

Aug. 14, 1928.

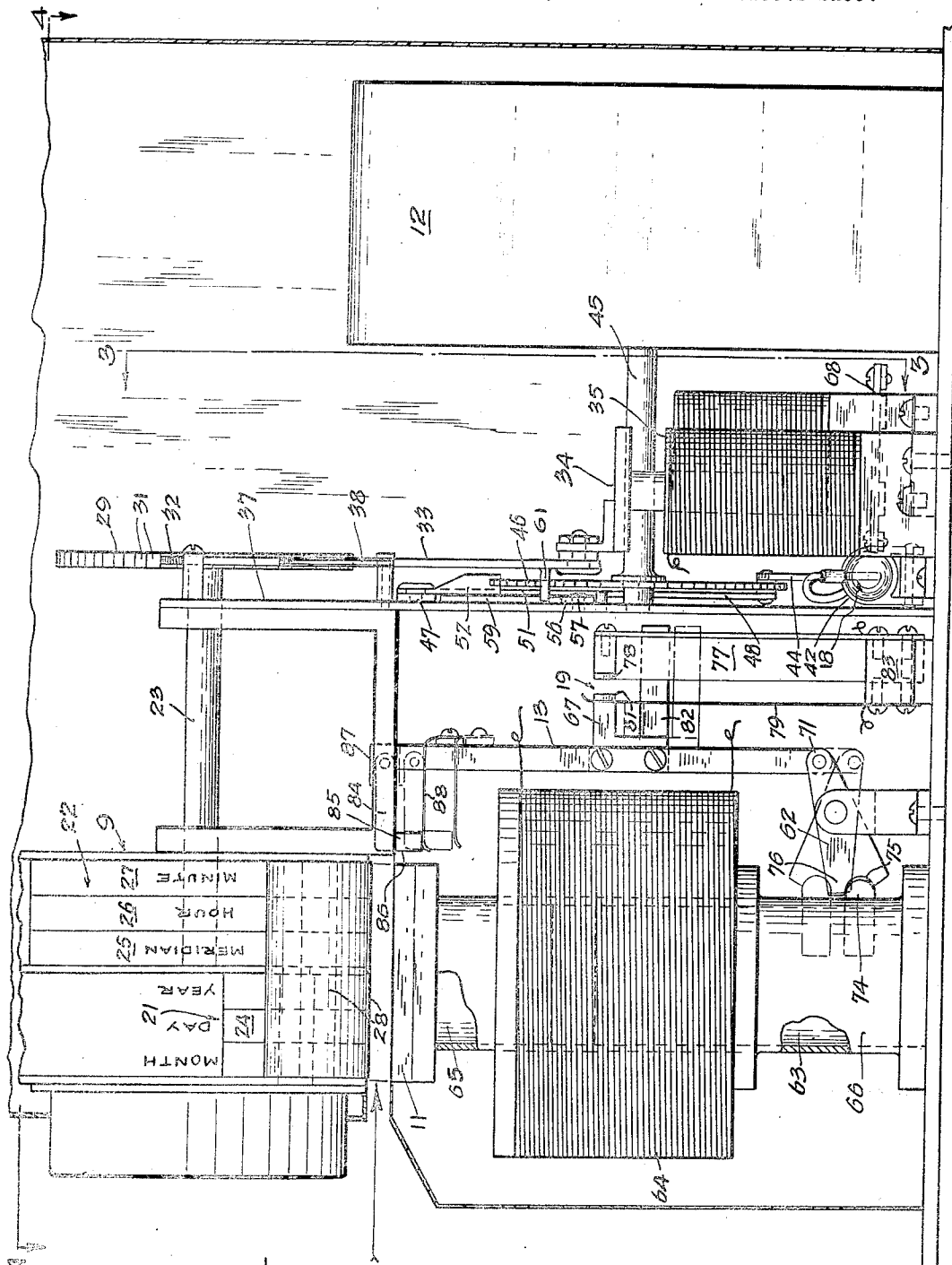
C. S. DUTTON

1,680,326

AUTOMATIC TIME PRINTING DEVICE

Filed April 4, 1927

5 Sheets-Sheet 1



INVENTOR.

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FIG. 3.

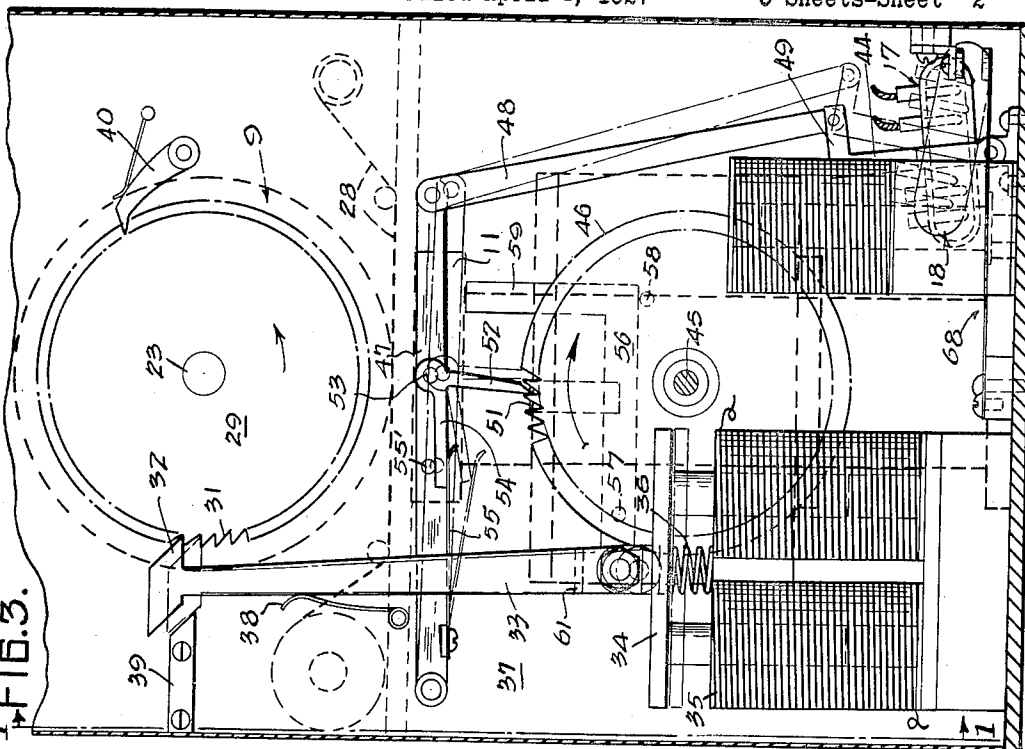
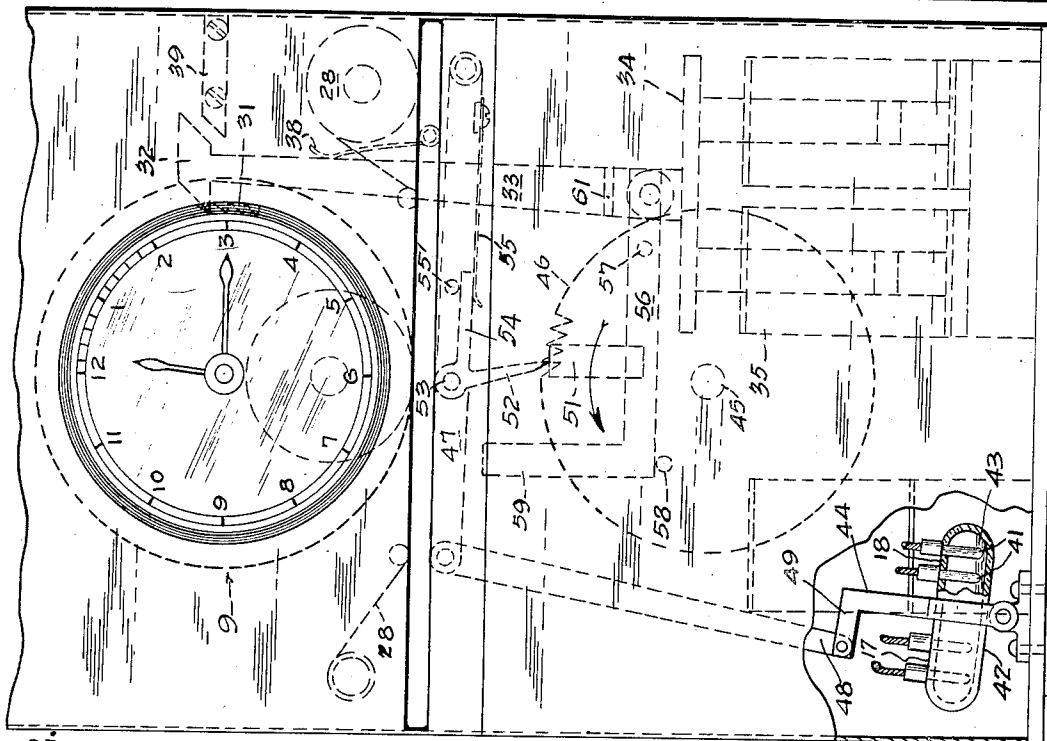


FIG. 2.



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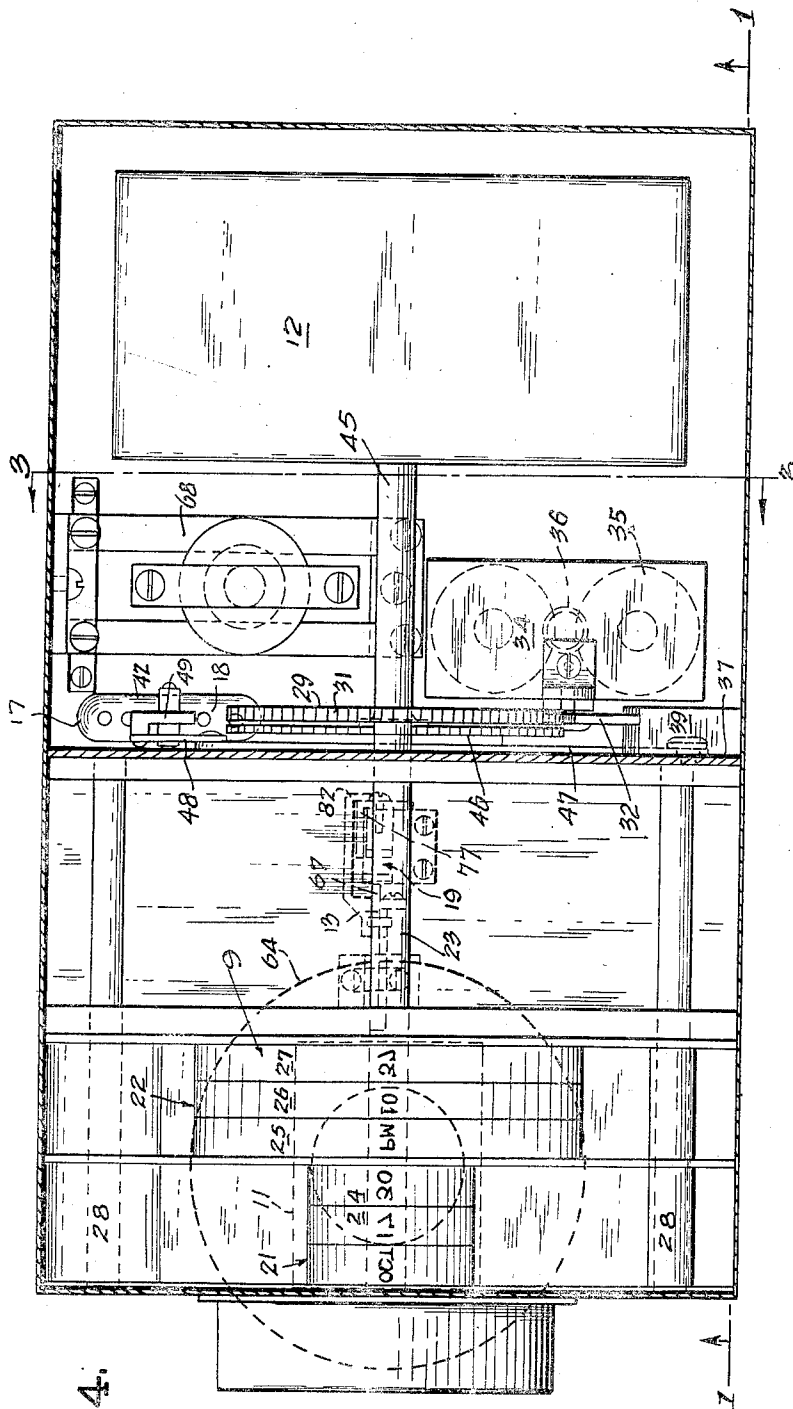
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FIG. 5.

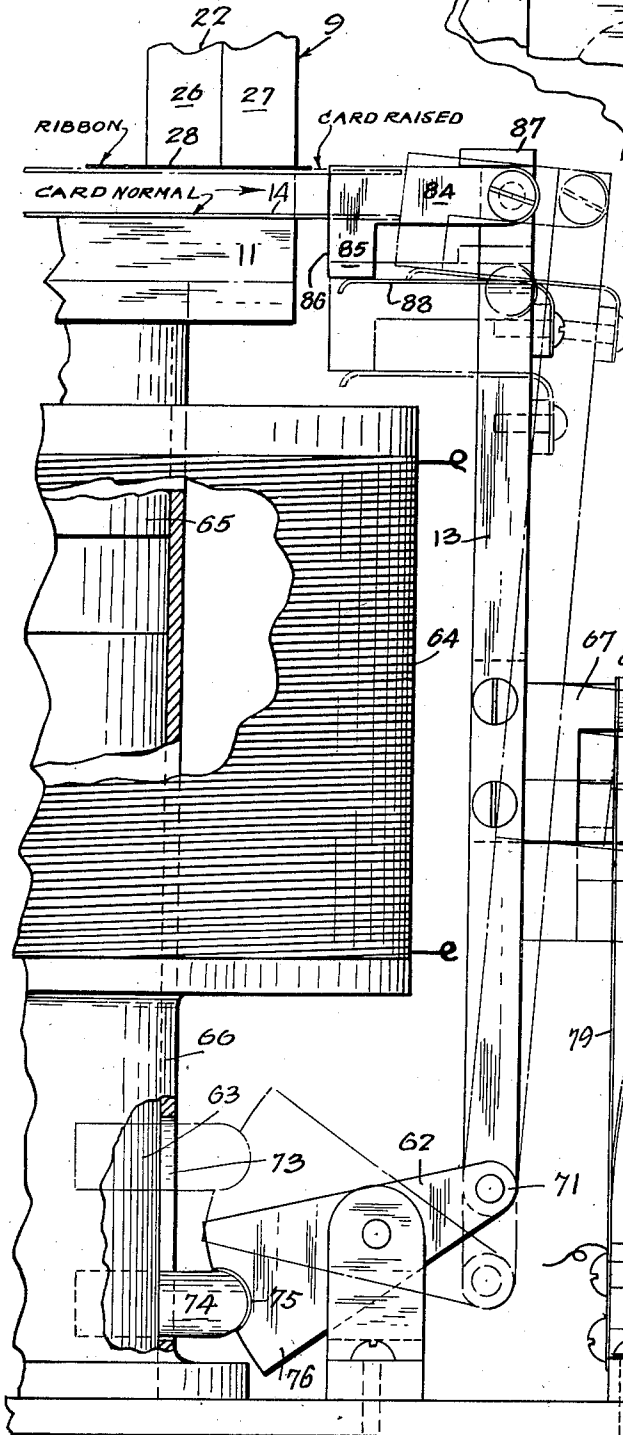


FIG. 6.

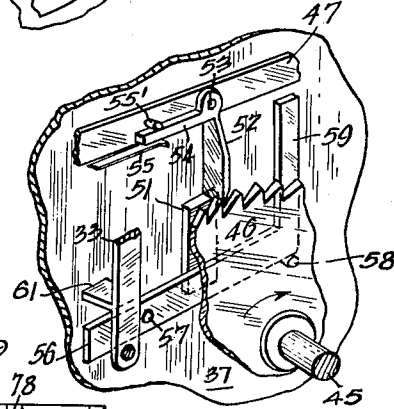
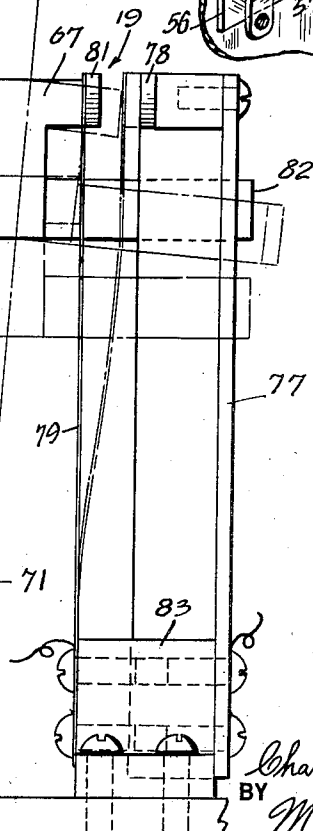


FIG. 7.



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5 Sheets-Sheet 5

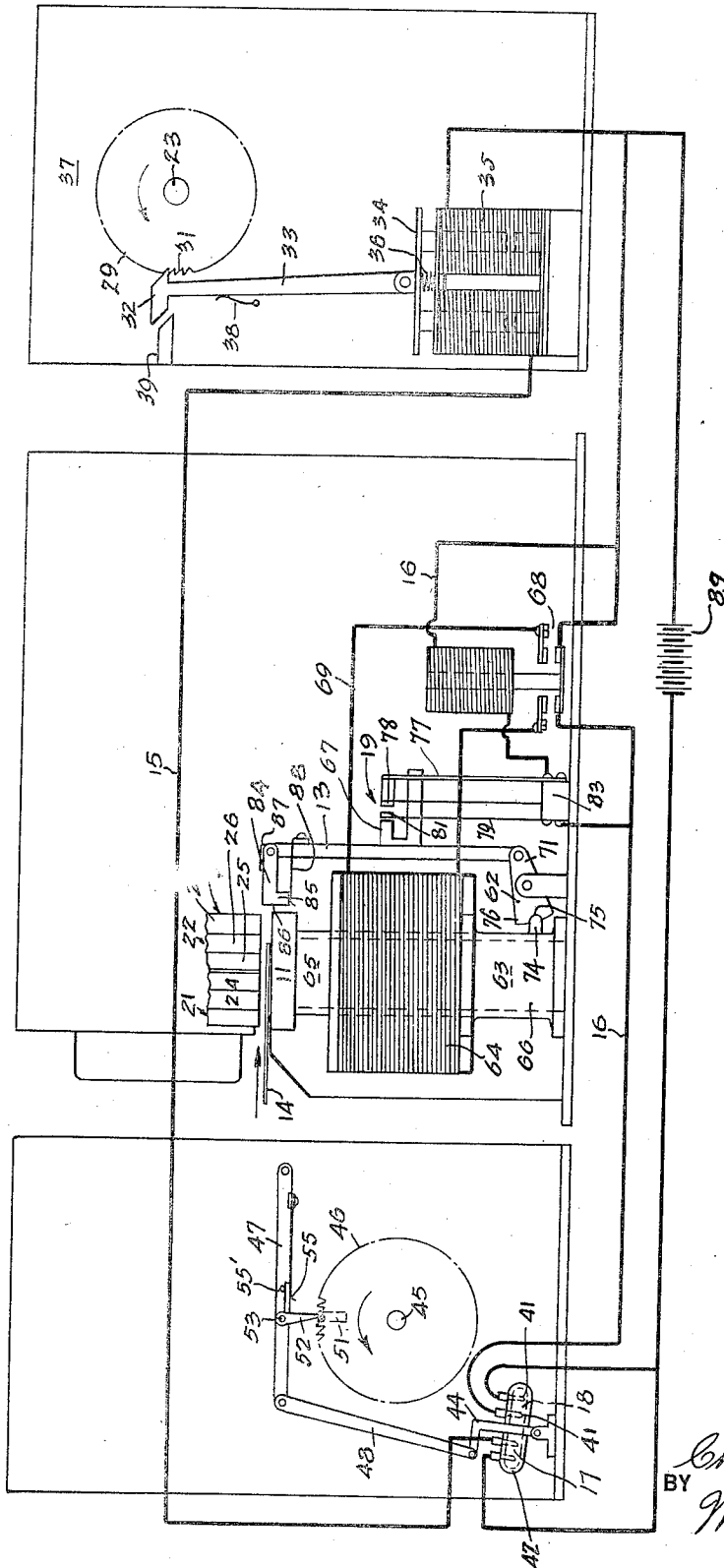


FIG. 8.

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UNITED STATES PATENT OFFICE.

CHARLES S. DUTTON, OF OAKLAND, CALIFORNIA.

AUTOMATIC TIME-PRINTING DEVICE.

Application filed April 4, 1927. Serial No. 130,695.

My invention relates to a device automatically operative by and upon the insertion of a card therein to print desired matter on the card, such device being particularly adapted for the stamping of individual time cards.

An object of the invention is to provide in a device of the character described means whereby the continued presence of the card therein can neither interfere with the completion of the primary printing cycle with respect thereto nor cause a repeated printing of the card.

Another object of the invention is to provide a device of the character described in which the printing mechanism is automatically rendered inoperative during the changing of the time printing type.

A further object of the invention is to provide a device of the character described whereby a card operatively disposed therein during the changing of the type will be automatically stamped immediately following such change and without requiring its removal or repositioning.

A still further object of the invention is to provide a device of the character described in which the stamping operation and setting of the type are electrically effected.

Yet another object of the invention is to provide in a device of the character described a novel switch by which a particularly efficient control of the operation of the device is effected.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the accompanying drawings, in which,

Figure 1 is a side view of the device, with the casing thereof broken away to disclose the mechanism.

Figure 2 is a front view of the device, with a portion of the casing broken away to show a switch forming part of the mechanism.

Figure 3 is a view taken on the line 3—3 in Figure 1.

Figure 4 is a plan sectional view of the device taken substantially on the line 4—4 in Figure 1.

Figure 5 is an enlarged fragmentary view of a portion of the showing in Figure 1.

Figure 6 is a plan view of a portion of the mechanism shown in Figure 1.

Figure 7 is a fragmentary perspective view of a portion of the mechanism shown in Figure 3.

Figure 8 is a diagrammatic view showing the various operative parts and the electric circuits of the mechanism.

As illustrated, the device essentially comprises a time-printing mechanism 9 having a movable platen 11, a clockwork mechanism 12 arranged to periodically set the type of the printing mechanism in accordance with the time, and an arm member 13 arranged to be displaced by and upon the insertion of a card 14 in the machine and to thereupon cause an operative actuation of the platen. Electrically operated means are provided both for effecting the setting of the printing mechanism by the clock and for effecting the movement of the platen following a displacement of the arm 13, such means being operatively included in a pair of normally open electric circuits 15 and 16 respectively. Mercury switches 17 and 18 of tilting character are provided in circuits 15 and 16 respectively, such switches being arranged to be so controlled by the clock mechanism 12 that switch 17 will be closed when, and only when, the periodic type settings are to be made, at which time the switch 18 is arranged to be open, it being noted that when switch 17 is open, switch 18 is arranged to be closed. A second switch 19 is also provided in circuit 16, which switch is arranged to be closed upon the displacement of arm 13 by a card 14. In this manner, with a card operatively disposed in the device, the closure of circuit 16 to effect an operative movement of the platen is prevented during the shifting of the type in the printing mechanism.

Referring now more particularly to the printing mechanism 9, it will be noted that such mechanism includes sets 21 and 22 of type wheels, with the wheels of set 21 arranged to be set by hand and the wheels of set 22 arranged for setting by and upon the rotation of a shaft 23. The wheels 24 of set 21 are here shown provided with the

appropriate type for printing the month, day and year of a record, while different wheels 25, 26 and 27 of set 22 are arranged for the printing of the meridian, hour, and minute respectively. It will now be noted that the data to be printed is that of a row of aligned characters of the different wheels and that such characters are those which are at a given time disposed radially downwardly of the type wheels. Any suitable means providing the necessary operative connection between wheels 25, 26 and 27 and the shaft 23 are utilized, it being noted that such means must provide for different and appropriate rotative rates for the before mentioned wheels, and it being further noted that such means are not shown in detail since they are not the subject of the present invention. Printing of a card 14, it will now be noted, is here shown arranged to be effected by pressing the same upwardly against an ink ribbon 28 disposed adjacent the row of set type by means of the platen 11 which is arranged to be projected radially against said row by means to be more particularly described hereafter.

Since the settings of the type wheels are to be made periodically, the shaft 23 does not turn steadily but is rotated slightly at equally timed intervals in accordance with the requirements of its connections to the type wheels of set 22. Mounted on the shaft 23 rearwardly of the printing mechanism is a ratchet wheel 29 having teeth 31 arranged to be engaged by a pawl 32 provided at one end of a member 33. The member 33, it will be noted, is pivoted at its other end to the armature 34 of an electro-magnet 35, such electromagnet being here shown as having a pair of coils with portions of the armature 34 movably engaged in each. As here shown, the armature 34 is disposed generally above the coils and is normally held in raised position by means of a compression spring 36. It will now be noted that a vertically disposed plate member 37 is provided forwardly of and adjacent the wheel 29, which member provides a mounting for certain parts of the operative mechanism. Mounted in the plate 37 is a spring 38 which bears against member 33 to keep the pawl 32 pressed against the teeth of the wheel 29, while a stop 39 is provided for limiting the downward movement of the member 33.

It will now be clear that upon energizing of the electromagnet 35, the member 33 will be pulled downwardly to rotate the wheel 29 in accordance with its movement, and that when the electromagnet is de-energized, the member 33 will return over one or more pawl teeth to engage another tooth for the next stroke of the member. To prevent the possibility of a backward rotation of the wheel 29 when the return of the pawl 32 occurs, a second spring pressed pawl 40 is provided,

such pawl being pivoted to the plate member 37.

As here shown, the electromagnet 35 is operatively included in the circuit 15 so that each time switch 17 is closed, it will operate to effect a rotative movement of the wheel 29. Referring to switch 17 and its companion switch 18, it will be noted that these switches comprise pairs of poles 41 disposed at opposite ends of a tube 42 providing a trough having therein a quantity of mercury 43 and arranged to be shifted between a pair of positions whereby the mercury completes the circuit between a pole pair at only one switch at a time. As here shown, the tube 42 is carried by and extends transversely of an arm 44 pivoted at its bottom and arranged to be swung from one side of the vertical to the other whereby the mercury will be shifted from one end of the tube to the other and so close the appropriate switch.

The clockwork mechanism 12, it will now be noted, may be of any suitable type, and since its structure forms no part of the present invention, is not shown in detail, except for a shaft 45 which extends therefrom to a point adjacent plate 37 and which is arranged to be driven at a constant rotative rate by the clock work mechanism. Mounted on the shaft 45 adjacent the plate 37 is a notched wheel 46, while pivoted to the plate 37 at one end and disposed generally horizontally above the wheel 46 is a bar member 47 having its free end attached by means of a link 48 to an offset 49 provided at the upper end of the switch carrying arm 44. It will now be noted that for one position of the bar 47, the mercury will connect the poles of switch 18, while for a certain lower position of bar 47, the mercury tube will be oppositely tilted to connect the poles of switch 17, and means are accordingly provided for disposing the bar 47 to effect a closing of switch 17 at the proper periods to set the type wheels in the manner previously indicated.

Mounted on the plate 37 opposite the upper portion of the wheel 46 is a member 51 providing a smooth horizontal upper surface on which is normally disposed the extremity of a downwardly disposed arm 52 of a bell crank lever 53 pivoted to the bar and having the other arm 54 thereof disposed generally along the bar. The arm 52, it will be noted, also extends laterally outwardly into the plane of the wheel 46 whereby a portion of its extremity may be normally engaged by the tip of a tooth of the wheel. A spring 55 is provided on the bar for engagement with the arm 54 of the lever 53 whereby the arm 54 will be normally held against a stop 55' and movement of the wheel tooth against the arm 52 may displace its end along the top surface of the member 51. It will now be noted

that when the bar is in its upper and normal position, it is arranged to be supported thereat by the bearing of arm 52 on the member 51 and that when the arm 52 is allowed to lower to fully engage the bottom of a space between a pair of teeth of wheel 46, the switch 18 is opened and switch 17 is closed. Accordingly, the member 51 is terminated at such a point that the lever arm 52 will drop therefrom into the wheel notch below it at the proper time to close the switch 17 and so effect a rotative displacement of the shaft 23 through the operation of the electromagnet 35, it being noted that the downward motion of the bar is thus arranged to be gravitationally affected.

Means are provided for effecting a return of the bar 47 to its raised position at the completion of the down stroke of the member 33 whereby the switch 17 will be opened and the parts will be disposed for the next periodic operation thereof. Pivoted to the plate 37 below the bar 47 is a lever 56, such lever being normally supported in a generally horizontal position by means of its pivot pin 57 adjacent one end and a stop 58 adjacent the other end. An upward extension 59 is provided on the lever end adjacent the stop 58, the upper end of such extension being disposed to lie closely adjacent the bar 47 when the latter is in its lowered position. The opposite end of lever 56 beyond the pivot pin 57 is disposed forwardly of the member 33, and such member is provided with a projection 61 which is arranged to engage the last mentioned lever end as the stroke of member 33 is completed to thereby force the extension 59 against the bar 47 to lift the latter above its normal upper position whereby the spring 55 may function to reseat the bell crank lever arm 52 on the member 51.

Referring now more particularly to the card operated arm member 13 and platen 11, it will be noted that the former is pivoted at one end of a lever 62 having the other end thereof pivotally engaged with a movable core 63 of a solenoid 64. The platen 11 is formed of a non-magnetic substance and is provided with a downwardly extending stem portion 65 disposed in the bore of the solenoid which thus provides a guide for the platen. The core 63 is normally disposed generally below the solenoid in the non-magnetic standard 66 thereof and is arranged to be raised when the solenoid is energized by a suitable current to strike the platen stem and so lift the platen and card against the ribbon and type for printing the card. It will now be noted that the arm 13 is arranged to be displaced backwardly upon the thrusting of a card 14 thereagainst, and that when the arm is so displaced, a projection 67 provided thereon is arranged to effect a closure of switch 19,

which switch is included in circuit 16 together with switch 18 and a double pole relay switch 68 which is arranged to effect a closure of a circuit 69 through the solenoid 64. In this manner, with switch 18 closed, it will be clear that closure of switch 19 will complete the connection of circuit 16 and so effect a printing movement of the platen.

It will now be noted that as long as the arm 13 is held in its backward position by card 14, the switch 19 will remain closed and the platen 11 would be raised and thereafter held raised against the ribbon and type even after the printing is completed whereby the card would be held against removal and the type wheels would be held against shifting by the mechanism previously described. Means are accordingly provided to prevent such contingency and, as here shown, such means comprises a provision for the displacement of the arm 13 from an operative relation to the card at the completion of the printing stroke of the platen whereby the switch 19 may open and the platen and arm be restored to their normal positions. The arm 13, it will now be noted, is disposed generally vertically and is pivotally secured to an arm 71 of a lever 62, which lever is pivoted for movement in a vertical plane. Extending radially from the movable solenoid core 63 through a slot 73, provided in the standard 66 is a projection 74, which projection is arranged to engage in a socket 75 provided in the other arm 76 of the lever 62 whereby a pivotal connection is, in effect, provided between the core and lever. In this manner, it will now be clear that when the core 63 is raised, the arm 13 will be vertically lowered, and vice versa, so that the vertical disposition of the arm is thus controlled by the position of the core.

It will be noted that the switch 19 comprises a standard 77 having provided at the top thereof a contact member 78, and a movable arm 79 carrying a contact 81 and arranged to be deflected to effect the engagement of the contacts 78 and 81. Preferably, and as here shown, the switch arm 79 is formed as a leaf spring and bears constantly against the extension 67 carried on the arm 13 whereby the latter is resiliently urged to maintain its forward position. Extending from the arm 13 is a second extension 82, which extension is arranged to slidably engage the rear side of the switch standard 77 whereby the forward movement of the arm 13 may be limited. As here shown, the switch members 77 and 79 provide electrical conductors from the switch contacts, are mounted in insulated relation on a block 83, and are connected in the circuit 16.

Pivotally mounted at the upper end of the arm 13 is a member 84, such member

being normally disposed forwardly of the arm in a fixed relation thereto and being provided at its forward end with a head portion 85 presenting an end surface 86 which normally extends slightly above the level of the ribbon 28 and considerably below the level of the top surface of the platen 11 when the latter is depressed. The member 84, it will be noted, is arranged to be normally held in its normal relation to member 13 by reason of its engagement with a stop 87 provided above it on the arm 13 and a leaf spring 88 mounted on the arm and operative against the member to hold it against the stop.

It will now be noted that when a card is inserted in the space defined between the platen 11 and ribbon 28 to cause a backward rocking of the arm 13 to close the switch 19, the solenoid 64 will, if switch 18 is closed, be energized to lift the core 63 against the platen stem 65 and so effect a printing of the card. But just as the card is printed, the arm 13 is arranged to have been lowered to permit the movement of member 84 beneath the card, whereby the arm 13 will move forwardly and the contact at switch 19 will be broken to permit the various operative members controlled by circuits 16 and 69 to resume their normal positions. In this manner, a printing cycle is completed even though the card be left in the device after it is printed. Usually the card is not removed immediately following its printing so that the return upward movement of the arm 13 will project its member 84 against the under side of the card, and such member, will, on account of its mounting, be deflected from its normal relation to the arm. In this manner, a gripping or mutilation of the card after the printing thereof is avoided, and it may be removed at pleasure, it being noted that the disposition of the member 84 beneath the card prevents the projection of a second card against the face 86 of the member 84 until the first card is removed.

Preferably, and as here shown, current for the various circuits is arranged to be derived from a common source such as the battery 89 by connecting the circuits 15 and 16 in parallel thereto and connecting the circuit 69 as a shunt circuit of circuit 16. It will be noted that the use of the relay switch 68 in circuit 16 to control the shunt circuit 69 permits the application of a greater current to the latter circuit than is necessary through the switch 19.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and method of operation will be readily understood by those skilled in the art to which the invention appertains, and while I have described the principle of operation, together with the device which I now consider

to be the best embodiment thereof, I desire to have it understood that the device shown is merely illustrative and that such changes may be made, when desired, as fall within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States, the following:

1. In a device of the character described, type means against which a card is arranged to be projected, means normally spaced from said type means to receive the card, a displaceable member arranged in the path of insertion of the card, means associated with said displaceable member to cause the projection of the card against said type means upon the displacement of the displaceable member by a card, and means thereafter automatically operative for releasing the printed card and for returning said displaceable member to its original position.

2. In a device of the character described, type means against which a card is arranged to be projected for printing the same, a platen normally spaced from said type means and operable to project said card against said type, imprinting means interposed between said type and platen, displaceable means associated with said card projecting means and adapted to intercept said card, and upon the insertion of a card thereagainst to cause the functioning of said platen to project said card against the type, and means automatically operable for returning said displaceable means and said projecting means to their normal inoperative positions.

3. In a device of the character described, relatively fixed type against which a card is arranged to be projected for printing the same, a platen normally spaced from said type in opposed relation thereto and movable to project said card against the type, an arm member pivotally displaceable by said card upon the insertion thereof between said type and platen electro-magnetic means operable to project said platen against said type, a switch controlling the operation of said electro-magnetic means and arranged to be actuated to effect an operation thereof during the engagement of said card with said arm, and means operative by said electro-magnetic means to disengage said arm from said card upon the printing thereof to thereby render said electro-magnetic means inoperative.

4. In a device of the character described, type against which a card is arranged to be projected for printing the same, a platen normally spaced from said type in opposed underlying relation thereto and projectible to move said card upwardly against the type, an arm member pivotally displaceable by the forward edge of said card upon the

insertion thereof between said type and platen and against said arm, a solenoid, a core slidably engaged in said solenoid and arranged when said solenoid is energized to move said core to project said platen against said type, a lever pivotally related to said core and arm whereby the movement of said core caused by the energizing of said solenoid will effect a lowering of said arm for releasing the same from engagement with said card edge to permit its return to its normal position after said card has been printed, an energizing circuit for said solenoid, and means controlled by the displacement of said arm to effect a closure of said circuit during such displacement.

5. In a device of the character described having type arranged to be periodically set by a clock mechanism, a platen normally spaced from the set type in opposed relation thereto and movable to project said card against said set type, electro-magnetic means operative by said clock mechanism to effect a setting of said type, electro-magnetic means automatically operative by and upon the operative insertion of a time card between said type and platen to effect a movement of said card against said set type, and switch means automatically operative to prevent a printing operation by said last means during the setting of said type by said first means.

6. In combination with a device of the character described having type arranged to be periodically set by a clock mechanism, a platen normally spaced from the set type and movable to project an inserted card against said set type, electro-magnetic means operative by said clock mechanism to effect a setting of said type, electro-magnetic means automatically operative by and upon the operative insertion of the card between said type and platen to effect a movement of said card against said set type; electric circuits including the respective electro-magnetic

means, and a switch means operative by said clock mechanism to so control said circuits that the printing of a card is prevented during the setting of said type and is permitted at all other times, said switch means comprising a member providing a trough for the reception of a liquid conductor and arranged to be differently positioned whereby the liquid may be disposed in different ends of the trough, and pairs of poles at said different ends of said trough each arranged in a different one of said circuits whereby said liquid may electrically connect but one pair of said poles at the different positions of said member.

7. In combination with a device of the character described having type arranged to be periodically set by a clock mechanism, a platen normally spaced from the set type and movable to project an inserted card against said set type, electro-magnetic means operative by said clock mechanism to effect a setting of said type, electro-magnetic means automatically operative by and upon the operative insertion of the card between said type and platen to effect a movement of said card against said set type, electric circuits including the respective electro-magnetic means, and a tiltable switch operative by said clock mechanism to so control said circuits that the printing of a card is prevented during the setting of said type and is permitted at all other times, said switch comprising a tiltable member embodying a trough adapted for the reception of a liquid conductor and arranged to be swung to opposite positions whereby said liquid will assume positions at opposite ends of the trough, and pairs of poles mounted in opposed ends of said trough each arranged in a different one of said circuits whereby said liquid may electrically connect but one pair of said poles at a time.

In testimony whereof, I affix my signature.
CHARLES S. DUTTON.