March 19, 1929. F. E. MacCORDY 1,706,033

PRINTING MACHINE

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FIG. 1.

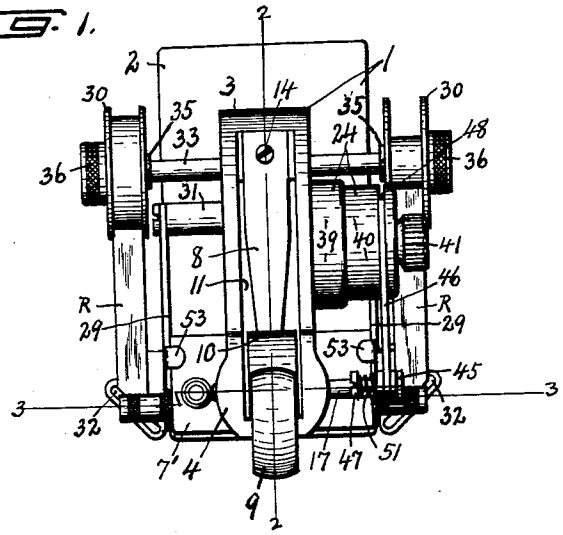


FIG. 2.

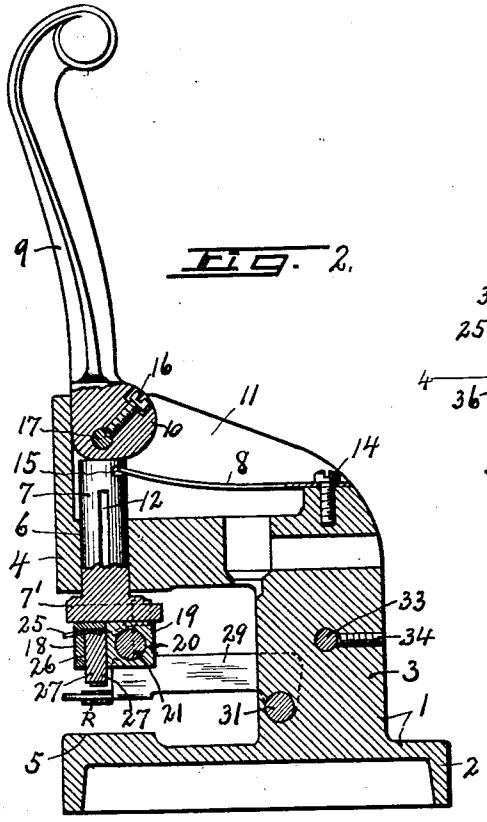
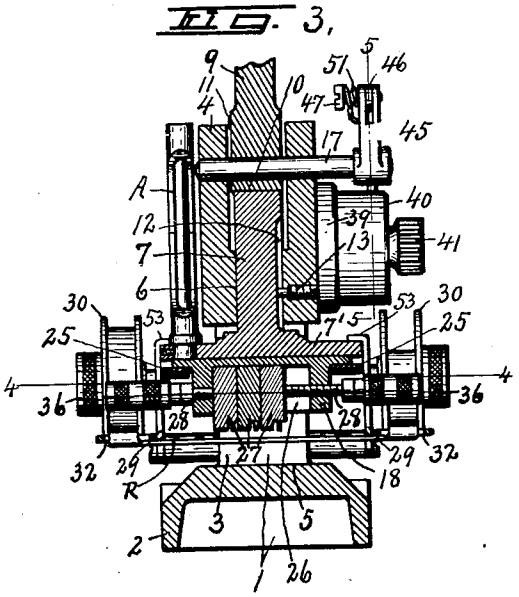


FIG. 3.



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FIG. 4,

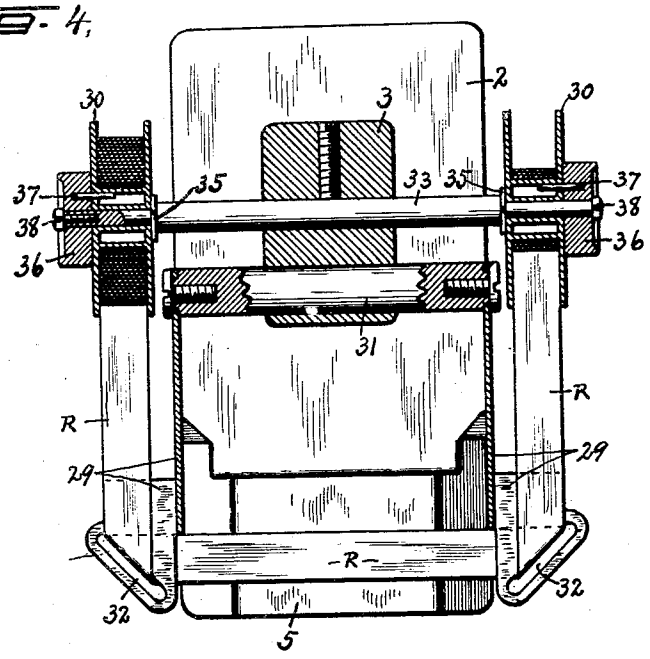


FIG. 5,

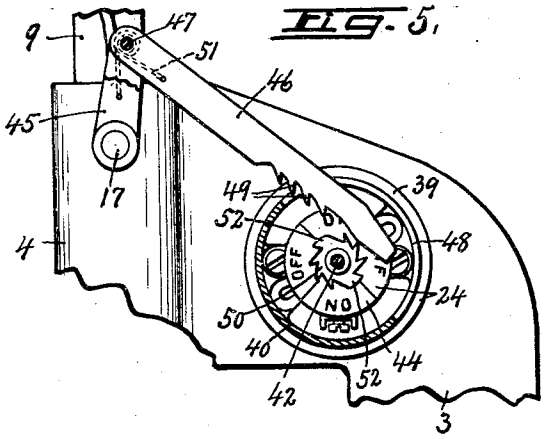
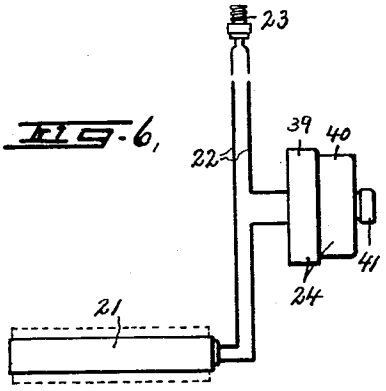


FIG. 6,



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Fig. 7.

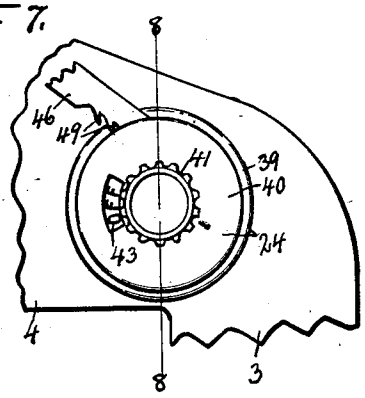


Fig. 8.

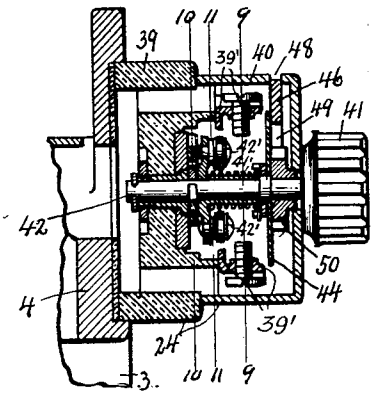


Fig. 9.

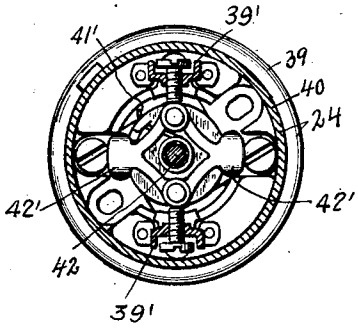


Fig. 10.

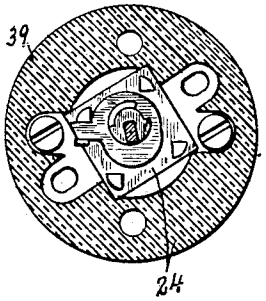
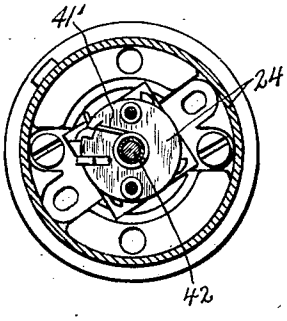


Fig. 11.



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UNITED STATES PATENT OFFICE.

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PRINTING MACHINE.

Application filed May 18, 1926. Serial No. 109,895.

This invention relates to a printing machine of the heated die and platen type by which impressions of the die may be transferred to the work upon the platen through the medium of a suitable transfer tape or ribbon interposed between the die and the work.

The main object is to provide a comparatively light and easily portable machine of this character to be used for impressing initials of personal names or other identification marks upon various articles of wearing apparel such as the sweat bands of hats and also upon hand bags, book covers, and other articles to which the printing mechanism may be applied.

One of the specific objects is to provide a more convenient means for removing, replacing and changing the type or dies than has heretofore been practised.

Another object is to heat the dies by means of an electrically heated cartridge supported in the machine in juxtaposed relation to the dies and capable of being easily removed and replaced when desired for inspection or repairs.

Another object is to flexibly connect the cartridge to a suitable plug which may be readily inserted into or removed from any standard form of lamp socket.

Another object is to control the heating circuit through the medium of an electric switch which may be closed at will for diverting the current to the heater but is automatically opened by the operation of the printing dies to their printing positions.

A further object is to provide simple means for feeding the transfer tape or ribbon in either direction across the platen and for frictionally holding it in different positions of adjustment.

Other objects and uses relating to specific parts of the machine will be brought out in the following description.

In the drawings:—

Figure 1 is a top plan of a printing machine embodying the various features of my invention.

Figure 2 is a vertical sectional view taken on line 2—2, Figure 1.

Figure 3 is a sectional view taken on line 3—3, Figure 1, except that the upper portion of the die operating lever is broken away.

Figure 4 is an enlarged horizontal sectional view taken in the plane of line 4—4, Figure 3, below the heater and dies showing more particularly the manner of supporting and adjusting the transfer tape together with the underlying portion of the bed and platen.

Figure 5 is an enlarged detail sectional view taken on line 5—5, Figure 3, showing more particularly the switch-operating means.

Figure 6 is a diagrammatic view of the detached heater and its controlling switch.

Figure 7 is a side elevation of the switch and adjacent portion of the frame showing a portion of the pawl for opening the switch.

Figure 8 is a sectional view taken on line 8—8, Figure 7.

Figures 9, 10 and 11 are sectional views of the switch taken respectively in the planes of lines 9—9, 10—10 and 11—11, Figure 8.

As illustrated this machine comprises a U-shaped frame —1— of cast metal or other suitable material having a base portion —2—, an upright portion —3— and a guide arm —4—, the base —2— being provided with a horizontal platen —5— while the guide arm —2— overhangs the platen in spaced relation thereto to form a clear open space at the front of the machine for the reception of the work, printing elements and heater, presently described.

The portion of the arm —4— directly over the platen —5— is provided with a vertical guide opening —6— for receiving and guiding a vertically movable plunger —7— which is normally elevated or retracted to its inoperative position by a flat retracting spring —8— but is adapted to be depressed against the action of said spring by means of a hand lever —9— and cam —10— thereon.

The arm —4— is provided in its upper side with a central forwardly and rearwardly extending recess —11— for receiving the upper end of the plunger —7—, spring —8— and cam —10—.

The plunger —7— is provided with a keyway —12— for receiving a key —13— in the adjacent side of the arm —4— to hold the plunger against turning movement, the upper end of said plunger being substantially flat and adapted to be engaged by the cam —10—.

The spring —8— is interposed between the side walls of the recess —11— and has its rear end secured by a screw —14— to the upper portion of the frame —1— as shown in Figure 2 while its front end is engaged in a slot

—15— in the rear side of the upper portion of the plunger —7— for normally holding the plunger in its uppermost position against the underside of the cam —10—.

The lower end of the lever —9— having the integral cam —10— is secured by a set screw —16— to a rock shaft —17— which is journaled in the opposite walls of the recess —11— and extends laterally beyond the outer face of one of said walls for receiving and supporting a part of the switch-operating means hereinafter described, see Figure 3.

Printing couple.

The lower end of the plunger —7— below the arm —4— is enlarged to form a head —7′— which extends laterally some distance beyond the outer side faces of the arm —4— and is provided with a substantially flat lower face for receiving and supporting a type or die holder —18— and a heater block —19—.

The heater block —19— is bolted or otherwise secured to the underside of the head —7′— of the plunger mainly at the rear of the axis of said plunger and extends laterally the major part of the length of said head and is provided with a central lengthwise opening —20— for receiving an electrically heated cartridge —21— of any suitable construction.

This cartridge is removable and replacable endwise from and within the opening —20— and is connected by flexible cables —22— to a block —23— which may be inserted in any standard form of lamp socket for diverting the electric current to the heater through the medium of an electric switch —24—.

The type or die holder —18— is removably seated against the lower face of the head —7′— and against the front face of the heater block —19— and is held in operative position by a pair of spring arms —25— which are also secured to the underside of the head —7′— at the opposite ends of the heater block —19— to extend forwardly therefrom for engaging flanges on opposite ends of the type holder —18— as shown in Figure 3.

The free ends of the spring arms —25— form with the lower face of the head —7′— a pair of slots which are open at the front side to permit the die holder —18— to be readily inserted into and removed from the slots as may be necessary when changing type or dies, the spring arms —25— being tensioned to frictionally hold the type holder —18— against the underside of the plunger head —7′— and also against the front face of the heater block —19— when the type holder is in operative position.

This type holder is provided in its rear side with a recess —26— for receiving a plurality of type or dies —27— which are held in operative position by clamping screws —28— in opposite end walls of the recess —26—, said recess being open at its rear side to allow the type —27— to be brought into direct contact with the heater block —19—.

A transfer tape or ribbon —R— is supported across the upper face of the platen —5— upon the front ends of a pair of rearwardly extending arms —29— and has its opposite ends connected to a pair of reels —30— which together with the arms —29— are located at opposite sides of the frame —1—.

The rear ends of the arms —29— are secured to opposite ends of a cross shaft —31— having its intermediate portion journaled in the upright portion —3— of the frame —1—, the front ends of said arms —29— being provided with rearwardly diverging slots through which the tape —R— is threaded for holding the front portion of the tape in a horizontal plane directly over the platen —5— and for holding the rearwardly extending portions of the tape in horizontal planes for winding and unwinding upon the reels —30—.

These reels —30— are mounted upon the opposite ends of a cross shaft —33— which is secured by a set screw —34— in a transverse opening in the upright portion —3— of the frame —1— and is provided with split friction washers —35— engaged with the inner end faces of the reels to frictionally hold said reels against undue rotary movement and thereby to keep the tape —R— under more or less tension.

A pair of hand wheels —36— are loosely mounted upon the outer ends of the shaft —33— and are connected by pins —37— to the adjacent reels whereby either reel may be rotated in one direction or the other for winding the tape thereon while the other reel is free to rotate to permit the unwinding of the tape therefrom.

The outer ends of the shaft are provided with threaded sockets for receiving screws —38— which hold the hand wheels —36— against endwise displacement from the shaft and also permit the hand wheels and reels to be adjusted endwise for varying the frictional resistance against the washers —35— which abut against annular shoulders on the shaft formed by reducing the ends thereof on which the reels —30— and hand wheels —36— are mounted.

Heater circuit control.

The electric switch —24— is preferably of the rotary snap switch type connected in the heater circuit and comprising a base portion —39—, cap —40— and handle —41— which latter is secured to the rotary shaft —42— carrying the usual contact member —42′— for contact with the usual switch terminals —39′— on the base as the shaft —42— is rotated.

The cap section —40— is provided with a suitable sight opening —43— while the shaft —42— is provided with a disk —44— upon which is printed successively the words "On" and "Off" for successive registration with the sight opening —43— to indicate the closed or open positions of the switch.

A crank arm —45— is secured to the protruding end of the shaft —17— to normally stand upwardly therefrom in the same direction as the hand lever —9— to be operated forwardly and rearwardly by said lever.

A pawl —46— is pivoted at —47— to the crank arm —45— to extend rearwardly therefrom and has the lower face of its rear end movable in a circumferentially extending slot —48— in the cap —40— and provided with teeth —49— for engaging with a ratchet wheel —50— on the shaft —42— as the lever —9— is rocked rearwardly to its printing position.

The rear end of the pawl —46— is normally held against the periphery of the ratchet wheel —50— by its own weight aided by a coiled spring —51— around the pivotal pin —47— and is freely movable at will through the opening or slot —48— to permit removal of the switch cap —40— when desired.

The ratchet wheel —50— is provided with a pair of diametrically opposite club teeth —52— which, when the switch is in its open position will be out of alinement with the teeth of the pawl —46— or in a plane nearly parallel with said pawl so that the teeth of the ratchet wheel between the club teeth on the side of the shaft —42— adjacent the pawl will be normally in registration with the teeth of said pawl to be engaged thereby when the pawl is moved rearwardly by the printing operation of the hand lever —9—.

It is evident, however, that if the lever —9— is operated while the switch is open the rearward movement of the pawl against the nearest ratchet tooth may cause a slight angular movement of the shaft —42'— against the action of the motor spring —41— of the switch but this angular movement will be insufficient to release the rotary switch member to its closed position by reason of the fact that the next succeeding club tooth —52— will then be brought into engagement with and trip the pawl from engagement with the first-named tooth, thereby allowing the movable switch member to return to its open position.

That is, the switch is normally set in its off or open position with the club teeth —52— out of alinement with the teeth —49— of the pawl —46— but when it is desired to use the machine for printing purposes the switch is turned one quarter of a revolution by means of its operating member —41— thereby bringing one or the other of the club teeth —52— into alinement with the teeth —49— of the pawl —46— at which time the switch will be closed to divert the current to the heater —20—.

Then, when the heater —20— and type —27— are heated to the required temperature the hand lever —9— is rocked rearwardly and downwardly to force the heated type and ribbon into engagement with the work upon the platen —5— for making the desired impression upon said work.

During this printing operation the pawl —46— will have been forced rearwardly into engagement with the alined club tooth —52— and one or more of the succeeding teeth for rotating the switch another quarter turn or to its open position thereby cutting off the current to the heater —20—.

It is now evident that the switch is closed at will to divert the current to the heater and is opened automatically by the operation of the printing mechanism thereby conserving the current and reducing the liability of overheating of the dies following each printing operation.

It is evident, however, that the operator may turn the switch on and off at will at any time through the medium of the operating member —41— and independently of the pawl —49— as may be necessary at times when the interval of preparation of the work for printing thereon is greater than the time required for bringing the heater to the required temperature as indicated by a thermometer —A— which is secured to the lower enlarged end of the plunger —7— adjacent the heating element as shown more clearly in Figure 3.

The transfer tape —R— is preferably of the gilded type in which a thin layer or film of gold is applied to the face of the tape adjacent the platen in such manner that when impressed against the work on the platen by the heated type —27— the gold will be instantly transferred from the tape to the work to form a permanent impression thereon.

The tape supporting arms —29— are movable vertically about the axis of their supporting shaft —31— and are adapted to be moved downwardly by the engagement of the type —27— with the intermediate portion of the tape during the printing operation aided by the weight of the arms thereof, the plunger —7— and parts carried thereby may be moved downwardly a limited distance relatively to the arms —29— by reason of the flexibility of the intermediate portion of the tape —28— to assure the making of a clean impression upon the work without contact of the arms —29— with the work.

The front ends of the arms extend upwardly across opposite ends of the head —7'— and are provided with inturned lugs —53— overhanging the adjacent ends of the head —7'— so that when the plunger is returned upwardly by the retracting spring

—8— the arms —29— and front portion of the ribbon carried thereby will be automatically returned to their starting positions.

Operation.

The operation, previously described, is as follows: assuming that the printing couple is in its elevated position and that the switch —24— is open, then the first operation is to insert the plug —23— into a lamp socket after which the operating member —41— is turned to close the switch —24— for diverting the current to the heater —20—.

The switch is allowed to remain closed until the type —27— are heated to the required temperature as indicated by the thermometer —A—. The work is then placed upon the platen —5— in proper position to receive the impression whereupon the lever —9— is operated to depress the plunger and type thereon for impressing the underlying portion of the tape —28— into engagement with the work during which operation the pawl —46— will have engaged and rotated the ratchet wheel —50— for opening the switch.

As soon as the printing operation is completed the cam lever —9— is returned to its starting position thus permitting the spring —8— to return the plunger —7— and parts carried thereby to their normal positions, the tape supporting arms —29— being also returned by the engagement of the head —7'— of the plunger with the lugs —53—, the machine being then ready for a repetition of the operations previously described.

When desired, the ribbon may be shifted endwise by simply turning one or the other of the reels —30— thereby presenting a different part of the tape to the type.

What I claim is:

1. In a printing machine of the character described, a printing couple, means for moving one of the printing elements toward and from the other, an electric heater for heating one of the printing elements an electric switch controlling the current to the heater, means for closing the switch, and means actuated by the first-named means for shifting the switch.

2. In a printing machine of the character described, a work support, a printing element, means for moving said element toward the support for printing upon the work, electrical means for heating said element, means for closing the switch, and means actuated by the first-named means for opening the switch.

3. In a printing machine of the character described, a printing element, means for moving said element to its printing position, electrical means for heating said element, an electric switch controlling the heating circuit, and operable at will to close said circuit, and means actuated by the first-named means for opening the switch.

4. In a printing machine of the character described, a platen, a plunger, a type holder carried by the plunger, a lever for operating the plunger, an electric heater carried by the plunger adjacent the type holder, an electric switch operable at will for closing the heater circuit, and means including a ratchet and pawl actuated by said lever for opening the switch at each printing operation.

5. In a printing machine of the character described, a platen, a type holder movable toward and from the platen, a transfer tape between the type holder and platen, means for moving the type holder into engagement with the tape and toward the platen, means for heating the type in the holder, an electric switch controlling the heating circuit and operable at will to close the circuit, and means actuated by the first-named means for opening the switch.

6. In a printing machine of the character described, a platen for supporting the work, a plunger movable toward and from the platen, a type holder mounted on the plunger a transfer tape between the type holder and platen, means for moving the plunger toward the platen, electric means carried by the plunger for heating the type in the holder, an electric switch controlling the heating circuit and operable at will for closing the circuit, and means actuated by the first-named means for opening the switch to break the heating circuit.

7. In a printing machine of the character described, a work-supporting platen, a plunger, means for moving the plunger toward the platen, additional means for retracting the plunger, a type-holder removable mounted on the plunger, a transfer tape between the type-holder and platen, an electric heater mounted on the plunger for heating the type, and means actuated by the first-named means for breaking the heater circuit.

8. In a machine of the characted described, a work-supporting platen, a type-holder movable toward and from the platen, means for moving the type-holder toward the platen, an electric heater for heating the type, an electric switch for controlling the heater circuit, means including a pawl and ratchet actuated by the first-named means for opening the switch.

9. In a machine of the character described, a work-supporting platen, a type-holder movable toward and from the platen, means for moving the type holder toward the platen, electrical means for heating the type, and means actuated by the first-named means for breaking the heating circuit.

10. In a machine of the character described, a work-supporting platen, a type holder movable toward and from the platen, means for moving the type holder toward the platen, an electric heater for heating the type, an electric switch operable at will for

closing the heater circuit, and means actuated by the first-named means for opening the switch to break the heater circuit.

11. In a machine of the character described, a work-supporting platen, a type holder movable toward and from the platen, means for moving the type holder toward the platen, an electric heater for heating the type, an electric switch operable at will for closing the heater circuit, and means including a pawl and ratchet actuated by the first-named means for opening the switch to break the heater circuit, said pawl and ratchet having cooperative means for preventing the closing of the switch by the operation of the first-named means.

12. In a printing machine of the character described, a work-supporting platen, a plunger movable toward and from the platen, a type-holder carried by the plunger, an electric heater mounted on the plunger adjacent the type-holder for heating the type, a rock shaft, a hand lever secured to the rock shaft and provided with a cam for operating the plunger toward the platen, a crank arm secured to the rock shaft, a rotary electric switch operable at will for controlling the heater circuit, and means actuated by the crank arm for operating the switch to break the circuit.

13. In a printing machine of the character described, a work-supporting platen, a plunger movable toward and from the platen, a type-holder carried by the plunger, an electric heater mounted on the plunger adjacent the type-holder for heating the type, a rock shaft, a hand lever secured to the rock shaft and provided with a cam for operating the plunger toward the platen, a crank arm secured to the rock shaft, a rotary electric switch operable at will for controlling the heater circuit, a ratchet wheel rotatable with the rotating part of the switch, and a pawl pivoted to the crank arm for engaging said ratchet wheel and operating the switch to open the circuit when the plunger is moved toward the platen, said pawl and ratchet wheel being provided with cooperative means for preventing the closing of the switch when the latter is opened.

In witness whereof I have hereunto set my hand this 13th day of May 1926.

FRANK E. MacCORDY.