Aug. 13, 1946. G. C. ELLERBECK 2,405,562

APPARATUS FOR PRINTING

Filed Sept. 13, 1943 3 Sheets-Sheet 1

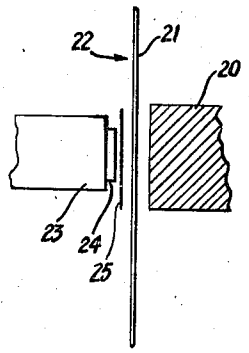


FIG_1_

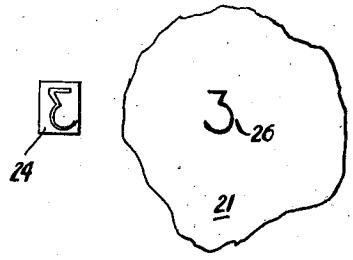


FIG_2_

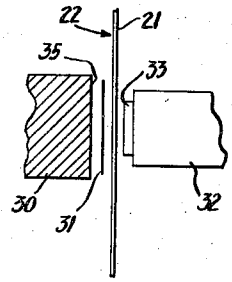


FIG_3_

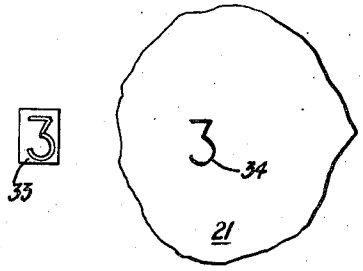


FIG_4_

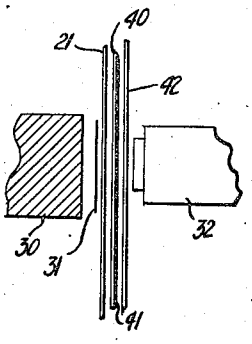


FIG_5_

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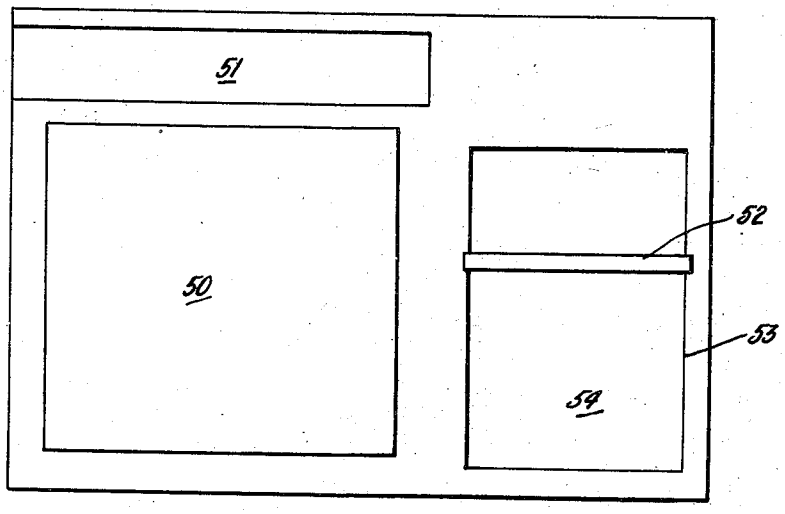


FIG_6_

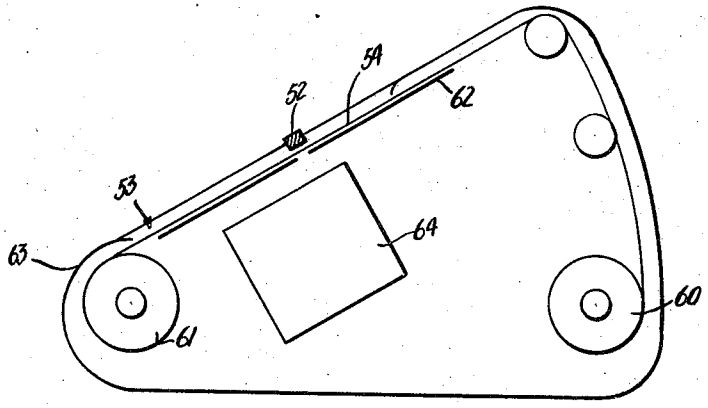


FIG_7_

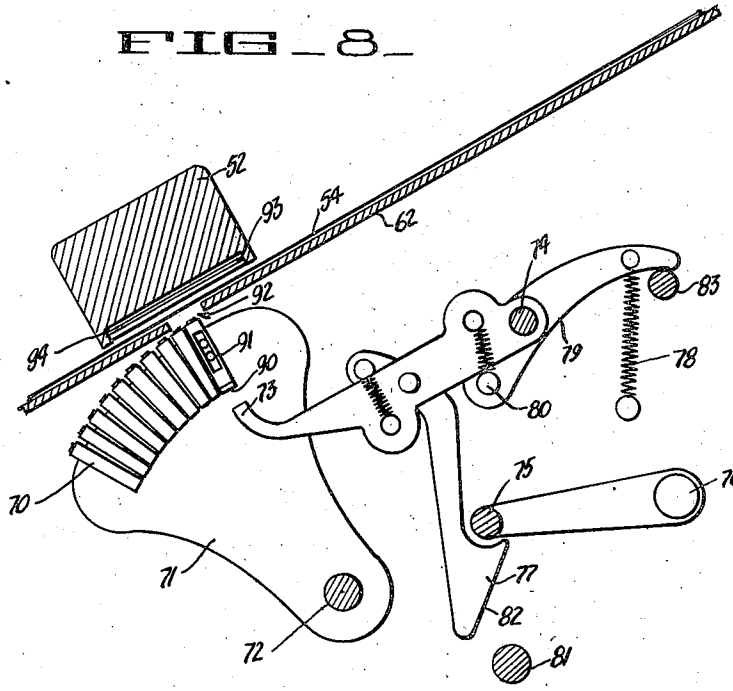
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APPARATUS FOR PRINTING

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FIG_8_



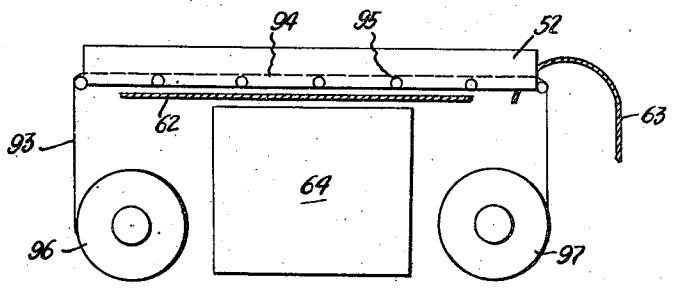


FIG_9_

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Patented Aug. 13, 1946

2,405,562

UNITED STATES PATENT OFFICE

2,405,562

APPARATUS FOR PRINTING

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Application September 13, 1943, Serial No. 502,379

4 Claims. (Cl. 101—96)

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This invention relates to the art of printing. One object of the invention is to provide a machine for printing in which the platen is disposed in front of the paper instead of in back thereof as is the usual practice, and to press the type face against the back of the paper to make an impression on the front thereof, a suitable inking means being provided intermediate the platen and the front of the paper.

Another object of the invention is to provide a printing mechanism in an accounting machine, a calculating machine and the like wherein the type and the selecting and actuating mechanism therefore is disposed within the casing of the machine and in back of the paper, the only part of the printing mechanism disposed above or in front of the paper being the platen and the inking means.

Other objects will become evident after the following disclosure.

In the drawings,

Figure 1 is a diagrammatic illustration of the conventional method of printing.

Figure 2 illustrates the type face employed in this method and the impression obtained thereby.

Figure 3 illustrates diagrammatically the arrangement of the parts for printing in accordance with my method.

Figure 4 shows the type face and impression obtained thereby in accordance with my method.

Figure 5 shows diagrammatically the method of obtaining more than one copy by my method.

Figure 6 is a diagrammatic illustration of an accounting machine in which a printing mechanism of my invention has been installed.

Figure 7 is a sectional diagrammatic illustration of the arrangement of the essential parts of the printing mechanism of the machine shown in Figure 6.

Figure 8 is a sectional view of the selecting and actuating mechanism of one order of the printing mechanism.

Figure 9 is a transverse view showing the ribbon and platen arrangement.

Figure 1 illustrates the conventional method of printing on the platen 20, disposed in back of the paper 21 the front of the paper is indicated by the arrow 22, and throughout this specification and the claims, what is termed the "front" of the paper is the face of the paper on which the ink impression is made. Disposed in front of the paper is the type 23 having a character such as the numeral "3" on its face 24. In order to make an impression on the front of the paper an inking means indicated at 25 is disposed between the type face and the front of the paper. This inking means may have ink applied to the face of the type or an ink impregnated ribbon as on a typewriter. The type face 24 is shown at Figure 2 where it will be noted that its char-

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acteristic is that it is the reverse of the impression 26 which it makes on the paper 21.

In Figure 3 I have shown the arrangement of the parts for operation in accordance with my method. The paper 21 is disposed in the same position as in Figure 1 for purposes of comparison so that the front of the paper is indicated by the arrow 22. The platen 30 is disposed in front of the paper and the inking means 31 is disposed between the platen 30 and the front of the paper 21, the type 32 having a type face 33 disposed in back of the paper. In order to make an impression on the front of the paper the type 32 is pressed against the back of the paper, or if desired, the type may be held stationary and the platen moved toward the type, or both the platen and the type may be moved together. Referring to Figure 4 it will be noted that the type face 33 employed in accordance with my method causes an exact reproduction 34 on the paper 21. As will presently appear, one of the advantages of my method is that it makes it possible to construct the platen with a flat face 35 (Fig. 3).

Figure 5 shows the manner in which duplicate copies can be made in accordance with my method. The platen 30, inking means 31 and the type 32 are arranged in substantially the same manner as in Figure 3. Paper 21 is disposed as shown, and in back of it, a sheet of carbon paper 40 having the carbon surface 41 facing the type 32, is placed. Intermediate the type 32 and the carbon paper 40 is the paper 41 on which the carbon impression is to be made.

My method of printing has numerous advantages, particularly when employed in the construction of office machines such as bookkeeping machines, accounting machines, calculating machines, etc. The principal advantage is that the bulk of the printing mechanism can be disposed in back of or underneath the paper rather than being disposed between the operator and the paper. From this arrangement flow other advantages such as greater visibility of the record. The only part of a printing mechanism disposed between the paper and the operator being a narrow bar which serves as the platen. All of the type, a selecting means therefore, the hammers and other actuating means, can be disposed within the casing of the machine where it is unobtrusive, more readily connected to calculating mechanism, protected from dirt and injury. It is also to be noted that in accordance with this method the type face remain clean because they do not come in contact with the ink. Also, where a ribbon is employed for supplying the ink it has longer life in that it is not struck directly by the type face which tends to cut holes in it.

To illustrate how my method may be advantageously employed in embodying a printing

mechanism in calculating machines I have shown such an application in Figures 6–11. Figure 6 is a plan view of the machine which is provided with conventional keyboard 50 which is employed for controlling the entry of items into a register or registers 51. In order to obtain a printed record of the calculations the printing mechanism may be located at the side of the calculating mechanism where, as previously mentioned, the only visible part is the platen 52 which bridges an opening 53 where the paper 54 is disposed. The advantage of this arrangement is that it places the complete record within the field of view of the operator of the machine.

The paper may be provided in the form of a long strip wound on spools 60, 61 (Fig. 7). A ledge 62 may be provided to support the upper stretch of the paper underneath the window 53 in the machine casing 63. The ledge 62 provides a flat support for the paper in the printing zone. In some cases it is desirable, in addition to printing on the paper strip 54, to make a simultaneous impression on a duplicate slip of paper and this can be effected merely by inserting the slip of paper with carbon paper between the strip 54 and the platen 52. The operator may do this whenever desired merely by inserting the duplicate slip from the exterior of the machine. Also, if it is not desired to make the record on a long strip of paper such as 54, but rather on individual sheets, as for example, in bank statements or department store accounts, the paper 54 is dispensed with and the individual sheets are inserted under the platen 52 and rest on the ledge 62. It will be noted that when employing my method of printing it is possible to place the printed record in the field of view of the operator, and on the exterior of the machine where it is readily accessible because the printing mechanism, indicated diagrammatically at 64, can be disposed under the paper and inside the casing 63 of the machine. As an example, a printing mechanism arranged in this manner is illustrated in Fig. 8.

As there shown, the type bars 70 are carried by a sector 71 on a shaft 72 which can be selectively adjusted to bring the desired type bar in line with the hammer 73 which is pivoted at 74.

A plurality of type sectors may be employed and the common actuating means, comprising a bail 75 on an oscillatory shaft 76 is adapted to engage hooks 77 pivotally connected to the hammer 73 for drawing them downwardly, causing springs 78 to be tensioned, which are attached to the tails of lever 79 having pins 80 engaging the hammer 73. Upon downward movement of the bail 75 hook 77 engages stationary transverse rod 81 and are cammed outwardly by reason of inclined edges 82 on the hook 77 thus releasing the hooks from the bail 75 and allowing the springs 78 to swing the levers 79 clockwise until the tails of the levers engage the stationary stop rod 83, after which the hammers 73 continue under their own momentum turning on the pivot 74 and striking bottom flanges 90 on type bars 91.

The type bars are thus projected upwardly thru an opening 92 in the ledge 62 to strike the underside of the paper 54, thus pressing the front or upper side of the paper against a ribbon 93 disposed in a channel 94 in the underside of the platen 52 thus causing impressions of the type to be made on the record sheet.

The arrangement of the ribbon is shown in Figure 9 where it will be noted that the platen 52 may have a series of guide rollers 95 disposed along the bottom of the channel 94, ribbon 93 being fed longitudinally of the channel 94. The ribbon may be wound on spools 96, 97 in the usual manner and have suitable mechanism for feeding the ribbon.

I claim:

1. In an office machine, such as a calculating machine, a casing for housing the mechanism thereof, means for supporting paper on which a printed record of calculations is to be made at the exterior of the casing and within the field of view of the operator, a platen disposed in front of said paper supporting means, a ribbon under said platen, the remainder of the printing mechanism including the ribbon spools, the type, the selecting means, and the actuating means, being disposed back of said paper supporting means and within said machine casing.

2. In an office machine, such as a calculating machine, a paper support for supporting paper on which a printed record of calculations is to be made within the field of view of the operator, a platen disposed in front of said paper support and having a surface adjacent to said paper support, a ribbon having a portion intermediate said surface of said platen and said paper support, the remainder of the printing mechanism including the remainder of the ribbon, the winding means for said ribbon, the type, the selecting means, and the actuating means, being disposed back of said paper support.

3. In a machine of the class described having a case, said case having an aperture therein for displaying a printed record, a printing mechanism including a platen, an inking ribbon, and type, said type being disposed within said case, the record being introduced between said type and said ribbon, said ribbon being movable across the record in a direction normal to the direction of introduction of the record, winding means for said ribbon disposed within said case, said platen extending across said aperture in front of the portion of said ribbon that is disposed in front of the record, said platen being substantially the same width as said ribbon, and means on said platen to confine the portion of said ribbon adjacent said platen within the confines of said platen whereby the only part of the printing mechanism obscuring the record being printed is said platen.

4. In a calculating machine, a casing for housing the mechanism thereof, a paper support for supporting within the field of view of the operator paper on which the figures of the factors involved in calculations performed by the machine are to be printed, a platen disposed in front of said paper support, a ribbon having a portion intermediate said platen and said support, the remainder of the printing mechanism being disposed behind said paper support and including numerical figure type on type-carrying members adjustable with respect to said platen to align therewith the type for printing the figures of the factors and including means for striking type aligned with said platen, said paper support having an elongated aperture therein substantially coextensive with said platen to permit type struck by said striking means to press the paper toward said platen.

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