

BULLETIN NO. 7  
ISSUE 2  
JANUARY, 1938

# TELETYPESETTER

OPERATOR INSTRUCTION  
MANUAL

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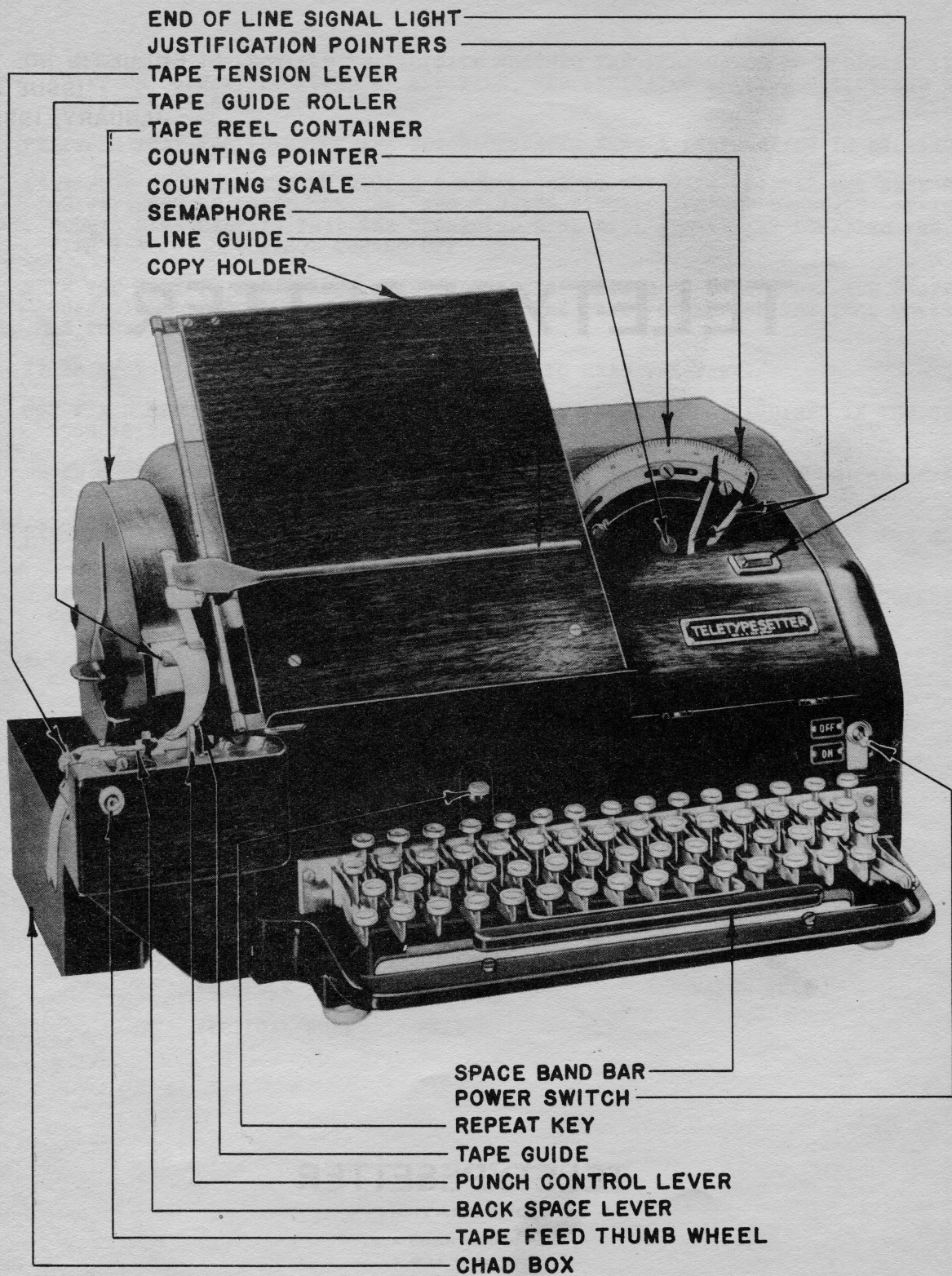


FIGURE 1

## OPERATOR INSTRUCTION MANUAL

### GENERAL

The Teletypesetter perforator is a unit of apparatus that is used to perforate paper tape for automatic slug line casting machine operation. Combinations of holes are perforated in the tape, which correspond to the key lever depressed. The perforated tape with the code combinations thus recorded may be fed automatically through a Teletypesetter operating unit attached to a casting machine, automatically producing lines of type in the form of slugs.

The perforator has, in addition to a perforating mechanism, a counting mechanism for indicating the total width of the matrices and the expansion limits of the space bands. With the use of the counting mechanism, an operator can readily determine the proper length of a line (not too long or too short) so that it will justify on the casting machine. The perforating and counting mechanisms are both controlled by the keyboard.

Figure 1 shows the Teletypesetter perforator as it is viewed by the operator. Following is a brief description of the principal operating features:

The perforator is driven by a small motor which is controlled by the power switch. The perforator is ready for operation when the motor is running.

The counting pointer (matrix pointer) moves over the counting scale as each character key is struck, a distance proportional to the width of the character added to the line.

The justification pointers indicate the range of expansion which may be used by the space bands of the casting machine.

The end-of-line signal lamp is located beneath the ruby glass and warns the operator when the counting pointer approaches the justification range.

The backspace lever and tape feed thumb wheel are used in backspacing the tape whenever necessary to make corrections.

The punch control lever permits the operator to set trial lines, without perforating the tape; the perforating mechanism is rendered inoperative but the counting mechanism operates as usual.

The repeat key enables the operator to feed blank tape rapidly. It is also used in connection with corrections which require many rub-outs.

### KEYBOARD ARRANGEMENT

The keyboard arrangement of the perforator is based on the universal typewriter keyboard, with the addition of a number of keys required to control the special characters used in the composition of printed matter. (See Figure 2.)

The shift key is similar in action to the shift lock of a typewriter in that all characters following the shift operation will be capitals or "upper case" characters until the unshift key is depressed. The semaphore is provided so that the operator can tell whether the keyboard is in the shift or unshift position. Red indicates shift and white the unshift position. To perforate the word "Jones" the sequence of key strokes is as follows: Shift, J, unshift, o, n, e, and s. To perforate the word "JONES" the sequence of key strokes is as follows: Shift, J, O, N, E, and S.

Each Line is ended by striking the return (RET) and elevate (ELEV) keys in the order names.



TOUCH SYSTEM OPERATION

In order to realize the full advantage of Teletypesetter equipment, the perforator keyboard should be operated by the touch system. This system enables the operator to prepare accurate tape at a rapid rate with least effort. This manual of instruction does not include a set of finger exercises to be used for practice in mastering the Teletypesetter keyboard touch system because the operation is similar to that of the typewriter keyboard. Recommended finger positions are shown in Figure 2.

CHARACTER WIDTHS AND LINE JUSTIFICATION

Figure 3 shows variations that may occur in printed copy. This figure should be studied carefully and the following characteristics noted:

- Width of various characters.
- Even margins, both right-hand and left-hand.
- Width of spacing between words:
  - Within a given line.
  - In different lines.

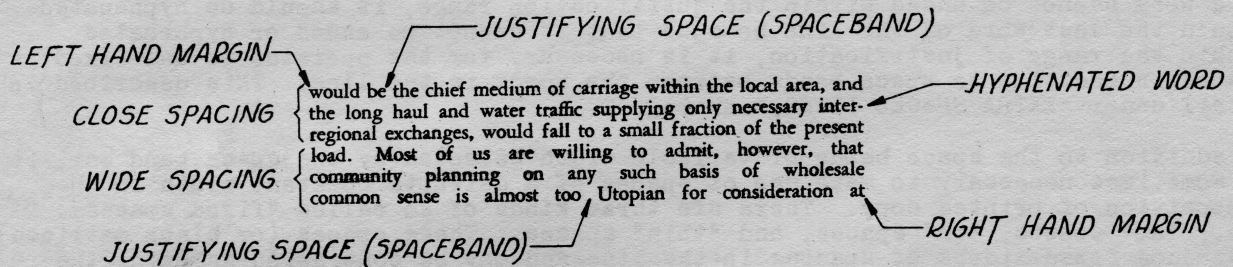


FIGURE 3

Figure 3 reveals that the printed copy differs from typewritten copy in that there is a difference in the widths of the spaces allotted to different characters.

The counting pointer moves across the counting scale from left to right as the keys are struck for the various characters. The distance that the pointer travels for each key stroke depends on the matrix width of the character selected. For example, the pointer moves one full scale division for the letter "W" and only one-third of a scale division for the letter "i". For characters of intermediate sizes the pointer moves a proportional amount; thus, as the pointer moves across the scale, it registers the total width of the characters used in each line. The spaces between words are measured by the justification pointers.

Further examination of the printed copy in Figure 3 shows that it also differs from typewritten copy in that the right as well as the left-hand margins are in alignment. The spacing between words in typewritten copy is uniform, whereas the spacing between words of printed copy, although uniform throughout a given line, is not the same for all lines. The spacing between the words in the first three lines of Figure 3 is quite close as compared to the wider spacing in the last three lines.

This variable width of spacing between words in printed copy makes it possible to maintain uniformity in the length of all lines, thus providing even margins at both the right and left-hand sides of the copy. Every line is set up to a length somewhat shorter than the distance between the left and right margins. However, the casting machine automatically expands the spacing between the words, so that the length of each line is equal to the distance between the margins. This is accomplished by using space bands.

The space bands used on casting machines are wedge shaped. The minimum spacing is determined by the width of the thin part of the space band and the maximum spacing is determined by the width of the thick part of the space band.

As explained previously, the counting pointer moves from left to right across the counting scale as the keys for the various characters are struck. However, when the space bar is struck, the counting pointer remains stationary, but the counting scale (attached to the right-hand pointer) moves from right to left. Each movement of the scale measures the thin part of the space band or the minimum width of the space, while the left-hand justification pointer moves a greater distance to correspond to the thick part of the space band or the maximum space width. The distance between the right and left justification pointers represents the total possible variation in the widths of the spaces.

This spread or separation between the two justification pointers represents a certain allowable range for ending the line, known as the range of expansion or justification. Therefore, if the counting pointer is somewhere between the two justification pointers, the line may be ended by striking the return (RET) and then the elevate (ELEV) keys. If the counting pointer is just inside the right-hand justification pointer when the line is ended, the width of the spaces between words will be the minimum. If the counting pointer is just inside the left-hand pointer, the width of the spaces between words of the line will be the maximum. IF THE LINE IS ENDED WHEN THE COUNTING POINTER IS NOT BETWEEN THE TWO JUSTIFICATION POINTERS, THE LINE WILL NOT BE USABLE.

If a word cannot be ended within the justification range, it should be hyphenated. Should the last word of the line be such that it cannot be ended or hyphenated within the range of justification, it is necessary for the operator to use fixed spaces in addition to space bands between the words in the line. This described in detail under "EXTRA SPACED LINES," on page 6.

In addition to the space bands of variable width selected by the space band bar, it is sometimes necessary to make use of spaces of a definite constant width in the composition of printed copy. There are three kinds of so called "fixed spaces"; i.e., "em" spaces, "en" spaces, and "thin" spaces. These spaces (or blank matrices) introduce fixed widths of spacing in the line and may be considered as being the same as characters, because they are counted by the counting pointer.

The "em" space is approximately the same width as the character "W." The "en" space is one-half the width of the "em" space, and the "thin" space is usually one-third the width of the "em" space. The "en" space is sometimes referred to as the "figures" space since it is the same width as the figures (numerals) in any particular copy.

THE SPACE BAND BAR SHOULD NEVER BE STRUCK TWICE IN SUCCESSION OR AT THE BEGINNING OR END OF ANY LINE. FAILURE TO OBSERVE THIS RULE WILL RESULT IN MECHANICAL DIFFICULTIES IN THE CASTING MACHINE.

#### QUADED LINES

It has been stated previously that a line will not be usable unless it is ended when the counting pointer is between the two justification pointers. In the case of the seventh line of the copy in Figure 4, it may be readily seen that the line is not justifiable after perforating the words "of leaders:". In order to make this line justifiable, it is necessary to finish the line by "quadding," which consists of striking "space band, en space, em space"; this sequence to be repeated until the counting pointer is between the two justification pointers, at the same time making sure that the last perforation before the return (RET) and elevate (ELEV) perforations is not a space band combination.

#### SPECIAL FINGERING FOR QUADDING

Ordinarily the keys for the "en" and "em" spaces are actuated by the little finger of the left hand, as shown in Figure 2. However, when these keys are used for quadding, it is good practice to use the second and first fingers of the left hand for controlling the keys for "en" and "em" spaces, respectively, the space band bar being controlled as usual by the right thumb.

#### INDENTIONS

In order to get proper alignment of copy, it is necessary that fixed spaces be used in making indentions. The first line of the copy in Figure 4 is indented one "em" space. The tabular matter in this figure is indented one and one-half "ems"; i.e., each line is started by perforating "em" space and "en" space.





is only used for figures and special characters. After operating the keyboard for a short time, the operator will become familiar with the group of combinations that start with the zero perforation. They are easily learned by associating them with corresponding letter combinations. For instance, the "W" and "2" when perforated, are alike except the "2" has the zero perforation added. Perforations of the characters E, R, T, Y, U, I, O, and P are like the perforations of the corresponding figures located immediately above the foregoing characters on the keyboard, except that the figures have the zero perforation added. Other character combinations have equal similarity, and may be memorized in the same manner.

Figure 6 is a code chart in which the combinations are arranged in groups to facilitate memorizing the code. The E, ELEV, SPACE, RET, and T are all single perforations and differ only in the position of the perforations in the tape, each perforation being positioned one code interval below the preceding perforation. The code combinations for the remaining letters of the alphabet are conveniently grouped in a similar manner.

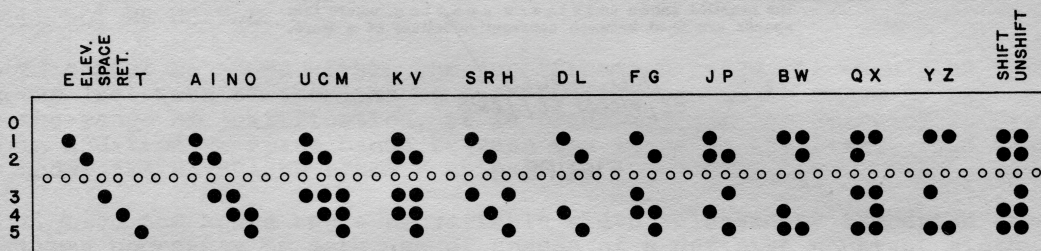


FIGURE 6

Figure 5 is a code chart in which the combinations are arranged to conveniently locate a combination. They are arranged in six groups starting with the combination that uses a perforation in the fifth position only and ending with combinations that begin with perforations in the zero position. A doubtful combination may be traced to its particular group according to the position of the first perforation and finally identified in that group.

The tape should be read from left to right, holding the tape in the same position as when it is fed from the perforator. When the tape is held in the proper position, the centers of the small feed holes are located slightly to the left of the center lines of the code perforations. Having determined the right and left ends of the tape in this manner, the reader may identify the top surface of the tape by looking for the frequent recurrence of the end-of-line signals (RET and ELEV). Figure 7 shows the position in which the tape should be held when reading.

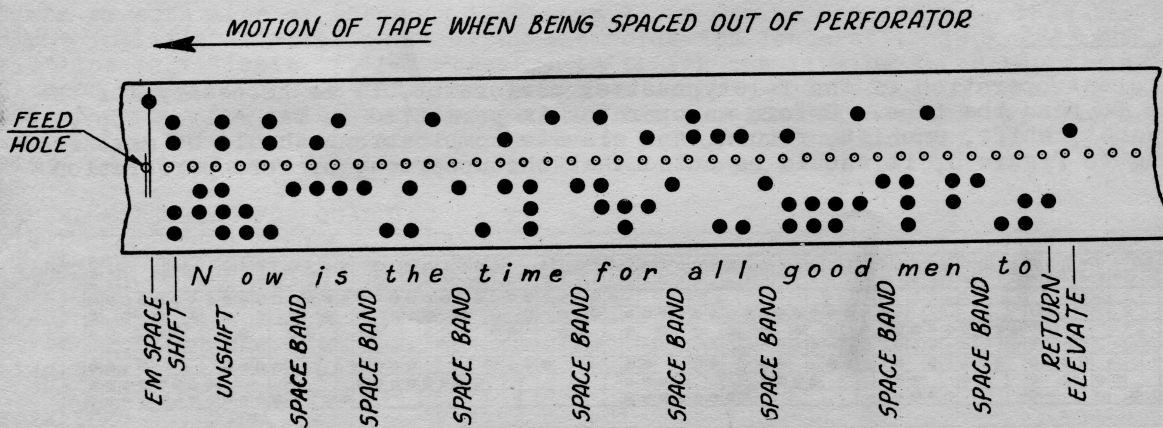


FIGURE 7

After the combinations have been memorized, the next step is to secure some perforated tape and practice tape reading. The character represented by each combination may be written above the combinations in the tape.

#### CORRECTING THE TAPE

If an error is made in perforating the tape, it should be backspaced, by pressing the backspace lever down once for each combination until the incorrect perforation is directly over the tape punches (when the combination which is immediately to the left of the chad chute is backspaced once, it will be over the punches), and deleted by depressing the RUB-OUT key. The rub-out key causes all six holes to be punched. This is a "dead" combination insofar as any operation of the casting machine is concerned.

It should be kept in mind that when a character or letter is rubbed out in the tape, the pointers are not backspaced. Therefore, if there is any doubt as to whether the line is within the justification range, the punching mechanism should be turned off and the line remeasured. If it is necessary to delete a whole line, the backspacing may be done rapidly by holding the backspace lever depressed and turning the tape feed thumb wheel clockwise. The perforations may be then deleted by depressing the rub-out and repeat keys simultaneously. To advance the tape without perforating code combinations, use the TAPE key or the TAPE and REPEAT keys simultaneously. Do not advance the tape by means of the thumb wheel, because the feed holes in the tape will be mutilated.

#### EXTRA SPACED LINES

In the composition of printed matter, it is not uncommon for a line to end so that the last word or syllable will make the line too long (counting pointer beyond right-hand justification pointer), while the line without this word or syllable would be too short to justify (counting pointer to the left of the left-hand justification pointer). In such cases THIN or EN spaces must be inserted with each space band or a thin space may be inserted between each letter in one or more words of the line. The latter practice is known as "letter spacing." (See example illustrated in the seventh line of the last paragraph of Figure 4.) Usually lines of this kind are not discovered until it becomes necessary to backspace to the place where the insertion of extra spaces is necessary. However, as the operator becomes more experienced, doubtful lines in which only a few space bands are used may be perforated so they can be easily extra spaced in the event they do not justify. To do this, strike the TAPE key three times after each space in the line. If the line requires extra spacing, the operator can backspace the tape and insert the proper THIN or EN spaces in the blank tape after each space combination. On the other hand if the line will justify without the use of extra spaces, it will not be necessary to backspace the tape as the blank tape does not perform any operation on the casting machine.

#### USE OF THE RETURN AND ELEVATE KEYS

The operator should strike the return (RET) and elevate (ELEV) keys in the order given at the end of each line. The return key serves to return the counting pointer and justification pointers to their respective zero positions preparatory to counting the length of the next line. The ELEV combination performs certain operations on the casting machine which result in the entire line being cast into a slug.

#### REPEATED CHARACTERS

NO CHARACTER KEY OF THE TELETYPESETTER PERFORATOR SHOULD BE STRUCK MORE THAN TWICE IN SUCCESSION. This includes such characters as "em" space, "em" leader, thin space, etc.

There is a limit to the speed with which a given character may be repeated on the casting machine. Thus, if any character is perforated three times in succession, only two of these characters will appear in the printed copy. This condition may be avoided by providing an idle interval in the tape so that not more than two identical characters will be perforated in succession.

For example, the number 1,000,000 may be perforated as follows: one, comma, cipher, cipher, tape (TAPE key) cipher, comma, cipher, cipher, tape, cipher; or

the number 1000000 (without commas) may be perforated as follows: one, cipher, cipher, tape, cipher, cipher, cipher, tape, cipher, cipher, cipher.

### SPECIAL CHARACTERS AND FUNCTIONS

1. f1, fl, ff, ffi, and ffl

In the composition of printed matter, these combinations of characters are sometimes set as one character, and provision has been made on the Teletype-setter perforator to permit their use.

2. Vertical Rule (VERT RULE)

This is a vertical line sometimes used for bracketing in printed copy.

3. Em Dash - (Shift Position on "8" key)

This is a dash which is equal in length to the width of an "em" space.

4. "BELL" and "PF"

These keys are used only in the case of wire transmission. The Bell signal serves to ring a bell on the printing telegraph machine. The PF or Paper Feed key is used for spacing out the paper on the printing telegraph machine at the end of an article.

5. "UR" and "LR" - Lateral Duplex Rail Operation

The "UR" and "LR" (upper rail and lower rail) keys are used for controlling the position of the lateral rail on the casting machine. With the lateral rail in the upper rail position, bold face or italic characters may be set, and when the lateral rail is in the lower rail position, roman characters may be set. Figure 8 illustrates the use of bold face and italic type.

In the composition of printed matter special emphasis is sometimes placed on certain words or phrases by means of bold face type, which presents a noticeable contrast in the copy as compared to the ordinary "roman" characters. If a line contains both roman and bold face characters it is commonly referred to as a mixed line.

It is a common practice in newspaper composition to set complete lines or paragraphs in bold face in order to direct the attention of the reader to certain parts of an article. Bold face type may be used for either UPPER CASE or lower case characters.

#### A. BOLD FACE

In book and magazine composition it is the usual practice to make use of italics in order to gain a similar degree of emphasis. Italics are often used when setting proper names, foreign expressions, etc, although the actual rules governing the use of italics are determined by the style of any particular kind of copy, which is in turn defined in the Rules for Composition followed by various printing plants. The term mixed line is also applied to lines of copy which contain both roman and italicized characters.

Explanatory paragraphs, footnotes, etc, in connection with printed articles are commonly set in solid italic, to differentiate between the article proper and the addenda. Both UPPER CASE and lower case characters may be italicized.

#### B. ITALICS

FIGURE 8

To set type in the upper rail position, strike the "UR" key. Then, all subsequent characters will be set in the upper rail position until the rail is returned to the lower rail position. This is done in two different ways. The lateral rail is arranged so that it always returns to the lower rail or roman position at the end of the line. The lateral rail may also be moved from the upper to the lower rail position anywhere within a given line by striking the "LR" key.

Note: When the tape is to be used on an operating unit not equipped with lateral rail delay mechanism, it is necessary to precede each "UR" or "LR" tape perforation with a time interval consisting of three TAPE (Blank) perforations. However, this time interval is not required at the beginning of a line.

Having once positioned the lateral rail in either the upper rail or lower rail position, the operator may proceed to select both shift and unshift characters as required in the line being set, without affecting the position of the lateral rail, so long as the "UR" or "LR" keys are not depressed.

#### SETTING QUADS AND LEADERS ON THE UPPER RAIL

When an "em" or "en" space is set on the upper rail, it usually appears in the printed copy as an "em" or "en" leader, respectively, and similarly, when an "em" or "en" leader is set on the upper rail, it appears in the printed copy as an "em" or "en" space, respectively.

#### INSERTING A ROLL OF TAPE IN THE PERFORATOR

To insert a new roll of tape in the perforator proceed as follows:

Remove the chad box.  
Remove the tape reel container cover.  
Remove the tape reel retainer.  
Remove the center of the old roll of tape from the core.  
Install the new roll of tape on the core with the tape unwinding from the bottom. Place the end of the tape on top of the tape guide roller and allow the end to extend a few inches beyond the tape reel container.  
Replace the tape reel retainer.  
Replace the tape reel container cover.  
Replace the chad box.  
Insert the end of the tape through the tape guide.  
Tear the tape squarely and insert it between the die plates of the punch block.  
Pull the tape tension lever away from the tape feed roll, and push the tape to the left until the end of the tape is in position between the tape feed roll and the tape tension lever.  
Now press the tape tension lever against the feed roll so that the pins in the tape feed roll grip the tape.  
Strike the "Tape" key a number of times until the tape feeds far enough to insure that the feed holes mesh properly with the feed pins in the feed roll.

#### SUMMARY OF OPERATING RULES AND PRECAUTIONS

NEVER END A LINE UNLESS THE POINTERS HAVE INDICATED THAT THE LINE WILL JUSTIFY.

END EACH LINE BY STRIKING THE RETURN AND ELEVATE KEYS IN THE ORDER GIVEN.

NEVER BEGIN OR END A LINE WITH A SPACE BAND OR STRIKE THE SPACE BAND BAR TWICE IN SUCCESSION.

NOT MORE THAN TWELVE SPACE BANDS SHOULD BE USED IN ONE LINE OF COPY. WHEN MORE THAN TWELVE SPACES ARE REQUIRED BETWEEN THE WORDS OF A LINE, THE OPERATOR SHOULD RESORT TO THE USE OF FIXED SPACES, PREFERABLY EN SPACES, TO MEET THE REQUIREMENT.

REMEMBER THAT WHEN THE SHIFT COMBINATION HAS BEEN PERFORATED IN THE TAPE, ALL SUBSEQUENT CHARACTERS CONTINUE TO BE SELECTED IN THE SHIFT POSITION UNTIL THE UNSHIFT COMBINATION HAS BEEN PERFORATED.

THE SEMAPHORE IS PROVIDED TO INDICATE WHETHER THE PERFORATOR IS COUNTING IN THE SHIFT OR UNSHIFT POSITION AT ANY TIME; RED INDICATES SHIFT POSITION AND WHITE INDICATES UNSHIFT POSITION.

REMEMBER THAT THE POINTERS ARE NOT BACKSPACED WHEN A PERFORATION IS DELETED.

CARE MUST BE EXERCISED IN MAKING CORRECTIONS IN THE TAPE SO THAT THE NECESSARY SHIFT, UNSHIFT, RAIL, RETURN, AND ELEVATE SIGNALS ARE NOT DELETED. IF IN DOUBT, MAKE CERTAIN THAT THE CORRECTED LINE WILL JUSTIFY BY COUNTING THE LINE WITH THE PUNCH CONTROL TURNED OFF.

WHEN THE TAPE IS BACKSPACED, THE TAPE WINDER SHOULD BE TURNED OFF AND BACKED UP SUFFICIENTLY TO RELEASE THE TENSION OF THE TAPE, OTHERWISE THE FEED HOLES WILL BE TORN.

IT IS ESSENTIAL THAT THE OPERATOR BE ABLE TO READ THE TAPE.

USE FIXED SPACES WHENEVER A DEFINITE SPACING INTERVAL IS REQUIRED IN THE COPY, SUCH AS INDENTIONS, TABULATIONS, ETC.

NEVER STRIKE ANY CHARACTER KEY MORE THAN TWICE IN SUCCESSION. USE THE TAPE KEY TO AVOID MORE THAN TWO SUCCESSIVE INDENTICAL PERFORATIONS.

REMEMBER THAT THE LATERAL RAIL RETURNS TO THE LOWER RAIL POSITION AT THE END OF EACH LINE.

WHEN IN THE UPPER RAIL POSITION USE THE EM AND EN LEADER KEYS FOR QUADDING AND THE EM AND EN SPACE KEYS FOR SETTING LEADERS.

ALWAYS STRIKE THE SAME KEY WITH THE SAME FINGER EXCEPT IN THE CASES OF LINES REQUIRING QUADDING OR A SERIES OF LEADERS, WHERE SPECIAL FINGERING IS USED.

CONCENTRATE ON DEVELOPING A SMOOTH EVEN KEYBOARD TOUCH.

THE FOLLOWING KEYS PROVIDE IDENTICAL SELECTION IN EITHER SHIFT:

PERIOD	THIN SPACE	RETURN
COMMA	EN LEADER	ELEVATE
SPACE BAR	EM LEADER	SHIFT
EN SPACE	TAPE	UNSHIFT
EM SPACE	RUB-OUT	PAPER FEED
VERTICAL RULE	BELL	