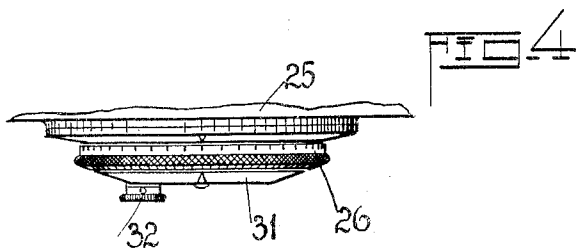
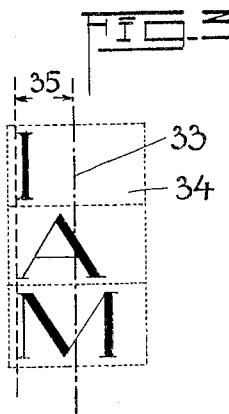
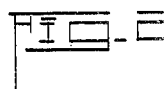
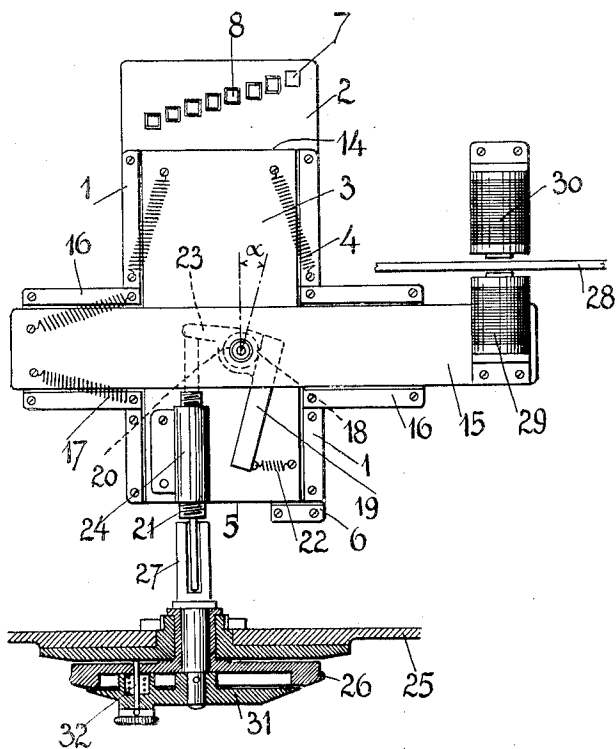
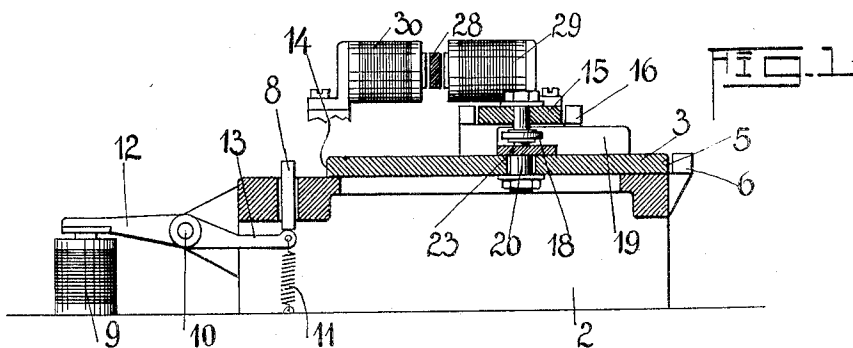


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MECHANISM FOR PRODUCING LINEAR DISPLACEMENTS AND IN PHOTOGRAPHICAL  
TYPESETTING MACHINES IN CONNECTION WITH THEM  
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MECHANISM FOR PRODUCING LINEAR DISPLACEMENTS AND IN PHOTOGRAPHICAL TYPESETTING MACHINES IN CONNECTION WITH THEM

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The invention relates to a mechanism for producing linear displacement by various steps of predetermined lengths, especially for use in connection with photographic type setting machines. The object of the invention is to provide a simple mechanism which, notwithstanding, will give better results than other mechanisms of the same type as regards exactness, reliability and rapidity of operation. Another object of the invention is to reduce the very numerous grades of step-forward displacement required for practical purposes into a few predetermined lengths. A further object of the invention is to satisfy all requirements and possibilities of photographic reproduction when the invention is used in connection with a photographic type setting machine.

A practical embodiment of the invention is diagrammatically shown by way of example in the accompanying drawings in which—

Fig. 1 is a sectional elevation of the mechanism and Fig. 2 is a plan view of the same, partly in section, in the position of rest.

Fig. 3 is a detail view of the type patterns of a photographic type setting machine used in connection with the invention, and Fig. 4 is a detail elevation of the parts appearing in section in Fig. 2.

In the guides 1 of frame 2 the controller slide 3 glides to and fro, springs 4 tending to keep it in the position of rest shown on the drawings, i. e. with its edge 5 on stop 6. A fixed stop 7 projects into the gliding surface, which stop limits the length of the longest forward stroke of slide 3. Other seven stops 8 are arranged staggered to enable the stroke of the slide to be reduced in a corresponding manner. In their position of rest these stops are situated below the plane of the slide, and it is only by means of the corresponding double-arm lever 12, 13 pivoted at 10 that such stop as may have been selected for the purpose is lifted into the working position shown on Fig. 1, in which it engages with the slide edge 14. Each lever 12, 13 is actuated by an electromagnet 9, the arms 12 being attracted when the magnets are energized and the arms 13 being retracted by springs 11, as

soon as the corresponding magnet is de-energized.

In the example shown on the drawings eight different lengths of stroke are accordingly available, which lengths are so chosen that any step desired, for instance any width of type etc. occurring in practice may be coordinated with one or the other of these different lengths of stroke. The movements of the controller slide 3 taking place in a straight line, the dimensioning and the selection of each length of stroke is quite independent of the other lengths of stroke. The selectors of stroke lengths below the longest stroke of controller slide 3 are required to set free the stroke of the controller slide 3, on the one hand, and to raise one of stops 8, on the other hand. At the same time, buffing devices must be provided, in a manner known per se, for the motion of the controller slide 3, in order to avoid any danger of breakage in spite of the shortening of slide strokes by unyielding stops. Slide 3 is preferably driven by the piston of a compressed air cylinder running under full-time admission of compressed air, further advantages obtained hereby being uniformity of speed of the slide, soft and easy running and highly sensitive regulation.

Thus, slide 3 takes up in a direct manner, in the form of its strokes of varying length (such variation depending on the limits set), the selected linear displacements e. g. type widths, either in their actual dimensions or on a certain scale. It only remains to transfer such displacements, by means of a coaster or free-run mechanism to a conveyer which acts on the tool or device to be displaced, for instance, the carrier of the light-sensitive setting plate, in order to ensure photographic type setting to be effected in the proper manner required for printing.

The step length selectors are subordinated to a keyboard, per se known, for instance to a typewriter keyboard, various keys of which may be correlated with each step length selector, for instance, the switch of a magnet 9, the mechanism being thus operated in the manner of writing by means of a typewriter. The predetermined number of stroke lengths

of the controller slide 3 may thus be connected with any desired plurality of keys. In order to reduce the number of keys, different selectors may also be subordinated to a common key, the current circuits of such selectors being branched-off so as to pass through two or more change-switches, which are operated by means of a change key similar to that of a typewriting machine.

In photographic type setting machines the actual magnitude of the type-widths depends on the grade of type to be set, e. g. on the ratio of photographic enlargement selected. At the same time the proportion of the different types, determined by the corresponding stroke lengths of slide 3 remains, in general, unaltered and accordingly it will be possible according to the invention to derive the varying lengths of step required in each case from the basic lengths available, the number of which may, as in the example shown, be eight, such derivation being effected by means of a transmission adjustable for different transmission ratios, such transmission being inserted between the controller slide 3 and the element to be displaced e. g. the conveyer of plate carrier or the like. This is effected by means of the transverse slide 15, which, like slide 3, glides in the guides 16 and is provided with return springs 17. A roller 18 mounted on slide 15 cooperates with an oblique but straight cam surface on a lever 19 pivoted at 20 to slide 3 and adjustable so as to vary the obliquity of the cam surface by means of a spindle 21, against which the nose 23 of the lever 19 is pressed by spring 22. Threads of the spindle 21 engage a nut 24 fixed on slide 3. Spindle 21 is turned by means of a hand-wheel 26 supported in casing 25. This spindle is slotted at 27 so as to allow the strokes of the controller slide 3.

If now slide 3 is moved forward, it will impart a rectilinear movement to the transverse slide 15 as well, by means of the cam surface on lever 19 acting on the roller 18. The directions of coordinated strokes are denoted by arrows. The length of the transverse stroke depends on that of the longitudinal stroke selected, the ratio of transmission being determined by angle  $\alpha$  (Fig. 2) i. e. exactly by the degree of slant of the cam surface, the adjustability of which has just been described.

The transverse slide 15 has an electromagnet 29 mounted thereon, by means of which a soft-iron travelling conveyer 28 is coupled to slide 15 during each stroke of the latter, when the magnet 29 is energized. A reversed connection arrangement is provided between magnet 29 and the fixed magnet 30, only one of the magnets being energized at a time. Conveyer bar 28 will therefore be released by magnet 30 and gripped by magnet 29 when the forward step, is made whilst during the reverse stroke of slide 15 the opposite process takes place, the bar 28

being now released by magnet 29 and gripped by magnet 30. As a result, bar 28 will move forward step by step and will be fixed in each position.

In case the mechanism is used in connection with a photographic type setting machine, positive connection is also provided between hand-wheel 26 and the means for controlling the general scale on which the pattern types are reproduced, for instance, the adjusting screw of the object lens, the various sizes of type in photographic type setting machines being as a rule different degrees of enlargement of the same type patterns. There exist, besides, also kinds of type, in which, whilst the basic relative mutual proportion of type widths remains the same, the proportion between the type width and the height of type becomes a quite peculiar one. If such kinds of type, in which for instance the types, whilst possessing the same height, are much narrower or much wider than usual, are set, spindle 21 is connected by a key connection with a second hand-wheel 31. In such cases the outer hand-wheel 26 sits loose on the spindle 21 and is coupled with the latter by means of the snap peg 32 and of the inner hand-wheel 31. By turning hand-wheel 26, the means for controlling the scale of reproduction of the type patterns is simultaneously adjusted.

If however, peg 32 is extracted from hand-wheel 26, the latter becomes disconnected from the other hand-wheel 31 which, therefore, can be operated to vary the transmission ratio between slides 3 and 15 independently from the scale of reproduction of the type patterns.

It becomes thus possible to convert the fixed lengths of the controller slide strokes into any lengths of steps desired, at will, and to extend this conversion, by operating hand-wheel 26, to both coordinates of the type image, or to limit it to the width coordinate alone by operating hand-wheel 31 when disconnected from hand-wheel 26. If in addition to this, type characters have to be handled, in which certain exceptional individual widths of type occur, one may recur to the change-switches or the like inserted in the circuits of the selectors as referred to above.

To begin type setting, hand-wheel 26 is first adjusted so as to correspond to the wanted ratio of type reproduction, then the transmission ratio between slides 3 and 15 is, if necessary, corrected so as to make it larger or smaller, by means of hand-wheel 31, and type setting can at once go on. A check can be kept on hand-wheel positions by means of circular divisions and pointers. In exceptional cases it will be necessary to provide, in addition to this, extra change-switches in the circuits, controlling the magnets.

According to the invention, the uniformly distributed type patterns of photographic

type setting machines when used in connection with the arrangement described are so arranged as to make the left-hand border of each type image get always on the same place, notably make it coincide with the left-hand border of the line along which it is intended to travel. In Fig. 3 this is shown, to make it quite plain, on three type images placed one above the other, the three type patterns having the same axis of division 33 in common i. e. possessing division fields 34 of equal size. The left-hand, i. e. initial borders are displaced from the centre-line of division 33 in the same initial sense and to the same distance 35 from the axis 33. It should be added that the starting type of the line is photographically exposed whilst the light-sensitive plate or film or like is still in that position of rest, starting from which this plate etc. begins to travel along the line in question, and that all individual exposures, and, therefore, those of the other types of the lines as well, precede the corresponding step-forward displacement of the light-sensitive sheet. If we proceed in this manner, the left-hand borders of all lines of a column will be in alignment, spaces between words will always be exact and the differences which might arise from the differences of initial types will be eliminated automatically. As besides, the right-hand end of the words or respectively of the lines results from the corresponding forward-steps, it will always be possible to measure in an exact manner the lengths of lines along which travel has taken place, on the traveller bar 28, which is important from the point of view of supervision and from that of justification of the lines.

The springs described return all parts into the position of rest and the traveller bar 28 will at the end of each line be pushed back into the initial position for the line following next, in the same way as the paper slide of typewriters, both magnets 29, 30 at the same time being de-energized.

Various changes in the construction and arrangement of the parts herein shown and described may be employed without departing from the spirit of my invention as disclosed in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A mechanism for producing linear displacement by various steps of predetermined lengths, comprising a controller slide adapted to reciprocate in a straight line, a support for said slide, guidings on said support for said slide, means for limiting the movements of said slide in one direction to selected distances, and means for transmitting at a variable ratio the movements of said slide in one direction only to the element to be displaced by steps.

2. In a mechanism as claimed in claim 1,

a fixed stop determining the maximum length of such movements of the controller slide as are transmitted to the element to be displaced by steps, a plurality of movable stops adapted to shorten said maximum length of said movements of said controller slide by various amounts when raised into the path of said controller slide, and step length selectors for individually raising said movable stops from below the path of said controller slide into working position and simultaneously causing said controller slide to start towards said movable stops.

3. In a mechanism as claimed in claim 1, a fixed stop determining the maximum length of such movements of the controller slide as are transmitted to the element to be displaced by steps, a plurality of movable stops adapted to shorten said maximum length of movements by various amounts when raised into the path of said controller slide, step length selectors for individually raising said movable stops from below the path of said controller slide into working position and simultaneously causing said controller to start towards said movable stops, and a keyboard to which said selectors are subordinated, several keys of said keyboard being correlated with one of said selectors.

4. In a mechanism as claimed in claim 1, a fixed stop determining the maximum length of such movements of the controller slide as are transmitted to the element to be displaced by steps, a plurality of movable stops adapted to shorten said maximum length of movements by various amounts when raised into the path of said controller slide, electromagnetically operated selectors for individually raising said movable stops from below the path of said controller slide into working position and simultaneously causing said controller to start towards said movable stops, a keyboard to which said selectors are subordinated, and change-switches in the electric circuits of said selectors adapted to complete the circuits of individual selectors through different keys of said keyboard.

5. In a mechanism as claimed in claim 1, a compressed air cylinder with a piston running under full-time admission to operate the controller slide.

6. A mechanism as claimed in claim 1, in which the means for transmitting the movements of the controller slide to the element to be displaced by steps comprises a second slide adapted to reciprocate in a straight line perpendicular to the direction of movement of the controller slide, a conveyer mounted on said second slide, and an oblique cam surface cooperating with said conveyer and mounted on said controller slide so as to allow adjustment of its obliquity.

7. A mechanism for producing linear displacement by various steps of predetermined lengths to be used in connection with a

photographical type setting machine, comprising a controller slide adapted to reciprocate in a straight line, a support for said slide, guidings on said support for said slide, means  
5 for limiting the movements of said slide in one direction to selected distances, means for transmitting at a variable ratio the movements of said slide in one direction to the sensitive receiving surface of said photo-  
10 graphical type setting machine, and duplex means for adjusting said ratio of transmission, one member of said duplex adjusting means having positive connection with, and the other member being independent of, the  
15 device provided on the photographical type setting machine for controlling the scale of photographic reproduction of the type patterns.

8. A mechanism as claimed in claim 7, in  
20 which the duplex means for adjusting the ratio of transmission comprises an axle having two handwheels mounted thereon, that of said handwheels which has positive connection with the optical enlarging means  
25 of the photographical type setting machine being loose on said axle and adapted to temporarily be connected with the other hand-wheel which is fixed to said axle.

9. In a photographical type setting machine to be used in connection with the  
30 mechanism claimed in claim 1, equally distributed type patterns having their initial borders displaced from the centre-line of division in the same initial sense and to the  
35 same distance from the centre-line of division.

10. In a photographical type setting machine to be used in connection with the  
40 mechanism claimed in claim 1, equally distributed type patterns having their initial borders displaced from the centre-line of division in the same initial sense and to the same distance from the centre-line of division, the starting type of each line to be set  
45 being on the place of the photographical exposure whilst the sensitive receiving surface is in its position of rest, and all individual exposures preceding the corresponding step-forward displacement of the sensi-  
50 tive receiving surface.

In testimony whereof I have signed my name to this specification.

EDMOND UHER, Jr.