

Operating Manual  
for the  
Ludlow Typograph

*Prepared By*

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WEYMOUTH VOCATIONAL SCHOOL

EAST WEYMOUTH, MASSACHUSETTS



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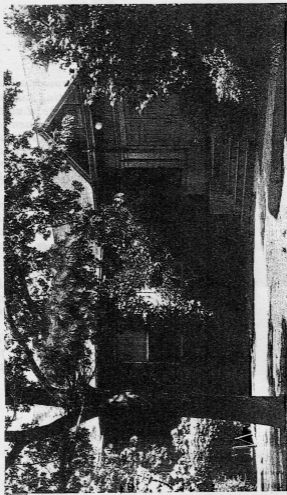
Printed by the Students of the Printing Department  
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**T**HE aim of this booklet is to provide a basic source of information for printing students and other new operators of the Ludlow machine. As such it covers all the essentials of equipment, operation and maintenance likely to be needed by the average operator, yet avoids details of many specific applications of the Ludlow system peculiar to individual printing plants.

In its preparation many sources have been consulted to enlarge upon and verify the author's personal experiences with Ludlow equipment during a period of over twenty-five years.

Grateful acknowledgement is made to James A. Westhaver and Warren E. McGuire of the New England Office of the Ludlow Typograph Co. for their cooperation and suggestions.

If this in some measure fills a long-existing need for a printed instruction guide for Ludlow operators, the effort of its preparation will be well rewarded.



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## Operating the Ludlow

The Ludlow machine is designed to produce hand-set composition of display type faces in slug form and to produce ruleforms of a quality comparable to wax ruling. The machine casts slugs by means of hand-set matrices. It is particularly adapted to casting display lines up to 96 point, and individual letters up to 240 point in size.

Considerable speed is attained in setting Ludlow mats as compared to setting foundry type, with the additional advantage that the Ludlow product presents a new printing face for each job, and can be produced in unlimited quantities speedily and economically. Furthermore, the machine occupies little floor space, has few moving parts, and because of its mechanical simplicity is relatively free from shut-downs due to mechanical trouble.

**MATRIX CASE**—The cases provided for the Ludlow are of two-thirds size, double-cap design, with boxes of sufficient size to hold all the mats usually furnished in fonts up to 48 point size. Large-letter cases are furnished for sizes above 48 point in which the mats are placed in horizontal rows similar to the method of storing wood type in regular type cases. Ludlow cabinets are built to hold the cases on an angle for convenience in setting, and to keep the mats from falling in disarray. The cases pull sidewise from the cabinet and are not removed when setting, being equipped with a mechanical stop to hold the cases fully extended without danger of them falling from the cabinet.

**SETTING THE LINE**—In setting the brass mats, the compositor uses a device called a stick, in much the same way that type is ordinarily set by hand. The stick is held in the left hand with the locking screw away from the operator and with the pica scale to the left. The

brass mats are taken from the case with the first two fingers and thumb of the right hand and set in the stick with the punched character toward the bottom and the reference mark upward.

**GATHERING METHOD**—When setting type of small size so that the mats may be conveniently handled, use of the "gathering" method is recommended. It is faster and requires less effort by the operator.

**JUSTIFYING THE LINE**—The locking screw on the end of the standard stick permits setting to any desired measure. Unlike ordinary type setting, the spaces and quads necessary for justifying the line are not inserted until after the letter mats have been set. The pica marking along one side of the stick indicates what spaces are needed to space the line to the desired measure. If the line is short, or to be centered, large quads are used at one or both ends, as in regular type composition. More recently a self-centering stick has been developed. This permits automatic centering and quadding without the use of spaces or quads. An important time saver is to carefully read every line in the stick before casting. The reference marks on the matrices are legible and can be quickly read. To develop speed it is *essential* that the lines are set *right* the first time.

**PROPER SPACE BETWEEN WORDS**—A pleasing appearance is a basic requirement of all good printing and a mark of good workmanship in typesetting is to be found in how well the compositor spaces his lines of type. Too little space gives the line a crowded appearance while too much makes the effect disjointed, hindering the reader and failing to provide a smooth-flowing line, the thought of which can be quickly understood. A rule for word-spacing which has wide acceptance and which has few exceptions, uses the width of the lower-case "s" between words set in upper

and lower-case and the width of the cap "S" between words set in all caps. Variations in type sizes and thick or thin type faces all seem to work out well by this method if the space chosen is the width of "s" in the font being used. Two extremes, an open type face of thin lines with excessive space *within* the letters; or its opposite, the very bold face with a minimum of white space *within* the letters, may be taken as exceptions to this rule.

**IMPORTANT**—In all fonts that contain regular ligatures, use them whenever possible. Swash characters and special "f" combinations may be used for special effects when appropriate.

**CENTERING THE LINE**—To center a line when the self-centering stick is not available, use whatever spaces are necessary to space the line to *exactly* even picas, putting one-half this space on each end of the line. Mentally subtract the length of this spaced line from the measure on which it is desired to center the type; now put one-half of this amount in front of the mats in the stick and quad out the remaining space.

**CENTERING SHORT LINES ON AWKWARD MEASURES**—Short lines to be centered on measures from 23 to 30 picas are easily handled in a single stick. Thus, if you have 11 picas of mats to center on a 27-pica measure, place 8 picas, (half the difference between 11 picas and 27 picas) in front of the line, quad out the remainder and cast. In assembling this line in the form, simply drop a blank slug on the end of the type slug and saw to the required 27 picas. This procedure eliminates the need of handling the extra quads required when using the double-measure stick.

Work that does not need to be trimmed to measure may be cast in any Ludlow stick that will accommodate it, allowing the excess blank space to serve as furniture in the lock-up.

**CASTING THE LINE**—After the line has been justified, the stick is placed for casting with the face of the mats downward over the vertical opening in the table of the machine, and the locking screw toward the operator. The stick is pushed against the stick stop and *held in position* until the locking lever above the table is pushed toward the right and *securely locked down*. The machine is now ready to cast the slug upon raising the starting lever under the front edge of the table. The newly cast slug then drops into the galley at the front of the machine.

When using multiple slug sticks, always push the stick into place for the second and the third casts, being sure to hold until locked down, or the slugs will not join properly. If you let go of the stick before it is locked, the spring in the stick stop will push the stick back a trifle, causing a space between adjoining slugs. Never lift the table top after starting machine until stick has been released.

Tension on the pot plunger spring may be controlled by the lever at the bottom of the machine. When casting 6-point slugs with little overhang it is seldom necessary to raise this lever above the bottom notch, particularly if the mouthpiece and plunger are cleaned frequently. However, in casting large sizes of bold type this spring tension may be increased, adding force to the pump action and resulting in a more solid face on the type. When metal dross accumulates on the mouthpiece and plunger, additional spring tension is of little help in obtaining solid slugs. The only remedy is to clean the plunger, pot well, and mouthpiece to allow free flow of metal into the mold with the necessary force provided by a free-moving plunger under normal spring pressure.

**UNDERPINNING OVERHANGING LINES**—Slugs cast on the Ludlow in type sizes larger than the body size of the



mold, overhang the slug body greater or lesser amounts depending upon the face size. This overhang is supported in makeup and lockup for press by low blank slugs cast on the machine. As many blank slugs as necessary are used to fill the space under this overhang. This operation is called "underpinning" the Ludlow lines.

**QUICK METHOD FOR CONTINUOUS SETTING**—When setting a large number of lines in the single-cast stick, do not wait for each line to cast before starting the next. Put two sticks in operation and set one line while the other is casting. By using this method there is no lost time as the manual work is continuous, the machine waiting for the next line, rather than the operator waiting for each line to cast.

**VARIETIES OF STICKS**—For use in setting the majority of ordinary Roman faces, sticks are marked "Loose Side." Matrices are positioned in these sticks so that both sides of the slug have an equal overhang, all sizes of type casting on a common "center line." The "Loose Side" term comes from the fact there is a movable strip along one side of the stick. This loose strip allows freedom of movement and permits a more rapid composition of the mats. In locking the stick into the machine this strip is forced against the mats assuring uniform alignment of all mats when the cast is made.

"Italic Sticks" as their name implies, are used only for setting italic matrices. However, it is well to note that a wedge-shaped space is furnished which permits setting Roman types in combination with Italic in the same line. This special space also may be used to convert an Italic stick for use with Roman mats or a Roman stick for use with Italic. Space matrices cut on an angle body are furnished in all widths from 6 points up and these are necessary for setting Italic faces in the Italic sticks.

Some special italic faces such as Ludlow "Mandate" are designed on an angle different than the regular italics. These require a special "Mandate" stick. Only in shops having this type face will this stick be required.

Lining Plate Gothic types, having a common bottom alignment in all sizes, require a special stick for this purpose. The stick is usually marked, "6LP-6PT. MOLD," indicating it is to be used for setting 6 point Lining Plate Gothics to obtain alignment at the bottom of the slug cast from a 6 point mold. This *same stick* is used for casting Ludlow rule forms because the horizontal rule matrices are made to align at the bottom with the Lining Plate Gothic type faces.

A special "Offset" stick is used to obtain variations of top and bottom alignment of Ludlow type faces. This special stick allows a 6 point space between the side of the stick and the line of mats when assembled in the stick for casting. The mats can be moved up or down to the required alignment, then the screw tightened to lock the mats in position for casting. This stick is most frequently used for aligning two sizes of caps for a "cap and a small cap" effect or to align rules at the bottom of regular type faces. In setting advertising prices, two sizes of figures may also be lined up by this method.

All varieties of sticks may be had in two-slug and three-slug lengths for setting lines longer than the mold of the machine. When holding the stick in the left hand in the position to compose a line, the notches in the upper edge act as alignment stops when pushing the stick forward for the second and third casts. In the opposite side, markers are placed for locating the division quads which limit the length of the respective slugs and assure safe casting in the machine. To avoid metal "squirts" the division quad *must* be placed *between* the two marks on the stick. It is always well to

place the quad as closely as possible to the exact break in each slug (22½, 45, etc.).

In casting from Multiple slug sticks, the Stick Stop Release Lever must be moved to the right after each slug is cast in order to advance the stick into position for casting the next slug.

Each style of stick requires its own matching style of division quad. For the "Loose Side" it is marked "S-500-A"; for the "6LP-6PT. MOLD" a division quad marked "S-502-A" is required; and italic division quads are so obvious no marking is needed although the factory part number is "S-501-A".

**USE OF THE DIVISION QUAD OR "BREAKER"**—At all times place the division quad as near to the 22½ and 45 pica line on the stick as possible, and never outside the limit marks. When possible, without too great an overhang, try to put the division quad between words, rather than make a break on the first or last letter of the word.

**BAD JOINTS ON TWO- AND THREE-CAST WORK**—The most common and hardest-to-remedy cause for bad joints on this kind of work is the thoughtless and careless habit of placing the stick in casting position at an angle. Develop the habit of placing the stick squarely up against both the side and the end gauges and hold it there firmly while locking down the equalizing bar.

A last word about Ludlow sticks is necessary. When the size range of the Ludlow was extended to the sizes above 48 pt., it became necessary to increase the size of the matrix from the then-standard 7/8 inch, to a matrix size of both 1¼ and 1½ inches. It is therefore necessary, when setting sizes above 48 point, to have the required sticks to accommodate matrices in the 1¼ and 1½ inch sizes. Also, self-quadding and self-centering sticks are available in some shops. However, their use can best be understood only with a stick for demonstration.

Effort should be made, when possible, to use measures which are convenient to the mold length of the Ludlow. On a 22½ em machine it is preferable for economy of effort to use measures of 21, 22 or 22½ rather than 23 or 24. In multiples, try to use 42, 44, or 45 unless 46 or 48 are absolutely necessary. When unavoidable, these measures may best be handled by spacing the line as usual, then indenting the front end with a 6-, 9- or 12-pica quad block. After casting the line, this space may be trimmed from the first slug before cutting the whole line to the required measure. The advantage of this method is in avoiding the small, hand-to-handle slug at the end of the line which results when this method is not used.

X REPEAT LINES—It is advisable to go through the copy and select all repeat lines; also those that are very similar and of the same measure. Sorting the work in this manner greatly helps production. Two-column newspaper step heads may be set in a Ludlow stick, with the first line to the left and the second line to the right. By setting them in this manner, one justification and trip to the machine are eliminated. Short pieces of blank slugs may be used if the lines must run full measure.

For casting lines flush right, another time saver is utilized by reversing the stick end-to-end and placing the last matrix in the usual beginning position of the slug. The stick is filled to the screw end with the necessary spaces and cast in the usual manner. Reversing the slug in makeup brings all the type to a common right-hand alignment.

BLANK SLUGS—Six-point or 12 point blank slugs may be cast on the Ludlow (if both molds are available) by means of a blank-slug block inserted and locked in the casting mechanism in the same manner as a line of matrices. The caster may be set to repeat-cast these blank slugs automatically. Matrices inserted in a stick

are used for casting border rules and decorative material. Proper regulation of metal temperature, aided by the water-cooled mold, assures a solid slug with good face in this kind of work.

**FONT NICK**—Every Ludlow font has a distinctly separate marking on the face of the matrix for identification purposes. One or more horizontal nicks *above* the reference character indicates the type series such as Eusebius Light or Bodoni Modern. All sizes in each series will match the nicks *above* the reference character. One horizontal nick *below* the reference character is so positioned that all fonts of the same size will match. For example: All 12 point fonts will match. A 12 point and a 36 point mat together in the stick will show a difference in alignment because of their difference in size. Yet if these two mats are of the same type series, the nicks *above* the reference character will match. X

**DISTRIBUTION OF SPACES AND MATS**—After the slug has been cast, an efficient, rapid method of distribution is necessary to attain a high rate of production on the Ludlow. This is best accomplished by laying the stick on the table-top which should be covered with pressboard or a thickness of felt for the protection of matrices. Placed horizontally with the screw to the right, the mats are in reading position. Loosen the screw slightly and then all spaces may be easily removed from the line, picking them out by the ears it is easy to group the spaces of each size together for transfer to the space case. Learn to use both hands for this purpose and to avoid unnecessary motions. With practice you will find this the most rapid and easy method of distributing spaces. The remaining mats and the stick may then be held in the left hand in the same manner as when setting the line. Using the second finger of the right hand under the mats and X

the first and third fingers to guide their sides, about  $1\frac{1}{2}$  to 2 inches of mats may now be lifted out of the stick in a convenient position for distribution to the case.

Regular Roman spaces marked with one nick across the face are known as "Special Precision Spaces for Use with Rule Forms." These should be kept separate and though they may be used with regular type faces, they should be handled carefully to prevent destroying their accuracy.

Special "high" spaces are available for the Ludlow in all sizes, both as to height and width of cut-out. These are often very conveniently used to reinforce single characters of small size cast alone on the slug, as well as for setting lines in forms to be electrotyped or stereotyped. In some special forms of work (news-paper 2-column heads) it is possible to obtain measures up to  $26\frac{1}{2}$  picas, overhanging a  $22\frac{1}{2}$  pica slug as much as 2 picas on each end by the use of a special stick and high spaces.

**USE OF RULE FORM MATS**—Ludlow rule form mats are made to the highest precision standards and should be used with this fact constantly in mind. Protection of the mats from abuse is all important to maintain proper alignment and justification. The Ludlow rule-form system is based on a set of horizontal rule matrices available in the following widths: 3pt., 6pt., 8pt., 10 pt., even pica measures from 1 to 12; 15 picas and  $22\frac{1}{2}$  picas. Half em measures are included in  $1\frac{1}{2}$  and  $2\frac{1}{2}$  pica widths. Vertical rules are engraved in the center of a matrix 6 points wide and may be either plain vertical rules or made with an intersecting horizontal line which joins perfectly with the horizontal rules. Because of the 6 pt. width of the vertical rule, column widths of definite measures are attained by separating the vertical rules with a horizontal rule 6 pt. less in width than the desired column width.

To maintain exact alignment in the vertical rule an interlocking matrix must be used in each cast. This casts a dove-tail shaped notch and projection on each slug below the printing surface which serves in makeup of the form to lock the slugs together in exact vertical alignment. Space between columns is controlled as mentioned above, but space between the horizontal lines is determined by the size of the vertical rule matrix alone. These are available in 6 pt. width and 12 to 24 points in height with steps of 2 points between sizes. A shop doing wide varieties of rule forms may have all the mats as manufactured but generally only the most useful sizes are purchased by the printer. Twelve, eighteen and 24 point verticals are sufficient to do a large variety of work without need for investing in a full series of these matrices. The vertical rules are made in many varieties, each of which is available as a plain rule or intersecting with a horizontal. The most common of these are single hairline, double hairline, 1 point, double 1 pt. and 2 point, sufficient to meet the requirements of the majority of rule jobs.

**BREAKING FOR COLOR**—Many color jobs can be set complete for a one-color key proof. When breaking the form for color it is advisable to use blank slugs, notched on the saw for identification, to replace type slugs removed for printing the second color. After the first color has been run it becomes an easy matter to reinsert the type slugs in the exact position they occupied before removal, the notched slugs indicating the position in the form each slug is to occupy.

**METAL LEVEL IN THE CRUCIBLE**—Always try to keep metal level approximately  $\frac{3}{4}$  inch below the top at the back of the crucible. If the metal level is permitted to drop below the top of the heating elements, they, when heated, will be damaged by their exposure to the air. This will also result in a hollow slug or one

with a poor printing surface. At the opposite extreme, if the crucible is filled to the brim the metal will overflow at the mouthpiece and may cause improper lockup between mouthpiece and mold, resulting in a metal squirt when casting.

*CAUTION—Never stop the pot mouthpiece directly under the mold for periods of more than a minute or two at a time. The heat will damage and perhaps ruin the mold which is the most vital part of the Ludlow machine.*

**CARE OF THE LUDLOW**—In common with all molten-metal casting machines, satisfactory operation depends upon perfect contact between matrices, mold and mouthpiece. At frequent intervals, a stiff bristle brush should be used to remove the particles of metal from the working parts, such as cams and slides, and at least once a week the entire machine should be cleaned and all accumulations of dust and metal trimmings removed. The machine is equipped with a highly efficient cooling system which constantly pumps water through the mold while the motor is in operation. Free movement of the plunger in the well is dependent upon the thorough cleaning of these parts at least twice a week and oftener if possible. The mouthpiece should be cleaned at the same time as the plunger and *after cleaning, several blank slugs should be cast to remove oil and foreign matter from the throat before casting from matrices.* The machine should be oiled thoroughly twice a week. The motor should have a few drops of oil once each week, however, do not over lubricate as this will result in a short circuit.

Examine both pot and mold wipers every day and replace with new ones if necessary.

Keep machine clean at all times both inside and out. If you have any trouble, look for dirt and chips of metal before changing adjustments.

**ADJUSTMENTS**—It is seldom necessary to change adjustments on the Ludlow. However, when such



adjustments are needed they are best left for someone who is *thoroughly familiar* with the mechanics of the machine. The regular Ludlow Manual of Instructions furnished with each machine tells how all adjustments are made and this book should be consulted for this information.

Do not change any adjustments unless you know just what you are doing. If you don't *know* what effect a change of adjustment will have, don't change it.

**THE SAFETY KEY**—The Ludlow drive shaft is provided with a soft-metal safety key intended to shear off when the machine is jammed, preventing breakage of parts which would occur if the machine is forced ahead. When this key shears off, replace with a new one and back the machine up in order to clear the obstruction causing the shearing. Be careful in removing the remains of the broken safety key so as not to damage the key-way on the end of the shaft.

**MACHINE TROUBLE**—In case you have any trouble that you do not understand, or that you are not absolutely sure how to fix, do not attempt to do it alone. Consult someone who understands the machine thoroughly and let him make the necessary repairs. It will be quicker and cheaper in the long run than to take the risk of breaking expensive or hard-to-replace parts.

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who is trained in the art of the mechanic of  
the human body. It is not for you to make  
adjustments now. All you can do is  
keep your body in the best possible condition.

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