

June 15, 1937.

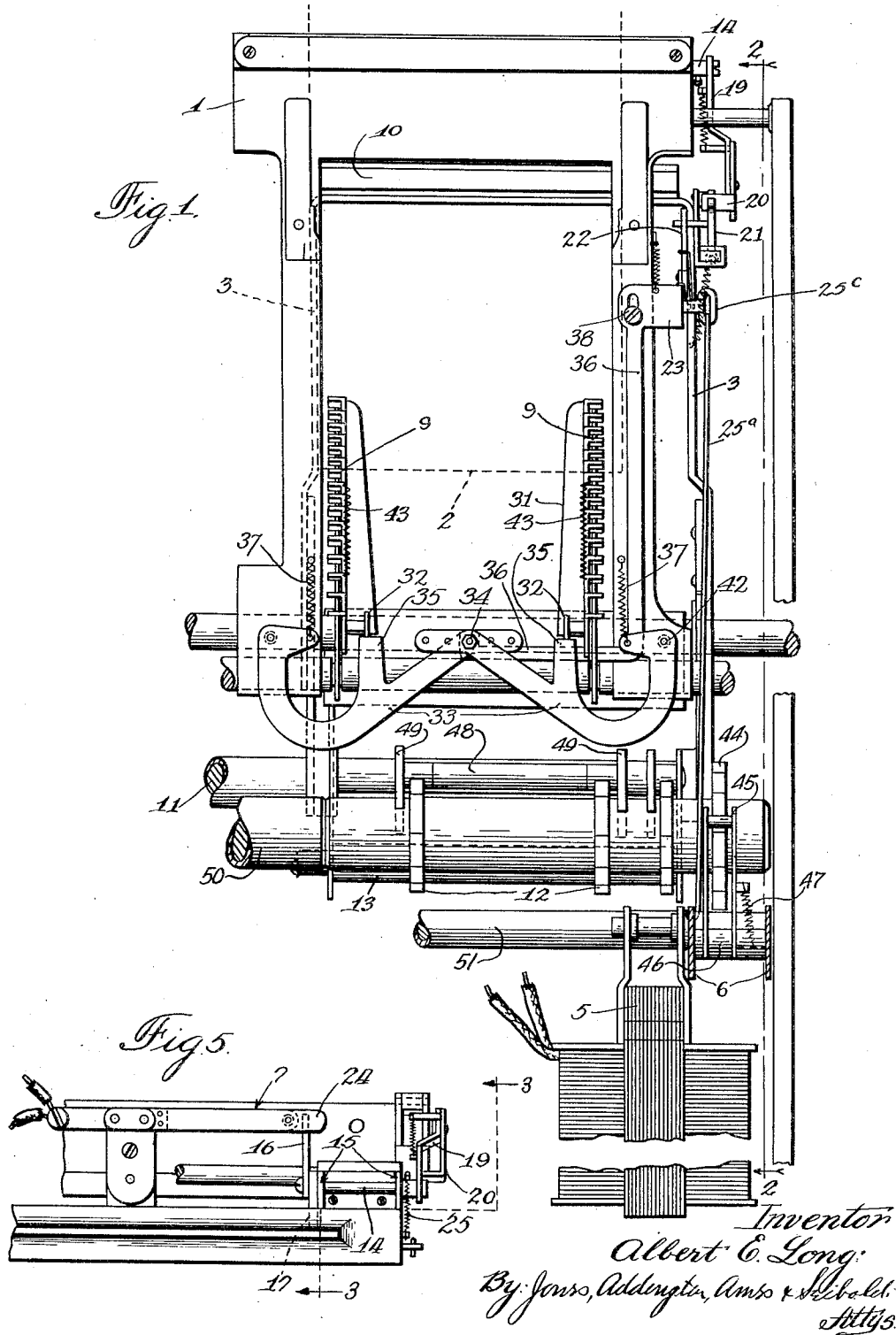
A. E. LONG

2,084,098

PRINTING DEVICE

Filed May 9, 1934

2 Sheets-Sheet 1



UNITED STATES PATENT OFFICE

2,084,098

PRINTING DEVICE

Albert E. Long, Chicago, Ill., assignor to Stromberg Electric Company, Chicago, Ill., a corporation of Delaware

Application May 9, 1934, Serial No. 724,675

29 Claims. (Cl. 101—297)

My invention relates to printing devices.

One of the objects of my invention is to provide improved means for holding the card or sheet in position during the printing operation. Specifically, my invention relates to in-and-out time recorders of a type in which the insertion of the card into the card receiver causes the printing operation. In this type of recorder, it is highly desirable to provide some means to insure that the imprint will take place in the proper position on the card. In using these recorders, the workmen operate them very rapidly and unless adequate means are provided for holding the card during the printing operation, the workman is likely to have the card partially withdrawn before the hammer strikes. My invention is designed to prevent this misplacing of the imprint.

In the drawings, in which an embodiment of my invention is shown,

Figure 1 is a front elevational view of part of an in-and-out time recorder embodying my invention;

Fig. 2 is a section substantially on the line 2—2 of Fig. 1, showing the position of the parts before the card is inserted;

Fig. 3 is a detail sectional view on the line 3—3 of Fig. 5, showing the gripping and switch arrangement after the card has been inserted;

Fig. 4 is a view of the parts shown in Fig. 3 after the hammer has been withdrawn and is about to be released for making the imprint; and

Fig. 5 is a plan view of the switch and card grip construction.

Referring to the drawings in detail, the construction shown comprises a card receiver 1 into which the workman inserts his card 2, a hammer 3 for cooperation with the type wheels 4 for making the imprint on the card, electromagnetic means 5 for causing the withdrawal and release of the hammer, manual means 6 for effecting the withdrawal and release of the hammer which may be used in the event that the current is off or the electrical operating mechanism is out of order, a switch 7 for controlling the operation of the electromagnetic means, card gripping means 8 operable substantially in synchronism with the closing of the switch 7 for holding the card in fixed position during the printing operation to insure that the imprint will be made on the desired portion of the card, and a time-controlled card rest or ladder construction 9, movable periodically step by step to different adjusted positions in each of which the distance which the card may be inserted into the card receiver is different, comprising a stepped control device engageable

by the lower edge of the card when inserted into the receiver for releasing the card grip and switch to permit the card grip to grip the card and the switch to cause the energization of the electromagnet to effect the printing operation.

The card receiver 1, hammer mechanism 3, hammer operating mechanism, type wheels 4 and stair step card rest 9 may be of any suitable construction, such as disclosed in my copending application, Serial No. 576,636, filed November 23, 1931, of which my present application is a continuation in part. The hammer 3 has an elongated imprint portion 10 to enable it to cooperate with the type wheels in any position to which the type wheels may be shifted laterally for effecting the lateral positioning of the printing. This hammer mechanism is rockably mounted at 11 and is withdrawn and released for the printing operation by means of a multiple toothed cam 12, which cam is actuated step by step, either by the electromagnet 5 or the manual lever 6 when it is desired to make an imprint as explained more fully hereinafter. A suitable spring is provided for effecting the printing movement of the hammer when it is released from the abrupt drop on the tooth of the cam 12.

The stair step card rest 9 is rockably mounted to swing about an axis at 13 and is time-controlled to cause it to be shifted periodically to bring the steps successively into position to be engaged by the lower edge of the card when it is inserted in the receiver 1. The mounting arrangement and manner of controlling this card rest in its periodic movements is fully disclosed in Patent No. 1,719,000, issued July 2, 1929 to C. M. Crook.

The stepped member 31 is movably mounted on the card rest or ladder 9 by means of pin and slot connections 30 and is normally held in its uppermost position by springs 43. Mounted on the stepped member 31 are the arcuate presser bars 32 which engage the bearing fingers 35 of the rock levers 33 in all positions of the card rest. The rock levers are connected together at 34 and, when the stepped member 31 is depressed by the insertion of a card, the levers 33 rock about pivot points 42 against the resistance of coil tension springs 37, causing the point of connection 34 to be moved downward. This movement is transmitted to the vertically movable slide 23 by the angle lever 36 which has one end connected to the rock levers at 34 and terminates at its other end in the slide 23 which is movably secured to the card receiver 1 by the pin and slot connection 38.

The card grip and switch construction com-

prises a rock shaft 14 rockably mounted in bearings 15 on the card receiver 1 (see Fig. 5), a switch-controlling rock arm 16 on the rock shaft, a card-gripping rock arm 17 also rockable with the rock shaft 14 and extending through an opening 18 in the card receiver into engagement with the card 2 when in gripping position, a latch-carrying rock arm 19 also rockable with the rock shaft 14 for controlling the rocking movement thereof, a spring-held latch 20 in the form of a bell crank lever pivotally mounted on the latch-carrying arm 19, a spring-held latch or keeper member 21 pivotally mounted on the hammer, and a keeper-controlling hook 22 pivotally mounted at 39 on the vertically movable slide 23 which is controlled jointly by the insertion of the card and by the actuation of the hammer.

The switch-controlling rock arm 16 lies underneath the end of the upper spring contact member 24. When this switch-controlling rock arm 16 is in the position shown in Fig. 2, it holds the contact on the upper leaf spring of the switch out of engagement with the lower leaf spring of the switch. When, however, the keeper or latch member 21 on the hammer is withdrawn from engagement with the latch member 20 on the rock shaft controller rock arm 19, the spring 25 snaps the rock shaft 14 and the rock arms 16 and 17 carried thereby into the position shown in Fig. 3, in which the card-holding rock arm 17 engages the card to hold it in definite position and in which the switch-controlling rock arm 16 is moved downwardly to permit the engagement of the contacts of the switch to close the circuit controlling the hammer operating electromagnet 5.

In the operation of the device, the workman inserts his card into the card receiver 1 until the lower edge of the card engages one of the steps of the member 31, which as previously explained is movably mounted on the card rest or ladder 9. The engagement of the card with member 31 causes the latter to be depressed, swinging the levers 33 about pivot points 42 and causing the common point 34 to be lowered as has also been explained. This downward movement is transmitted to the movable slide 23 by lever 36. The keeper controlling hook 22 moves downward with slide 23 and rotates the latch or keeper member 21 about its pivot on the hammer, causing the hook to disengage the latch 20. The spring 25 snaps the rock shaft 14 and the rock arms 16, 17 and 19 carried thereby to the position shown in Figure 3 in which the downward movement of lever 16 has allowed the contacts 24 to close, thereby completing the circuit to electromagnet 5.

The energization of the electromagnet 5 causes the rock lever 25^b to swing about its shaft 51. A pawl 45 is pivotally mounted on rock lever 25^b at 46 and is held in engagement with cam 44 by spring 47. Cam 44 is mounted on shaft 50 together with cams 12. The downward movement of the left hand portion of rock lever 25^b causes pawl 45 to engage a tooth on cam 44 and rotate shaft 50 and cams 12 in a counter clockwise direction. The follower shaft 48 is provided with a roller or rollers which ride on the teeth of cams 12. As the cams are rotated the hammer mechanism is swung about its pivot point 11 against the tension of spring 53 until the follower shaft and rollers drop off of the point of the cam teeth. The hammer is then snapped forward for the printing blow by spring 53. The latter part of the printing movement is due to

the momentum of the hammer as pointed out later. When the circuit to electromagnet 5 is opened as explained hereinafter, rock lever 25^b returns to its normal position allowing pawl 45 to engage the succeeding tooth on cam 44 in preparation for the succeeding printing operation.

In the withdrawn position of the hammer, the control mechanism for the card grip and switch assumes the position shown in Fig. 4 in which the card grip 17 is still engaged and the switch contacts are still in engagement but in which the latch or keeper member 21 on the hammer is withdrawn from the actuating hook 22 and the actuating hook 22 is withdrawn so as to be out of the path of the latch or keeper member on the printing movement of the hammer to prevent any possibility of the hook member 22 re-engaging the keeper member 21 on the printing movement and to prevent injury to the hook member 22 from being struck by the keeper member. This withdrawal of the actuating hook 22 out of the path of the latch or keeper member is effected by means of a link 25^a pivotally secured at its lower end to the hammer-controlling rock lever 25^b and having a lost-motion connection at 25^c with the hook lever 22. This lost-motion connection at 25^c permits the necessary movement of the slide under the action of the inserted card for moving the keeper member 21 downwardly to release the latch member 20. On the movement of the hammer toward the card, the keeper or latch member 21 on the hammer rides underneath the latch member 20 on the rock shaft controller arm 19.

The final printing movement of the hammer is due to its own momentum, as the hammer is made in two parts, the upper part 26 being pivotally connected to the lower part 27 at 28 and normally held in the relative position shown in Fig. 2 by means of the spring 29. On the printing movement of the hammer, however, the momentum of the upper part of the hammer stretches the connecting spring 29 between the two hammer parts and the upper part of the hammer flies forward under its own momentum, moving about the pivotal point 28 until it strikes the card 2 to effect the printing operation, whereupon it rebounds under the action of the connecting spring 29 to assume again the position shown in Fig. 2. On this rebound movement, the keeper or latch member 21 on the hammer hooks against the latch member 20 on the rock arm 19 and withdraws this rock arm to bring it back again to the position shown in Fig. 2, in which the switch is opened and the card grip is released. The release of the magnet raises the link 25^a so that hook lever 22 is again free to move forward under the influence of spring 41 to reengage the latch member 21.

In case the workman does not immediately remove his card but holds it in the card receiver so as to keep the stepped member 31 in its lower position, the movable slide 23 will be held in its lower position as shown in Figure 3. The keeper member 21 will reengage latch 20 and move it to the right thereby opening the circuit to magnet 5 during the return movement of the hammer after it has effected its printing blow. The hook member 22 is permitted to rotate in a clockwise direction to its normal position on slide 23 as soon as link 25^a is raised by the release of the magnet. However, since slide 23 is held in its lower position by the workman's card which is still depressing stepped member 31, the hook-

ing edge of hook 22 will not reengage the laterally extending pin on keeper member 21 but will lie below this pin. This prevents chattering or a plurality of printing operations for a single insertion of a card since it is only when the card is removed and the slide 23 allowed to assume its uppermost position that the hook 22 will engage the pin on keeper member 21 and thereby again place the mechanism in condition to respond to the insertion of a card. Thus the contacts 24, after being opened by the printing operation, cannot again be closed until the card has been removed to allow hook 22 to reengage keeper member 21.

Further modifications will be apparent to those skilled in the art and it is desired, therefore, that my invention be limited only by the prior art and the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a printing construction including printing means for printing on a sheet and sheet-controlled means for causing the printing operation, means for gripping the sheet during the printing operation, and means controlled by said sheet-controlled means for causing said gripping means to assume gripping position in definite time relation with respect to the printing operation.

2. In a printing construction including printing means for printing on a sheet, means for variably limiting the distance which the sheet may be inserted to cause the printing to be variably positioned on the sheet and sheet-controlled means for causing the printing operation, means for gripping the sheet during the printing operation, control means for the gripping means actuated by said positioning means, and means controlled by said printing means for moving said gripping means to non-gripping position in definite time relation with respect to the printing operation.

3. In a printing construction comprising printing means for printing on a sheet, including an impression member, an electromagnet for furnishing power for actuating the impression member and a switch for controlling said electromagnet, means for gripping the sheet during the printing operation, and means for controlling said gripping means in definite time relation with respect to the operation of the switch.

4. In a printing construction comprising means for printing on a sheet, including an impression member, an electromagnet for furnishing power for actuating the impression member and a switch for controlling the electromagnet, means for gripping the sheet during the printing operation, and means for releasing said gripping means in definite time relation with respect to the operation of the switch.

5. A printing construction comprising an impression member, an electromagnet for furnishing power for actuating the impression member, a switch for controlling the electromagnet, a rock shaft, control means for said switch mounted on said rock shaft, and gripping means for holding the sheet during the printing operation also mounted on said rock shaft.

6. A printing construction comprising means for printing on a sheet, sheet-controlled means for causing the printing operation, means for gripping the sheet during the printing operation, and a latch for holding the gripping means out of gripping engagement with the sheet.

7. A printing construction comprising printing

means for printing on a sheet, means for causing the printing to be variably positioned on the sheet, means controlled by the insertion of the sheet into engagement with said positioning means for causing the printing operation, means for gripping the sheet during the printing operation, and sheet-released means for latching the gripping means out of gripping engagement with the sheet.

8. A printing construction comprising printing means for printing on a sheet, means controlled by the sheet for causing the printing operation, means for gripping the sheet during the printing operation, a sheet-released latch for holding the gripper out of its gripping position prior to the printing operation, and means controlled by said printing means for relatching the gripping means in non-gripping position.

9. In a printing construction for printing on a sheet, a sheet-controlled movable impression member for effecting the printing operation, means for gripping the sheet during the printing operation, and a latch mechanism comprising means carried by the movable impression member for holding the gripping means in non-gripping position.

10. In a construction for printing on a sheet, a sheet-controlled movable impression member for effecting the printing operation, means for gripping the sheet during the printing operation, and means controlled by the sheet and by the movement of the impression member for controlling the gripping means.

11. A construction comprising means for printing on a sheet, means controlled by the sheet for causing the printing operation, gripping means for holding the sheet during the printing operation, latch means for holding the gripping means in non-gripping position, and means for releasing the latch comprising a hook cooperating therewith controlled by the sheet.

12. A construction comprising means for printing on a sheet, means for gripping the sheet during the printing operation, latching means for holding the gripping means in non-gripping position, and sheet-controlled means for releasing the latching means and for causing the printing operation.

13. A printing construction comprising means for printing on a sheet including sheet-controlled means for causing the printing operation, means for gripping the sheet during the printing operation, latch means for holding the gripping means in non-gripping position, a hook cooperating with said latching means for releasing it, and means controlled by the printing means for controlling said hook.

14. In a printing construction, a movable impression member, sheet-controlled means for causing the movement of said impression member to effect the printing operation, means for gripping the sheet during the printing operation, latch means for holding the gripping means in non-gripping position, a sheet-controlled hook for releasing the latching means, and means controlled by the movement of the impression member for holding the hook out of cooperative relation with respect to the impression member during the printing operation.

15. A printing construction comprising means for printing on a sheet, an electromagnet for furnishing power for the printing operation, a switch for controlling the electromagnet, means for gripping the sheet during the printing operation, and means for moving said gripping

means to non-gripping position in definite time relation with respect to the switch opening.

16. In a printing construction, means for printing on a sheet including sheet-controlled means for controlling the printing operation and means for gripping the sheet during the printing operation comprising a spring dog gripper and a sheet-controlled latch for holding the dog gripper in non-gripping position.

17. A printing construction comprising means for printing on a sheet including sheet-controlled means for controlling the printing operation, means for causing the printing to be variably positioned on the sheet, means for gripping the sheet during the printing operation, and means controlled by said positioning means when engaged by the bottom edge of an inserted sheet in any of its printing positions for controlling said gripping means.

18. A printing construction comprising printing means for printing on a sheet, positioning means for positioning the sheet with respect to said printing means, and means controlled by said positioning means when engaged by an inserted sheet for locking the sheet in printing position.

19. A printing construction comprising printing means for printing on a sheet, a movable abutment for limiting the insertion of the sheet to variably position the sheet with respect to said printing means, and means controlled by said abutment when engaged by a sheet in any of its positions for locking the sheet against retraction.

20. A printing construction comprising printing means for printing on a sheet, positioning means for positioning the sheet with respect to said printing means, means controlled by said positioning means when engaged by an inserted sheet for locking the sheet in printing position, means for effecting the printing operation, and means responsive to the printing operation for releasing the sheet.

21. A printing construction comprising printing means for printing on a sheet, positioning means for positioning the sheet with respect to said printing means, and means controlled by said positioning means when engaged by an inserted sheet for locking the sheet in printing position and for effecting the printing operation.

22. A printing construction comprising printing means for printing on a sheet, positioning means for positioning the sheet with respect to said printing means, electric power means for effecting the printing operation, and means controlled by said positioning means when engaged by an inserted sheet for locking the sheet against retraction and for completing a circuit to said electric power means.

23. A printing construction comprising printing means for printing on a sheet, positioning means for positioning the sheet with respect to said printing means, electric power means for effecting the printing operation, means controlled by said positioning means when engaged by an inserted sheet for locking the sheet in printing position and for completing a circuit to said electric power means, and means responsive to the printing operation for releasing the sheet and for opening the circuit to said electric power means.

24. A printing construction comprising means

for printing on a sheet including a movable impression member, positioning means for variably positioning the sheet with respect to said printing means, an electromagnet for operating said impression member to perform the printing operation, means responsive to the engagement of said positioning means in any of its positions by the edge of a sheet for locking the sheet against retraction and for completing a circuit for said electromagnet, and means controlled by said impression member for releasing the sheet and for opening the circuit to said electromagnet.

25. In a card recorder, printing means for printing on a card inserted in said recorder, variable positioning means for limiting the depth of insertion of the card, and means responsive to the engagement of a card with said positioning means in any of its limiting positions for locking the card against retraction and for effecting the printing operation.

26. In a card recorder, printing means for printing on a card inserted in said recorder, variable positioning means for limiting the depth of insertion of the card to cause the imprint to be variably positioned on the card, card-controlled means including said positioning means for effecting the printing operation, and means for preventing withdrawal of the card effective from the instant the card engages said positioning means until said printing operation has been completed to insure the proper positioning of the imprint on the card.

27. In a card recorder, printing means for printing on a card inserted in said recorder, means for positioning the card with respect to said printing means, electric power means for effecting the printing operation, a circuit for said electric power means, means for locking the card in printing position during the printing operation, and means for simultaneously rendering said locking means effective and closing said circuit.

28. In a card recorder, printing means for printing on a card inserted in said recorder, movable positioning means for variably limiting the depth of insertion of a card to secure imprints on different portions of the card, electric power means responsive to the engagement of said positioning means in any of its limiting positions by the edge of an inserted card for effecting the printing operation, means for locking the card in printing position, and means for operating and for releasing said locking means in definite time relation to the printing operation.

29. In a card recorder, printing means including a movable impression member, positioning means for variably positioning a card inserted in said recorder to secure imprints on different portions of the card, electric power means for operating said impression means to effect the printing operation, means for locking the card in printing position during the printing operation, means controlled by the insertion of a card into engagement with said positioning means for simultaneously operating said locking means and completing a circuit to said electric power means, and means controlled by said impression member for simultaneously releasing said locking means and opening the circuit to said electric power means.