

March 11, 1969

H. PRIEB
MULTIPLE-COLOR PRINTING STRUCTURE FOR
BOOKKEEPING MACHINES AND THE LIKE

3,432,022

Filed April 21, 1966

Sheet / of 2

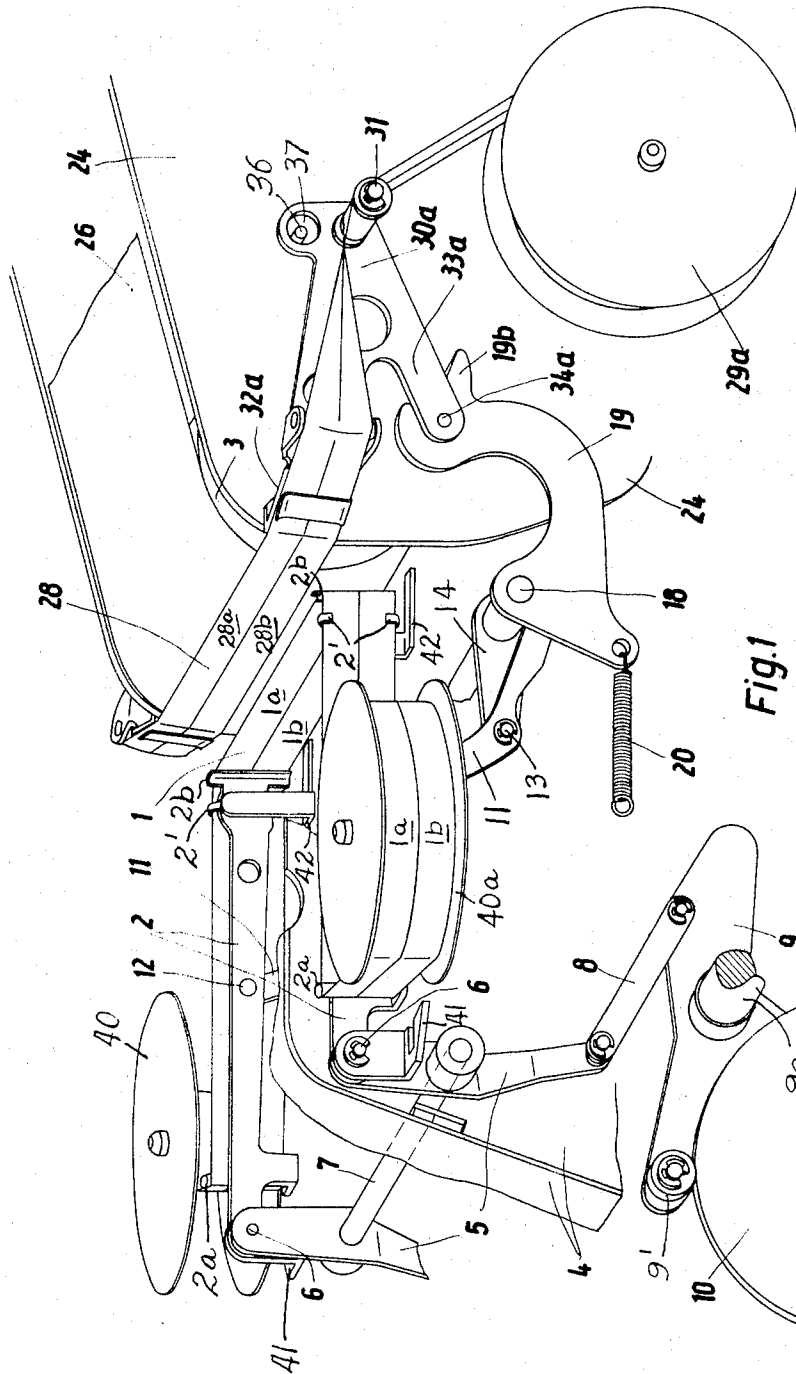


Fig. 1

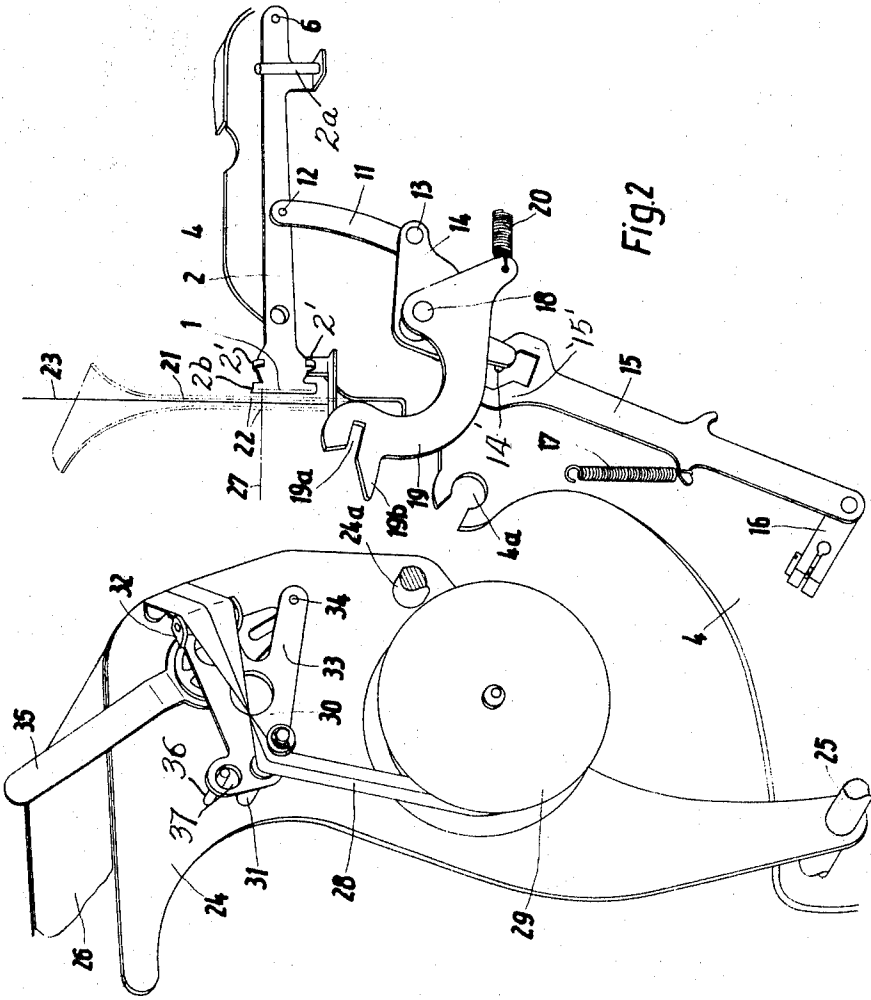
March 11, 1969

H. PRIEB
MULTIPLE-COLOR PRINTING STRUCTURE FOR
BOOKKEEPING MACHINES AND THE LIKE

3,432,022

Filed April 21, 1966

Sheet 2 of 2



1

2

3,432,022

MULTIPLE-COLOR PRINTING STRUCTURE FOR BOOKKEEPING MACHINES AND THE LIKE

Horst Prieb, Bielefeld, Germany, assignor to Anker-Werke Aktiengesellschaft, Bielefeld, Germany, a corporation of Germany

Filed Apr. 21, 1966, Ser. No. 544,245

Claims priority, application Germany, Apr. 26, 1965, A 49,034

U.S. Cl. 197-153

Int. Cl. B41j 35/34

8 Claims

ABSTRACT OF THE DISCLOSURE

A business machine has a pair of bichrome ribbons selectively controllable conjointly to print duplicate originals, one of the ribbons being suitably disposed on the main frame of the machine for cooperation with an inlet guide for one record sheet, the other of the ribbons being suitably disposed on a pivotally mounted platen frame for cooperation with a second record sheet carried thereby. The frames carry cooperating linkage interconnectable, when the platen frame is rotated to print position, to effect conjoint control over the ribbons to selectively conjointly change the effective ribbon fields thereof.

My invention relates to bookkeeping machines and the like.

In particular, my invention relates to that part of the structure of a machine of the above type which provides printing on sheets such as vouchers, control strips, and the like.

My invention relates in particular to structures of this type where the imprint is made on sheets of the above type in different colors.

With conventional bookkeeping machines, particularly of the type which are capable of providing receipts where the amount which is posted on a receipt is posted also at the same time on a control-strip, the imprints are provided on the sheet material through inked ribbons. It is of advantage to use in such machines a pair of inked ribbons, one for the voucher printing and the second for the control-strip printing, this second ribbon being guided between the voucher and the control strip. It is conventional with machines of this type to imprint values such as, for example, negative values, returned money amounts, control numerals, and the like in red on the voucher or check. It is however also desirable, for the sake of better visual evaluation of the items posted on the control strip, to use the more visually striking and therefore more visually apparent red color printing for control purposes on the control strip.

It is accordingly a primary object of my invention to provide bookkeeping and calculating machines of the above type with a structure capable of printing in more than one color not only a sheet material such as a voucher or receipt but also on a sheet material such as a control strip, so that a pair of different sheets of the same machine can both receive imprints of different colors.

It is in particular an object of my invention to provide a construction which is capable of providing on one sheet two different colors and on another sheet two different colors with the color which is provided on the one sheet always accompanied by a predetermined color on the other sheet.

In particular, it is an object of my invention to provide a construction where, for example, both the voucher sheet and the control strip will simultaneously receive red imprints while the structure can also be set to simultaneously provide both the voucher sheet and the control slip with black imprints.

Further, it is an object of my invention to provide a construction which is exceedingly simple, rugged, and reliable in operation.

Also, the objects of my invention include the provision of a structure which makes it possible to release the connection between elements of the structure so that sheets can be introduced into and removed from the apparatus in an exceedingly convenient manner while still permitting the apparatus to be quickly and easily set up in an operating position after a new supply of sheet material has been provided in the machine.

Primarily with the structure of my invention the bookkeeping machine or the like is provided with a pair of positioning means for respectively positioning a pair of sheets at locations where they are adapted to receive imprints through inked ribbons, respectively. My bookkeeping machine also includes a pair of these inked ribbons which are situated at the above locations to provide the imprints on the sheets, and each of these inked ribbons has at least a pair of different colors extending longitudinally therealong. This pair of inked ribbons are respectively supported by a pair of support means for movement between a pair of different positions where the differently colored portions will respectively be situated at a printing position. Thus, one of the support means supports one of the inked ribbons for movement between a first printing position where one color is at a printing location and a second printing position where the other color is at a printing location, and in much the same way the other support means supports the other of the ribbons where the first color thereof is in the printing position and this other ribbon can be moved by way of its support means to a second position where the second color is in a printing position. In accordance with my invention a single switching means is operatively connected to both of these support means for simultaneously situating both of the inked ribbons in the first printing position or both of the inked ribbons in the second printing position, so that the color which is applied by the above one ribbon in its first position will always be accompanied by the color provided by the other ribbon in its first printing position, and in the same way whatever color is provided by the one ribbon in its second printing position will necessarily be accompanied by the color provided by the other ribbon when the latter is in its second printing position.

My invention is illustrated by way of example in the accompanying drawing which forms part of this application and in which:

FIG. 1 is a fragmentary perspective side elevation of one possible embodiment of a structure according to my invention, this structure being shown in its coupled condition in FIG. 1; and

FIG. 2 shows the structure of FIG. 1 in a side elevation as it appears from the side opposite from that visible in FIG. 1, and in addition FIG. 2 shows the structure in its uncoupled condition.

Referring now to FIGS. 1 and 2, it will be seen that the illustrated structure includes an inked ribbon 1 which has a plurality of different colors. In the illustrated example the inked ribbon 1 has a pair of colors, red and black, for example, extending longitudinally therealong. The inked ribbon 1 is adapted to be situated by a support means described below at a location where it will participate in providing an imprint on a sheet such as a voucher or check, and a positioning means also described below positions this latter sheet at a location properly situated with respect to the ribbon 1 so as to receive the imprint therethrough. The portion of the ribbon 1 through which the imprint is made extends horizontally and is parallel to a rotary paper roller or platen 3 which is adapted to support a second sheet, such as a control strip,

at a location for receiving an imprint, so that the roller or platen 3 acts as a positioning means to determine the location of the control strip.

The inked ribbon 1 is guided between a pair of spools 40 and 40a by a pair of ribbon-guiding levers 2 each of which has two sets of inwardly curved ribbon-guiding fingers 2' extending inwardly over the outer edges of the ribbon 1 and suitably carry ribbon guide posts 2a and 2b. The pair of ribbon-guiding levers 2 are pivotally connected, by means of pivot pins 6, respectively, to a pair of levers 5, respectively, which are supported for turning movement by a shaft 7 which is in turn carried by the housing 4 of the machine. This shaft 7 extends between the side walls of the housing 4. Horizontal ears 41 and 42, not essential to the invention, are respectively connected to the pins 6 and the fingers 2'. A push-bar 8 is pivotally connected at one end to a lever 5 and at its opposite end to a cam-follower lever 9 which has a cam-follower roller 9' rotatably mounted thereon and maintained in any suitable way in engagement with the camming periphery of a rotary cam 10. Thus, in accordance with the configuration of the camming periphery of the cam 10 the lever 9 will be turned about a fixed pivot pin 9a to act through the push-bar 8 on the lever 5 to control movement of the levers 2 which carry the ribbon 1. It is to be understood that the structure shown in FIG. 1 for one of the levers 5 is duplicated to cooperate also with the other of the levers 5, so that both of the ribbon levers 2 will always be moved in precisely the same way.

The pair of ribbon-guiding levers 2 are pivotally connected by way of pivot pins 12 to the upper ends of a pair of rock-levers 11 which are themselves pivotally connected by way of pivot pins 13 to a pair of control levers 14. Each lever 14 carries a dog pin 14' which is straddled by a forked end portion 15' of a shiftable control bar 15 which is pivotally connected at its bottom end to a control lever 16. A spring 17 is fixed at one end to a stationary support and at its opposite end is connected to the shiftable member 15 for constantly urging the latter back into its starting position. The lever 14 is fixedly mounted on a rotary shaft 18 on which there is also fixedly mounted a lever 19. This lever 19 is provided at its upper left end, as viewed in FIG. 2, with an elongated notch or slot 19a which at its left end, as viewed in FIG. 2, joins a downwardly inclined edge portion of a lug 19b. A spring 20 is connected at one end to a stationary pin or the like and at its opposite end to the lever 19 so as to constantly tend to rotate the latter, and this spring 20 tends to turn the lever 19 in a clockwise direction, as viewed in FIG. 1.

Referring to FIG. 2, a receipt voucher 23 is indicated therein, and this receipt voucher 23 has its location determined by a positioning means which includes the funnel-shaped inlet guide 21 for the receipt voucher 23, this guide 21 being provided at the printing position with openings 22 passing therethrough, so that in this way the portion of the sheet 23 which is to receive an imprint will be in registry with the openings 22.

Situated opposite the positioning means 21 is the positioning means 3 in the form of a paper roller or platen, and this positioning means 3 is carried by a tiltable supporting frame or housing 24. This frame 24 carries a known control strip feeding device and it is pivotally mounted on a shaft 25 for tilting movement about the shaft 25 in such a way that the control strip 26 can be brought into the printing position, indicated by the line 27 in FIG. 2, this control strip 26 being the other sheet whose location is determined by the positioning means 3.

The frame 24 serves as a mounting structure for a support means which supports a second inked ribbon 28 which also has a plurality of colors and which in fact has the same colors as the ribbon 1. Thus, the second inked ribbon 28, through which the imprint is provided on the sheet 26 also has a pair of different colors extending longitudinally therealong, and these colors may also be red and black. However, the arrangement of the colors on one of the ribbons is the reverse of the arrangement of the

colors on the other of the ribbons. Thus, if for example, the ribbon 1 has an upper black zone 1a and a lower red zone 1b, then the ribbon 28 will have an upper red zone 28a and a lower black zone 28b.

The inked ribbon 28 for coacting with the control strip 26 is derived from a supply spool 29 (FIG. 2) from which the ribbon 28 is guided for movement to a second spool 29a (FIG. 1). The structure which guides the ribbon 28 includes a pair of levers 30, 30a which respectively form a support means supporting the inked ribbon 28 for movement between a first printing position where one of its colors is situated at the elevation of the line 27 of FIG. 2 and a second printing position where the other of its colors is located at the elevation of the printing line 27 of FIG. 2. In the same way the levers 2 form a support means supporting the ribbon 1 for movement between first and second printing positions where the different color zones of the ribbon 1 are respectively situated at the elevation of the printing line 27.

These supporting levers 30 and 30a respectively have ribbon-guiding and supporting portions 32 and 32a which directly engage and guide the ribbon 28.

A switching means is provided for switching the supporting levers for the inked ribbons between the positions where the differently colored portions of the ribbons 1 and 28 will be located at the printing elevation 27, and this switching structure of my invention includes a pair of levers 33 and 33a which respectively form integral extensions of the levers 30 and 30a and which respectively carry motion-transmitting pins 34 and 34a which form part of a motion-transmitting means of my invention in the form of a pin-and-slot connection which includes the above-mentioned slots or notches 19a of the levers 19. Thus, the pins 34 and 34a can respectively be received in the slots 19a of the levers 19.

The machine housing 4 is provided at both of its side walls with a pair of open eyes or notches 4a (FIG. 2) which are adapted respectively to receive a pair of stop-pins 24a of the frame 24 when the latter is tilted about the shaft 25 in a clockwise direction, as viewed in FIG. 2. A releasable locking lever 35 is provided at the housing 24 (FIG. 2), and the operator can turn the locking lever 35 so that in a known way through an unillustrated pin-and-slot connection the housing 24 is releasably locked with the machine housing 4. Thus, when the lever 35 is in its locking position it is not possible to displace the frame 24 from the position where its pins 24a are respectively situated in the openings 4a.

The operation of the above described structure of my invention is as follows:

The lever 35 will initially be turned to its unlocking position so that the frame 24 can be turned to the uncoupled position of FIG. 2, thus facilitating the introduction of a new control strip 26 which can be threaded into the strip-feeding structure which is of a conventional construction and which is carried by the frame 24. After the strip 26 is thus properly threaded through the strip-feeding structure, the frame 24 is turned in a clockwise direction, as viewed in FIG. 2, toward the machine housing 4 and this turning movement of the frame 24 is accompanied by engagement of the pins 34 and 34a with the lugs 19b of the levers 19 at the upper edges of these lugs, and thus during the continued turning of the frame 24 to displace the pins 24a respectively into the openings 4a, the pins 34 and 34a are respectively received in the slots 19a of the levers 19 so that through this motion-transmitting means in the form of a pin-and-slot connection the levers 33 and 33a are respectively brought into cooperative relationship with the levers 19. The stop-pins 24a are respectively received in the openings 4a of the machine housing 4, and then the operator turns the releasable locking lever 35 so as to lock the frame 24 in its operative position from which it cannot be moved until the lever 35 is again displaced to its release position. In this way the levers 19 of the switching means of my invention are operatively coupled with the levers 33 and

5

6

33a which form a pair of actuating levers respectively connected with the support means formed by the pair of levers 30 and 30a by being integral extensions thereof, as pointed out above. It will be noted that these levers 30 and 30a are supported for turning movement about the coaxial pins 31 which are respectively carried by the side walls of the frame 24 so that these pins 31 provide an axis of turning for the support levers 30 and 30a while the ribbon-supporting levers 2 are supported for turning movement about the common axis defined by the pair of pins 6, so that with the structure of my invention the pair of support means for the pair of inked ribbons are respectively turnable about a pair of parallel axes between which this pair of support means extends with the levers which constitute one of the support means extending toward the levers which constitute the other of the support means. Furthermore, it will be noted that the actuating levers 33, 33a, on the one hand, and 14, on the other hand, are interconnected with the levers of the support means so as to turn in the same directions as these latter levers, while the levers 19 will transmit the turning of the levers 14 to the levers 33 and 33a so as to provide for the ribbon 28 a direction of movement which is always opposed to the direction of movement provided for the ribbon 1. The levers 30 and 30a are retained in position when the housing 24 is in uncoupled position by means of a locking pin 36, extending from the housing 24 and inserted in an opening 37 formed in the lever 30, when the slot 19a formed in the lever 19 disengages from the pin 34 as the housing 24 pivots away from the housing 4 about the pivot shaft 25. The lever 30 pivots clockwise as shown in FIG. 2 until the pin 36 comes into abutment with the edge of the opening 37. This pivoting motion is great enough to permit the pin 34 to come into contact with the inclined edge 19b of the lever 19 when the housing 24 is again pivoted, so that the pin 34 can be inserted into the slot 19a.

After the operator actuates the machine so as to initiate a cycle of operations, for the purpose of posting certain items, for example, the rotary cam disc 10 turns and acts through the cam-follower lever 9 to turn the latter in such a way that the push-bars 8 act on the levers 5 to turn the latter in a clockwise direction, as viewed in FIG. 1. At this time the ribbon-supporting levers 2 simply rest on the upper ends of the rock-levers 11 which turn about the pivots 13 so as to displace the ribbon 1 to its printing location, and in the particular position shown in FIG. 1 it is the upper half of the ribbon 1 which is situated at the elevation of the printing line 2 so as to be in a printing position. At this time there is no movement of the levers 19, so that the ribbon 28 simply remains in its position adapted to provide an imprint on the strip 26. Thus, when the metal type is displaced in an unillustrated conventional manner to provide an imprint it will act through the ribbon 1 to provide an imprint on the voucher 23 as well as through the ribbon 28 to provide an imprint on the strip 26. With the position of the parts shown in the drawings where the upper part of the ribbon 1 is in the printing position, the lower part of the ribbon 28 is simultaneously in the printing position, and assuming that both of these parts of the ribbons have a black color, then a black imprint will be provided simultaneously on the voucher 23 and on the strip 26.

The levers 19, 33, 11, 2 and 30 are designed in such a way that when the upper portion of the ribbon 1 is situated at the printing elevation 27, the lower portion of the ribbon 28 is simultaneously situated at the same elevation and of course in alignment with the upper portion of the ribbon 1. This is the coupled position of the parts which is shown in FIG. 1.

When the operator sets the machine into operation to provide a posting of an item such as "money returned," by actuation of a suitable key, then this is the type of item which when posted should be posted in red rather than black, and in response to actuation of this latter key the lever 16 shown in FIG. 2 turns in a counter-clockwise direction, as viewed in FIG. 2, prior to the actual print-

ing, and in this way the shiftable control member 15 is released to the spring 17. The cam surface on the interior of the fork 15' is so shaped that the dog pin 14' of lever 14 moves toward the right-hand side of FIG. 2 under the biasing force of the spring 20 as the control member 15 is shifted upwardly so that the lever 14 and thus the shaft 18 therewith are turned in a counterclockwise direction, as viewed in FIG. 2. Thus, at this time the shaft 18 will turn in a clockwise direction, as viewed in FIG. 1, with the result that the lever 19, which is also fixed to the shaft 18, turns in a clockwise direction, as viewed in FIG. 1, thus displacing the levers 30 and 30a downwardly about the coaxial pivots 31 while at the same time the actuating levers 33 and 33a turn in the same direction. The extent of movement is such that the upper red portion of the ribbon 28a becomes situated at the printing position 27. To reset the ribbon 28 so that printing in black may be effected, a suitable key is depressed so that the lever 16 shown in FIG. 2 turns clockwise and the control member 15 is shifted downwardly against the bias of the spring 17, whereby the cam surface on the inside of the fork 15' tends to move the dog pin 14' toward the left-hand side of FIG. 2. This produces counter-clockwise turning of the shaft 18, as viewed in FIG. 2, and results in a corresponding counter-clockwise turning of the lever 14 which is fixed to the shaft 18 so that the rock-levers 11 are simply raised upwardly to turn the pair of ribbon-carrying levers 2 in a clockwise direction about the common axis provided by the pair of pivot pins 6, and thus the ribbon 1 is displaced upwardly so as to situate its lower inked portion at the printing position 27. When the upper portion of the ribbon 28 is red the lower portion of the ribbon 1 is red, so that simultaneously with displacement of the upper red portion of the ribbon 28 to the printing position, the lower red portion of the ribbon 1 is displaced to the printing position. The turning of the levers 33 and 33a in response to turning of the levers 19 is brought about by the motion-transmitting means provided by the pin-and-slot connections 34, 34a and 19a. As a result the receipt 23 and the control strip 26 will simultaneously be imprinted with an imprint of the same color.

It is apparent, therefore, that with the structure of my invention while it is possible at any time to uncouple the structure so that it assumes the position of FIG. 2, the structure can again be readily coupled simply by returning the frame 24 to its operative position. In the coupled condition which is shown in FIG. 1 the switching means of my invention is operatively connected to the pair of ribbon-supporting means in such a way as to displace the pair of ribbons simultaneously in opposite directions guaranteeing that whenever one color is provided on one sheet the same color will be provided on the other sheet, while at the same time there is the possibility of selectively providing either one of at least a pair of different colors on each sheet.

I claim:

1. In a bookkeeping machine or the like, a pair of housings, one of which is pivotable toward and away from the other, a pair of positioning means respectively housed by said housings and respectively positioning a pair of sheets at locations for receiving typing imprints through inked ribbons, respectively, a pair of inked ribbons respectively mounted in said housings and situated at said locations for determining the color of the imprints provided on the sheets through the inked ribbons, each of said inked ribbons having at least two different colors extending longitudinally therealong, a pair of support means respectively mounted in said housings and supporting said pair of inked ribbons for movement of each ribbon between a pair of printing positions, one of said support means supporting one of said ribbons for movement between first and second printing positions where one of the colors of said one ribbon will be typed in said first printing position and the other of said colors of said one ribbon will be typed in the second printing position thereof, and

the other of said support means supporting the other of said ribbons for movement between first and second printing positions where one color of said other ribbon will be typed when said other ribbon is in said first printing position and the other color of said other ribbon will be typed when said other ribbon is in said second position thereof, and a single switching means operatively connected to both of said support means for simultaneously acting thereon to switch said ribbons simultaneously between said printing positions for locating both of said ribbons in said first printing positions thereof at the same time or both of said ribbons in said second printing positions thereof at the same time, so that the color applied by said one ribbon when in said first position thereof will always be accompanied by the color applied by said other ribbon when the latter is in said first printing position thereof and the color applied by said one ribbon when in said second position thereof will always be accompanied by the color provided by said other ribbon in the second printing position of the latter.

2. The combination of claim 1 and wherein said single switching means includes a pair of levers respectively connected operatively to said pair of support means and a motion-transmitting means cooperating with said levers for transmitting the motion of one of said levers to the other of said levers.

3. The combination of claim 2 and wherein said motion transmitting means includes a pin-and-slot connection between said levers.

4. The combination of claim 3 and wherein said pin-and-slot connection includes an elongated slot which is open at one end for receiving a pin of said pin-and-slot connection, so that said levers can be displaced away from each other to non-operative positions where they do not engage each other and said motion-transmitting means is not operative to transmit motion between said levers.

5. The combination of claim 1 and wherein the color provided by said one ribbon when in said first printing position thereof is the same as the color provided by said other ribbon when the latter is in said first position thereof, while the color provided by said one ribbon in said second printing position thereof is the same as the color provided by said other ribbon in said second printing position thereof.

6. The combination of claim 5 and wherein said colors are red and black.

7. In a bookkeeping machine or the like, a pair of positioning means respectively positioning a pair of sheets at locations for receiving typing imprints through inked ribbons, respectively, a pair of inked ribbons respectively situated at said locations for determining the color of the imprints provided on the sheets through the inked ribbons, each of said inked ribbons having at least two different colors extending longitudinally therealong, a pair of support means respectively supporting said pair of inked ribbons for movement of each ribbon between a pair of printing positions, one of said support means supporting one of said ribbons for movement between first and second printing positions where one of the colors of said one ribbon will be typed in said first printing position and the other of said colors of said one ribbon will be typed in the second printing position thereof, and the other of said support means supporting the other of said ribbons for movement between first and second printing positions

where one color of said other ribbon will be typed when said other ribbon is in said first printing position and the other color of said other ribbon will be typed when said other ribbon is in said second position thereof, and a single switching means operatively connected to both of said support means for simultaneously acting thereon to switch said ribbons simultaneously between said printing positions for locating both of said ribbons in said first printing positions thereof at the same time or both of said ribbons in said second printing positions thereof at the same time, so that the color applied by said one ribbon when in said first position thereof will always be accompanied by the color applied by said other ribbon when the latter is in said first printing position thereof and the color applied by said one ribbon when in said second position thereof will always be accompanied by the color provided by said other ribbon in the second printing position of the latter, the colors provided by said ribbons when in said first printing positions thereof being both the same while the colors provided by said ribbons when in said second printing positions thereof being also both the same but different from the color provided in said first printing positions of said ribbons, and said ribbons being positioned respectively on said pair of support means at attitudes where the colors of said one ribbon have with respect to each other an arrangement which is the reverse of the arrangement of the colors of said other ribbon, and said switching means coacting with said pair of support means for simultaneously moving the latter in opposite directions, respectively, to situate the same colors of said ribbons simultaneously at said first printing position of said ribbons and the same colors also simultaneously at the second printing positions of said ribbons.

8. The combination of claim 7 and wherein said pair of support means respectively include levers turnable about parallel axes with said levers extending toward each other between said axes and said switching means including a pair of actuating levers respectively connected with said levers of said pair of support means for turning the latter in the same direction as said actuating levers, respectively, and a third lever forming part of said switching means, turnably connected to one of said actuating levers for turning movement therewith, and operatively connected to the other of said actuating levers for turning the latter in a direction opposite to the direction in which said one actuating lever turns, so that the ribbons will respectively be displaced simultaneously in opposite directions.

References Cited

UNITED STATES PATENTS

1,394,632	10/1921	McKay	197—153
1,562,431	11/1925	Ananson	197—153
1,688,367	10/1928	Waldheim	197—153
1,704,020	3/1929	Sacerdote	197—153
1,800,399	4/1931	Page	197—157
2,027,515	1/1936	Burcky	197—157 X
2,128,267	8/1938	Sacerdote	197—153
2,331,331	10/1943	Lambert	197—153

ERNEST T. WRIGHT, JR., *Primary Examiner.*

U.S. Cl. X.R.

197—156, 157