May 5, 1931. H. A. WEINLICH 1,803,954

TYPEWRITER CONTROLLED PERFORATING MACHINE

Filed June 2, 1927 3 Sheets-Sheet 1

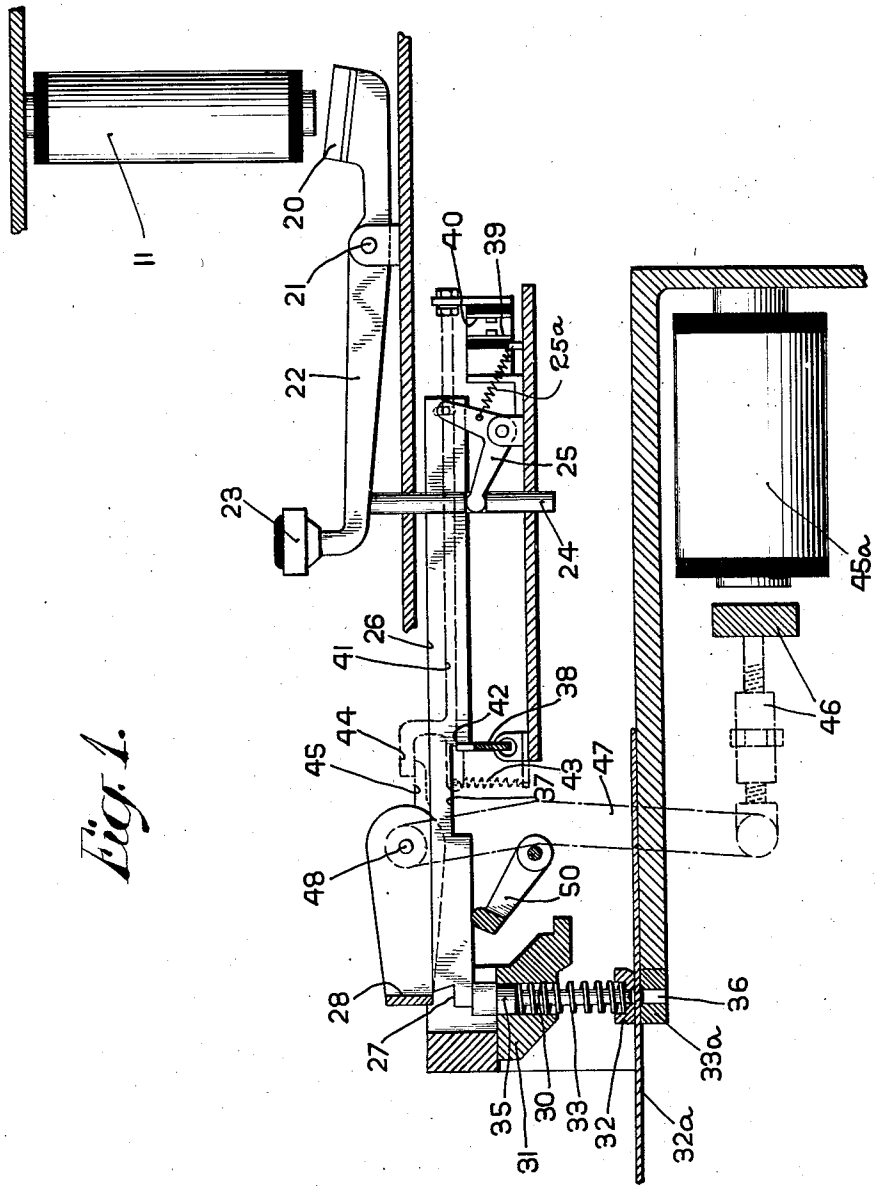


Fig. 1.

Inventor
Hermann A. Weinlich
By his Attorney
W. W. Wilson

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Fig. 2.

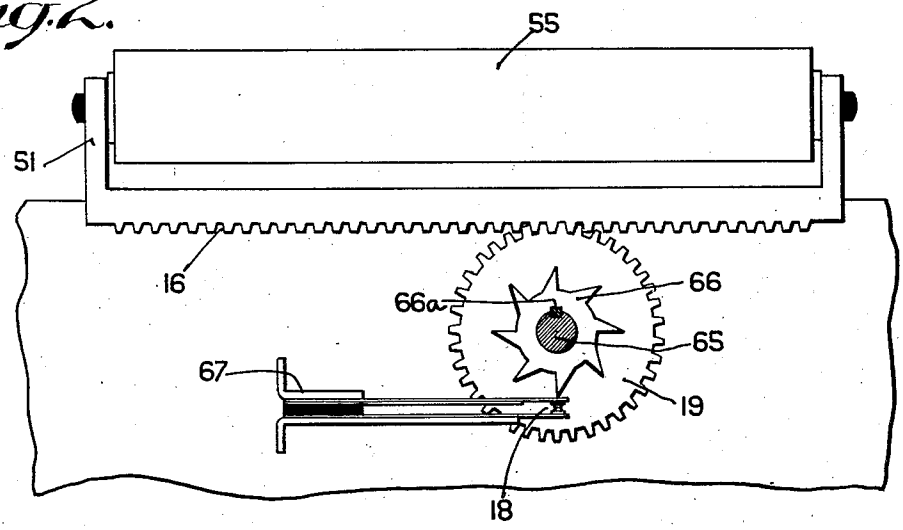
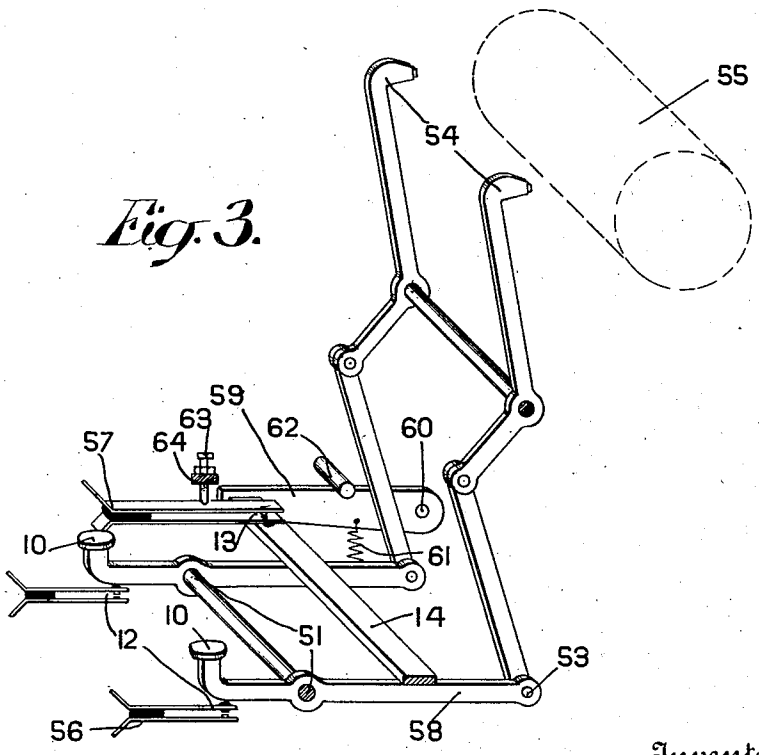


Fig. 3.



Inventor
Hermann A. Weinlich
By his Attorney
W. M. Wilson

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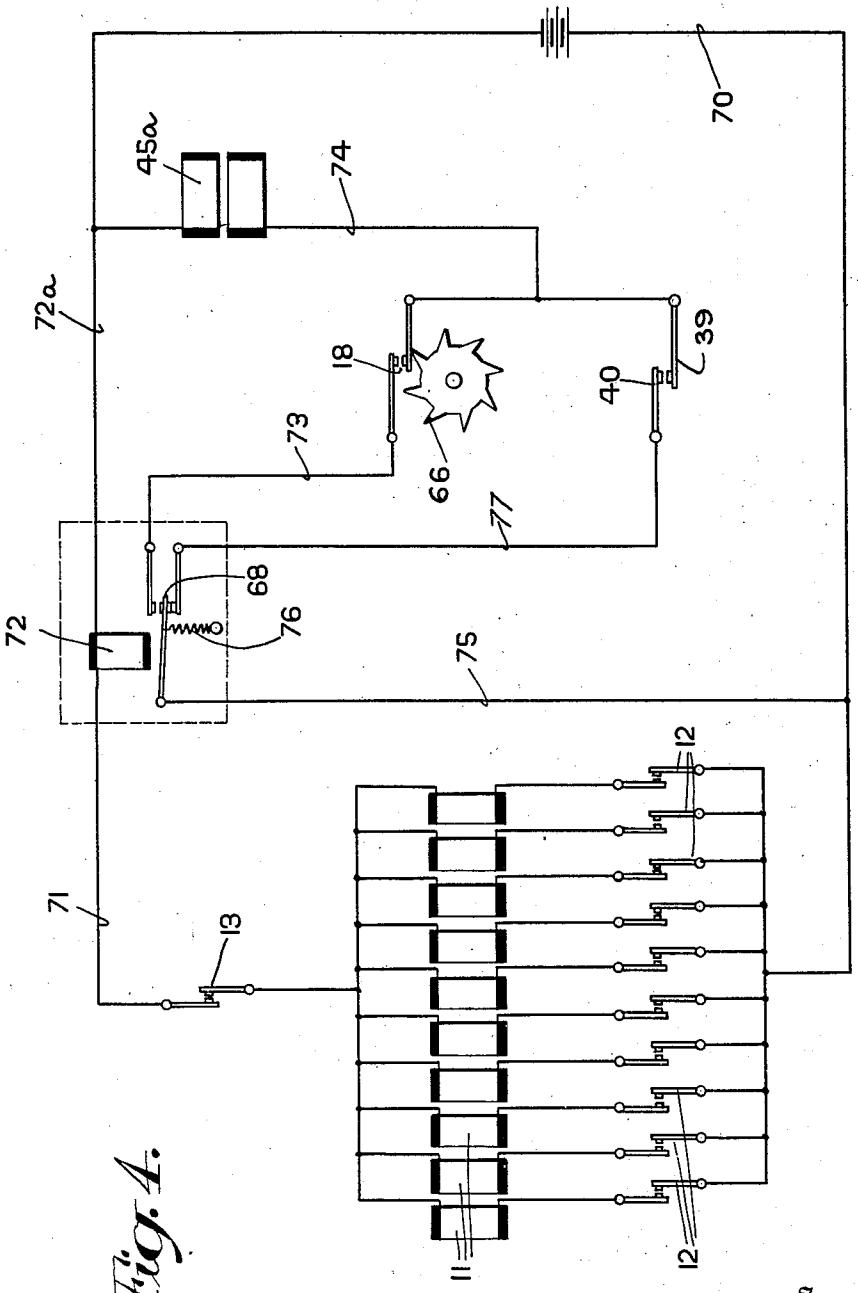


Fig. 4.

Inventor
Hermann A. Weinlich
By his Attorney
W. M. Wilson

Patented May 5, 1931

1,803,954

UNITED STATES PATENT OFFICE

HERMANN ADALBERT WEINLICH, OF BERLIN, GERMANY, ASSIGNOR TO THE TABULATING MACHINE COMPANY, OF ENDICOTT, NEW YORK, A CORPORATION OF NEW JERSEY

TYPEWRITER CONTROLLED PERFORATING MACHINE

Application filed June 2, 1927, Serial No. 195,971, and in Germany January 24, 1927.

This invention relates to printing and perforating machines and is especially adapted for the printing of records together with the perforating of records which are subsequently utilized for the tabulation of the various items enumerated on the printed record or may be utilized to print the record without punching or punch the record without printing.

In commercial practice it is customary to make invoices up on a typewriter and if the business institution uses record cards as a means of accounting, obviously the record cards would have to be perforated by a separate and in a separate machine. That is, the various items enumerated on the printed invoice would have to be punched on the record cards in order to be used in the well known Hollerith tabulating machines.

According to my invention when the invoice is printed a record card is concurrently perforated.

In a typewriter printing and perforating machine of this kind, it often occurs that an operator in depressing a numeral key of the typewriter will depress it sufficiently to close a contact to the punch selecting magnet of the perforating machine but not sufficiently to print on the record sheet. As far as I am aware, no practical means has ever been produced or even proposed which will guarantee the printing operation along with a punching operation. This means I have succeeded in producing a practical and efficient form.

An object of my invention is to provide a typewriter printing and perforating machine wherein the perforating of a record card cannot be effected unless the corresponding printing operation is positively effected on the record sheet.

Various other objects and advantages of the invention will be obvious from the following particular description of one form of mechanism embodying the invention or from an inspection of the accompanying drawings; and the invention also constitutes certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the accompanying drawings I have shown for the purpose of illustration one form of mechanism embodying the invention in which:

Fig. 1 is a detail view of a key punch showing one of the selector magnets and associated parts including one of the punches, the parts being shown in section.

Fig. 2 is a schematic view of the typewriter actuating means showing the position of the contacts and means for closing the same.

Fig. 3 is a fragmentary rear view of a typewriter showing the means for moving the platen and also for closing a contact to the punching magnet of the perforating machine.

Fig. 4 is a circuit diagram.

Referring more particularly to Figs. 1 and 2, a general description of the operation of my typewriter printing and perforating machine will be given. Upon the depression of a typewriter key it is rocked about its pivotal connection and closes a contact mounted beneath the typewriter key. Mounted above the typewriter key on the frame of the typewriter is another pair of contacts which are closed by means of a bail overlying all of the typewriter keys. These contacts are spaced at a distance above the bail so that a mere depression of a key will not cause the bail to close them. It is only when the keys are operated with sufficient force to insure printing that the bail flies up and closes the contacts. In the operation of the machine an operator in depressing a type key will have to strike it a blow sufficient to rock the bail in an upward direction against the contacts mounted above the keys. As soon as the bail strikes the upper contacts they are closed and simultaneously a printed record is made upon the record sheet on the platen roll of the typewriter. When the key is depressed for a printing and punching operation closing the lower contacts and rocking the bail upward to close the upper contacts, a selector magnet of the perforating machine selects a punch corresponding with the key depressed. That is, if key "2" is depressed, the punch corre-

sponding with that key will be set up for a perforating operation. Immediately after the key is released by the operator to allow it to return to its normal position, the carriage of the typewriter is moved longitudinally through the escapement mechanism. The platen carriage need not be shown here in all of its details, only so much as is necessary for an understanding of my invention is shown. The platen roll carrying the record sheet is rotatably mounted in a carriage which carriage is integral with a rack meshing with a gear which gear is fixed on a shaft. Also mounted on this shaft adjacent to the gear is a star wheel which rotates with the shaft when it is actuated by the rack. This star wheel is adapted to close a set of contacts which in turn establish a circuit to the punch actuating magnet of the perforating machine. It is to be noted that if the typewriter key does not receive a blow sufficient to rock the bail about its pivotal connection to close the upper contacts that no printing will be made on the record sheet and also that the punching device will not function. In other words, the device must print in order that the punching magnet can be actuated to perforate a record. As the operation of the perforating machine used in connection with my device is fully described in the copending application of J. T. Schaaff, Serial No. 731,980, filed August 14, 1924, it is unnecessary for me to present a detailed description of the entire machine.

For an understanding of the invention certain parts of the above perforating machine and their operation will now be described. Referring to Fig. 1, each selector magnet 11 is provided with an armature 20 pivoted at 21. The armature 20 is provided with a forwardly extending lever 22 overlying vertically movable plungers 24 slidably mounted in the machine. Each plunger has one leg of a bell crank 25 slidably connected thereto, the opposite ends of said bell crank being connected to separate controlling slides which will hereinafter be called interposers and are indicated at 26. These interposers are each provided with a notch 27 in the upper parts of their forward ends so as to permit the ready downward movement of the punch actuator 28 without encountering the interposer 26. When any one of the selector magnets has been energized, the armature of said magnet will be attracted and the outer end of levers 22 will be depressed thus forcing down its respective plunger and operating the bell crank 25 to shift the corresponding interposer 26 so that the notch 27 is carried out of the path of the punch actuator 28 which, if then operated, will be brought directly into contact with the upper surface of the interposer and depress the same. Each of the interposers has its forward end arranged over a punch 30 which is slidably mounted in a bridge piece 31.

Extending across parallel with the table of the punch located beneath the bridge piece 31, but spaced therefrom is a stripper plate 32 which forms an abutment for the lower end of compression spring 33 which normally acts to elevate the punch 30. Each punch is provided with a shoulder 35 adjacent its lower end and against which the upper end of the spring 33 abuts.

The card 32*a*, as will be noted, passes between the stripper plate 32 and a die 33*a* fitted in the table of the punch. This die is provided with a plurality of openings 36 one for each punch which receive and pass the discs punched out of the card.

These interposers 26 are each provided with a notch 37 on its under surface, which notches are aligned across the punches 30 when the interposers are in their normal retracted position shown in Fig. 1. These notches 37 are arranged to receive a pivoted common switch operating bar 38. This bar 38 is normally held in the position shown in Fig. 1 by any suitable spring. Bar 38 is connected to the insulated finger of a movable switch contact element 40 by a link 41. This link has its free forward end provided with a shoulder 42 which is engaged by the forward side of the bar 38 and the link 41 is held down in a guiding slot in the bar by a spring 43. The free end of the link 41 is also provided with a hook 44 which is engaged over a laterally projecting finger 45 projecting rearwardly from the punch actuator 28. When anyone of the interposers are shifted forward so as to have its front end in the path of the actuator 28 the bar 38 will be rocked on its pivotal connection and engaging the shoulder 42 will be rocked on its pivotal connection and engaging the shoulder 42 will pull upon the link 41 and bring the movable contact element 40 into engagement with the stationary contact element 39 thus closing the circuit to the magnet 45*a* which attracts its armature 46 and through the lever 47 rocks shaft 48 and the selected interposer through actuator 28. This communicates motion to punch 35 thereby driving the same through the card and die.

As the actuator 28 is rocked on its fulcrum the tongue or finger 45 is elevated and engaging the hook 44 lifts the free end of the link 41 out of engagement with the bar 38 against the tension of spring 43 and permits the spring contact 40 to draw the link 41 rearwardly. Thus the circuit of the punching magnet 45*a* is broken immediately after the operation of the actuator, irrespective of the length of time bar 38 may be held in its forward position as actuated by the interposers. The interposers are re-

turned to normal inactive position by means of independent springs 25*a* connected to one end of each bell crank 25. According to Patent No. 1,426,223 issued to J. T. Schaaff, each time a punch is actuated a lever similar to lever 50 is rocked downwardly. This lever controls the feeding of the card column by column through well known escaping mechanism.

Referring now to Figs. 2 and 3, a detailed description of my typewriter printing and perforating machine will be disclosed. As the general construction of a typewriter is well known I have, therefore, only shown schematically the mounting of some of the numeral keys to which part of my invention applies. One of the numeral keys is shown at 10 pivotally mounted at 51 and has the usual connection at 53 with the type hammer 54 adapted to print on a record sheet on the platen roll 55. Mounted on the frame of the device at 56 directly beneath the left end of the arm 58 of the typewriter key 10 as viewed in Fig. 2 are contacts 12. Upon the depression of the key 10 the contacts 12 are closed establishing a circuit to the selecting magnet 11 of the perforating machine. It often occurs that an operator does not strike the key a blow sufficient to cause the printing hammer 54 to print a record but depresses the key far enough to close the contacts 12. The result is that a record is perforated but no printed record is made of the item on the record sheet. I have succeeded in providing means whereby the printing of a record is positively made before the punching magnet of the perforating machine is actuated to perforate a record.

To overcome the perforating of a record without printing as above referred to, I have provided contacts 13 similar to contacts 12. The contacts 13 are fixed to the frame of the typewriter at 57 and are mounted directly above the arm 58 of the numeral key 10 (Fig. 2). A bail 14 fixed at its both ends to a pair of side arms 59 which arms are pivotally connected to the frame of the device at 60 is provided for closing the contacts 13. The side arms 59 are biased by a spring 61. A stop 62 is also provided for arresting the bar when it is actuated by the depression of one of the numeral keys. A set screw 63 mounted in a block 64 fixed to the machine may be provided for adjusting the contacts 13. These contacts are adjusted by the set screw so that they cannot be closed, setting up a circuit to the selecting magnets 11 of the perforating machine, until the type hammer 54 has actually printed on the sheet on the platen roll 55. In other words the key of the typewriter must receive a blow sufficient to rock the bail 14 upwardly to close the contacts 13 insuring a printed record before the selecting magnets of the perforating machine are set up.

Assuming now that the key 10 has been struck a blow sufficient to allow the bail 14 to close the contacts 13 and also printing a record. During this operation the contacts 12 and 13 respectively have been closed setting up a circuit to the selecting magnets 11 (Fig. 1). Immediately after the operator releases the key to allow it to return to its normal position, the platen roll 55 rotatably mounted in a support or carriage 15 integral with which is a rack 16, meshing with a gear 19, will be moved longitudinally by well known escapement mechanism. The gear 19 meshing with the rack 16 is rigidly fixed on a shaft 65. Also keyed on the shaft 65 is a star wheel 66. This star wheel as will be noted is adjacent to the gear 19. The star wheel 66 closes the contacts 18 each time the platen is moved one step longitudinally. These contacts are fixed to the frame of the typewriter at 67 and are mounted directly beneath the star wheel 66 so that they may be closed when the carriage or support 15 is moved upon the releasing of one of the numeral keys 10 after a printing operation.

The contacts 12 and 13 respectively which are closed by the depression of the key 10 and bail 14 are so timed that when the key is released by the operator to return to its normal position, the contacts will not break until after the contact 18 has been closed by the star wheel 66 allowing the current to flow to the punching magnet 45*a* causing the perforating machine to punch a hole in the record card corresponding with the printed information on the invoice. It is obvious that other means may be employed such as a slow acting magnet or a stick circuit for holding the upper contacts 68 closed until the contact 18 has been closed.

Referring now to Fig. 4, an illustration of the circuit diagram is disclosed as comprising a plurality of selecting magnets 11 and a plurality of contacts 12. The double contact 68 held in a downward direction by a spring 76 is provided for completing the closure of the circuit to the punching magnet 45*a* when the contacts 12 and 13 are closed. The magnet 45*a* is energized by the contacts 39, 40 when closed by the interposers 26. The energization of magnet 45*a* causes the perforating machine to punch. Presuming that the numeral key 10 has been struck a quick blow, the corresponding contacts 12 being closed by the key, and contacts 13 by the bail 14, a circuit will be established as follows: from the positive side of the line 70 through contacts 12, selecting magnet 11, contacts 13, wire 71, magnet 72, wire 72*a* and back to the negative side of the line. The energization of magnet 72 closes

the upper contact 68 so that when the escapement through the star wheel 16 closes contacts 18 the following circuit will be closed from the positive side of the line 70 through wire 75, upper contact 68, wire 73, contacts 18, wire 74, magnet 45*a* and back to the negative side of the line. The energization of magnet 45*a* will effect perforating as previously described. Presuming now that the operator desires simply to use the perforating machine to perforate a record without printing. Upon the depression of the punch actuating key 23 of the perforating machine, a circuit is established as follows: from the positive side of the line 70 through wire 75, lower contact 68 now held closed by a spring 76, wire 77, contacts 39, 40 closed by the interposer 26, wire 74, punch actuating member 45*a* and back to the negative side of the line.

In the normal operation of the machine I have found that by timing the contacts 13 so that they are not closed unless the type 54 engages the platen 55, the magnet 72 will maintain the upper contact 68 closed until the escapement of the carriage causes closure of contacts 18. This is so even though the contacts 13 may open and thus permit de-energization of magnet 72 before the escapement causes closure of contacts 18 by reason of the time required for the magnet 72 to release its armature. In this connection it is obvious that to permit a slow releasing operation of the typewriter keys the magnet 72 may be a slow acting magnet so as to hold the upper contact 68 closed an appreciable length of time after contacts 13 may have opened. Also as I have previously stated, a stick circuit or holding circuit may be employed in connection with magnet 72, such circuits being well known, to hold this magnet closed after contacts 13 and 12 have been opened and until contacts 18 have been closed to cause energization of magnet 45*a*.

While I have shown and described and pointed out the fundamental novel features of the invention as applied to a single modification it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. I intend to be limited therefore only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine of the class described, printing elements, means for perforating a record corresponding to data printed by said printing elements and means controlled by the printing elements for causing actuation of the perforating mechanism only when printing is effected.

2. In a machine of the class described, printing mechanism including a common operated element, means for perforating a record corresponding to the data printed by said mechanism, and means controlled by said common operated element for rendering said perforating mechanism operative only when the printing mechanism effects an imprint.

3. In a machine of the class described, means for printing data, means for perforating a record to correspond with the printed data, means for operating the printing means and perforating means, and means whereby said perforating operating means is rendered effective only when said printing means is effective to print.

4. In combination, a typewriting machine including printing type bars, a carriage escapement mechanism, perforating devices for designating by perforations the data printed by the type bars, means controlled by said escapement device for causing operation of the perforating devices, and means common to and associated with said printing bars for controlling the effectivity of the escapement controlled means.

5. In combination, a typewriting machine including a carriage escapement device, and typewriter keys, perforating devices designating by perforations the data represented by the typewriter keys, means including an electrically actuated element for operating said perforating devices, contacts for controlling said element, means associated with said escapement device for controlling said contacts, and supplemental means associated with said contacts whereby their effectivity is controlled by the position of the typewriter keys to effect an imprint.

6. In a machine of the class described, a plurality of means for printing data, a member common to and operated by said means, means for perforating a record to correspond with the printed data, and means under control of the operated member for controlling the perforating means.

7. In a machine of the class described, printing mechanism, a carriage associated with said printing mechanism, perforating means, means controlled by said carriage for controlling said perforating means, and a supplemental control associated with and common to said printing mechanism for controlling the perforating means.

8. In a machine of the class described, means for printing data, a member common to and operated by said means, means for perforating a record to correspond with the printed data, and means whereby said member controls said perforating means.

9. In a machine of the class described, a typewriter mechanism including an escapement device, perforating devices, contacts controlled by said escapement device for controlling said perforating devices, and a

set of contacts common to said typewriter mechanism for controlling the effectivity of the escapement controlled contacts.

10. In a machine of the class described, the combination of a punch, an electrical means for operating said punch, typewriter keys, contacts for controlling said punch, and means common to and operated by any of said keys for controlling said contacts.

11. In a machine of the class described, the combination of a punch, an electrical means for operating said punch, a platen, typewriter keys adapted to strike a platen to print, contacts operated by said keys controlling said electrical means and arranged to be operated only when any of said keys strikes said platen.

In testimony whereof I hereto affix my signature.

HERMANN ADALBERT WEINLICH.