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 [31] **1,597**

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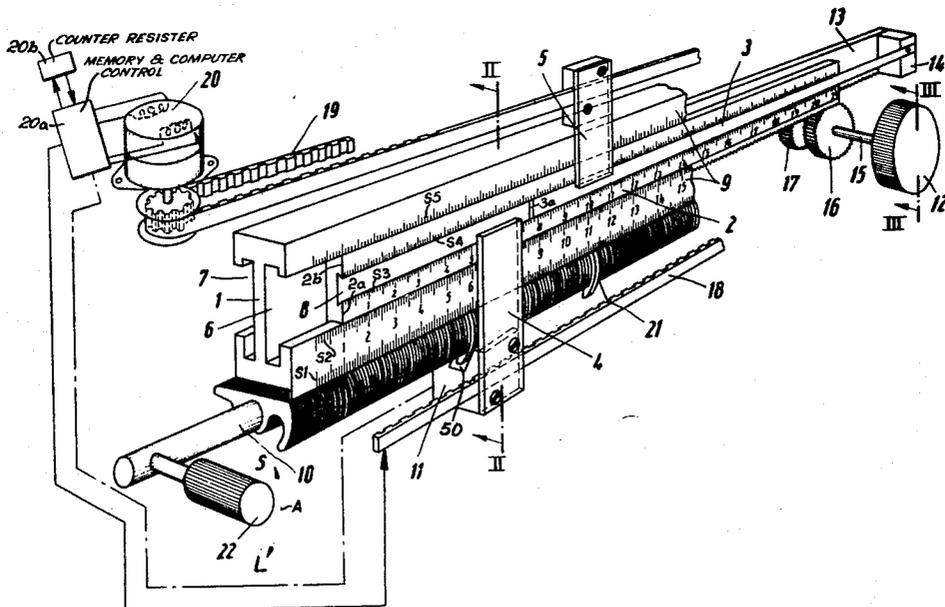
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[54] **DIGITAL DISPLAY AND CONTROL DEVICE FOR THE SETTING, JUSTIFICATION, AND CONTROL OF LINES OF PRINT**
6 Claims, 3 Drawing Figs.

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 [51] Int. Cl. **B41j 29/42,**
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 84.1, 187, 188, 194, 176, 179, 191; 95/4.5;
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ABSTRACT: The present invention provides a digital display and control device for the setting, justification, and control of lines of print. The display and control device consists of a guide rail having in the front and rear each a longitudinally extending guide channel mounted on the frame of the composing machine; the device also includes a slide, adapted to slide in the front guide channel, determining the start of the line and having a guide channel therein, a tongue, indicating the line end adapted to slide in the said guide channel in the slide and connected to a rack slidingly mounted in the rear guide channel of the rail, a tabulating device mounted directly under the guide rail, a length indicator, movable along the front side of the rail and overlying the bottom half thereof; the length indicator is mounted on a photoelectric device engaging the tabulating mechanism and controlled thereby, while a justification indicator overlies the top half of the guide rail and is adapted to move along the same.



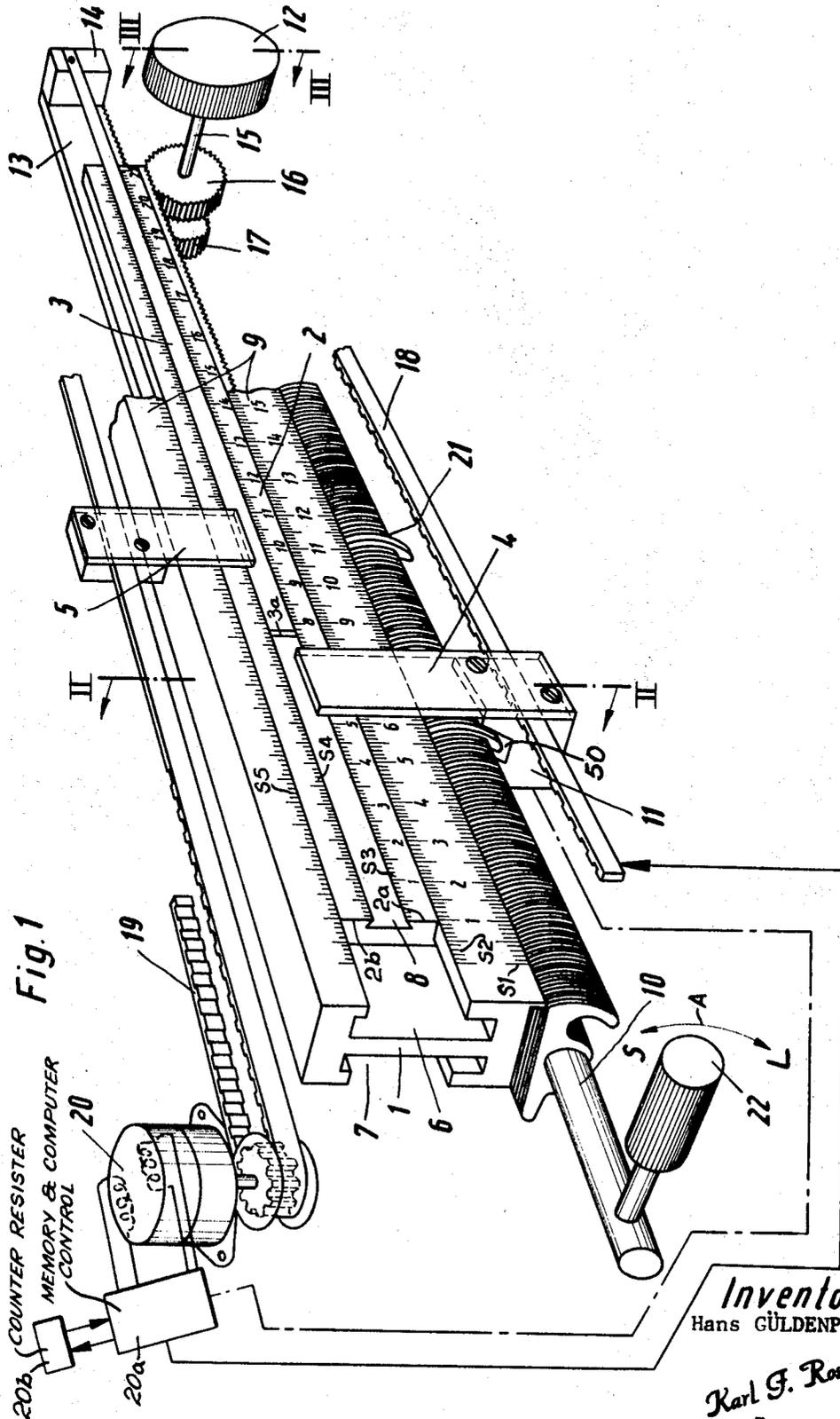


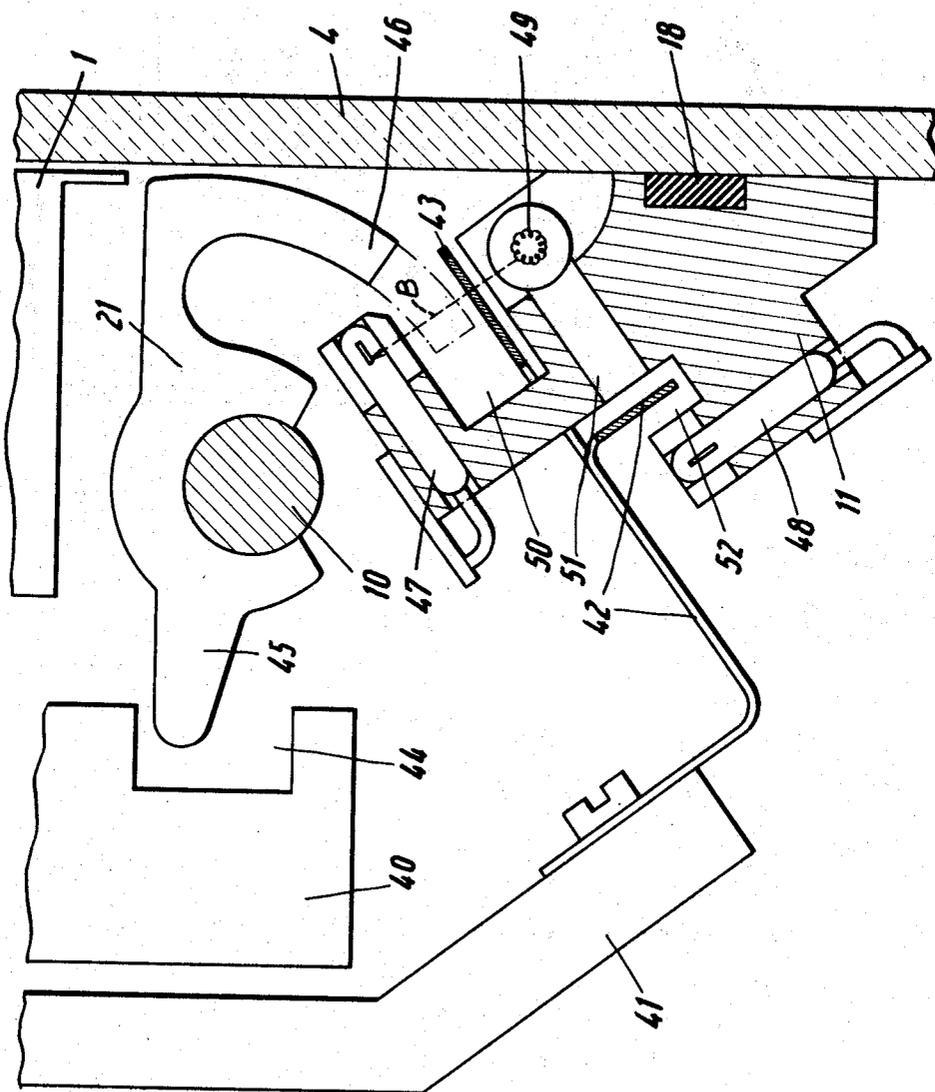
Fig. 1

COUNTER RESISTER
MEMORY & COMPUTER
CONTROL
20
20a
20b

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Fig. 2



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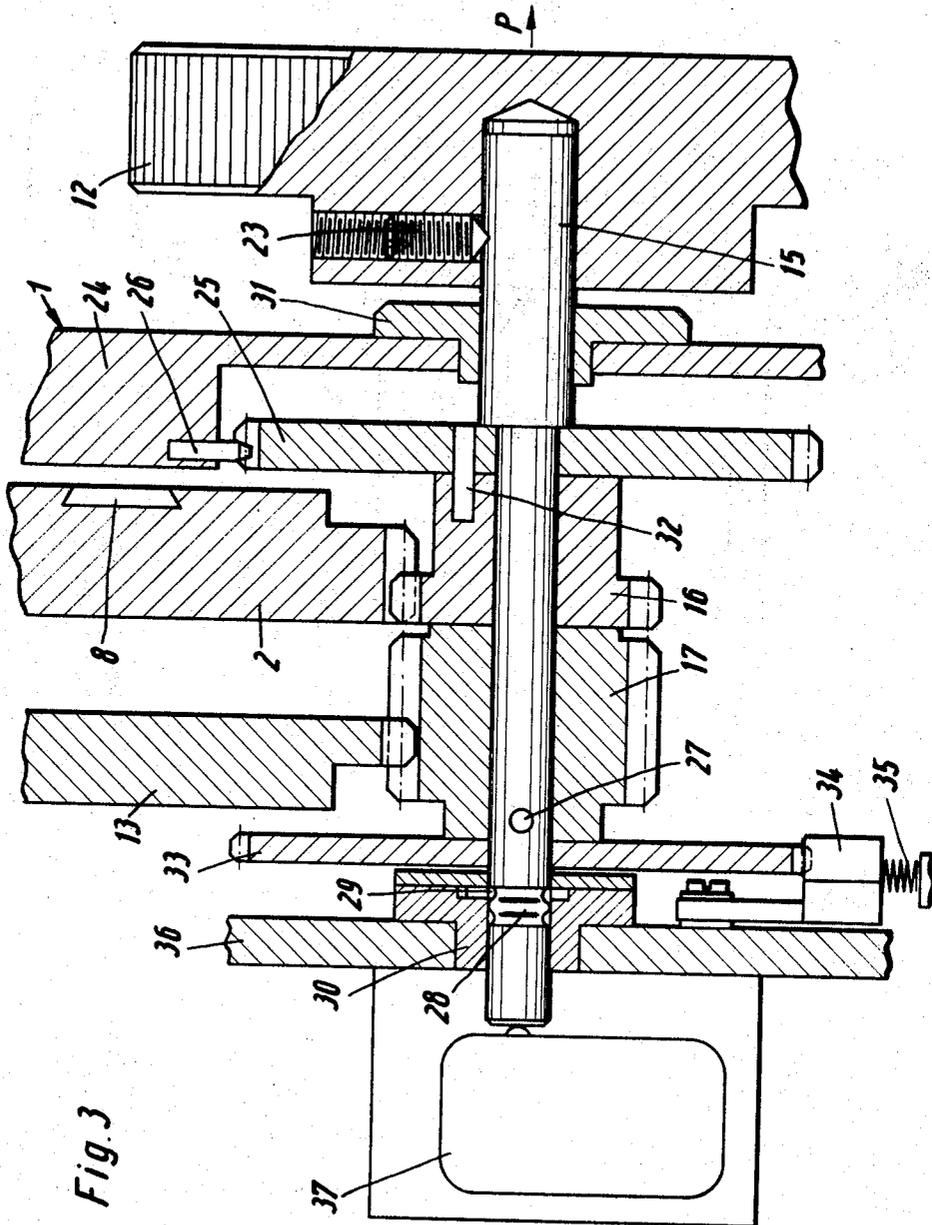


Fig. 3

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DIGITAL DISPLAY AND CONTROL DEVICE FOR THE SETTING, JUSTIFICATION, AND CONTROL OF LINES OF PRINT

SPECIFICATION

The invention relates to a digital display and control device for photostetting machines in which preferably binary coded information is produced by operating a key, whereby, by means of an electronic memory, individual lines consisting of spaces and letters of different widths are set into lines, justified and checked.

It is already known in photostetting machines to effect control by means of coded signals. Usually a paper tape is used on which the necessary information is stored. Such tapes are produced so that the letter content of a line is separated by control codes from the letter content of the next line, enabling the machine to close one line before the next one is set. In known setting machines, letters and spaces of different widths are used, wherein the spaces vary in width between a maximum and a minimum value. All lines within the same text are arranged to have the same length, i.e., the letter content of a line is limited to a justifiable measure by means of suitable spaces. The possibility of indicating the justification of a line must be such that the compositor can terminate the line in time at the end of a word or a syllable.

It is known to use for purposes of indication mechanical analogue counters. It is also known to use electronic digital counters for the composition of letter or space widths, utilizing counting chains which require a bistable switching element for every unit to be counted. These digital type width counters are coupled to an analogue or digital display.

In a known construction, upon operation of a key of the keyboard the keyed symbol is coordinated with the aid of a magnetic drum memory with different tracks for the code combination. This code combination may be recorded, for example, on a recording strip, and a further counting-value combination determines the number of the counting impulses, applied by successive impulse generators to a counter. Two counters are provided, one for the symbols and a second for the spaces. These counters have indicators which represent the difference between the two counter displays.

In a known construction, the indicator comprises two superimposed illuminated strips, which are connected via known analogue or digital converters to the stages of the two counters so that increased loading of one counter gives, in one illuminated strip, light and dark bands increasing from left to right, while increased loading of the second counter gives, in the other strip, light and dark bands broadening from right to left.

There is also known a counter and type width indicator for keyboard machines for making recording tapes, in which contacts associated with the keys produce a number of counting impulses corresponding to the widths of the keyed symbols and which bias the counting stages of a type strip counter, adding the width of the keyed symbol in accordance with the position of an adding-subtracting switch in the direction of rising or falling indicated values and which is characterized by a counting chain determining the type width of the type widths summation and sum display, and comprising bistable, automatically switching flip-flops, connected with the keyboard contacts, and a counting chain controlled indicating chain of bistable flip-flops adding the type widths, whose switching states are analogously combined and displayed by means of stepped series resistors.

An improved version of this known type width counter and indicator uses a movable diaphragm instead of an illuminated strip, in which the individual positions are associated with values in the form of detectable markings in binary representation, and which is further characterized by a value associated with the position of the diaphragm and the arrangement accompanying the state of the associated counter which, in the absence of agreement between these values gives signals for adjusting the diaphragm, which contain a directional

criterion, and by a drive mechanism for the diaphragm reacting to these adjusting signals.

Yet another known apparatus uses a series of neon tubes for indicating the line load and the justifying possibilities.

Finally, there is also known an apparatus for producing control tapes for photostetting machines, facilitating the making up of matter automatically, using a measuring and display unit, in which the display unit has a fan-shaped scale dial, relative to which a letter indicator and two justification indicators are movable. In this known apparatus, the matrix counter is movable along the edge of an arcuate scale dial by means of a counter, which is operated differentially as a function of the width of the letters forming a line.

All these known indicators for photostetting machines have certain drawbacks and disadvantages. Some of these machines do not give a sufficiently clear display and frequently it is not possible to indicate correction of incorrectly keyed symbols.

The invention has the object of providing an improved digital display indicator for photostetting machines. The display is coupled to a control means and makes possible the reproduction of the real or absolute length, irrespective of a proportionate scale.

The present invention provides in a photostetting machine for the setting, justification, and checking of lines, a display and control device including a guide rail having front and rear sides provided with respective longitudinally extending guide channels; a slider adapted to slide in the front guide channel and to determine the start of a line, the slider itself being provided with a guide channel; a tongue adapted to slide in the slider guide channel and to indicate the line end, a rack slidably mounted in the rear guide channel of the rail and connected to the tongue; a tabulating device mounted under the guide rail; a line length indicator movable along the front side of the rail and overlying the bottom half thereof, a photoelectric device carried by the length indicator, which device cooperates with and is controlled by the tabulating device; and a justification indicator overlying the top half of the guide rail and adapted to move along the same.

The justification pointer and the length indicator can have different functions and objects according to the requirements. Thus the length and justification pointers may be used to indicate the justifiability of a line. It is also possible to use both pointers for indicating the start and end of a horizontal line. In addition, the length indicator may indicate the projection ordinate. With a line to be written vertically (e.g. in tables) the length indicator shows its distance from the line start while the justification pointer may be used to define the length of this line from a given point vertically towards the top or bottom. In this case the system merely measures the length of the line or vertical distance.

The display and control device may be provided with a rotary knob by means of which the tongue indicating the line end may be rotated by a gear. This rotary knob may be pulled out by a certain amount so that, with the knob pulled out, the tongue may be moved in unison with the slide defining the line start. The rotary knob may be indexed at full units of length.

It is a further feature of the invention that the length indicator is connected to a photoelectric converter and mounted thereon. The photoelectric converter consists, in one embodiment, of a light source and two photovaristors and engages a tabulator located immediately under the guide rail. It is important for the photoelectric device that any set tabulator so cooperates therewith that a light beam coming from the light source to one of the two photovaristors is broken, and that the interruption of the light beam going to the second photovaristor is effected by a line end tongue.

A feature of the invention is that feed in of a new line into the memory of the photostetting machine may be commenced during the resetting of the justification and length indicators.

Both the length and the justification pointers may advantageously be moved by a stepper motor wherein the transmission ratio for the pointer drive is such that with every step of the motor one-quarter of the gross feed unit, or some other

fraction dependent on the construction of the stepper motor, is carried out.

The digital display and control device of the invention has the advantage of making possible an accurate and very clear display of the important data of several parameters, either simultaneously or at choice. The ends of the slider and of the tongue indicate clearly and unmistakably the start and end of a line, and an adjustment is easily made by means of the rotary knob. The two pointers movable along the guide rail fulfill simultaneously several functions, indicating either the justification range, the length of a horizontal line, or the length and end gap of a vertical line.

Another advantage is that the digital indicator may have several outputs enabling a parallel display in a rectangular system of coordinates.

The invention will be further described, by way of example, with reference to the accompanying drawing, in which:

FIG. 1 is a perspective diagrammatic view of a display and control mechanism according to the invention;

FIG. 2 is a cross section through the display and control mechanism of FIG. 1 along the line II-II in FIG. 1; and

FIG. 3 is a cross section through the display and control mechanism along the line III-III in FIG. 1.

With reference to FIG. 1, it can be seen that the scales S_1 , S_2 , S_3 , S_4 and S_5 required for the display are arranged after the manner of a slide rule. The display consists of a guide rail 1 with substantially I-shaped cross section, mounted on the frame of a composing machine, not shown. The front and rear sides of the guide rail 1 have guide tracks 6 and 7. In the front track 6 of rail 1, a slider 2 is movably mounted and serves to indicate the start of the line with the index edges 2a, 2b which cooperate with scales S_2 , S_5 . The end faces 9 of the front of the guide rail 1 above and below the front guide channel 6 have the scales S_2 , S_5 of which one (e.g. scale S_2) is in the metric decimal system. In the same way the slider has the two scales S_3 , S_4 of which the lower one (S_3) is a decimal scale similar to that scale S_2) of the guide rail. Slider 2, movable in the front channel 6 of rail 1, has in turn a guide channel 8 in which a tongue 3 engages slidingly. The position of the left-hand edge or end 3a of this tongue 3 indicates the line end. By means of a rotary knob 12, a spindle 15 and a gear 17, the position of tongue 3 may be indexed by increments of a millimeter. To this end, tongue 3 is connected via a bracket 14 to a rack 13 extending parallel to tongue 3 and located within the rear guide channel 7 of the rail 1. When rotary knob 12 is pulled out, the pinion 16 engages the slide 2 and couples the latter to rack 13 which is always connected with pinion 17 so that the tongue 3 and the slide 2 may be adjusted in unison via gears 16 and 17 upon rotation of knob 12. A justification pointer 5 overlies the top half of the guide rail 1 and is connected by a toothed belt 19 to a stepper motor 20. The upper scale S_5 of guide rail 1 is a typographical scale cooperating with the pointer 5 to indicate the dimension of the projection ordinate related to the left edge of the photographic material (not shown). Underneath guide rail 1 there is a plurality of tab stops 21 adjusted in increments of 1 millimeter and mounted on a composing shaft 10; these tab stops 21 are conveniently actuated by a tipping lever 22 to the left of the indicator. If this tipping lever 22 is moved down in the direction L of the arrow A this effects the setting of a tab stop 21, determining the position of the line-end tongue 3, while movement of the lever 22 in the direction S towards the top cancels or clears the tabulator (tab stop) setting.

The lower half of the front of guide rail 1 is overlain by a length indicator 4, moved by a toothed belt 18. The length indicator 4 is mounted on a photoelectric device 11, for operation with the tabulator 10, 21, 22. This photoelectric device 11, or photoelectric converter, detects the line start, the line end, and any further set tab stops 21, and is controlled thereby. The setting of the tab stops 21 can establish the margin positions and intermediate character portion determine either the justification of the line or the line end.

FIG. 2 shows more clearly the functioning of the photoelectric device 11, with reference to a cross section along the line I-I in FIG. 1. This photoelectric device 11, connected to length indicator 4, consists of a light source 49 and two photovaristors 47 and 48, and can be moved in unison with the pointer 4 along rail 1 by means of toothed belt 18. The device 11, shown in cross section in this FIG., has two recesses 50 and 52, through which a light beam B from a light source 49 falls upon photovaristor 47 or 48. The row of tab stops 21 arranged immediately under guide rail 1 is mounted on a shaft 10, and each individual tab stop 21 may be set by a setting mechanism 40. To this end, a recess 44 of setting mechanism 40 engages the rear part 45 of each tab stop 21 in an appropriate position of the latter. When a tab stop 21 is set, its front lug 46 is in the broken line position, interrupting the light beam B between light source 49 and photovaristor 47. This interruption may also be effected, apart from setting the tabulator nose 46 into the recess 50 of the photoelectric device 11, also by a fixed line start tongue 43, mounted on a support 41 (neither of which has been shown in FIG. 1). At the same time the switching contact of a microswitch 37 is released, which is held in the depressed position, when the rotary knob 12 is depressed by shaft 15 (FIG. 3). When rotary knob 12 is pulled out, the gear 17 which has hitherto been in engagement with rack 13 of tongue 3, meshes now also with the racklike guide of slider 2. The ratchet wheel 25 (not seen in FIG. 1 is withdrawn from the indexing screw 26 (not seen in FIG. 1) so that the same can now be moved with the gear 16 in the same manner, while the gear 17 and the shaft 15 of the housing 24 (not seen in FIG. 1) are mounted in a bush 31 of the housing 24 and in a bush 30 of the mounting 36.

Through a bore 51 in photoelectric device 11, the light beam passes from light source 49 to photovaristor 48. This light beam is interrupted when the line end tongue 42 (FIG. 2) engages into the recess 52 of the photoelectric device.

FIG. 3 is a cross section along the line III-III in FIG. 1, and shows the mechanism of rotary knob 12. Rotary knob 12 is mounted by means of a grub screw 23 on shaft 15. In the depressed position of the rotary knob 12, shown in the drawing, only the slider of tongue 3 can be rotated via shaft 15 and the gear 17; the latter is mounted on the shaft by means of a screw 27. Gear 17 engages with rack 13, which is firmly connected to slider 2. The rotary knob 12 is retained in its depressed position by means of a spring clip 29 in a right-hand recess in guide 28.

Gear 16, arranged adjacent to gear 17, is only fitted to shaft 15, and is prevented from rotation by a ratchet wheel 25, a grub screw 32 and a positioning screw 26, located in the housing part 24. Shaft 15 also carries, to the left of gear 17, a ratchet wheel 33 for actuating a pawl 34 which engages resiliently with the teeth of the ratchet wheel 33 and is biased by a spring 35. By means of this ratchet device 33, 34, the rotary knob 12 is indexed in increments of full millimeters against accidental rotation. When the rotary knob 12 is pulled out in the direction of the arrow P, it is retained in this position by means of the clip 29 in the left-hand recess of guide 28.

The transmission ratio of the stepper motors actuating the justification indicator and length pointer, 5 and 4, respectively, are such that, with every step, the motor advances one-quarter millimeter. The stepper motors run in a four-step cycle, resulting in accurate actuation in terms of the signals from the two photovaristors and the potential of the two motor coils.

Justification indicator 5 and length pointer 4 have the following functions:

1. During edge setting for normal grouped style, the two pointers represent a justification range, in that with variable spaces between words, the length indicator 4 advances always by one-half of the preset amount (increment of movement of the stepping device) and the justification pointer by twice that amount. When the justification pointer 5 reaches the end of the line, optical and acoustic signals of conventional type (see U.S. Pat. No.

3,137,381) indicate that the line is now justifiable. However, further symbols may be added until the length indicator 4 reaches the line end and blocks the keyboard. This blocking may be released only by deleting a symbol or by removing characters to reverse the length indicator 4. Thus, in the justifying range defined by the excursion of length indicator 4 it may be seen from the position of the pointer 5 whether a started word can still be fully accommodated on the line or whether it must be divided into syllables. In addition, it can be estimated from the positions of the pointers to what extent the resulting word spaces or intervals differ from the preset value of characters permitted, which is reached exactly when the justification pointer 5 is twice as far behind the line end as the line end indicator 4 is in front of the line end.

Finally, during justification, where all thickness values are read cyclically from a memory, for example, a matrix store, and are again inscribed, while the values for the word intervals are always increased by one unit, the length indicator 4 continues to advance (via belt 4 stepped by the memory in conventional manner) always by equal amounts in units of full millimeters until the line end has been reached.

On the other hand, if the justification order (depression of the "finished" key) is given before the justification pointer 5 reaches the line end, e.g. with the final words of a block of print, this line is automatically justified as with a free setting by doubling the originally stored values for the word intervals, which are thereby brought to normal values.

2. With a composition justified towards the right and/or the center (right and/or center quadding) and with free composition, only the length indicator 4 is needed and the justification pointer 5 may remain inoperative (belt 19 is not driven). Here, the pointer moves naturally with every word interval by the full, preset amount. For free composition, the line is set up on actuation of the "finished" key at the point indicated. With this setup, the length indicator 4 is automatically returned to the line start via the drive (not shown) for belt 18.

With a composition justified towards the right or center, the length indicator 4 runs after the pressing of the "finished" key first to the end of the line, or in the case of tabulator operation, to the next set tabulator 21. With justification towards the right, the line start is also shifted by a stepper motor 20 by the same amount of the residual line to the right, but in the case of center composition only by half that amount. When the line end has been reached in amounts reckoned in full millimeters, the indicator returns automatically to the start of the line. If the justification is made with a tabulator, the indicator stops at the full millimeter value reached.

3. In order to enable a new line to be commenced during the return movement of the length indicator, photovaristors 47, 48 are arranged to switch 16 mm. before the line start and apply the further return impulses to an eight-step, forward counting register. On keying in new symbols new forward impulses are given, and these are counted by additional registers until they reach zero and switch the indicator drive 20a to forward movement. So long as these additional registers continue to count, individual deletion orders and the feed in of fixed negative values (spaces) are rendered ineffective.

4. Horizontal lines up to 16 mm. are set with fixed values, longer lines by correspondingly set tabulators or with the line end from the left towards the right. Line start and end are displayed by the line indicator on the format scale. The distance from the top edge of the photographic material may be read from a cassette indicator, not shown, and is set with the cassette keys or with the line jump keys.

5. During the setting of vertical lines, the distance from the

left-hand edge of the photographic material is displayed by the length indicator 4. The desired gap may be set either with fixed values or by starting appropriately set tabulators. Short vertical lines up to 16 mm. are composed by means of the line jump keys from the top to the bottom, but longer lines must be set as line lengths and the justification indicator 5 must be so coupled with the vertical movement of the cassette that the line extends from the starting point, indicated on the cassette indicator, as far towards the bottom, as the justification indicator moves to the right. Vice versa, vertical lines may also be set from the bottom towards the top, if the justification indicator is placed at the line end and at the start. Several vertical lines of equal length can thus be set adjacently alternatively from the top and from the bottom.

I claim:

1. A display and control device for the setting, justification and checking of lines in a photosetting composition machine having a carriage, said device comprising:

a guide rail adapted to be mounted on said carriage and having front and rear sides provided with respective longitudinally extending guide channels;

a slider slidably received in the guide channel of said front side for indicating the start of a line, said slider being formed with a further longitudinally extending guide channel;

a tongue slidably received in said further guide channel for indicating the end of a line;

a rack slidably mounted in the guide channel of said rear side of said guide rail and connected with said tongue;

tabulator means connected to an underside of said guide rail and extending therealong;

a line length indicator movable along the front side of said guide rail and extending beneath said tabulator means;

photoelectric means carried by said line length indicator and cooperating with said tabulator means for producing a control signal for the device; and

a justification indicator extending along the upper side of said guide rail and shiftable therealong, said front side of said guide rail being provided with scales cooperating with said indicators for displaying the line end location and the justification of the line.

2. A display and control device as defined in claim 1, further comprising an axially shiftable rotatable knob; first gear means connecting said knob with said rack and second gear means connecting said knob with said slider; indexing means for rotating said knob and indexing said tongue in full units of length in one axial position of the knob; and means enabling joint movement of said tongue and said slider in a second axial position of said knob.

3. The display and control device defined in claim 2 wherein said photoelectric means includes a light source producing a light beam and photosensitive means spaced from said light beam, said tabulator means including a multiplicity of tab stops displaceable from a normal position into a set position interrupting said light beam, and means for setting said tab stops, said device further comprising a line end tongue interrupting said beam in a predetermined position of said line length indicator.

4. The display and control device, as defined in claim 2 further comprising a line start tongue cooperating with said photoelectric means.

5. The display and control device defined in claim 4 wherein said guide rail and said slider are each provided with respective scales subdivided correspondingly.

6. The display and control device defined in claim 5, further comprising a stepper motor operatively connected with said indicators for displacing same along said guide rail.