lever to be thrown under the pot pump lever about ¼″. Tighten the check nut securely. Do not permit the pot to press against the mold any longer than necessary.

**Model X Pump Stop.**—As soon as the matrix line is justified, the pump stop lever should be thrown clear of the pot pump lever catch block 1/32″. Adjust by means of the screw in the forward end of the operating lever, against which the right-hand vise jaw presses to operate the pump stop lever.

**Metal Pot.**—The jets of the pot mouthpiece should be even with and within the constant or smooth edge of the mold body. This vertical adjustment of the pot is made by the upper screws in each pot leg. The metal pot must lock squarely across the face and against the mold. Adjust with the front and back screws in the lower ends of the pot legs. For the benefit of the inexperienced, once the pot legs have been properly adjusted, resetting



will not be required except at indefinite intervals. It may be necessary to face the mouthpiece because it has warped, to bring it parallel with the mold.

**Pot Lever Eyebolt.**—The two nuts on the pot lever eyebolt, regulate the compression and tension of the pot lever spring while the pot is locked against the mold. The front nut should be turned up against the sleeve inside the spring. This nut regulates the tension of the spring or the stiffness with which the pot will lock against the mold. The rear nut on the pot lever eyebolt should be adjusted so there will be about ⅛″ space between it and the pot lever when the pot is locked against the mold. This nut regulates the compression of the lever against the spring as the pot cam locks the metal pot mouthpiece against the mold.

It may be sometimes necessary to shift the position of the sleeve upon the eyebolt. Drive out the two pins holding the sleeve to the eyebolt and after finding its new position, drill new holes to fasten the sleeve to the eyebolt. Never discard the sleeve, as it is a safety device to permit the proper spacing between the position of the front and back nuts so the spring coils will be open the proper distance.

**First-Style Knife Wiper.**—The nuts at the lower end of the rod are to be set while the first elevator is resting upon the vise cap so there will be ⅛″ vertical shake in the rod. Replace the rod spring if broken. The full upstroke of the wiper blade is made against the tension of the spring.

**New-Style Knife Wiper.**—Detent in the rod guide should have enough tension to hold the knife wiper in an elevated position after the first elevator has descended from transfer position. This is to prevent the wiper striking the ejector blade. Adjust tension of the detent with the screw at left side of the rod guide. The rod spring should be replaced if broken, otherwise the knife wiper blade might not make its full upstroke to clear the knife edges of shavings.

**Ejector Lever, Normal Position.**—There is a screw in the ejector lever which can be turned to take up lost motion while the lever is standing at normal position, so that the ejector locating plunger will freely enter the notch in the ejector blade holder before making an ejector blade change. Usually there should be about 1/16″ play between the screw and the sleeve on the justification lever shaft.

**Ejector Lever, Forward Stroke.**—Adjust the screw in the ejector lever pawl until the ejector blade clears the inside slug galley 1/32″; on the new-style outside galley the screw in the ejector lever pawl should be set so the ejector blade will clear the top of the slug galley chute spring 1/32″. Lowering the position of the pawl will lengthen the stroke the ejector blade is caused to make.

**Elevator Transfer Lever, Normal Position.**—When the machine is standing at normal position, the right side of the transfer finger should be 5⅝″ from the left side of the transfer channel. For the 42-em machine this space is 7⅝″. Adjust by moving the cam roller arm upon the transfer lever shaft at the rear of the machine. The cam roller arm is clamped to the shaft with two hexagon-headed cap screws.

**Spaceband Transfer Lever.**—The spaceband transfer lever is connected to the elevator transfer lever by a turnbuckle, and moves as the transfer lever compels through its turnbuckle attachment. While standing at normal position, the turnbuckle is to be adjusted until the hooks of the spaceband transfer lever pawl go past the points of the spaceband box top rails ⅛″. This is to insure the pawl starting the spacebands down the inclined rails of the box, from which point they slide by gravity.

**Elevator Transfer Lever. First or Transfer Stroke.**—When the transfer lever moves to cause the transfer finger to push the matrix line from the first to the second elevators as cam No. 10 permits, the transfer finger should stop even with the end of the second elevator bar plate. This adjustment is regulated by the screw in the automatic safety pawl against which the buffer in cam No. 10 strikes when the roller in the split arm of the transfer lever causes the buffer to push the pawl clear of the upper stopping lever. The pawl banks against the rim of the cam and the adjusting screw in the safety pawl limits the first stroke of the transfer lever.

**Elevator Transfer Lever, Second Stroke.**—When the transfer levers come together after the second elevator has lifted the matrices from the transfer channel, to push the spacebands under the hooked end of the spaceband transfer lever pawl, there should be ⅛″ between the right side of the transfer slide finger and the bottom of the slot in the pawl. Adjust with the horizontal screw in the transfer finger slide.



**Elevator Transfer Slide Releasing Lever.**—While the second elevator is seated upon the transfer channel, the screw in the second elevator lever should depress the releasing lever, to clear the stop block on the transfer slide 1/32″. Adjust with the screw in the second elevator lever which depresses the releasing lever. In case of a distributor stop or other cause, preventing the second elevator from descending to transfer position, the releasing lever will arrest the transfer lever and stop the machine.

**Transfer Bar Pawl.**—There is a slight vertical freedom of the pawl in the transfer bar. While the second elevator is seated upon the transfer channel, the bar should be adjusted so that when the pawl is pushed upward with a finger, the lower edge of the pawl will be even with the bottom of the second elevator bar. Also move the bar sidewise so there will be 1/64″ between the pawl and the end of the second elevator bar. Loosen the two hexagon-head binding screws at the front of the slide guide and turn the two adjusting screws in the top of the slide guide, afterwards holding the bar up while tightening the two binding screws.

**Second Elevator, Transfer Position.**—When the second elevator is resting upon the transfer channel, the cam roller should clear the cam; adjust by the bolt connecting the second elevator lever to the cam lever. The spring interposed between the two levers provides a cushion impact when the second elevator seats at the distributor.

**Second Elevator Lower Guide.**—The lower guide on the bracket is adjustable by loosening the binding screw in the bracket and adjusting the two headless screws which move the adjustable guide to position the second elevator bar forward or backward so the bar teeth will register with the matrix teeth in the first elevator jaws at the time of transfer.

All machines are now equipped with an adjustable plate, on the transfer channel back plate to assist in holding the second elevator bar plate in positive alignment. This plate should be set to permit .005″ space between it and the rear edge of the second elevator bar plate. It will be necessary to remove the transfer channel front plate in order to turn out the two guide plate fastening screws, after which the two bushings regulating the position of the guide plate can be adjusted.

**Cam Shaft Bracket Tie.**—This tie rod extends from the right-hand cam shaft bracket into the column and takes the strain when the metal pot is locked against the mold. It should be turned up with a wrench until the rod head bears lightly against the bracket.

**Distributor Box Matrix Lift.**—The lift is to be adjusted to raise matrices above the vertical faces of the box rails 1/32". At the time the lift makes its complete upstroke there should be 1/32" between the underside of the matrix upper ears or lugs and the top of the distributor box rails. Adjust with the screw in the cam lever.

**Distributor Box Lift Block.**—The lift block is movable to cause the matrix lift to project under the matrix or "bite" the matrix about .028" (the thickness of the average six-point thin space) when it is at its lowest stroke and about to raise a matrix into the distributor screws. The lift is held against the lift block by a spring and the block is adjustable to determine the amount the lift shall project under the matrix.

**Mixer Distributor Box.**—The box is independently adjustable for position at each distributor, and is mounted upon a swinging arm which banks against an adjusting screw in the front distributor screw bracket for the front distributor position, and against an adjusting screw in the stop screw bracket for the back distributor position. The screws which limit the stroke of the box are adjusted until a wide matrix, such as a 36 point capital "M" or "W" passes freely from the box to the lift rails. The box rests at a slight angle to the axis of the distributor screws and matrices turn to a position parallel with the distributor screws when raised to the lift rails.

**Mixer Distributor Box Clutch Tripping Lever.**—The normal position of the tripping lever is regulated by a screw in the font selector bracket, against which it banks, so that the block will be engaged by the block at the lower end of the clutch operating lever about 1/32". The adjustment of the normal position of the clutch tripping lever, explained above, always involves readjustment of the font selector arm feeler points, as the tripping lever is fastened to the same shaft. Altering the normal position of the tripping lever will cause the feeler points to swing through a small arc of a circle about the same distance.



**Mixer Distributor Box Clutch Operating Lever.**—The clutch operating lever is to be set by means of the two screws in the clutch cam lever so that there will be 1/64" space between the block at the lower end of the operating lever and the end of the block on the clutch tripping lever at the time the shifter gear cam is engaging the clutch cam lever roll. This is to insure the return by gravity of the clutch tripping lever to normal position.

**Mixer Distributor Box Shifter Cams.**—There are two shifter gear cams, one for each position of the box at the front and back distributors. In some of the first Mixer machines, these two cams are movable in their slots in the side of the shifter gear so that while the box clutch is resting at normal (or inactive) position there will be a space of about ⅜" between the cam and the cam lever roller. Each cam, at the proper instant, according to which distributor is in use, moves the clutch operating lever away from the tripping lever in order to permit it to be free to return to normal position by gravity. After the tripping lever has assumed its normal position, and the shifter gear cam has passed the roller on the cam lever, a spring will pull the operating lever against the end of the tripping lever. On the present E machines these cams are fixed as to position.

**Mixer Distributor Feeler Points.**—The upper and lower magazine feeler points are separately adjustable by screws at the lower end of each arm. The points must be a little in advance or to the right of the matrix lifts (viewed from the back of the machine). In this way a matrix for the upper magazine, in case the box is in back distributor position, will bear against the feeler point and trip the clutch before the lift can raise it into the back distributor screws. Adjust the front distributor feeler point first, by having the box in position at the back distributor, throw off the distributor belt, raise the back distributor screws; place a thin space matrix (one about .028" thick) from the lower magazine in the box, and a lower case "m" matrix from the upper magazine. Slowly raise the distributor box matrix lift by hand until the matrix has been raised high enough to clear the tops of the lower rails, when the second, or thick, matrix from the upper magazine, should trip the tripping lever by advancing against the feeler point. The tripping lever should not be thrown out of engagement with the operating lever until after the thin space matrix clears the tops of the distributor box lower rail tops, and the thick

matrix should trip the clutch immediately after the thin space matrix has cleared the lower rail tops. The position of the feeler point is regulated by screws in the feeler arm. After the correct adjustment has been secured by the adjusting screws, back one of them about ⅛ turn away from the font selector arm center rod, so that when changing a magazine containing matrices with a different font notch, the arm will slide easily lengthwise upon the rod, thus permitting the sector to be changed to another notch, which controls the location of the feeler point endwise on the rod in relation to the different selector notches cut in the lower edges of the matrices.

The adjustment of the front distributor feeler arm can now be made, using for the first matrix a thin space about .028" thick from the upper magazine, followed by a thick matrix, such as a lower case "m" from the lower magazine. Trip the box clutch by hand and turn the distributor until the box is in position at the front distributor. Then pass the two matrices into the distributor box and adjust the front distributor feeler point in the same manner as described for the back distributor feeler point.

**Distributor Clutch Lever Adjusting Plate.**—This plate should be set to engage the channel entrance automatic stopping bar 1/32". If adjustment of the plate causes it to engage the stopping bar more than 1/32" the channel entrance partitions will have a greater movement than necessary before the stopping bar can be disengaged from the plate which might result in springing the partitions out of line. If this occurs, it will be necessary to bend the partitions back in line again with duckbill pliers.

**Distributor Clutch Lever Pawl Screw.**—When the distributor is in operation and the channel entrance is closed against the magazine, the end of the clutch lever pawl screw should be 1/16" away from the clutch flange collar. A check nut holds the adjustment of the screw.

**Distributor Beam, Sidewise Position.**—The distributor beam is adjustable for sidewise position so that matrices as they drop from the combination bar will clear the channel entrance partitions. Run several lower case "f" matrices upon the bar. As the matrices drop while turning the two-pitch distributor screws slowly by hand they should strike the top of the channel entrance partition at the right (back view), then when the distributor is running under power on a machine geared to deliver 6½ slugs



per minute, momentum will throw the matrices toward the center of the channels into which they drop. In the case of the first-style four-pitch distributor screws, the lower case "f" matrices should just clear the channel entrance partition. Adjust the sidewise position of the beam with the adjusting screws at the left-hand side of the distributor bracket, after loosening the two binding screws at the top of the bracket.

Before attempting to adjust the endwise position of the distributor beam, go over the channel entrance partitions with a pair of duckbill pliers and bend them in line with the tripping bar lugs.

**Distributor Beam, Position for Height.**—The beam is supported upon the distributor bracket by two screws in the top of the beam. These screws should be adjusted until there is about 1/16" space between the bottoms of the matrices upon the combination bar and the tops of the channel entrance partitions. The beam can be adjusted for height by the two screws in the top of the beam after loosening the two binding screws at the top of the distributor bracket.

**Distributor Matrix Screw Guard.**—The distributor screw guard deflects matrices from the lower distributor screw into the channel entrance. The guard must not bind upon the screws nor touch the matrices while they are traveling along the combination bar. Have a pi matrix upon the combination bar at either end of the distributor while adjusting the guard. Adjust for position after loosening the binding screws in the guard brackets.

**Channel Entrance, Sidewise Adjustment.**—Single Distributor Machines. The channel entrance is adjustable sidewise to align the lower ends of the partitions with the magazine entrance partitions. Note that the partitions, not the feathers, are to be aligned with the magazine channels. The first-style means of adjusting the entrance consists of a number of very thin steel washers on the left-hand partition plate bracket screw which can be put at one side or the other of the frame lug in order to shift the entrance sidewise. These washers are only intended to align the partitions with the magazine partitions and should not be used to shift the channel entrance to obtain clearance for matrices when dropping from the distributor combination bar.

The new-style means for adjusting the sidewise position of the channel entrance has a bushing in place of the washers. This bushing is pinned in a lug at the left-hand side of the frame and

the hinge screw supporting the entrance passes through the bushing. The pin can be driven out after removing the hinge screw by driving inwardly when it will fall inside the bushing. The entrance can be shifted, if necessary, after removing the pin.

**Channel Entrance Frame Adjustment.**—Single distributor machines. Adjust the two screws in the left and right-hand channel entrance frame brackets to position the lower end of the channel entrance partition plate 1/32″ away from the upper end of the magazine lower channel plate.

**Channel Entrance Open Position.**—While the channel entrance is in closed position and resting upon the magazine by means of the two locating fingers at either side, there should be 1/16″ between the lugs of the left and right-hand partition plate brackets and the ends of the plate stop screws at either side of the frame. These screws support the partition plate while the entrance is open and permit the locating fingers to engage the magazine easily when the entrance is being closed.

**Mixer Channel Entrance, Sidewise Adjustment.**—Each channel entrance is independently adjustable so that the lower ends of the partitions (not the partition springs) will align with the magazine channel plate partitions. At the left side of the channel entrance frame (back view) opposite the end of each entrance, there is an adjusting screw which regulates the position of each entrance. Loosen the binding screws in the upper magazine partition plate bar and adjust for position with the adjusting screw. The lower magazine channel entrance is adjustable for sidewise position in like manner, except that the binding screws project inwardly from the back of the channel entrance frame.

**Mixer Channel Entrance, Partition Plate Adjustment.**—The lower partition plate of each channel entrance rests upon screws projecting through the frame tie bar, and these screws should be turned so that the lower partition plate of each channel entrance, will be even with the lower channel plate of the magazine.

**Friction Driving Clutch.**—When the machine is in action, there should be 15/32″ space between the driving shaft bearing and the flange. Pack out both the clutch arm leather buffer pieces evenly with pieces of thin cardboard between the buffers and the shoes. To make a test of this adjustment, back the machine a trifle by hand and open the controlling lever. This is the equivalent of the machine being in action under power. While in this position,



insert a gauge 15/32″ wide, made from a piece of ordinary thin steel or brass rule, between the driving shaft bearing and the flange on the driving shaft inside the right-hand cam shaft bracket.

The inside rim of the driving pulley and the clutch arm leather buffers must always be kept clean and free from oil. Oily clutch buffers will cause the clutch to slip and the machine will stall.

See that the brass screws fastening the buffers to the shoes do not extend above the gripping surfaces of the buffers.

Never use rosin, ink, belt dressing or any other kind of dope on the clutch buffers to make them pull better. If the adjustments are maintained, the clutch will always pull the machine through its normal movements. The use of dope on the buffers will cause the clutch to release later than it should and sets up a strain which is hard on the parts.

**Clutch Rod Spring.**—The clutch rod spring normally causes the clutch buffers to grip the inside rim of the driving pulley with a pressure ranging from 16 to 20 pounds. The clutch spring, after long use, can be stretched a little by first taking it out of the hollow end of the driving shaft after removing the end nut. The length of the spring should not exceed five inches. If the spring is stretched too much, the function of the clutch slipping in case of an accident will be defeated.

**Forked Lever.**—While the machine is in action there should be 1/32″ play between the flange and the forked lever. Adjust with the screw in the lower end of the upper stopping lever. The lower stopping lever is merely a means of connection between the upper stopping lever and the forked lever. If the clutch fails to pull the machine around because the 1/32″ space between the flange and the forked lever does not exist, see if the 15/32″ adjustment between the driving shaft bearing and the flange is as it should be, possibly the leather buffers have become worn and need underlaying because they permit the flange to bind against the forked lever, in which case, the clutch will appear to be weak.

**Automatic Stopping and Safety Pawls.**—Set both pawls so that the right side of the pawls (standing back of the machine) will be 15/16″ from the right side of the cam. An adjusting screw in each pawl, bearing against a lug of the cam, regulates their normal position. The automatic stopping pawl is the one that bears down on the upper stopping lever when the machine comes

to a stop at normal position. The automatic safety pawl bears down upon the upper stopping lever and stops the machine at transfer position when the second elevator is held up by matrices blocking the distributor.

**Upper Stopping Lever.**—The automatic stopping and safety pawls should rest upon the upper stopping lever ¼". The upper stopping lever is adjustable sidewise by loosening the square-head set screw in the vertical starting lever bracket and turning the vertical shaft in which the upper stopping lever is mounted.

**Vertical Lever, Normal Position.**—The vertical lever moves only when the controlling lever is pulled to start the machine. Its normal position is regulated by a screw inside the machine column so that as the automatic stopping and safety pawls pass it just before striking the upper stopping lever, there will be 1/64" between the upper lug of the vertical starting lever and the pawl.

**Vertical Starting Lever in Action.**—When the controlling lever is pulled by hand to start the machine, a stud on the connecting rod engages the lower lug of the vertical starting lever and causes its upper lug to push the automatic stopping or safety pawl clear of the upper stopping lever 1/64". The distance the upper lug of the vertical starting lever can push the pawls clear of the upper stopping lever is regulated by a headless screw in the vertical starting lever bracket. The person making this adjustment should have someone hold out on the controlling lever (with the power turned off) while looking at the relation of the parts.

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# MAINTENANCE ROUTINE

Everyone who buys, uses or operates good machinery knows that it must be cared for if it is to serve as a productive unit. While the Intertype is the simplest line composing machine in the world, it is, nevertheless, a complicated mechanism. Like all precision machinery, it requires a certain amount of routine or daily attention, as well as periodical care at more widespread intervals. The machine will respond to common sense maintenance and the time allotted to give it the necessary attention will be more than offset by uninterrupted production.

*If these maintenance duties are performed at stated times in an orderly manner their execution will become a very simple matter.*



Usually, some person is made responsible for the good running condition of the machine or battery of machines. Where the size of the installation does not justify a full-time machinist, a brief period apart from productive time should be set aside every day for the performance of the simple duties essential to good machine maintenance.

The first and most important things to consider are the polishing of the spacebands, cleaning the pot pump plunger and crucible well every day without fail, and the avoidance of the application of too much oil to the distributor screw bearings and the back mold wiper felts.

Fifteen or twenty minutes a day for a single machine, will, as a rule, provide time enough to polish the spacebands, attend to the plunger and pot crucible well, clean the mold faces, vise jaws and first elevator jaws, clean away the metal trimmings, dust the machine, return all matrices to their proper places, and do any little repair jobs, such as a non-responding keyboard cam, a binding magazine escapement, or the changing of a spring some place about the machine.

The cleaning of a set of matrices and magazines, together with the assembler entrance will require from one and one-half to two hours; cleaning and oiling the keyboard cams, yokes and frames, according to the skill of the one doing the work, will take upwards of two hours.

### EVERY DAY

Polish the spacebands upon a flat pine board with dry graphite. Dixon's No. 635 is best suited for the purpose.

Clean the plunger with a wire brush; scrape the pot crucible well, and clean the intake holes in the well.

Polish the bottom of the outside slug galley delivery chute with a pine stick and mold polish.

Polish the fronts of molds, vise jaws and first elevator jaws with a clean dry cloth and dry graphite; wipe the top of the justification block and do not permit graphite to be deposited upon the block.

Brush metal trimmings from the machine.

Collect all matrices that may have accumulated in the distributor pan or upon the keyboard tray, and return them to their proper magazines.

Dust the machine, especially those parts in immediate proximity to the belts.

### WEEKLY

Oil the machine with the exception of the motor and distributor.

Clean the main cams with coal oil and wipe them dry the day after the machine has been oiled. Some oil will work out upon the cam surfaces later, but a thin film of oil upon a clean cam will do no harm.

Clean assembler matrix delivery belt pulleys and supporting plate with a cloth and high test gasoline.

Wipe the pot mouthpiece and scratch out the cross vents lightly to remove the oxides which tend to close them. Thoroughly clean the back of the mold disk and see that no metal adheres to the back of the molds.

Remove the graphite crusts from the back mold wiper felts with a stiff wire brush, and apply mold polish if needed.

Clean the delivery slide fingers (inside), the transfer slide finger and the distributor shifter slide buffer face, with a cloth and high test gasoline.

If an electric pot is in use, polish the relay contact fingers and pole pieces in the control box with fine sandpaper. Inspect the thermostat lever contacts. The latter will not necessarily need polishing weekly, but should be inspected weekly.

Inspect the motor commutator and polish with fine sandpaper. See that the brushes are free in the brush holders.

Wipe the second elevator head and tops of transfer channel plates where the elevator seats during transfer. If the Mixer is in use, apply a thin film of oil to the top of the second elevator bar plate after cleaning.

Go over the machine and tighten screws that might have worked loose. A new machine should be inspected frequently for a time. The screws holding the long and short segments to the mold turning cam, the ejector lever cam screw, the set screws for the pot pump lever and mold cam lever shafts, and the pot leg adjusting screw nuts should be particularly watched.

Inspect the cam rollers to see that they are turning freely.

Examine the distributor conveyor screws for oil that may have worked out upon the threads. The oil, if permitted to remain upon the screws, will foul the lugs of matrices and cause them to stick in the magazine.



### EVERY TWO WEEKS

Oil the distributor bearings.

Oil the motor.

Oil the knife block.

Oil the assembling elevator gate roller and hinge pin sparingly and apply the oil with a wire or toothpick; oil the delivery slide releasing pawl, the adjusting rod spring, and the lever link back of the face plate; oil the transfer lever link, the spaceband transfer lever pawl and turnbuckle; oil the distributor shifter lever link; apply some grease to the assembler slide bell hammer where it is engaged by the hammer trip.

Loosen the pot lever shaft set screw and rock the shaft several times with a screw driver inserted in the hole in the end of the shaft. If the shaft moves stiffly apply coal oil, then lubricate with machine oil. The new-style pot lever shaft can be tested in this way, but before doing so, note the position of the lever between the pot jacket lugs and see that the lever does not bind against either the driving gear or the pot pump cam.

### ONCE A MONTH

Refill the grease cups.

### EVERY THREE MONTHS

Remove mold cooling oil separator cylinder from the mold cooling equipment and wash the steel wool free from dirt and oil by immersing in gasoline.

Remove the pot and mouthpiece burners if gas is used to heat the metal. Use a stiff wire brush to clean the burners and wipe out the burner orifices underneath the pot.

Clean the front and back keyboard cams, rubber rolls and frames. *Lubricate the cam pivots with clock oil only.*

Clean magazines and matrices. These need not be attended to at one time, but the cleaning process can be spread over a period of several weeks.

Remove the pot lever, wash and clean the rollers in coal oil and apply new hard grease.

### YEARLY

Remove the entire keyboard from the machine, and clean all the parts, including the keyrods and frame. Depending upon conditions in the room, once a year is sufficient, although

in some plants this operation may be necessary once every six months.

## OILING THE INTERTYPE

It is impossible to give absolutely definite instructions as to how often each part of the machine should be oiled or how much oil should be used. The essential point is to keep all bearings and working surfaces sufficiently lubricated at all times, without allowing any surplus lubricant to remain on the machine and collect dirt. Carry the oil can in one hand and a wiping cloth in the other, and wipe off all dirt and surplus oil as the work progresses. Wiping the parts and preventing excess oil are the two important items in caring for the machine.

For all parts requiring oil, excepting the keyboard cams, use a medium grade of good mineral oil. The oil and grease sold by the Intertype Corporation is recommended.

Keep all cam and roller surfaces free from dirt, to insure the turning of the rollers.

Do not put oil or any other lubricant on the matrices or in the magazines, or in any path through which the matrices and spacebands pass.

The art in oiling the machine is to see that all parts get the oil required and yet avoid applying an excess that may escape from the region which it is intended to lubricate. It should be remembered that there is considerable heat around the metal pot and the amount of oil applied to the parts to which this heat will be transferred should be regulated so that matrices will not be fouled by traveling oil.

Use an oil can which can be controlled as to the amount escaping from the end of the spout. If too much is let out at one time, a little solder applied to the tip and then drilled out with a very small drill will enable you to control the can so that one drop at a time will be ejected from the spout.

Do not promiscuously fill an oil cup just because it has a cover and is packed with wicking. Wicking is put in the cup to permit oil to drain slowly. However, in most cases two or three drops of oil weekly is all that is required.

Some systematic method should be followed in oiling the various parts. The following list contains the points of lubrication for a single distributor machine, commencing at the left side and working around the machine. Any other systematic method of locating the points of lubrication would be equally as good.



**These Parts Should be Oiled Once a Week—**

| Parts to be Lubricated | Number of Holes or Surfaces |
|---|---|
| Mold turning bevel pinion shaft | 2 |
| Mold turning shaft bearings | 2 |
| First elevator slide and gibs | 4 |
| *Mold slide bearing | See footnote |
| Vise closing screw and bushing | 2 |
| Justification lever roller | 1 |
| Vise closing and justification lever roller | 2 |
| Pot pump lever shaft bearing | 2 |
| Pot pump lever roller | 1 |
| Pot lever roller | 2 |
| Mold slide cam lever shaft bearing | 2 |
| Pump stop lever bearings and rod bearings | 3 |
| Distributor shifter lever shaft bearings | 2 |
| First elevator auxiliary lever roller | 1 |
| Ejector lever pawl | 1 |
| Ejector lever link wing pin | 1 |
| Second elevator lever roller | 2 |
| Second elevator shaft bearings | 2 |
| Main cam shaft | 2 cups |
| Justification lever shaft bearings | 2 |
| Justification lever bearings | 2 |
| First elevator lever and ejector lever shaft bearings | 4 |
| Driving shaft | 2 cups |
| Driving pulley | 1 |
| Mold slide cam lever rollers | 2 |
| Spaceband transfer lever shaft rear bearing | 1 |
| Delivery lever shaft rear bearing | 1 |
| Elevator transfer lever shaft rear bearing | 1 |
| Intermediate shaft | 2 cups |
| Keyboard rubber roll shafts (one drop in each bearing) | 4 |
| The pi stacker pulleys | 4 |
| Assembler drive and idle pulleys | 2 |
| Assembling elevator lever bearings | 2 |
| Assembler shaft and idle pulley | 2 |

*There is a cup above the mold slide to the right of the metal pot. It is essential that only a small quantity of oil be applied to this cup. Once a week rub a thin film of oil on the mold slide bearing with the fingers when the slide is pulled out. This manner of lubrication will prevent excess oil from the cup flowing into the ejector parts and fouling the matrices.

Matrix delivery belt idle pulley.....1
Spaceband transfer lever shaft (front bearing).....1
Spaceband lever turnbuckle wing pins.....2
Delivery lever shaft (front bearing).....1
Elevator transfer lever shaft (front bearing).....1
First elevator lever link wing pins.....2
Slug lever connecting rod.....1
Metal pot leg bushings.....2
Universal ejector shifter lever bearings.....3
Vise automatic stop mold disk dog.....1
Mold disk guide.....1
Mold slide.....4
Justification rod bearing in vise.....4
Mold disk locking stud blocks.....2
Mold disk stud.....1
Magazine frame wing pin (Equipment B).....4
Magazine cradle frame shaft (lower) shoes (Equipments C and D only).....2
Magazine frame bearings.....2
Motor armature shaft.....2
Distributor box matrix lift lever bearings.....2
Distributor box matrix lift lever cam roller.....1
Distributor conveyor screws.....6
Distributor clutch lever.....1
Distributor clutch shaft.....1
Distributor clutch.....1 cup

See that the mold turning cam shoe wiper felt is well saturated with oil.

Rub a little oil on the second elevator guides, upper and lower, and on the inside of the delivery lever air cylinder.

**Distributor Screws.**—Apply one drop of oil to each distributor screw bearing once in two weeks. These bearings are not called upon to do very heavy duty and the screws merely propel their own weight in the bearings. If too much oil is applied to the screw bearings, it will work out into the screw threads and foul matrices which will then fail to drop freely from the magazines.

**Assembler Bearings.**—Be cautious as to the amount of oil that is applied to the assembler bearings. One small drop weekly will be sufficient in each assembler bearing. Too much oil, especially in the star wheel shaft bearing, will cause matrices to become gummy.



**Front and Back Mold Wiper Felts.**—The front mold wiper should not have anything rubbed into the felts other than gasoline and graphite. When giving the back mold wiper attention, apply only enough lubricant (which is usually of a greasy nature) to keep the wiper working efficiently for a week. The heat generated by the molds will cause the lubricant to become thin and if there is an excess, it will flow to the front of the mold and foul matrices.

**Keyboard Cam Lubrication.**—Remove the keyboard cam yoke frames every three months and remove the cams and rubber rolls. Wash the parts in high test gasoline, using a 4" fibre bristle brush to scour the parts. After drying the cams thoroughly, apply very little clock oil (with toothpick or wire dropper) to the bearing only. Use a good grade of clock oil. An excessive amount of oil will be transferred to the rubber rolls from the cams and cause them to rot.

**Inspect the Motor Bearings.**—See that the rings are revolving and well lubricated and fill the oil well as required. Once every two weeks will be sufficient, although the motor commutator and brushes should be inspected weekly.

See that the mold turning cam shoe, the pot pump and the pot cam wiper felts are supplied with oil.

Rub a little oil on the second elevator guides, upper and lower, also on the inside of the delivery lever air cylinder.

**With Medium Cup Grease.**—Turn the cap of the driving gear or pulley grease cup slightly each week. Apply grease to the distributor shifter cam, the pot return cam and the ejector cam.

**With Dry Graphite.**—Apply graphite weekly to the delivery slide, the elevator transfer slide, and the distributor shifter slide channels. Clean thoroughly and apply the graphite sparingly to the grooves of the upper and lower channels.

## SOME SPECIAL NOTES

Never flood the machine with oil. Always carry an absorbent wiping cloth with the oil can and remove all surplus oil as you go along. The cups do not need to be filled, just put in a few drops of oil.

Oil or graphite should not be put in the magazine. Keep it absolutely clean.

Move the channel entrance gently when closing it, but always open it quickly to prevent matrices falling from the channel entrance into the magazine.

Magazine escapements never need oil.

Keep your temper. If a matrix fails to respond don't try to loosen it by pounding the magazine or the keybutton.

If the machine stalls shut off the controlling lever, then locate the trouble and remedy it.

The back distributor screw should never be raised when there are matrices on the combination bar, as it is sometimes difficult to return the screw to place with the matrix lugs between the screw threads.

The level of the metal in the crucible should not be permitted to sink below the top of the well. On the other hand, do not allow the metal level to go higher than within one-half inch of the top of the crucible rim.

Never feed slugs into the metal pot. They should be melted in a metal furnace in as large quantities as possible, the metal skimmed and cast into pigs. The heat of the metal in the furnace can be about fifty degrees in excess of the temperature required in the metal pot, or approximately 600 degrees. Information regarding metal furnaces and their use will be sent upon request by the Intertype Corporation.

Overheating the metal in the machine metal pot causes imperfect slugs and hastens rapid deterioration of the metal. Keep the temperature in the neighborhood of 550 degrees. Test the metal temperature occasionally with a thermometer.

Never force the first elevator down into the vise cap when the matrix line is so tight that the elevator will not descend far enough to release the vise automatic. If this advice is disregarded, matrices will be ruined and a metal squirt may occur. Damage to the first elevator jaws might also result.

Never leave the machine in such a position that the metal pot mouthpiece is pressed against the mold. The mold will surely be warped from the heat.

If the clutch slips, first see if the leathers are oily. Also look to the 1/32" space between the forked lever and collar. It is not necessary to stretch the clutch spring except at very long intervals.



The spaceband transfer lever pawl should be locked before lowering the second elevator to the transfer channel by hand after clearing away a distributor stop.

The lugs of matrices can be cleaned by rubbing them on a board or felt, but the sides should be cleaned with a soft cloth.

Polish the spacebands every eight-hour run by rubbing on a smooth pine board over which is sprinkled Dixon's No. 635 dry graphite.

Never clean matrices with gasoline or any other solution that contains oil. Such liquids cause type metal and dirt to stick tenaciously to brass.

If a matrix stalls the distributor screws by catching at the lift, throw off the belt and back the distributor a trifle to release the matrix.

Never use the ejector lever to pound a stuck slug from the mold. If a slug sticks in the mold or the side knives, back the machine a trifle by hand and raise the ejector lever pawl to release the ejector, then permit the machine to run ahead to normal position. The slug may then be taken out after removing the mold cap. Pounding out stuck slugs injures the ejector blades and damages the molds. Avoid stuck slugs by keeping the metal in the pot at the right level.

Clean the plunger, the well and the metal intake holes in the well daily.

# TROUBLES AND REMEDIES

## KEYBOARD RUBBER ROLLS AND FERRULE

It is highly important that the rubber rolls and shafts be given the necessary attention to keep them revolving steadily and that the rubbers be clean and fairly resilient. Remove the rolls from the machine occasionally and clean them with coarse sandpaper, finishing the cleaning process by either washing them with soapy water or high test gasoline, using at least a four-inch fibre brush.

Another important thing to watch is to see that the rubber rolls are not crowded onto the shafts in such a way that their diameter is more than one inch at any point throughout their length. If larger than this, the keyboard cams may not clear the stop strip teeth. Also if one roll is larger than the other, transposition of matrices may occur when the keyboard is operated.

If the rubber roll shafts are revolving at a speed much in excess of 275 or 280 revolutions per minute trouble may be encountered by the operator in getting double letters, that is, two lower case "o" matrices or two lower case "e" matrices together in a word. The reason for this is that the cam operates the escapement so rapidly that matrices will not have sufficient time to slide over the escapement points by gravity and the second matrix will be caught at its lower lug by the front point of the escapement.

The ferrule at either end of the roll is held in place by a spring clip or ring. This prevents the roll from creeping beyond the end of the shaft and rubbing the cam yoke frame, which would slow the speed of the rolls. The ferrule also aids in preventing excess oil creeping to the roll in case too much has been applied to the shaft bearing.

Keyboard rubber rolls are furnished in two styles—plain and corrugated. Both have their merits. The plain rubber roll, of course, furnishes a more accurate surface upon which the cam revolves. In some plants, during cool weather, no fire is kept over night and the keyboard chills. Until the keyboard is warmed the next morning the cams act sluggish, that is, they fall upon the rolls but do not revolve immediately. To overcome this condition, corrugated rolls are furnished which have about 60 teeth or corrugations upon their surface.

### NON-RESPONSE OF MATRIX

When a matrix fails to respond to the touch of a keybutton, it may be due to any one of several causes. The best manner in which to locate the trouble is to first note whether the key rod is rising and falling. If not, in all probability the keyboard cam does not revolve, for one of the following reasons:

Gummy substance holding up the free end of the cam yoke. Remove the cam and wipe the end of the yoke on a cloth; also wrap the cloth around a thin piece of wood, insert it in the guide plate slot and wipe clean.

Rubber roll hard or glazed. Remove both rolls and roughen with coarse flint paper, then wash in gasoline.

Teeth of the cam dull or rounded. This is likely to occur on a machine that has been in use a long time. Use a small three-square needle file and touch up the teeth.



Rubber roll diameter too large. The roll should not exceed one inch in diameter.

When applying a roll do not crowd it so as to cause variations in diameter throughout its length.

Cam pivot extremely dry. Use clock oil only to lubricate—just a small drop applied with a toothpick or flattened wire dropper.

A loose cam yoke bearing screw.

If none of the above causes are present, and the key rod moves up and down at the touch of the keybutton, see if the key rod spring has become disconnected, or is weak in tension. A key rod can be removed to strengthen the spring by turning out the two rear screws in the upper key rod guide, pushing back the guide strip and lifting out the key rod wanted.

Groove cut in rubber roll by the cam wheel. A roll can be patched by using a piece of old roll, cutting away the defective part and applying a patch. It is not advisable to make a rubber roll patch less than six inches in length. A small piece might be twisted out of position by the action of the cams.

Accumulation of dirt and grit in escapement bearing. Remove escapement and rub it on fine abrasive cloth, afterwards polishing in graphite.

Escapement spring has lost tension or has become disconnected. If the tension is weak, clip off two or three coils and replace.

Matrix having had a lug slightly twisted in the distributor box.

Escapement burred and binding in its seat.

An assembler entrance partition out of alignment with the magazine channel so that it protrudes part way out of the magazine. Bend the partition into place.

Oil or gummy dirt in the magazine channel or on the matrices. Wipe off the matrix lugs. If very much oil has fouled the channels it may be necessary to run out the matrices and clean the magazine. Oil in the proper place has its function, but it becomes a source of extreme annoyance when used in excessive quantities. Oil in combination with dust and dirt which settle in machinery, comprises a nasty compound and must be removed from the magazine. It should be noted here that too much oil applied to the distributor bearings, the assembler bearings, the assembling elevator, the front and back mold wipers will cause trouble; especially is this true of the distributor screws.

Burred matrix toes from impact with some part of the machine where the matrix travels will cause them to stick in the magazine.

A matrix having had one or both lower lugs or toes damaged by the lock-up of the mold, due to the sending in of a tight line.

If the stroke of the delivery slide is too rapid and a matrix is jarred above the rest of the line when it passes into the delivery channel, it is possible to damage the lower lugs. Avoid raising the assembling elevator too forcibly.

### DOUBLES OR CONTINUOUS RESPONSE

If a keybutton stays down after having been depressed, the matrices will continue to drop. Sometimes two letters will respond when only one is wanted. This is caused by an accumulation of rust, dirt, oil or bits of type metal that have worked into the space between the key bar and the guides, or between the key bar and the banking bar.

The remedy is to use a long spout oil can kept for the purpose and filled with gasoline. Squirt a little of the fluid on the key bar just under the banking bar. Apply the end of the spout between the banking bar and the blade for the keyboard locking apparatus, in the region where the key sticks. Vigorously tap the keybutton. Occasionally a key lever will stick down, due to the presence of a chip of metal or paper lodged between the lever and its slot in the keyboard top plate.

After having tried to remedy a double letter as explained above, and the keybutton still persists in sticking down, remove the cam and yoke of the offending character, insert the end of the oil can spout in the cam yoke slot in the frame plate and squirt gasoline on top of the key bar. In this way gasoline will flow down the length of the key bar and loosen any foreign matter lodged between the key bar and the guides or banking bar.

A loosened rivet in the lower edge of the long wedge will cause hesitating delivery. A sleeve or short wedge that binds in the top of the long wedge, due to accident, will cause hesitating delivery from the box. Sleeves must slide freely the entire length of the spaceband, or groove in the long wedge.

### SPACEBAND BOX TROUBLES

The Intertype spaceband box under normal conditions, gives no trouble of any kind. Occasionally, excess oil in the vise justification apparatus or the assembler bearings will foul the lower ends of the long wedges. Naturally oil and graphite will form a gummy accumulation in the "floor" of the box and interfere with timely dropping of the spacebands. In case they do not slide forward promptly, clean the floor of the box. This can be done without removing the box from the machine. Use a cloth saturated with high test gasoline or benzol fashioned into a swab on the end of a slender stick of wood or a matrix hook.



When the releasing plunger retreats into the hole in the back plate of the box, it must clear the edge of the hole and on coming back into normal position the point of the plunger must advance a little ahead or beyond the end of the banking pin so as to throw the spaceband clear of the banking pin. In order to obtain these two conditions of the forward and back strokes of the releasing plunger, first give attention to the back stroke.

Remove the spacebands from the box, throw off the keyboard belt, depress the spaceband key and turn the rubber roll shaft slowly by hand. When the keyboard spaceband cam has reached its highest stroke and the key lever is at its lowest point, see if the end of the plunger clears the hole in the back plate. A groove cut in the rubber roll under the spaceband cam will prevent the pawl from making its full stroke.

It will be noticed that when the key rod lever is standing in normal position, it has some lost motion. This is intentional for the reason that the releasing plunger in the box is thus permitted to make its full stroke toward the front of the spaceband box.

If the stroke of the lever does not cause the pawl to clear the edge of the hole in the back plate of the box, the lever can be bent slightly to cause it to do so, but first see that the rubber roll is full diameter and round under the spaceband cam. If bending the lever is necessary, bend it only enough to accomplish the required adjustment. Too much of a bend will set up a strain at high stroke of the spaceband cam and cut a groove in the rubber roll.

The adjusting plate is movable to prevent the delivery of more than one spaceband at a time, that is, it partly covers the second spaceband so that it cannot start to slide out due to friction when the first one is being pushed towards the front plate of the box. This plate is also movable so that it can be adjusted to accommodate spacebands of different thicknesses. Adjustment of the plate is made by turning the rubber roll shaft slowly until the releasing

plunger has made its full back stroke and the first spaceband has fallen against the banking pin. Stop the rotation of the rubber roll shaft and loosen the plate screw. Adjust the plate until it covers about one-half of the second spaceband, then tighten the screw.

## TRANSPOSITIONS

A transposition is nothing more or less than a matrix or spaceband misplaced by reason of its delivery along with other matrices and spacebands out of place in the assembled line.

Transpositions are exasperating to the rapid operator who "feels" the flow of matrices coming into the assembler, at times as many as twelve matrices per second.

The possibility of human error in fingering a keyboard is always present. Operators should strive to finger the keys evenly, especially on combinations of letters that occur in simple words or long word endings. Repetition of certain word forms may lead to carelessness.

It has long been the contention of men in a position to know that transpositions of letters in type matter are more often due to mechanical causes than from error in the human element. None of these causes, however, originally existed in the machine itself. They are the result of conditions brought about through constant use or abuse. Insofar as possible, each part of the machine is built to compensate for wear and if properly maintained, free from dirt and dust accumulations, there should be but little trouble experienced with transpositions from mechanical causes.

Following are given the contributing causes of transpositions, many of which would never occur if proper attention were given in caring for the machine.

The first thing to consider is the keyboard. If, after long use, the cam does not start turning as promptly as it should, the fall of the matrix will be out of time.

Sharpen the cam teeth with a small three-square file.

Rubber rolls may be glazed or hardened. Roughen with coarse flint paper and wash in gasoline or soapy water, or put on a new roll. The rubber roll should not be more than one inch in diameter. If one roll is larger than the other, because of its improper application on the shaft, there will occur a slight variation in the timing of the matrix delivery.

A cut in the rubber roll directly under the cam.



On machines that have been used a long time, the tension of the rubber roll shaft pulley friction spring may be weak. Replacement of the part will be necessary. The points of the friction spring may be bent to increase the tension until a new one can be ordered in case none are in the supplies list.

Sluggish action of the magazine escapement. Polish on fine abrasive cloth and rub in graphite.

Keeper rod binding against magazine escapement because of a kink in the rod.

Dry cam yoke pivot. Use clock oil only and apply just a little to the pivot with a toothpick or similar tool.

Oil on matrices or in the magazine. Light matrices (thin ones) will drop slowly from this cause. Excess oil on distributor screws, assembler bearings and front and back mold wipers are contributing causes.

An interfering assembler entrance guide at the mouth of the magazine. Use duckbill pliers and bend the partition to place. If several guides interfere with the prompt dropping of the matrices it is possible that the assembler front will need relocating. In case a single guide is interfering with the delivery of the matrices from one channel, bend the guide to permit free passage of the matrices from the magazine. Turn the keyboard roll shaft slowly by hand after depressing the key bar for the offending character and note how it drops from the magazine. The keyboard belt should be removed from the pulley while doing this.

Uncertain speed of the matrix delivery belt. See that the pulley bearings are free and oiled. If there is too much slack in the belt, adjust the idler pulley by means of the nut back of the pulley stud.

The assembler star wheel may not have enough tension to throw matrices to an upright position in the assembler. The star wheel shaft is provided with a brass plate or disk inside of the small gear that is driven by the intermediate gear and a nut and spring. The purpose of this device is to throw matrices positively yet gently into the assembling elevator. If the spring is too strong, matrices will jump out of the assembler, or else the assembler slide will advance too far when the matrix takes its position in the line. The brass disk and spring should have some oil. The tension of the spring can be weakened by squeezing it in a vise. Likewise the tension can be increased by tapping the spring with a light ham-

mer while rolling it on the corner of an iron block or the jaw of a bench vise. Learn to judge the spring tension by thrusting a finger against the star wheel while in motion. It should have just enough tension to throw quad matrices smoothly into the assembler while they are being assembled with spacebands. This is not an infallible test and every one learning to adjust the star wheel spring tension will require several trials before he can judge whether or not it is exactly right.

A worn star wheel can be the cause of transpositions. It will be noticed that the front and back corners of the spokes are first to wear out. When the spoke corners have been reduced 1/32" or more apply a new star wheel. Star wheels are cheap as compared to the cost of machine corrections.

A machine geared to run less than six and one-half lines per minute may cause transpositions.

If the upper key rod guide is not positioned correctly uncertain matrix delivery will result. The key rods may be slipping to one side of the escapements instead of fully registering with them. Adjust the upper key rod guide sidewise, then tighten the screws. The relation of the key rods to the escapements can be noted by looking at them from the rear of the machine.

The assembler entrance cover cushion may have slots worn in it from long use. In this case renew the spring cushion.

The upper edge of the small assembler chute cover may extend farther in than the lower edge of the large cover, so as to trip matrices as they pass. This can be readily fitted for correct position.

The assembler chute finger should be set so that thin matrices will not bound out of the assembler. This finger is adjustable and can be positioned in case of the first style assembler, so that the thickest matrix in the font will just pass underneath. In the case of the new style assembler the prongs of the finger can be set down as far as possible toward the chute rails and to the left as far as clearance with the assembling elevator will permit. The chute finger is intended to direct matrices to the star wheel and as the wheel flips the matrix to an upright position the spring acts on the top of the matrix to aid it in assuming this position. Some attention should be given to assembler entrance guide No. 1 next to the chute spring so that it will just permit the thickest matrix in the font to pass through without hesitancy. The position of this guide has a great deal to do with matrices bounding out of the assembler.



## SOME CAUSES OF ASSEMBLER TROUBLES

A loose round assembler driving belt will give the effect of a weak star wheel friction spring. Tighten the driving belt, if too loose.

A star wheel shaft that is running in its bearing without oil will give the effect of too strong tension of the friction spring.

Too much oil applied to the assembler bearings will foul the matrices and cause trouble with free dropping from the magazine after the oil has been transferred to the matrix lugs and by them to the magazine channels. Use a small, short-spout oil can and lubricate weekly with one small drop in each bearing. Use a medium grade of machine oil.

If the bell hammer pawl is not slightly lubricated with grease, an effect will be produced equal to a weak star wheel spring tension at the point where the pawl engages the bell hammer trip.

Assemblers are equipped with bushings for the matrix belt pulley shafts. After having been run a long time, new bushings may be applied, if the old ones permit the shafts to cause the the pulleys to run out of line. Grasp the pulley and shake it to see if the bushing hole has become enlarged through wear. The old bushing should never be pounded out. An old bushing may be pushed out by putting a roller having a large hole back of the plate and over the bushing hole, starting it by squeezing a round pin directly against the front end of the bushing between large vise jaws. A new bushing can then be inserted in the assembler by squeezing to place between the vise jaws. The assembler is provided with means of adjustment so that matrices cannot be damaged in the vise jaw lockup. Take advantage of these devices. Never put more matrices in a line than will go in freely and still permit the star wheel to turn slightly. The spaceband buffer finger may have a depression worn at the right side under the assembling elevator where the spacebands first drop down upon it. In this case spacebands may fall down when the assembling elevator gate is opened to make corrections in the matrix line.

## CAUSES OF INTERFERENCE WITH COMPLETE DOWNSTROKE OF FIRST ELEVATOR

An overset line.

Vise jaws set for narrower measure than assembler.

Assembler measure wider than vise jaw measure.

First elevator duplex rail cap screw has worked loose and protrudes.

A binding first elevator duplex rail.

Spring for duplex rail broken and fails to pull the rail back to its seat after the transfer.

Matrix or spaceband lodged on the vise cap or in the space between the vise cap and the jaws.

A binding knife wiper rod.

The knife wiper caught on a defective slug which has partly pulled back between the knives after ejection.

## SOME CAUSES FOR BACK SQUIRTS

Dirty pot pump plunger and crucible well. The plunger and well should be cleaned daily, or oftener if necessary.

Too high a metal temperature. The metal temperature should be kept between 525° and 550° F.

Metal pot level too high. The metal level should not be higher than within one-half inch of the crucible top.

Pot leg adjusting screws have worked loose.

Warped mouthpiece or mold.

Metal accumulations on the backs of the molds, due to neglected back mold wiper.

Vise locking stud has worked loose.

One of the liners has been shaved by the back trimming knife so that it is no longer .875" from front to back. The same effect will be obtained if a wide ejector blade has struck a narrow-measure left-hand liner.

On a machine that has been in use for some time the pot lever spring may have lost its tension.

Misadjustment of the pot lever will cause back squirts, if the lever does not compress about ⅛" when the pot cam forces the pot against the mold.

Broken pot lever spring.

Poor grade of metal. Also metal that has been robbed of its alloys by slovenly remelting methods and careless skimming.

Cracked pot lever cam roller anti-friction rollers.



## CLEANING OUT A BACK SQUIRT

This company is cognizant of the fact that, through negligence, carelessness or misadjustment of the casting apparatus, it is possible to have metal squirts on machines of its manufacture. It is our intention to present information in this booklet so that squirts may be prevented, and in the event they do occur, correct information may be had so as to properly take away the surplus metal and preserve the parts—especially the avoidance of damage to molds.

In cleaning out what is known as a back squirt, always be careful to remove the type metal in such a way as to avoid damaging molds.

Back squirts, theoretically, are never supposed to occur. The reason for their occurrence, such as high metal temperature, misadjustment of the pot lever, uneven mouthpiece lockup in relation to the mold, foul plunger, and so on, can be readily identified and remedied after a little thought.

Usually a back squirt is detected immediately after the cast. If the machine stalls, shut off the controlling lever as soon as detected. The vise can be opened and let down to second position and the mold slide pulled out to make the squirt accessible. Often a back squirt can be cleaned out by merely opening the vise to first position, disconnecting the mold slide from its cam lever by the handle in the plunger lever bracket, after which the mold slide can be pulled out from its normal position about two inches. This will be sufficient opening to make the ordinary back squirt accessible. There is no danger in getting the mold disk and its turning pinion out of time, because the extension teeth on the small driving pinion remain in mesh with the disk teeth when the disk is pulled out.

If it is necessary to let the vise down to second position, turn the machine by hand until the first elevator rests on the vise cap. If the machine cannot be turned by hand with the friction clutch arm, pull out on the knob to disconnect the pinion from the mold disk and slightly turn the knob until the pin in the mold turning flange is disengaged from the pinion, then turn the machine by hand with the friction clutch arm until the first elevator rests upon the vise cap. The object in having the first elevator rest on the vise cap is to make clearance for the first elevator lever roller at the lowest point of the cam, so the connecting link will

not be broken by the weight of the vise. Open the vise and pull out the vise frame rest knob in the machine base until the vise frame rest lug has cleared the stud, then let go of the stud and lower the vise frame rest lug upon the stud.

The mold cap may be removed by loosening the two swivel bolt nuts at either end of the mold and lifting the cap from the body with the forked wrench supplied for the purpose. Lay the cap down carefully to avoid rounding or nicking the edges.

Use a long piece of brass to remove the metal from the parts and *keep it away from the mold.* If a steel screwdriver must be used, see that it is blunt and has a rounded end. Carefully avoid gouging or digging it into any part of the machine.

Wipe all the mold and mouthpiece parts with a dry wiper cloth.

Sometimes a piece of metal will adhere to the disk in such a way as to block the wheel by wedging between the scraper back of the disk and the front lower end of the mold slide casting. If metal accumulates on or around the back knife carefully pry it loose without disturbing or injuring the back knife.

Having wiped the parts clean, return the liners and cap to the mold body, and have the mold which is being used at the time in position at the top of the disk; push the disk back in place so that the timing marks on the pinion and disk register with each other, raise the mold slide lever in the plunger bracket and close the vise.

### REMOVING A FRONT SQUIRT

A squirt consists of metal that has escaped the confines of the mold cell, flowing over the parts, either at the front or rear of the mold.

While it is not intended that metal squirts of any kind should occur, nevertheless a machine will squirt when some abnormal circumstance arises. This may be when the operator wilfully forces an overset matrix line into the vise jaws, because he is too shiftless to divide a word and thin-space the line, or because of misadjustment of the parts; or the vise automatic is not functioning as it should; or a matrix or spaceband may have lodged unnoticed in the vise cap in such a position that a tight lockup between the mold and matrix line cannot be had; again, in a loosely-spaced line one or more of the end matrices may squabble—that is, assume an angular position to the others of the matrix line, through the opening of which the metal can flow.



On machines that are equipped with the first-style two-letter first elevator slide filling piece, the operator may send over a line in auxiliary position, and in addition may have thrown the hinged filling piece under the first elevator. This will cause the matrix line to be held so high that the lower back matrix lugs will have contact with the front of the mold just under the casting cell and above the aligning groove. This prevents a tight seal between the mold and matrix line, causes a front metal squirt, damages matrices, may stall the machine, and sets up a strain between the parts which will not do the machine any good.

A device has been applied to Intertypes for some time past which prevents the operator from forgetting to throw the filling piece or new-style stop bar from under the first elevator head when using the duplex rail, either in whole or in part, in the assembling elevator. This device is known as the first elevator alignment stop bar.

The major problem in cleaning out a front squirt is to remove the metal in such a way as not to damage the mold or first elevator jaws.

As soon as the squirt is noticed, shut off the controlling lever.

If the vise cannot be opened, perhaps metal has gathered around the back jaw support. Take out the screws in the support and the two screws at the left of the elevator head, after which the back jaw can be released by gently prying with a *blunt* screwdriver. Don't force the back jaw, as it can be sprung easily, in which case trouble will be had with the lockup and also the transfer of matrices from the first elevator jaw to the second elevator. The metal-bound matrices can be lifted from the front jaw. If metal has entered the aligning groove of the duplex rail, use nothing harder for its removal than a piece of six-point brass rule, and with a small pig of metal or brass hammer tap the metal strip out endwise to the right side of the duplex rail.

In replacing the back jaw, match the left end evenly with the separating block and the front jaw. Never pound a back jaw to the key of the separating block. Squeeze the block and back jaw together by gentle pressure with the hands. Use a new pi matrix to test the space between the front and back jaws. If the back jaw has been assembled correctly with the separating block, and it seems to be slightly sprung, grasp the open end of the jaws and exert some pressure to bring it in line with the

front jaw again. In removing metal, great care must be used not to nick or damage the face of the mold or the aligning rail grooves. Sometimes it is better to take the mold body from its pocket in the disk in order to remove metal from the locking stud hole. Upon returning the mold body to its pocket, first wipe the mold base and pocket in the disk to remove any small particles of metal or dirt which would throw the mold out of proper alignment. Always use a piece of brass rule for the purpose of removing metal squirts. This rule is procurable in all composing rooms.

If matrices are metal-bound, especially in the tooth recess, to such an extent that they cannot be separated with the fingers, tie a cord around the bunch and dip only as far as necessary in the metal pot. Spacebands should always be immersed in cool water and polished with graphite after separating from the matrices in this manner. Unless this is done, the heat of the metal will likely draw the temper, making them unfit for use, because they will not stand the strain of justification.

### SLUG STALLS ON THE KNIVES

In case the operator forgets to set the knife block when changing the slug body or thickness of the slug (larger point size), the machine will stall at ejection. Before attempting to open the knife, back the machine until the mold disk is disengaged from the stud blocks, which will move the slug away from the knives upon which it is impinged; then move the right-hand knife to the proper setting. If the knife block lever is moved before the slug is backed away from the knives, the collar may become disengaged from the pilot screws. In case the knife block lever has been moved before the slug is backed away from the knives, the dial may be manipulated so that the holes in the dial will be put in engagement with the pilots on the adjusting screws after the disk is backed away and before the slug is ejected from the mold.

### CLUTCH TROUBLES

If the machine stops with a chattering noise, the leather clutch arm buffers may be tacky and force the automatic stopping pawl to depress the upper and lower stopping levers against the vertical shaft before the leathers are released from the inside rim of the driving pulley.



If the cams rebound slightly once upon stopping at normal position, it is an indication that all bearings and rollers are properly lubricated; that the clutch buffers are clean and the clutch is in proper adjustment, although the rebound of the cams will not occur on all machines that are in good condition.

If the machine starts with a loud noise there may be a dry cam roller bearing in the machine which drags the cams when the machine stops, and prevents the clutch releasing as soon as the upper stopping lever is moved to release the clutch.

If the space between the clutch shaft bearing and the forked lever is too wide, the clutch cannot be released soon enough to stop the machine smoothly.

If the clutch flange bears against the forked lever because the leather buffers are too thin, the machine will hesitate after the cast when the pot pump plunger should rise from the crucible well, and possibly at ejection. A weak clutch spring will give this same effect.

Greasy clutch buffers will cause the clutch to slip.

The clutch rod spring should not have too much tension. Its purpose in permitting the clutch to slip in case of accident will be defeated if the tension is increased too much by stretching the spring. The maximum length should not exceed five inches.

Never use belt dressing, rosin, printers' ink or any other dope upon the leather clutch buffers.

If the clutch flange is dry upon the clutch shaft and sticks, the machine may not start when the delivery slide is sent over to start the machine.

### CAUSES OF BENT MATRICES

There are several contributing causes for the bending of thin matrices in the distributor box, and each one can be identified and eliminated without a great deal of trouble. The most common cause will be found in misadjustment of the distributor box matrix lift, which will not have a high enough stroke to lift the matrix so there will be 1/32" clearance between the top corners of the upper rails and the underside of the matrix upper lugs or ears.

Should the lifting edge of the distributor box lift become rounded from long use, the lift will slip out of engagement with the matrix before having raised it the full distance. A lift can be reworked so as to present a sharp right-angle lifting surface

to the bottoms of the matrices. Sometimes merely dressing on a flat oil stone will be sufficient. If too badly worn, the lift should be annealed, which will permit it being filed. After filing, harden it again by heating the top part a bright red, then dip the end about one-quarter inch deep in water.

A cause for the bending of thin matrices will be found in the improper setting of the distributor box lift block, so that the lift does not have a "bite" upon the matrix of about .028".

The distributor shifter buffer will accummulate a gummy substance upon its face and should be wiped off regularly with a cloth saturated with gasoline. If there are one or two matrices in the box when the shifter is retracted, one of them may become bent because the gum on the buffer face throws the matrix slightly sidewise. The same effect will result if the distributor box front plate upper rail spring is broken off or is not fitted in such a manner that it does not bear against the matrices nearest the vertical faces of the upper rails as the shifter is retracted.

One of the common causes for bending thin matrices can be found in a worn or rounded bar point that does not properly hold down the second thin matrix as the first one is being raised by the lift.

It so happens that through accident an occasional matrix will become rounded at the bottom and slip from the lift. Discard such matrices. This is not likely to occur except in the case of very old matrices.

The lift spring may lose its tension so that the lift will not be held firmly against the matrices.

Neglect in oiling the distributor box lift lever stud and roller causes excessive wear upon these parts and the roller will become elliptical in shape, so that the upstroke of the lift will vary, causing the bending of thin matrices.

The slope of the distributor box lift lever cam, after a long time, may become worn down so that it will give the effect of causing matrices to be lifted out of time with the distributor screw threads.

The vertical faces or shoulders of all four box rails wear. This is equivalent to throwing the distributor screw threads out of time with the lifting of matrices. The wearing off of these vertical faces also widens the original space of 1/32" between the rails and the bar point. The bar point then appears to be too short. All four rails should be renewed at the same time.



# MISCELLANEOUS

## STAR WHEEL REMOVAL

A star wheel may be said to be worn out when it will not flip matrices to a vertical position in the assembling elevator. The corners of the spokes round off before the center part, owing to the fact that the sides of matrix bodies are hollow-milled. There is also a tendency for matrices to assume a position out of true or at an angle to the parts while being assembled. The star wheel will need renewal when worn down about one thirty-second of an inch.

To remove a star wheel on the spring-rail and the flanged-pulley types of assembler, take off the chute cover and its spring; turn out one screw in the front chute rail and lift off the rail. In the flanged-pulley type, loosen the screw for the chute top plate.

## OPENING VISE TO FIRST POSITION

There are two positions to which the vise can be opened. To open the vise to first position, merely turn the left and right-hand locking handles and let the frame down until it is supported near the lower end by the frame rest stud. With the vise in this position, the mold disk can be pulled out a distance of about two inches by first releasing the mold cam lever handle.

## OPENING VISE TO SECOND POSITION

To open the vise to second position, start the machine and shut off the controlling lever as the first elevator seats upon the vise cap, and before the mold disk has moved forward. With the machine in this position the vise can be lowered to second position because the first elevator lever cam roller will be opposite the lowest depression in the first elevator cam, and when the vise is let down, the weight of the vise frame and first elevator slide will not be taken by the lever. Next, hold up the vise slightly and pull out the knob to retract the vise frame rest in the machine base. After the lug at the bottom of the vise frame has passed the rest, release the rest knob, which will be moved back to original position by a spring; then let the vise down again until it engages the frame rest. Disconnect the mold cam lever handle, disengaging the cam lever from the mold slide. Disconnect the ejector lever link by taking out the wing pin which connects it to the ejector

lever, disengaging the link from the ejector slide, and lift it out of the machine. The new-style ejector lever link is notched to fit over the wing pin where it engages the wing pin in the lever and has an extension to serve as a handle when lifting it out of the machine. The mold disk may now be pulled forward away from the metal pot. The mold slide may be removed from the machine while the vise is in this position.

### CLEANING PLUNGER AND WELL

The pot plunger fits in the pot crucible well with little clearance between the parts. After several hours operation a dross coating forms in the well. The plunger and well must be cleaned daily. If neglected too long the output of the machine will be seriously affected. For this reason the oxide coating which accumulates must be removed from the plunger with a stiff wire brush; the well must also be cleaned at the same time by the use of a hand scraper or rotary brush. These tools are made in several forms, any one of which is suitable for the purpose. If the rotary wire brush is used always turn it clockwise in the well, to avoid breaking off any of the bristles which might remain submerged in the metal and later cause the plunger to stall the machine while being raised after making its casting stroke. Before replacing the plunger clean out the two intake holes which are apt to clog with dross, using for this purpose the hooked end of the pot mouthpiece wiper. A rotary scraper is also made, consisting of two or three flat blades mounted on a turning rod, which bear against the side wall of the well under spring tension.

### BURNER AND GAS GOVERNOR

In regulating the pot temperature, the center pot burner and the mouthpiece burner are the controlling factors. The best slugs are secured if the pot temperature is a little lower and the mouthpiece temperature a little higher than is commonly considered correct, namely, 550 degrees. The plant pressure governor is adjusted by adding to or removing weights from the governor diaphragm, in the case of an artificial gas governor; or by a screw adjustment on the valve stem, in the case of a natural gas governor. The mercury around the edge of the diaphragm acts as a seal only. The gas pressure at the burner should not exceed 1″ (water). Adjust the temperature governor which is attached to the pot by means of the thumb screw provided. Go



slow when making adjustments, allowing half hour intervals between such changes to insure completion of the effect.

Once every three or six months remove the burners (including the mouthpiece burner tube) from the machine. The mouthpiece burner accumulates dirt and dross, which should be brushed off. The perforations in the tube can be opened with a small drill or wire. The main burner, also, accumulates dirt and objectionable oxides which affect the heating power of the flame and render temperature control difficult.

The burners are conventiently fastened to the feed pipes with small unions that make it easy to take them out.

After the burners are removed, wipe out the heating orifices under the crucible with a cloth swab. Do not attempt to take the top plate from the main burner after it has been in use for some time, without having on hand an extra top plate and bolts and nuts which hold the parts together. The plate and screws become brittle from the heat and may crack. When replacing the parts after they have been cleaned thoroughly with a wire brush, coat the top plate and nuts with graphite grease, so that the next time they are removed the parts will separate easily.

The flames from the gas burners should be of a greenish-blue color, indicating thorough oxygenation of the gas while passing through the burner mixing chambers. A yellow color indicates a lack of oxygen and the flames will deposit lampblack or carbon on the crucible, and if the coating is heavy enough, will act as an insulator.

The Intertype crucible is fitted with separate flues for the pot and mouthpiece burners. This dividing wall is so arranged that the fumes of combustion from the main pot burners do not affect the mouthpiece burner flame, but pass by into the pot chimney.

The average casting heat of metal is from 525 degrees to 550 degrees F. A 5-point slug will require a higher temperature (575 degrees) and a 14-point slug (525 degrees). These are given as average figures to indicate the difference in metal temperatures between extreme slug sizes.

When first starting to heat the metal, in a gas-heated metal pot, turn on the flame gradually. Too rapid heating may cause the crucible to crack, as the metal at the bottom of the pot will melt and expand with such force that either the crucible will crack or the metal will be forced through the pores in the iron

and drop down on the burner. The Intertype crucible will not crack readily because of the auxiliary burner, but it is well to be careful not to try to heat the metal too quickly.

### MOUTHPIECE AND MOLD PARALLELISM

Depending upon the casting heat used and the nature of composition being done on the machine, the metal pot mouthpiece may occasionally become warped out of parallelism with the mold. If this condition is present, metal will escape between the mouthpiece and mold, causing back squirts. The mouthpiece must then be filed or dressed true again. To determine whether or not the mouthpiece is warped, use a Prussian blue or red lead test. Either of these powders are mixed with machine oil to the consistency of thick cream.

Proceed as follows: Run the machine ahead until the first elevator rests upon the vise cap, lower vise to second position, disconnect the pot pump plunger pin, lower mold cam lever handle, disconnect ejector lever link from the ejector lever; withdraw mold slide until the disk is out of engagement with the mold driving pinion.

Inspect the back of the mold and scrape off any metal that may have accumulated on its base; also wipe the mouthpiece. Apply either Prussian blue or red lead to the back of the mold with a cloth folded into a square about two inches wide; with the mold in horizontal position at the top of the disk, push mold slide back until the disk is again in engagement with the driving pinion; raise mold cam lever handle and close the vise; it is not necessary to connect the ejector lever link. Go around to the driving clutch and turn the machine ahead until the pot contacts with the mold through pressure caused by the short pot cam shoe; pass the cam shoe back and forth over the pot lever roller two or three times, then back machine until the mold disk has retreated from the vise and stop it just before the first elevator rises from the vise cap. Open the vise and pull out the mold slide; look at both the mouthpiece and back of the mold to determine the contact of the two parts. If the mouthpiece shows contact at either end, or if it touches only in the center, it is warped; if spotty along its entire length it will need dressing with a file or an aloxite stone. Prior to using a stone on the mouthpiece soak it in machine oil to prevent steel particles filling the pores.



If the mouthpiece shows a transfer impression at one end only, in all probability one of the pot legs will need adjusting to bring the other end of the mouthpiece nearer the mold.

To bring the left side of the mouthpiece closer to the mold, the left pot leg must be moved forward by turning out the rear screw at the back of the leg and following up by turning the front screw in the same amount. Adjust the screws not more than half a turn each time. Several impressions may have to be taken and the pot leg adjusted each time before a true relation of the mouthpiece with the mold is obtained. Always tighten the pot leg adjusting screw nuts to prevent them working loose.

Never jam the adjusting screws very tight against the bushing, just bring them up enough to take out any play between the parts, but *do* tighten the check nuts.

There is a screw in each pot leg at the side which support the pot upon the bushings and are adjustable in order to raise or lower the mouthpiece to align the jets with the smooth side of the slug, which should show round and full on the slug base.

If the pot is to be adjusted for height, first loosen the screw underneath the pot leg in the center of the leg cap. This screw complements the adjustment of the upper adjusting screw.

If the pot leg adjusting screws have been moved very much, always look at the relation of the pot lever cam roller with the two main cams between which it rests on the pot cam. Sometimes, if the screws have been adjusted considerably, the pot lever will be swung to one side so much as to rub one of the cams, preventing proper lockup of the mouthpiece against the mold.

Lubricate the pot leg bushings on the regular oiling day.

### THE POT LEVER

Occasionally (from three to six months) the pot lever should be removed from the machine. The purpose in removing it is to clean and lubricate the cam roller, the roller pin and the nine anti-friction rollers contained within the large cam roller.

The lever can be removed from the machine by placing a pig of metal or block of wood between the pot jacket lug and the pot pump lever cam roller. The object in doing this is to transfer the weight of the metal pot from the pot lever cam roller to the pot jacket lug. Grasp the pot balancing spring and jerk it out with a quick motion. Loosen the wing pin holding the lever eye-

bolt to the lug underneath the pot and take it out. Loosen the pot lever shaft set screw in the pot jacket lug. Pass a screwdriver through the hole in the end of the pot lever shaft. If the machine is equipped with first-style pot lever spacing washers which locate the lever between the mold cam and driving gear and the pot pump cam, it will be necessary to catch them as the shaft is withdrawn. If the lever is fitted with the screw pin entering the lever shaft through a slot in the top of the lever, the screw pin will have to be removed before withdrawing the shaft. Support the pot lever at its lower end as the shaft is pulled out. The pot lever can now be lowered and taken out from beneath the metal pot. Do not disturb the adjustment of the eyebolt nuts.

Place the lever on a convenient bench or work-top. Turn out the set screw and withdraw the pot lever cam roller pin to release the roller, the nine small anti-friction rollers and two thin washers which separate the rollers from the pot lever. Wash all the parts in kerosene, including the lever. If any of the anti-friction rollers are crazed or broken, replace with new ones.

Lay the cam roller down upon a flat surface and put in one washer; coat the inside of the space around the edges with stiff graphite grease, set the cam roller pin end up in the center; squash in the nine anti-friction rollers, finally placing the other thin washer on top of the anti-friction rollers. Wipe off any surplus grease. Withdraw the cam roller pin. The stiff graphite grease will hold the nine small rollers in place while returning the assembled cam rollers to the pot lever. After inserting the cam roller and pin in the pot lever tighten the set screw against the cam roller pin.

At this time thoroughly clean out the two oil holes at the top of the lever bearing which lubricate the pot lever shaft. Return the lever to the machine in reverse order from that used in its removal.

The pressure exerted by the pot cam against this roller through tension of the pot lever spring is tremendous, and periodical attention should be given so that the lever will always have proper lubrication. If the anti-friction rollers become cracked and broken, back squirts will occur.

### SETTING SECOND ELEVATOR TRANSFER

Setting the second elevator transfer means that the first elevator must be aligned for height so that the matrix teeth will



register with the second elevator bar, and the bar must be adjusted horizontally so that there will be no sidewise friction of the matrix teeth with the bar teeth.

The adjustments for this transfer have been made easily accessible so that anyone with a little patience can adjust the parts. These adjustments are highly important for the reason that if matrix teeth are out of register with the second elevator toothed bar while being transferred, they will be worn down and consequent distributor troubles will be had. A matrix can only distribute as perfectly as the teeth in the v-shaped recess at the top of the matrix will permit.

To begin with, there isn't much use in attempting to set a second elevator transfer if the first elevator back jaw is kinked or deflected away from the front jaw, which condition will permit matrices to slur the end of the second elevator toothed bar. Using a *new pi matrix,* see that the first elevator back jaw is properly spaced with the front jaw at the right-hand end so that the matrix will pass in and out of the jaw freely without extra play. After having seen that the back jaw is in proper order, look at the second elevator bar. If there are burrs at the receiving end of the teeth, carefully dress them out with a fine three-square needle file, being particular to preserve the angular pitch of the teeth.

Remove the front and back first elevator jaw detents so they will not throw the new pi matrix out of alignment while testing adjustments.

With the machine in transfer position and a *new pi matrix* in the first elevator, place a lamp on top of the transfer channel opposite the second elevator bar plate and to the left of the spaceband transfer lever so as to illuminate the interior of the transfer channel. Push the new pi matrix close to the second elevator bar, but not engaging it. Look through the first elevator jaws from the left end, and the position of the new pi matrix in relation to the end of the second elevator bar can be noted. The lamp placed on top of the transfer channel will enable you to see the light between the matrix and bar teeth. If the matrix teeth are too high or too low to match the bar teeth, raise or lower the first elevator by means of the adjustable stop screw in the stop bar at the lower end of the slide. To adjust horizontally, loosen the fastening screw in the lower guide and

turn the two screws. Moving these screws positions the lower guide plate against which the second elevator bar plate angle piece rests.

### SETTING SIDE KNIVES

The left-hand or stationary knife should be first set so as to just trim off any fins or fine metallic slivers at the top of the smooth side of the slug. Loosen the two square-head anchor screws at the front of the vise frame. The two square-head center screws hold the right-hand mold disk locking stud block in place, and to loosen the left knife, turn out on the top and bottom square-head anchor screws. The bow spring between the knife and the mold disk locking stud block will cause the knife to follow adjustment of the two screws passing through the knife block from the right. Tighten the anchor screws after each manipulation of the adjusting screws and cast another slug which can be calipered to see what effect movement of the adjusting screws has had upon the knife. Then set the right-hand or movable knife to trim the rib side of the slug. In other words, the right-hand knife must be exactly parallel to the left-hand knife setting.

The right-hand knife may be adjusted by loosening the two small jam screws in the knife and turning the two adjusting screws a little at a time until parallelism is obtained. After having adjusted the knives, always tighten the nuts on the adjusting screws to preserve the settings. Interposed between the jam screws and adjusting screws are placed small copper plugs. The plugs prevent the jam screws injuring the adjusting screw threads.

### SETTING THE BACK KNIFE

The back knife is mounted on a bracket behind the mold disk at the left side of the mold disk bearing. When properly adjusted, it will trim the bases of all slugs so they will be of even height, or .918″. Two screws clamp the knife to its supporting bracket. The cutting edge of the knife must be set as closely as possible, but must never press against the back of the mold.

When adjusting the knife, assemble a 30-em line of capital letter matrices. Lock the spaceband transfer lever pawl and recast from the same matrix line between adjustment of the screws until the setting of the knife has been completed. The outside adjusting screw regulates the position of the left side



of the knife which trims the outer ends of a 30-em slug base. The inside adjusting screw regulates the position of the right side of the knife which trims the central part of a 30-em slug base.

If it is not convenient to use a 30-em slug while setting the knife, a 15-em slug will do. In this case, moving the outside adjusting screw will position the knife to cause its left side to trim the right portion of the slug base, and turning the inside adjusting screw will cause the right side of the knife to trim the left side of the slug base.

### SIZES OF TYPE

In the setting of side trimming knives, the basis of .014″ to the point may be used, which greatly simplifies the mathematics and for all general purposes will be close enough. However, if undersize trim is desired, it is a simple matter to so adjust the right-hand trimming knife.

| | | | | | |
|---|---|---|---|---|---|
| Pearl | 5 point | .070″ | Bourgeois | 9 point | .126″ |
| Agate | 5½ point | .077″ | Long Primer | 10 point | .140″ |
| Nonpareil | 6 point | .084″ | Small Pica | 11 point | .154″ |
| Minion | 7 point | .098″ | Pica | 12 point | .168″ |
| Brevier | 8 point | .112″ | English | 14 point | .196″ |

### SOME NOTES ON THE MIXER DISTRIBUTOR

If excess oil has fouled the distributor screws, clean them with strips of cloth saturated with gasoline. The middle conveyor screw can be cleaned with a watchmaker's brush while the distributor is running under power. Before cleaning the screws, cover the channel entrance and the tops of the magazines with newspapers or pieces of wiping cloth.

Wipe the top of the second elevator bar plate clean and keep a thin film of oil spread over the top so the bar plate will pull back into its seat properly. If the bar plate becomes dry or gummy, the end of the second elevator bar will not match the outside end of the distributor box bar, and matrices will not transfer into the box freely.

See that the taper pin holding the tripping lever upon its shaft has not worked loose before attempting to set the feeler points. When adjusting the feeler points take up all lost motion of the arms upon the shaft by turning the adjusting screws against the shaft and then back one of them away about one-eighth turn

If a feeler point becomes bent, the distributor box will be caused to work back and forth constantly, just the same as if a wrong font or reversed matrix should be put in the line. The point can be straightened with a pair of duckbill pliers.

Do not trip the font selector arms by hand while matrices are being raised by the lift into the distributor screws, for the reason that one of the feeler points may become bent.

The clutch should not be tripped and thrown into action until a matrix has been started forward upon the lift or stationary rails by the conveyor screws.

If a matrix fails to be lifted into the screws possibly the lift does not have enough bite upon the matrix. The small block which regulates the inward position of the lifts may be adjusted to permit the lift to "bite" matrices about .028" or the thickness of an average 6-point thin space.

The tension of the distributor box bar point spring must not be so strong that the lift will stall while raising a thick matrix into the distributor screws.

The spring on the shifter gear link slide provides a cushion over-throw for the distributor box as it comes to position. The spring on the shifter link permits the link to become disengaged from the shifter gear stud in case of a jam caused by the box parts striking an obstruction while swinging from one distributor to the other.

## LEVELING THE DISTRIBUTOR

Good distribution of matrices is dependent to a very great extent upon the level position of the distributor. First of all, the machine itself should be tested by placing a small level upon the keyboard bracket before the keyboard has been applied, or upon the vise cap. Place the level in both left-and-right, and front-and-back positions. The level should always indicate a true front-and-back position, but the clutch side of the distributor may be a trifle higher than the box side, which will cause matrices to be supported by the lower distributor screw as they travel along the combination bar. Thin strips of leather or wood may be used to level the machine.

After having tested the machine as above, place the level lengthwise upon the back distributor screw to determine if the screws are properly leveled to correspond with the position of the machine. The distributor beam rests upon the distributor



bracket by means of two adjustable screws at either side of the beam. If the machine is level and the conveyor screws are too low at the clutch side, adjust the outside beam screw.

## KEEP DISTRIBUTOR SCREWS CLEAN

It has been mentioned in several places in this book that surplus oil applied to the distributor conveyor screw bearings will flow out upon the ends of the screws and into the threads. This oil will then be transferred to the lugs of all matrices coming into contact with the screws. Oil may also be caused to foul matrices, not only by an excess application to the screw bearings, but also by too free use of it in the assembler bearings and the mold wipers. A little care exercised on oiling day will obviate the troubles incident to this cause of contamination. Matrices cannot drop freely from the magazine when their lugs have been fouled with oil.

In order to clean the screws, open the channel entrance and cover it and the magazine with a protective cloth; hang a weight upon the distributor clutch lever. While the distributor is running under power, strips of cloth or a watchmaker's brush saturated with benzol or high test gasoline may be used to clean off the oil. In any event, keep the screw threads clean and dry. The best plan is to avoid the application of too much lubricant in the bearing oil holes from the oil can spout. A periodical cleaning of the distributor screws is beneficial.

## THE BASE AND MAIN CAMS

The Intertype machine is built upon a low base which weighs approximately 400 pounds and is designed to eliminate vibration. At the right on the base is mounted the column which carries the distributor bracket and other main frame castings, including the pot pump bracket.

The main cams are carried upon a large cam shaft which is supported by two heavy brackets at the rear of the machine base. All of the large operating levers are controlled through the movements of the main cams, over the contours of which the lever rollers travel to transmit the various motions to the levers. The lever cam rollers are of suitable high grade steel. Some of the cam surfaces are reinforced with hardened steel shoes at points of heavy pressure to resist wear.

There are ten main cams upon the cam shaft, and these are described below in order from the right, standing at the back of the machine. With the exception of the first elevator cam (No. 1) and the delivery and elevator transfer cam (No. 10), they are bolted together with ⅝" bolts. Some of the cams are keyed to the shaft and others are slipped over one another at the bearings from the right.

**Cam No. 1.**—First Elevator Cam. This cam permits the first elevator to descend from normal to casting position, raises it slightly through compression of the spring in the first elevator slide link, raises it to transfer position where the matrix line is moved into the transfer channel, and then permits the elevator to descend again to normal position.

**Cam No. 2.**—Distributor Shifter Cam, operates the distributor shifter outwardly as the second elevator bearing the matrix line comes to position at the distributor box. The cam then permits the shifter to push the matrices from the second elevator into the distributor box. The distributor shifter cam rider is not fitted with a cam roller because there is not much of a throw in its movement.

**Cam No. 3.**—Mold Turning Cam determines the turn of the mold in the mold disk from normal to casting and from there to ejecting positions. There are two toothed segments upon this cam. The short segment turns the mold through a quarter revolution of the disk from normal to casting position, and the long segment turns the mold disk through three-quarters of a revolution from casting to ejecting position. The mold turning cam is cast together with the vise closing cam.

**Cam No. 4.**—Vise Closing Cam has two functions. One of these functions is to close in the left vise jaw slightly at the time of justification through the vise closing mechanism and open it after the slug is cast, so the justified matrix line can be lifted without friction from the vise jaws. The other function is to assist in driving the spaceband wedges upward to justify the matrix line tightly between the vise jaws before a slug is cast. This is sometimes called the second justification.

**Cam No. 5.**—The Justification Cam operates the first justification lever, which in turn actuates the pump stop. This cam is cast together with the second elevator cam. The justification lever is actuated by a powerful spring as the cam revolves.



**Cam No. 6.**—The Second Elevator Cam permits the second elevator to be lowered to transfer position where it receives the matrices from the first elevator. The cam then raises the elevator to normal position at the distributor. The second elevator cam is the largest of the group.

**Cam No. 7.**—The Pot Pump Cam permits the downstroke of the pot pump plunger which forces metal into the mold and then causes the plunger to rise again to normal position. The front edge of the dip in the cam which permits the pump lever to descend is reinforced with a hardened steel shoe to resist the wearing action of the pump lever cam roller.

**Cam No. 8.**—The Pot Cam. Through the pot lever, this cam moves the metal pot forward so that its mouthpiece will lock tightly against the mold to make facewise alignment of the matrices. The pot is then permitted to recede slightly from the mold to permit the justification levers to drive home the spacebands. The pot cam then moves the pot mouthpiece against the mold just before the pump plunger descends to cast the slug. The pot is locked against the mold with a yielding pressure of the pot lever, which is interposed between the pot cam and the metal pot. The spring not only acts as a safety device in case of an obstruction to the action of the pot locking against the mold, but also provides a means of positively sealing the mouthpiece and mold at the time of the cast that would not be possible under any other conditions. The compression crowns of the pot cam are fitted with hardened steel shoes to resist wear.

**Cam No. 9.**—The Mold Cam and Driving Gear. The driving gear meshes with the driving shaft pinion mounted directly underneath, through which motion is imparted to all the cams upon the shaft. The mold cam is within and at one side of the driving gear and operates the mold slide, to advance the mold disk to the position in which the matrices are aligned and a slug is cast. This cam returns the mold disk after a slug has been cast and advances it again to ejecting position, finally returning it after the slug is ejected. The mold cam and driving gear also carries the pot return cam, which withdraws the pot from the mold after casting; it also carries the ejector lever cam, actuating the lever which ejects the slug from the mold.

**Cam No. 10.**—The Delivery and Elevator Transfer Cam are cast together. The rollers on the delivery and elevator transfer

levers ride against these cams with a sidewise point of engagement. After the delivery slide has conveyed a matrix line to the first elevator, the cam, through the delivery lever, returns the slide to normal position. The slide is caused to start back to normal position quickly by a sudden rise in the cam.

The elevator transfer lever cam roller has a similar point of engagement with the elevator transfer cam to that of the delivery lever cam roller. The cam, through the transfer lever, operates the transfer lever slide finger which moves the matrix line from the first to the second elevator.

Attached to the transfer lever is the spaceband transfer lever which returns the spacebands from the transfer channel to the spaceband box. The spaceband transfer lever receives all its motions from the elevator transfer lever through a turnbuckle connection inside the machine column.

Cam No. 10 also carries the automatic stopping and safety pawls. The automatic stopping pawl compels the clutch to be thrown out of action so as to stop the machine at normal position after making one revolution. The automatic safety pawl, through the same mechanism, stops the machine in case of a distributor stop or should anything prevent the complete transfer strokes of the first and second elevators, which on being obstructed, prevent the transfer lever cam roller pushing the automatic safety pawl from the upper stopping lever.

A lug on cam No. 10 returns the ejector lever to normal position after the ejector has pushed a slug from the mold through the side trimming knives and into the slug galley.

There is a pad upon the surface of the cam which depresses the second elevator safety pawl clear of a lug on the second elevator lever so the elevator can descend when a distributor stop does not obstruct its free descent. The safety pawl functions to hold up the second elevator a short distance lower than the distributor box while a distributor stop is being cleared away. It also functions should anything momentarily hold up the second elevator and prevents its dropping down upon the transfer channel in case the machine has traveled as far as transfer position.

## CARE OF THE MAIN CAMS

The main cams will be particularly trouble-free if given a small amount of attention regularly. The cam surfaces should be cleaned once a week immediately after oiling day, with kerosene and a wiping cloth, afterwards wiping the cams dry with another cloth. The dirt, metal bits and gummy accumulations which might cause the cam rollers to slip should not be permitted to foul the cam surfaces. If the cams are wiped clean and dry the next day after the machine has been oiled, enough of the oil will work out from the cam roller bearings to keep the cams slightly moist the balance of the week.



Keep the cams *clean* at all times and never squirt oil upon the cam surfaces.

Put a little oil on the felts of the mold turning cam, pot pump cam and pot cam wipers when oiling the machine.

It is a good plan to insert the end of a wire in the oil holes of all the cam roller bearings before putting fresh oil in them, to remove the dirt which might stop the oil holes and cause the cam rollers to cut the cams. A dry cam roller bearing will bind the roller which may wear flat spots on its outer surface and cut the cam face.

## INTERTYPE BORDER SLIDES

Border slides are strips of brass with rules or designs punched throughout their length. They are held in place before the mold by a matrix slide block. This block is shaped like a line of matrices, and slides into the first elevator jaw in the same way. It has a slot for holding the slides, which are interchangeable, so that one block can be used in connection with any number of slides, bearing different designs.

Slides and slide blocks can be supplied in any length desired, up to and including forty-two ems.

All Intertype slides can be used in other slide blocks and other slides can be used in the Intertype blocks. The standard slide and slide block are thirty ems long. All rules cast on the constant or smooth side of the slug unless otherwise specified. In casting slugs from border slides, from a 30-em block set the vise jaws for 30½ ems so that a spaceband or two can be put at the left end of the line. In this way the matrix slide block will be justified just like ordinary matrix lines.

## INTERTYPE BORDER MATRICES

One and two-letter border matrices are exactly similar to ordinary one and two-letter matrices, and are assembled in lines in the usual way. No extra equipment of any kind is required.

By combining matrices carrying different designs, an almost unlimited variety of borders can be produced. Border matrices always run pi but can have special combination teeth cut to run in the magazine. This, however, is rarely necessary and will be done only on special request of the customer. In casting border slugs from matrices, set the vise jaws for 30½ ems so that a spaceband or two can be put at the left end of the line. In this way border matrices will be justified just like ordinary matrix lines.

### MATRICES

If a matrix produces a hair-line, or develops any other defect, it should be removed from the magazine immediately. Take a proof of the complete font occasionally, by running out all the matrices in alphabetical order and pulling a press proof of slugs cast from them in such order.

*Keep the matrices away from oil, grease and dirt.*

When a matrix has been dropped, it should be picked up immediately. If it is stepped on or otherwise mistreated it is likely to cause hair-lines.

Special keyboard layouts, and matrices cut to correspond, can be furnished for any special work required.

### ORDERING MATRICES AND OTHER SUPPLIES

Be sure that your order contains all information necessary to fill it correctly. Many orders are delayed daily because they are unsigned or because they do not specify exactly what is required. For instance, customers write for "One 8-point liner," without mentioning the width of slug to be cast; "Matrix border slide No. 134," without mentioning the width desired; "One font of Century Expanded with Century Bold," without specifying the size: "Sorts matrices of the following characters," without giving either the size or face with which they are to be used. Such omissions often cause expensive delays, which can be prevented only by care on the part of those who write the orders.

Follow carefully the instructions for ordering which are printed in the Intertype Parts and Supplies Catalog and the Matrix Specimen Book.

If it is necessary to telegraph for supplies, please send the telegram as early in the day as possible, so that it will surely be delivered in time to insure shipment the same day.



## HINTS FOR OPERATORS

It is not feasible to give a course in machine operation in this book, but a few important suggestions will be of value.

The art in operating an Intertype keyboard to obtain maximum production lies in successively touching the key buttons evenly and smoothly so that matrices will come to rest in the assembling elevator in their proper sequence. Consistent practice and faithful application of the principles of a touch system will bring this about.

It is not necessary to watch the keyboard keys after having mastered a touch system of operating, as the fingers will automatically locate the keys. The eye will be free to watch the copy and the assembler. Nervous and physical energy will thus be conserved for the important task of concentration upon the copy being set. After a time, the operator will develop a sixth sense which will enable him to detect the failure of a matrix to properly respond to the keyboard touch.

If a touch system of operating has been adopted, the operator while working on straight matter, can assemble matrices so rapidly that alterations may be made in the line, or the line can be thin-spaced without always interrupting the continuous operation of the machine.

The Intertype Corporation is interested in the fingering methods used in operating its machines. We strongly urge our customers to see that their operators adopt a scientific operating system, for the reason that the correct fingering of a keyboard has become a highly specialized vocation. There are a number of schools devoted to this purpose. The Intertype Corporation maintains a school for its customers in Brooklyn, in which is taught a scientific method of operating the keyboard.

**Endeavor to Operate Evenly.**—Control the movements of the fingers so that the intervals between the dropping of matrices will be evenly timed. If a matrix fails to respond, do not impatiently pound the keybutton. Identify the cause of non-response and eliminate it. Nothing can be gained by losing your temper and pounding the keybutton or the magazine, besides, you might spring the magazine top plate. For causes of non-response of matrix see page 56.

**Proper Spacing of Matrix Lines.**—A good operator always fills out the matrix line as much as possible and avoids crowding more matrices into a line than will freely go in. If necessary, insert thin spaces between the words to fill out the line. It is just as easy to thin-space lines correctly on an Intertype as it is when setting type by hand. Any spacing effect may be obtained by the use of suitable spacebands which are made in various thicknesses for all kinds of composition.

**Neatness About the Keyboard.**—The beginner should acquire neat and orderly habits about the keyboard. Keep all the spacebands in their proper place in the spaceband box. Do not let them fall to the floor or accumulate upon the keyboard tray. A small receptacle, called a pi box, is furnished with the machine and is intended to be used for depositing portions of an overset matrix line or a wrong matrix. It is, however, only intended as a convenience and a temporary repository for a few matrices. Keep all the matrices in their respective magazines.

**Changing Magazines.**—Before making a change of magazine see that all matrices belonging to the magazine about to be changed have been removed from the keyboard and have cleared the distributor bar. In this way the annoyance of wrong fonts will be obviated.

**Transpositions.**—If transpositions occur in proofs, make sure that the fault is not due to careless slurring of the keybuttons. Then consult the list of causes for transpositions on page 60 of this book.

**Pot Crucible Metal Level.**—It is important that the metal level be maintained as high and constant as possible to insure solid body and good face slugs. When the metal is permitted to run low, the plunger is apt to become coated with excess dross, porous slugs will be cast and metal squirts may occur. The thermostat which controls the temperature of the metal is not as accurate in operation when the metal level in the crucible is low. All of these annoyances seriously affect the quality of the output and cut down machine production. The level of the metal should be maintained close to one-half inch from the top of the crucible casting. It is extremely desirable, where metal pots are fed by hand, that one pig at a time be put in the crucible at regular intervals. Replenishing the metal supply with several pigs at one



time will cause the temperature to drop to such an extent that the chilled metal may cause the mouthpiece jets to become clogged which will result in imperfect type faces and slugs.

**Avoid Handling Matrices** and Spacebands as much as possible. Some operators' hands perspire freely and this moisture will be transferred to the matrices and spacebands as well as the keyboard keybuttons. Frequent washings with ordinary household cleaning ammonia will keep the keybuttons clean.

**Distributor Stops.**—If the distributor stops frequently, consult the causes therefor in the chapter pertaining to the distributor. When opening the channel entrance pull it towards you gently until about one-half inch away from the magazine, then open it quickly. This will prevent matrices sliding flatwise into the magazine. After the matrix causing the distributor to stop has been cleared away, close the channel entrance *gently*.

# INDEX

## Intertype Branch Offices

Orders for Matrices, Supplies and Accessories, will be most promptly filled when directed to the Branch Office nearest you. The location of Branch Offices and the Territories covered by each is given below.

### EASTERN TERRITORY

**360 Furman Street, Brooklyn, N. Y.**

| | | |
|---|---|---|
| Connecticut | Massachusetts | Rhode Island |
| Delaware | New Hampshire | South Carolina |
| Dist. of Columbia | New Jersey | Vermont |
| Maine | New York | Virginia |
| Maryland | North Carolina | West Virginia |
| | Pennsylvania | |

### MIDDLE WESTERN TERRITORY

**130 North Franklin Street, Chicago, Illinois**

| | | |
|---|---|---|
| Colorado | Kentucky | North Dakota |
| Illinois | Michigan | Ohio |
| Indiana | Minnesota | South Dakota |
| Iowa | Missouri | Wisconsin |
| Kansas | Nebraska | Wyoming |

### SOUTHERN TERRITORY

**1007 Camp Street, New Orleans, Louisiana**

| | | |
|---|---|---|
| Alabama | Georgia | Tennessee |
| Arkansas | Louisiana | Texas (except |
| Florida | Mississippi | El Paso) |
| | Oklahoma | |

### SAN FRANCISCO TERRITORY

**500 Sansome Street, San Francisco, California**

| | | |
|---|---|---|
| Alaska | Idaho | Oregon |
| Northern California | Montana | Utah |
| Hawaiian Islands | Nevada | Washington |

### LOS ANGELES TERRITORY

**1220 South Maple Avenue, Los Angeles, California**

| | | |
|---|---|---|
| Arizona | Southern California | New Mexico |
| | El Paso, Texas | |

**Distributors are located throughout the world**

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