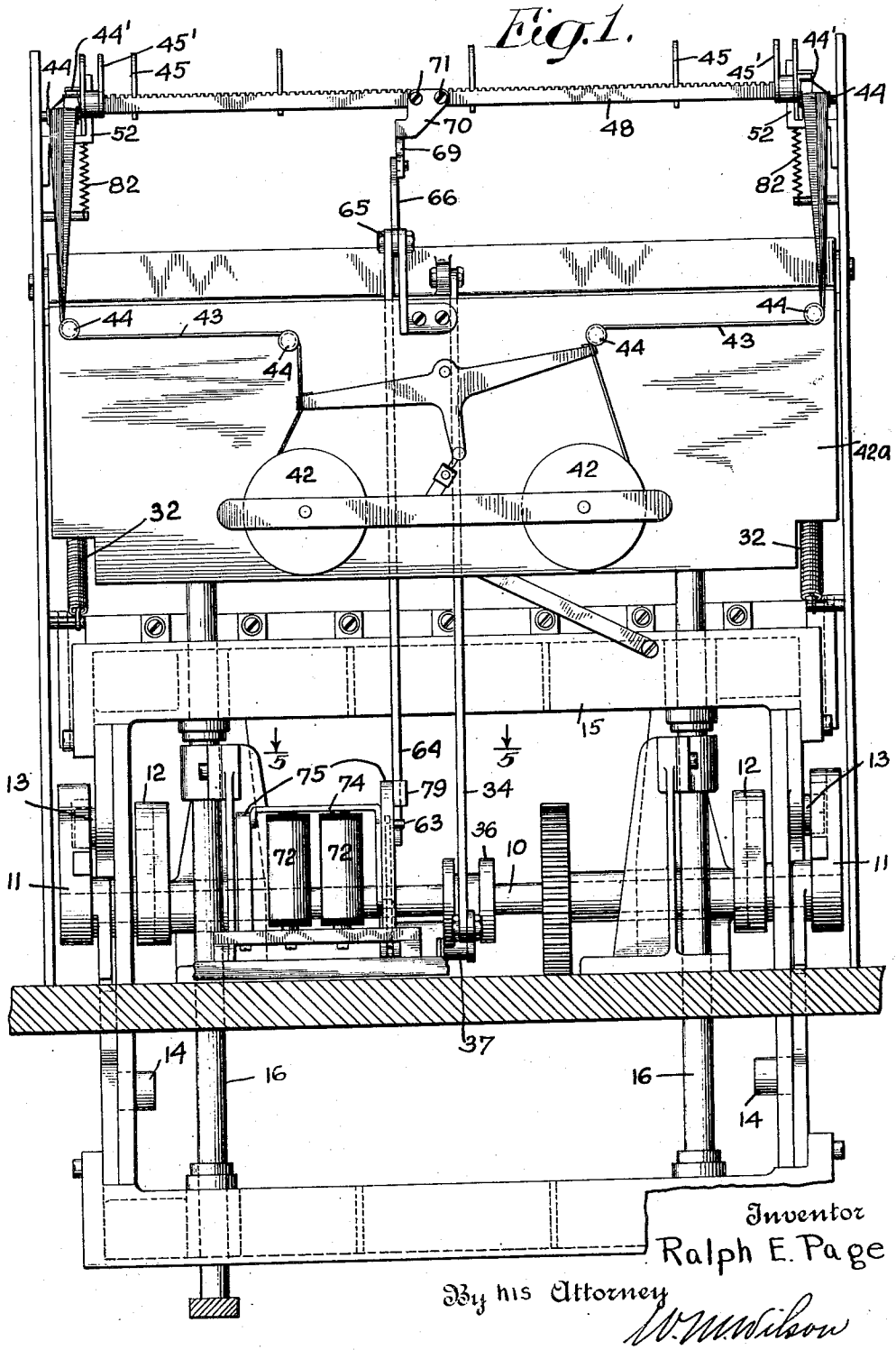
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RIBBON SUPPORTING MECHANISM

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Fig. 1.



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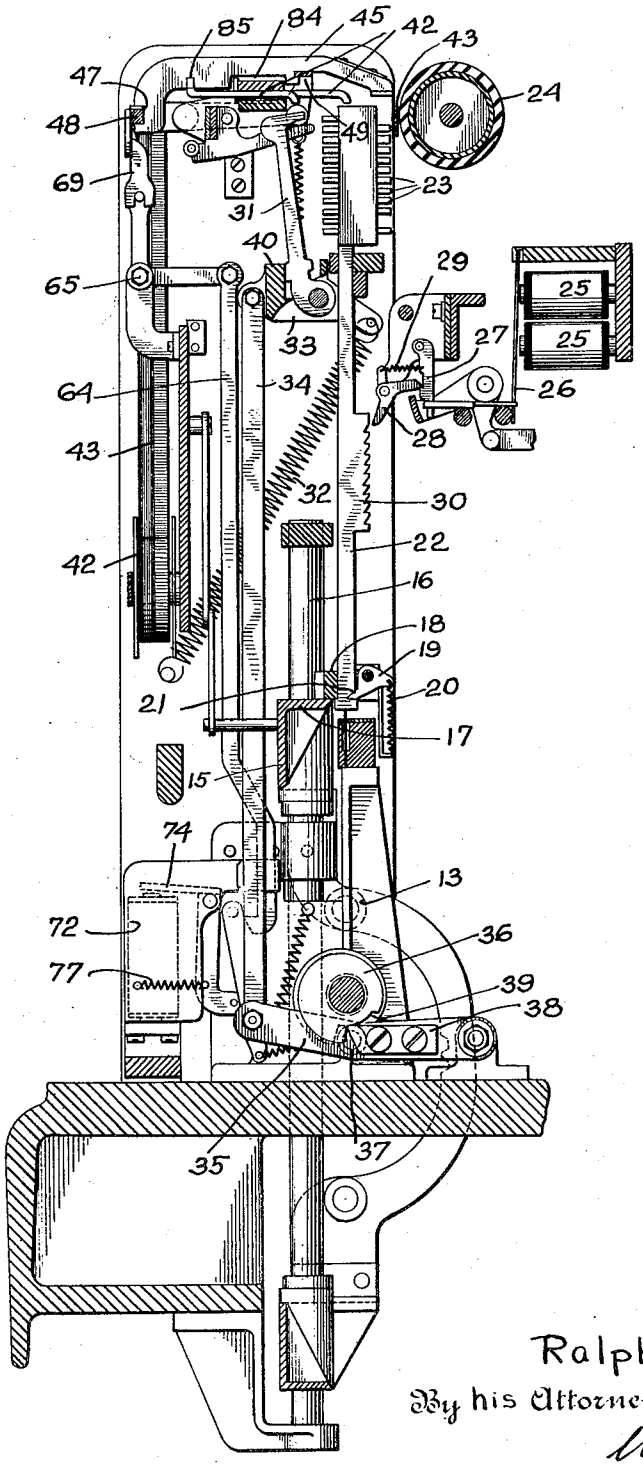


Fig. 2.

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RIBBON SUPPORTING MECHANISM

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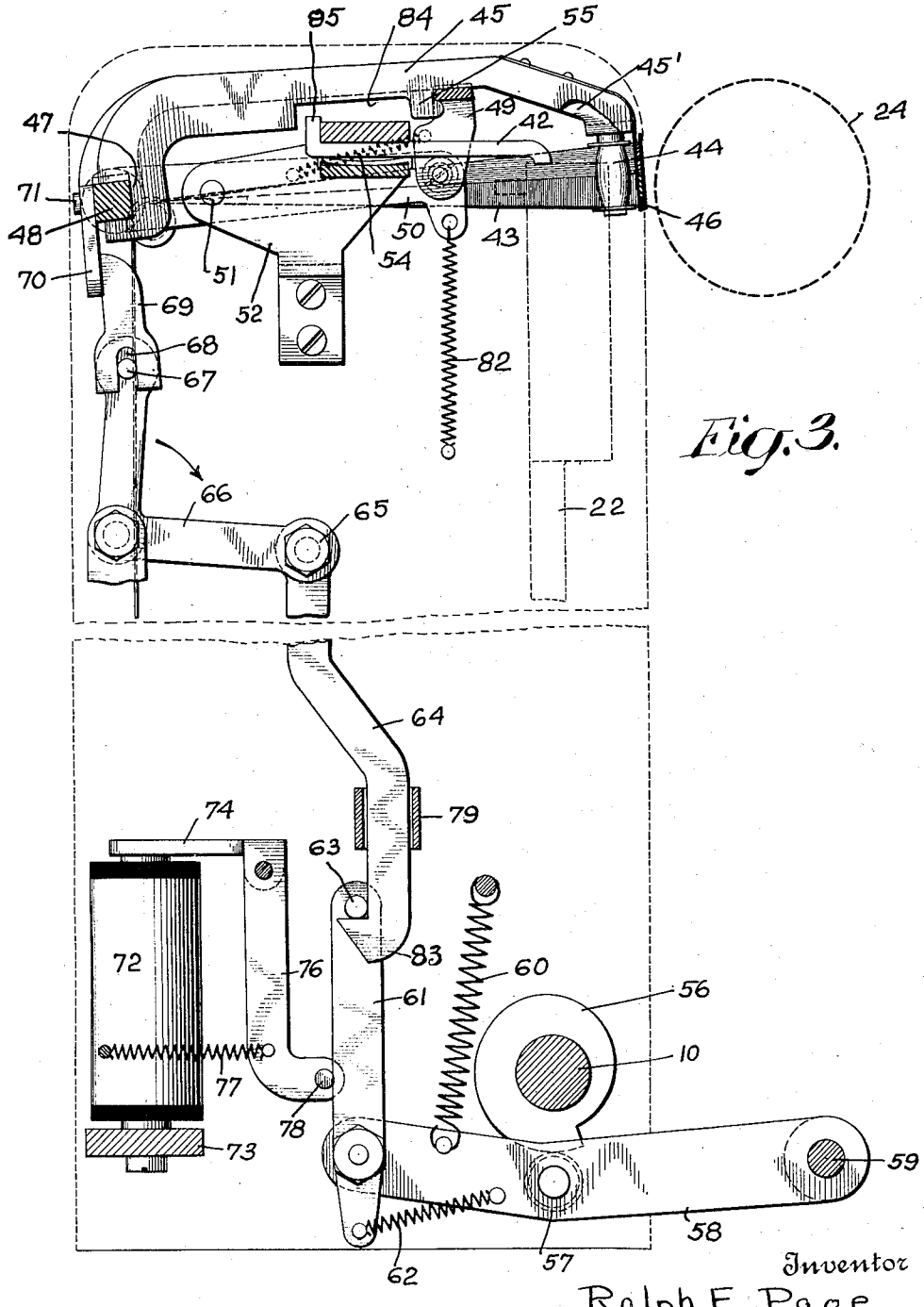


Fig. 3.

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RIBBON SUPPORTING MECHANISM

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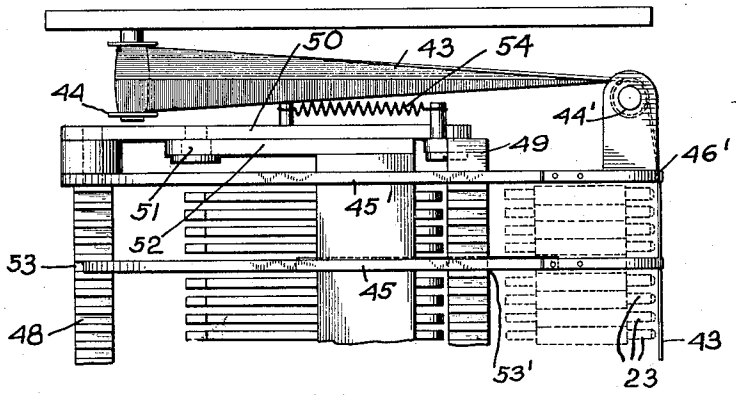


Fig. 4.

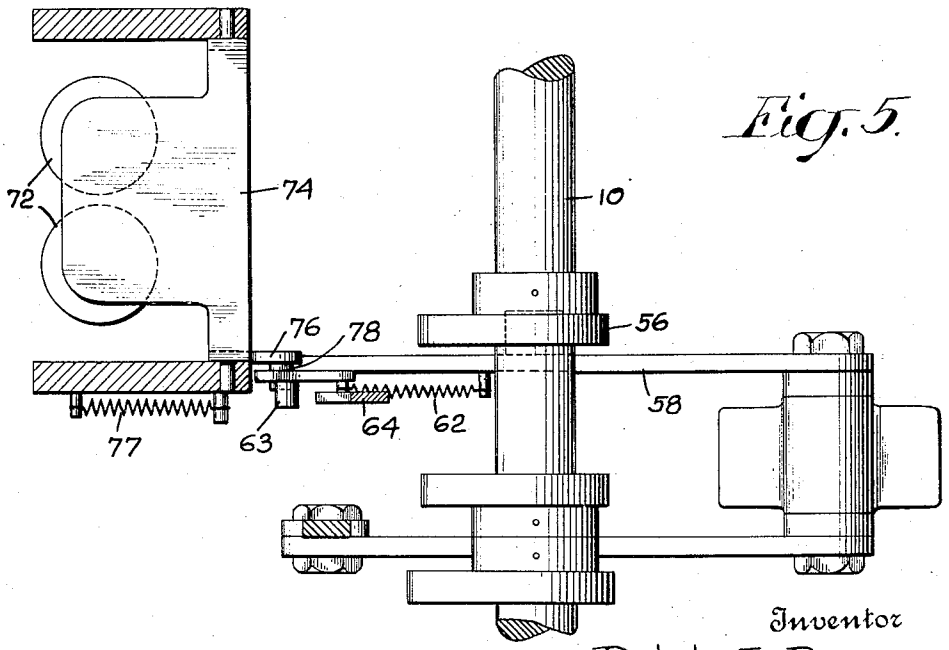


Fig. 5.

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UNITED STATES PATENT OFFICE

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RIBBON-SUPPORTING MECHANISM

Application filed October 1, 1927. Serial No. 223,314.

This invention relates to an improved ribbon mechanism which may be used on printing machines, such as, for example printing tabulating machines.

In adding machines, typewriters, etc., the usual end supports for the inking ribbon are sufficiently close to each other to keep the ribbon fairly taut and counteract any tendency of the ribbon to sag. In certain classes of machines, as for example printing tabulating machines, the distance between the end supports for the inking ribbon is such that the ribbon has a tendency to sag due to the weight of the ribbon between the supports. Furthermore, hammering of the type against the ribbon has a tendency to curl the ribbon. The sagging or curling of an inking ribbon is a serious matter, especially in the case of a two color ribbon, because a slight sagging or curling may present the wrong color in a position to receive the impression upon the type actuated by the printing hammers. In order to prevent this curling and sagging, intermediate supports are placed between banks of type elements in machines wherein the banks are spaced from each other. In machines wherein the bank of type elements is too wide, or wherein the banks of type elements are not spaced from each other to permit of intermediate ribbon supports, it has thus far been impossible to support and guide the inking ribbon properly.

Invariably, in the use of a machine such as of the printing tabulating type, one or more of the type bars remain idle throughout a period of operation of the machine; thus providing in effect a blank space in the group of type bars.

An object of this invention is to devise means adapted to utilize said blank spaces as positions for ribbon supports.

An object of the invention is more specifically to provide adjustable or removable intermediate supports for an inking ribbon extending across a wide bank of type elements.

The structure hereinafter described also comprises an improved shiftable ribbon mechanism for shifting the ribbon from position for printing one color to position for printing another. This ribbon shifting mechanism is claimed in an application Serial No. 310,493, filed October 5, 1928, which is a division of the instant application.

Further objects and advantages will be more fully set forth in the accompanying specification and claims and shown in the drawings in which

Fig. 1 is an elevational view of a printing head reciprocator with the shiftable ribbon mechanism and removable ribbon supports thereon.

Fig. 2 is a side view of same.

Fig. 3 is a detail of the ribbon supports and automatic ribbon controlling device.

Fig. 4 is a detail of the ribbon supporting means.

Fig. 5 is a section on line 5—5 of Fig. 1, showing a detail of the ribbon shifting means.

In order to clearly disclose my invention, it has been shown as applied to a printing head reciprocator disclosed in the copending application of R. E. Page, Serial No. 217,079, filed Sept. 2, 1927, but it will be understood that the invention is applicable to any similar printing apparatus.

For the purpose of this invention it will be sufficient to give a general outline of the operation of the printing head reciprocator. The printing head comprises a shaft 10 carrying pairs of cams 11 and 12 fixed thereto at each side of the ribbon. Coacting with these cams are cam followers 13 and 14, respectively. The cam followers 13 and 14 are fixed to a cross head 15 slidably mounted for vertical movement on guide rods 16. The upper end 17 (Fig. 2) of the cross head 15 engages a bar 18 carrying a plurality of individual pivoted pawls 19 biased by springs 20. Pawls 19 are adapted to individually engage notches 21 in the type bars 22. The type bars carry a plurality of type lugs 23 for printing on a sheet of paper inserted between the platen 24 and the inking ribbon 43. A magnet 25 when energized attracts its armature 26 to withdraw a latch 27 from a pawl 28 thereby permitting the pawl 28 under the influence of a spring 29 to engage one of the notches 30 on the type bars 22. Movement of the bar is thereby stopped, while pawl 19 coacting with the notch 21 of

said bar leaves the notch and permits the cross head to continue moving upward. It is understood that there is a printing magnet 25 and locking pawl 28 for each type bar 22 and due to the releasable drive of the bars, the latter may be stopped in different relative positions. Each of the type lugs 23 corresponds to one of the notches 30 on the type bars 22 so that the type lug corresponding to the notch engaged by locking pawl 28 will be in position for printing upon the record sheet against the inking ribbon and platen roll. Printing by the type lugs 23 is effected after the cross head has completed its rise by means of hammers 31 actuated by a spring 32 through a linkage 33, 34 and 35. Cooperating with link 35 is a cam mechanism 36 on main shaft 10 which has portions engaging a cam follower 37 on said link 35 to retract the hammers 31 while the type bars 22 are being moved to their uppermost position. After the type bars have reached their uppermost position a cam wiper 38 on the link 35 begins to coact with the cam mechanism 36 and when the wiper reaches a recess 39 in the cam, link 35 moves toward the recess permitting spring 32 to rock link 33 clockwise, as viewed in Fig. 2. A plate 40 integral with link 33, moves with the link and engages hammers 31 to actuate them towards the type lugs 23, causing them to strike the type lugs which are in printing position. Before the machine is set in operation, any type bar 22 that is not to be used may be restrained from actuation by the cross head by means of one of the latches 42 which is moved into position to engage the top of the bar and thus hold it inoperative.

Reference will now be had to Figs. 1, 3, and 4 wherein the removable ribbon supports and means for automatically shifting an inking ribbon from one color to another is illustrated. As will be noted two ribbon rolls 42 are mounted on a fixed plate 42^a and are provided with any well known means for feeding and reversing the direction of feed of the ribbon. The feeding and reversing means need not be described herein as it forms no part of the present invention. The ribbon 43 is directed and guided by a series of like guide rolls 44 into printing position between the type lugs 23 and the platen roll 24. The guide rolls 44′ of said series of guide rolls, also serve as end supports for the ribbon as it passes in front of the type lugs. The ribbon is further supported by stationary end supports 45′ and removable intermediate supports 45.

Referring to Figs. 2 and 3, the removable support 45 comprises an arcuate arm carrying a wire hook 46 at one end through which the ribbon 43 travels. This wire hook is open at the top so that the ribbon may easily be inserted therein. The opposite end of the arm of support 45 is provided with a rectangular notch 47. Extending the width of the machine, parallel to main shaft 10, are notched bars 48 and 49 (Figs. 1 and 4). Fixed to the bar 48, adjacent its ends is a stationary ribbon support 45′ (Fig. 4) extending horizontally and at right angle to the bar. This ribbon support has a retaining hook 46′ thereon similar to that of the removable ribbon support 45. It is to be understood that for all settings of the machine, the two stationary supports 45′, are at the side of the device, and serve as supports and guides for the ribbon 43. At each side of the machine, a lever 50 is pivoted intermediate its ends at 51 to a plate 52 fixed to the side frame of the machine as shown in Fig. 1. At one of their ends, levers 50 are rigid with the ends of notched bar 48 extending at right angles to the levers and at the other end, levers 50 are pivotally connected to the ends of notched bar 49. When one of the supports 45 is to be placed in position to support the ribbon, the ribbon is first inserted into the wire hook 46. Said support is then mounted on bar 48 by seating the rectangular notch 47 on said bar in position for the top wall of the rectangular notch to engage that one of the bar notches 53 which is in line with the type bar locked out by latch 42. The bottom of the support has an undercut projection 55 which is engaged by the ledge of bar 49, the latter pivoting on its connection with lever 50 to permit placing projection 55 thereunder. A set of springs 54 holds bar 49 firmly against said projection 55. One of the notches 53′ on bar 49 is in alignment with the notch 53 on the bar 48 upon which the support has been placed and both bar notches serve to prevent transverse movement of the support 45 when the latter is mounted on said bars. The support 45 when in position is thus fixed against transverse movement by engagement with a pair of aligned notches 53 and held against longitudinal movement by the projection 55 engaging bar 49 and rectangular notch 47 engaging bar 48.

The ribbon 43 may be of the ordinary two-color type i. e. comprising a black or blue-half which is normally held in front of the type lugs 23 in printing position and a red half which is normally held out of printing position but which may be brought into said position, when desired, by suitable mechanism shown in Figs. 1, 2 and 3.

Referring now to Fig. 3, an enlarged detail of the ribbon shifting mechanism is illustrated. A cam 56 fixed to the shaft 10 of the machine coacts with a cam follower 57 mounted on a link 58 which link is pivoted on a pin 59 to the frame of the machine and biased by a spring 60. Link 58 has pivotally connected thereto a link 61 one end of which has a spring 62 connected thereto, the spring being also anchored to link 58. The

upper end of the link 61 carries a stud 63 which coacts with a hook member 64 pivoted at 65 to a bell crank 66. A stud 67 carried by the vertical arm of the bell crank 66 engages between the bifurcated portion 68 of an arm 69 integral with a plate 70 fixed to the notched bar 48 by screws 71 (Fig. 1). A magnet 72 fixed to the device at 73 when energized through a suitable circuit attracts its armature 74, pivoted to standards 75. Integrally formed with armature 74 and extending at right angles thereto is a member 76 biased by a spring 77. The member 76 carries a stud 78 at its lower end which abuts the link 61. A suitable guide 79 on one of the standards 75 is provided for guiding the vertical movement of the hook member 64.

When it is desired to shift the ribbon from its normal position in which the black or blue portion thereof is in line with the type for printing in said colors to a position where its other color portion such as red is in line with the type for printing red characters, a suitable circuit is set up through a magnet 72 which when energized attracts its armature 74 to rock it counterclockwise, as viewed in Fig. 3. The right angular extension 76 of the armature then moves toward link 61, and the stud 78 therein engages the link 61 turning it clockwise on its pivot with the result that the stud 63 on the link engages in the hook portion 83 of the member 64. In the normal operation of the machine with characters being printed in black, the cam 56 will oscillate links 58 and the link 61 yieldingly connected thereto without causing motion of link 64 due to the fact that pin 63 is out of engagement with hook 83 on hook 64. When the magnet is energized to cause the stud 63 to engage the hook portion of the latching member 64 as described, link 61 upon being actuated downwardly by cam 56 and link 58 will through pin 63 move link 64 downwardly. The downward movement of the member 64 rocks bell crank 66 in the direction of the arrow, Fig. 3 and through arm 69, plate 70, integral with the arm and bar 48, rocks the levers 50 connected to said bar about pivots 51 (Figs. 3 and 4). The levers 50 in this movement carry bar 49 with them so that the bar 48, levers 50, and bar 49 rock as a unit about pivots 51. The right hand ends of stationary and removable ribbon supporting bars as viewed in Fig. 3 which are mounted on said bars will thereby shift upwardly to position the red or any other desired color portion in line with the type in printing position. Deenergization of the magnet 72 permits spring 77 to rock armature 74 and arm 76 so that the stud 78 withdraws from the link 61. The stud 63 on the link 61 is likewise withdrawn by the spring 62 from engagement with latching member 64. The ribbon shifting mechanism is restored to its normal black or blue position by means of the spring 82.

It is to be understood that the contour of cam 56 is such that while magnet 73 is energized, the cam retains the ribbon in its shifted position during the time that the printing hammers strike the type to print on the paper. When magnet 73 is deenergized, pin 78 on armature arm 76 will be retracted, permitting link 61 under force of spring 62 to follow the pin whereupon pin 63 on said link will leave hook 83 on link 64 thus breaking the connection between links 61 and 64. Hence, cam 56 will oscillate links 58 and 61 without imparting motion to link 64 so long as magnet 73 is deenergized.

A recess 84 in the arm of removable support 45 is adapted to permit entrance of the upwardly extending rear end 85 of the latch 42 when the latter is engaging its corresponding type bar to hold it down, as shown in Fig. 3. When the latch is not holding a type bar down, its end 85 will not enter the recess but engage the bottom of the support arm and prevent its being placed in printing position, thus preventing positioning a support 45 over an active type bar.

While I have shown and described and pointed out the fundamental novel features of the invention as applied to a single modification it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. I intend to be limited therefore only as indicated by the scope of the following claims.

I claim:

1. In combination, a printing device comprising a plurality of printing elements located side by side and movable to a plurality of printing positions, means for supporting ribbon guides and supports in the path of movement of said printing elements and means for preventing movement of those printing elements in whose path the ribbon guides and supports are placed.

2. In combination, a printing device comprising a plurality of printing elements located side by side and movable to a plurality of printing positions, and means for preventing movement of desired printing elements, removable ribbon guides and supporting means therefore for removably supporting them in the path of the printing elements which are provided with means for preventing movement thereof.

3. In combination, a printing device comprising a plurality of printing elements located side by side and concurrently movable through different printing positions and means associated with each printing element for selectively holding it against movement, removable ribbon guides and means for supporting one of said guides in the path of movement of each of said printing elements.

4. In combination, a printing device comprising a bank of printing elements located side by side and movable through different printing positions and means associated with each printing element for holding it against movement, a pair of permanent ribbon guides located at opposite ends of said bank, additional removable ribbon guides and means for removably supporting said additional guides intermediate the permanent guides and in the path of movement of said printing elements.

5. In combination, a printing device comprising a bank of printing elements located side by side and movable through different printing positions and means associated with each printing element to hold it against movement, a notched bar extending along one side of said bank and a second notched bar extending along the other side of said bank, said bars being provided with aligned notches in the plane of each printing element, and removable ribbon supports arranged to be supported in opposite aligned notches of said bars to extend in the path of said printing elements.

6. In combination, a printing device comprising a bank of printing elements located side by side and movable through different positions, holding means for restraining one or more of said elements against movement, a ribbon guide member, means for detachably supporting said member in the path of movement of said elements, said ribbon guide member having a portion associated with said holding means to insure disposal of said member on said support only in the path of movement of a restrained printing element.

7. In combination, a printing device comprising a plurality of printing elements located side by side and movable through different positions, means for holding one of said elements against movement, a ribbon guide member, means for removably supporting said member, and means for preventing the disposal of said member on said supporting means in the path of movement of a printing element not being held down.

8. In combination, a plurality of printing elements located side by side and movable to different positions, a removable guide member, a notched supporting bar engaging one end of said member, and a second notched supporting bar yieldingly engaging a recess in said member intermediate its ends, and a hook fixed to the free end of said member to guide an inking ribbon for cooperation with said printing elements.

9. In combination with printing elements movable to different positions, means for restraining one of said elements against movement, a ribbon guide, a pair of spaced bars detachably supporting said guide in the path of movement of a printing element restrained against movement, a pivoted member connecting said bars, and means for automatically rocking said member on its pivot to shift the ribbon guide.

In testimony whereof I hereto affix my signature.

RALPH E. PAGE.