March 4, 1952 C. H. GILBERT 2,587,612

PRINTING APPARATUS

Filed Nov. 19, 1948 3 Sheets-Sheet 1

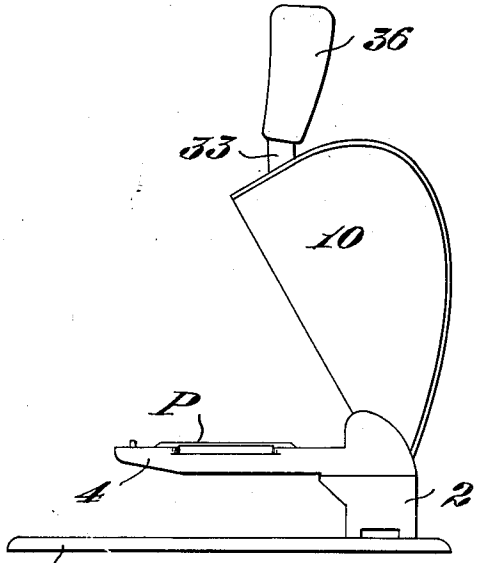


Fig. 1

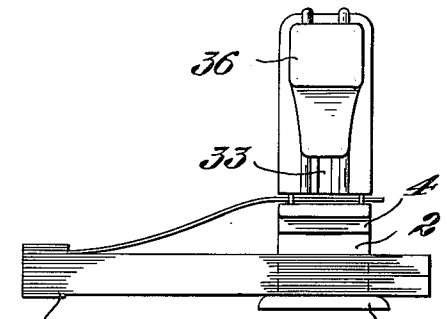


Fig. 2

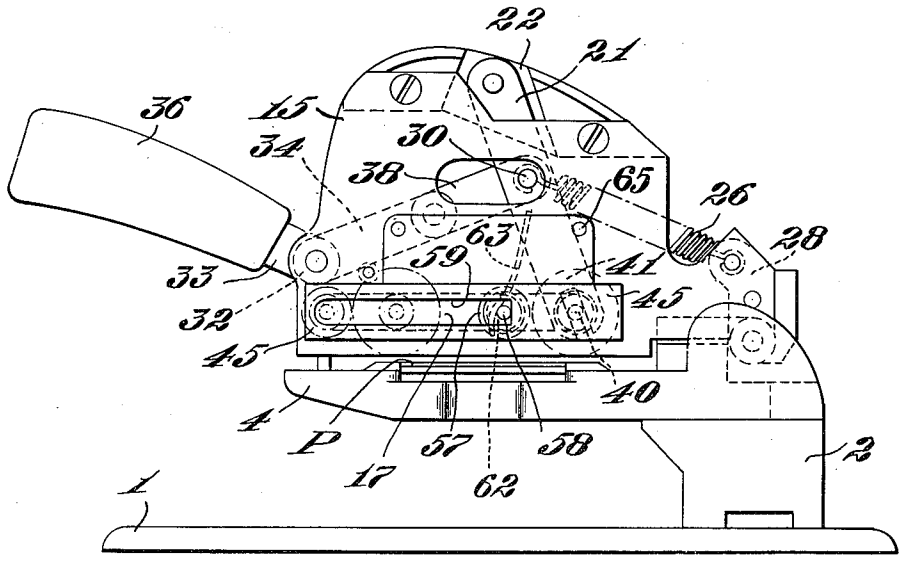


Fig. 3

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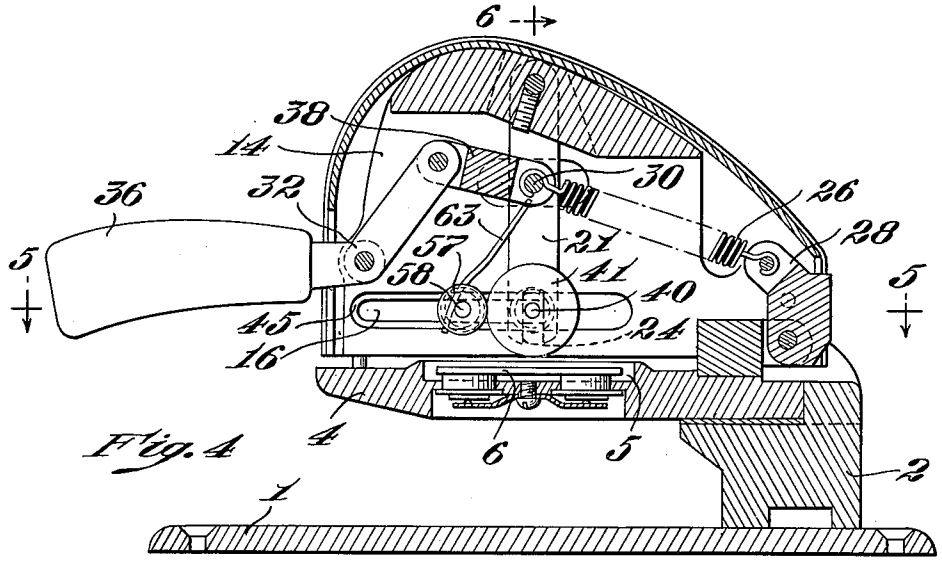


Fig. 4

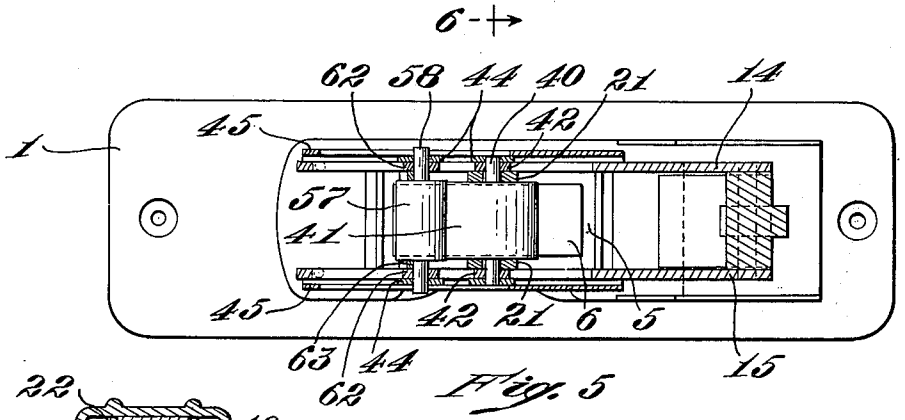


Fig. 5

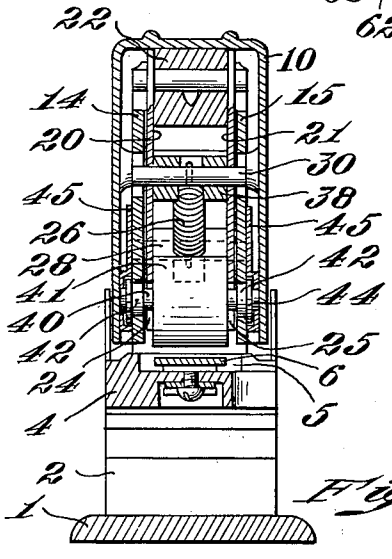


Fig. 6

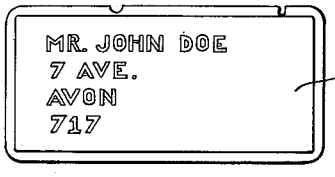


Fig. 7

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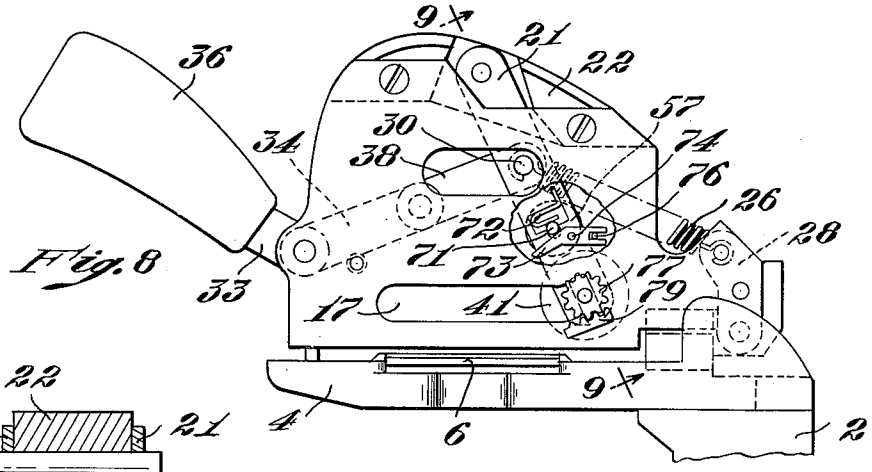


Fig. 8

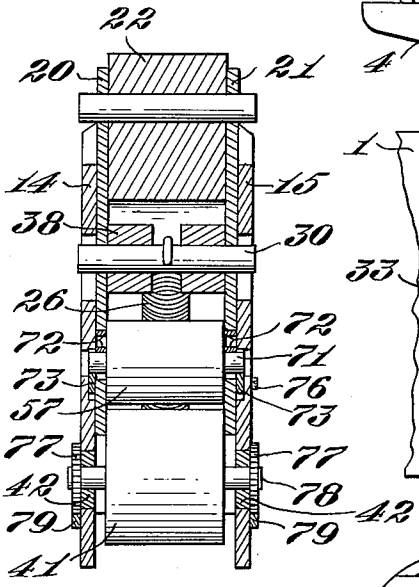


Fig. 9

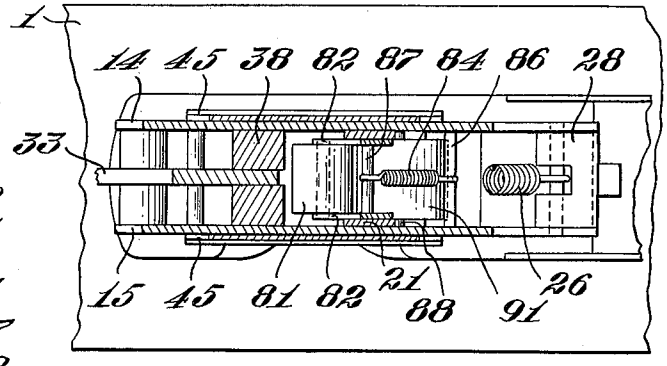


Fig. 11

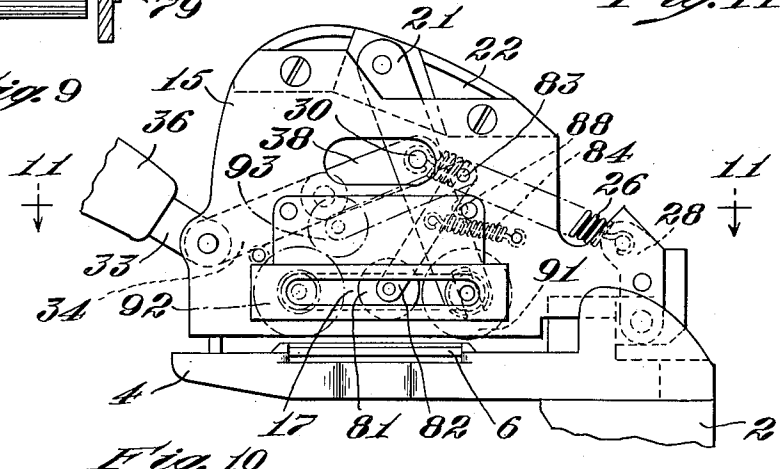


Fig. 10

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UNITED STATES PATENT OFFICE

2,587,612

PRINTING APPARATUS

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Application November 19, 1948, Serial No. 60,845

2 Claims. (Cl. 101—269)

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This invention relates to a device such as is shown in Patent 1,801,592, granted April 21, 1931, for printing names and addresses or other indicia on sales slips or the like, with portable printing plates having raised characters.

Heretofore such devices have usually employed an inked typewriter ribbon, a roller for pressing the ribbon against the uppermost sales slip and mechanism for advancing the ribbon between successive impressions and periodically reversing the direction of travel. Although such devices have proved satisfactory the necessary use of an inking ribbon and associated winding mechanism substantially increases the cost of manufacture, and periodically the inking ribbon must be changed, requiring an inconvenient and somewhat irksome procedure.

Instead of pressing an ink ribbon against the uppermost sales slip with a roller, it has been proposed to dispense with the ribbon and employ an ink-absorbent roller. However the requirements for successful operation are so exacting that only a few materials are suitable and unless made with great care the rollers differ in printing characteristics. For example many porous materials do not have the crushing strength necessary to withstand the stresses set up in the roller as it is rolled over the raised characters on the printing plate with only a few thicknesses of thin paper between the plate and roller.

The principal objects of the present invention are to provide a simplified device which dispenses with the necessity of using an inking ribbon and winding mechanism, but which possesses all the advantageous features of the prior devices, and to provide a device wherein the inking member may be readily removed and replaced. Other objects are to provide a device in which the ink-reservoir roller is not subjected to much pressure in operation and can be made of any porous material capable of absorbing ink and depositing a thin film of ink on a smooth surface when rolled thereover.

According to the present invention the machine comprises two opposed members, one having a seat for the printing plate and the other having a printing roller mounted for movement in a path parallel to and substantially contiguous with the raised characters of the printing plate for pressing against the plate a sheet interposed between the two members, characterized by a porous ink-reservoir roller for applying ink to the printing roller and a spring or other means holding the ink-reservoir roller in

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rolling contact with the periphery of the printing roller during the aforesaid movement. Preferably the machine also has a stop or other means for disengaging the ink-reservoir roller from the printing roller when the printing roller reaches its idle retracted position so that ink does not transfer from the ink-reservoir roller while the printing roller stands in retracted position. In its preferred embodiments the machine also has a mainspring for returning the printing roller to retracted position, the mainspring being sufficiently stronger than the auxiliary spring to continue the printing roller to retracted position after the ink-reservoir roller engages the aforesaid stop.

For the purpose of illustration typical embodiments of the invention are shown in the accompanying drawings in which:

Fig. 1 is a side elevation of one embodiment with the opposed members separated for the insertion of a printing plate and the sheet or sheets to be printed;

Fig. 2 is a front elevation of the same embodiment with the parts in operative position and a book of sales slips applied to the machine;

Fig. 3 is a side elevation with the cover removed and with the parts in idle position;

Fig. 4 is a central longitudinal section with the parts in mid-position;

Fig. 5 is a section on line 5—5 of Fig. 4;

Fig. 6 is a section on line 6—6 of Fig. 4;

Fig. 7 is a face view of a printing plate suitable for use in the machine;

Fig. 8 is a view like Fig. 3 showing a modification;

Fig. 9 is a section on line 9—9 of Fig. 8;

Fig. 10 is a view like Figs. 3 and 8 showing another modification; and

Fig. 11 is a section on line 11—11 of Fig. 10.

The embodiment shown in Figs. 1 to 6 comprises a base 1 formed at one end with an upstanding block 2 to which a plate holder 4 is rigidly secured in spaced relation to the base 1 so as to permit the body of a sales book B to be inserted beneath the plate holder as illustrated in Fig. 2. The plate holder is recessed as indicated at 5 (Figs. 5 and 6) and is provided with a yieldable plate-centering member 6 adapted to support a printing plate P (Fig. 7) within the recess 5. The printing plate P may be of the construction shown in Patent 1,912,437, being formed with raised characters in non-reversed order.

A head 10 is pivotally mounted at the rear of the plate holder so as to swing upwardly, as

shown in Fig. 1, to permit sales slips or the like to be positioned on the printing plate P, the head 10 comprising a split casing or housing (Fig. 6) within which are spaced side walls 14 and 15 formed with aligned elongate guide slots 16 and 17 defining a path parallel to the plane of the characters of the printing plate P.

Spaced depending arms 20 and 21 are pivoted at their upper ends to a spacer block 22 (Figs. 3–6) and the lower ends of these arms terminate in bifurcated portions 24 and 25 aligned with the guide slots 16 and 17. One end of a tension spring 26 is connected with a spacer block 28 at the rear of the housing and its other end is connected with a pin 30 extending between the central portions of the arms 20 and 21, a tension spring 26 being operative to retract and hold the arms in retracted position (Fig. 3).

An actuating member 32 in the form of a bell-crank is pivotally mounted between the side walls 14 and 15 with one arm 33 projecting outwardly through an opening in the front of the casing 6 and its other arm 34 extending inwardly. The arm 33 is provided with an operating handle 36 and the inner end of the arm 34 is pivotally connected by a link 38 with the pin 30, the construction and arrangement of parts being such that by depressing the handle 36, the arms 20 and 21 are swung forwardly, and upon releasing the handle the spring 26 retracts the arms and restores the handle to elevated position.

The bifurcated ends 24 and 25 of the arms 20 and 21 embrace the end portion of an axle or shaft 40 associated with a printing roller 41 arranged to travel along a path parallel to and substantially contiguous with the plane of the characters of the printing plate P carried by plate-holder 4. As shown in Figs. 3 and 6 the shaft 40 has a sliding fit within the roller 41. The ends of the shaft 40 carry disc-like rolls 42 fitting within the slots 16 and 17 with washers 44 contiguous to the outer faces of side walls 14 and 15. Retainers 45 are riveted or otherwise secured to the outer faces of side walls 14 and 15 to prevent displacement of the rolls and washers and these retainers are formed with slots corresponding to but slightly smaller than the slots 16 and 17, so as to permit the shaft 40 to be slid outwardly therethrough and the printing roller 41 removed without displacing the rolls and washers.

The mechanism for applying ink to the periphery of the roller 41 comprises an ink-reservoir roller 57 mounted on a removable shaft 58 which projects from the ends of the roller through the slots 16 and 17 and thence through slots 59 in the retainers 45. Surrounding the projecting ends of the shaft 58 in the slots 16 and 17 are rolls 62 corresponding to the rolls 42 for the roller 41. The roller 57 is held in contact with the roll 41 by a spring 63 except in the idle position of the parts shown in Fig. 3. As the parts approach this position the projecting ends of the shaft 58 strike the ends of the slots 59 to obstruct further movement of the ink-reservoir roll. The main spring 26 is sufficiently stronger than the auxiliary spring 63 to continue the movement of the parts to the point where the arms 20 and 21 engage the stop pin 65.

To replace the ink-reservoir roller 57 it is necessary merely to remove the cover 10 and slide the shaft 58 out of the roller, whereupon the roller will drop out of the head. By advancing the printing roller 41 to a position where its shaft is in line with the slots 59, this roller may also be removed from the machine in the same way.

The modification shown in Figs. 8 and 9 is similarly constructed except in that instead of mounting the ink-reservoir roller on rolls in the slots 15 and 16 it is mounted in slots extending longitudinally of the arms 21. Its shaft 71 projects through these slots and its periphery is pressed into rolling contact with the printing roller by springs 72 mounted in the arms. Disposed beneath the ends of the shaft 71 are cams 73 to lift the ink-reservoir roller out of contact with the printing roller as the printing roller approaches the idle retracted position shown in Fig. 8. The cams may be pivotally mounted at 74 for adjustment and an eccentric adjusting screw 76 may be mounted in the side wall of the head to effect the desired adjustment of the spacing between the two rollers in the idle position. As shown in Fig. 9 the side plates 20 and 21 may be provided with openings through which the shaft 71 may be removed to replace the ink-reservoir roller.

The modification of Figs. 8 and 9 also differs from that shown in Figs. 1 to 6 in that pinions 77 are mounted on the projecting ends of the shaft 78 of the printing roller for engagement with inclined racks 79 mounted on the side walls of the head adjacent the upwardly inclined ends of the slots 16 and 17. In riding down the inclined ends of the slots the engagement of the pinions 77 with the stationary racks 79 rapidly rotate the printing roller so that the freshly inked portion of its periphery is brought into printing relation with the sheet to be printed by the time the printing roller descends to printing level.

In the modification shown in Figs. 10 and 11 the inking roller 81 is journaled in two arms 82 which are pivotally mounted on the side walls of the head at 83. The roller 81 is held in contact with the printing roller by a spring 84, one end of which is attached to the head by a pin 86 (Fig. 11) and the other end of which is connected with the arms 82 through a pin 87. In the idle position the ink-reservoir roller is held out of contact with the printing roller by means of a stop pin 88 in the path of the arms 82. Here again the printing and ink-reservoir rollers may readily be removed by lifting off the cover and sliding the roller shafts out through the slot 16 or 17. As the inking roller moves from the retracted position 91 to the advanced position 92 the ink-reservoir roll moves from the full-line position to the dotted-line position 93.

The printing roller may be made of any hard strong material but steel is recommended. The ink-reservoir roller of each embodiment may be made of any porous material capable of absorbing ink and depositing a thin film of ink on the smooth printing roller. Typical examples comprise powdered iron compact, powdered copper compact, graphite, gypsum, thermosetting resin, ceramic compositions and silicate compositions.

A graphite roller may comprise compressed graphite or carbon impregnated with pitch and reheated to carbonize the pitch, thereby producing a dense material such as manufactured and sold by U. S. Graphite Company under the name Graphitar #4.

A satisfactory iron compact roller may be made from 100 mesh electrolytic iron with added graphite, ferro-manganese and lubricant, pressed at 4.5 tons per square inch pressure, sintered and hardened by quenching.

A good powdered copper compact may be made from 100 mesh copper powder with added lu-

bricant and pressed at nine tons per square inch and then sintered.

A satisfactory gypsum roller may be made from calcium sulfate made and sold by U. S. Gypsum Company under the name Red Top Plaster of Paris by making a paste with water, casting and then drying.

A good silicate roller may be made by mixing sodium silicate, sodium fluosilicate and fine aggregate into a paste and then casting and drying.

A good thermosetting resin roller may be made from phenol formaldehyde resin made and sold by the Bakelite Corporation under the trade name Bakelite Molding Compound XM 9131 Stiff Flow.

The pores of the ink reservoir roller should be of capillary size so that the ink does not flow out except in response to pressure of the roller against the printing roller.

It is to be understood that this disclosure is for the purpose of illustration and that various changes and modifications may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. In the art of printing machines of the type adapted to use portable printing plates having raised characters, a machine comprising two opposed members, one of the members having a seat for a printing plate and the other member having a printing roller mounted for movement back and forth between advanced and retracted positions in a path parallel to and substantially contiguous with the raised characters of said plate for pressing against the plate a sheet interposed between said opposed members, a porous ink-reservoir roller for applying ink to said printing roller, a spring pressing the ink-reservoir roller against the printing roller so that the ink-reservoir roller rolls over the periphery of the printing roller as the printing roller rolls over said sheet, and means for disengaging the ink-reservoir roller from the printing roller when the printing roller reaches said retracted position so that the ink does not transfer from the ink-reservoir roller while the printing roller stands in retracted position.

2. In the art of printing machines of the type adapted to use portable printing plates having raised characters, a machine comprising two opposed members, one of the members having a seat for a printing plate and the other member having a printing roller mounted for movement back and forth between advanced and retracted positions in a path parallel to and substantially contiguous with the raised characters of said plate for pressing against the plate a sheet interposed between said opposed members, a main spring urging said roller toward said retracted position, a porous ink-reservoir roller for applying ink to said printing roller, an auxiliary spring pressing the ink-reservoir roller against the printing roller so that the ink-reservoir roller rolls over the periphery of the printing roller as the printing roller rolls over said sheet, and a stop for disengaging the ink-reservoir roller from the printing roller as the printing roller approaches said retracted position, said main spring being sufficiently stronger than the auxiliary spring to continue the printing roller to retracted postion.

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