Sept. 9, 1930. J. R. PEIRCE 1,775,172

PORTABLE PERFORATING AND PRINTING MACHINE

Filed April 26, 1927 6 Sheets-Sheet 1

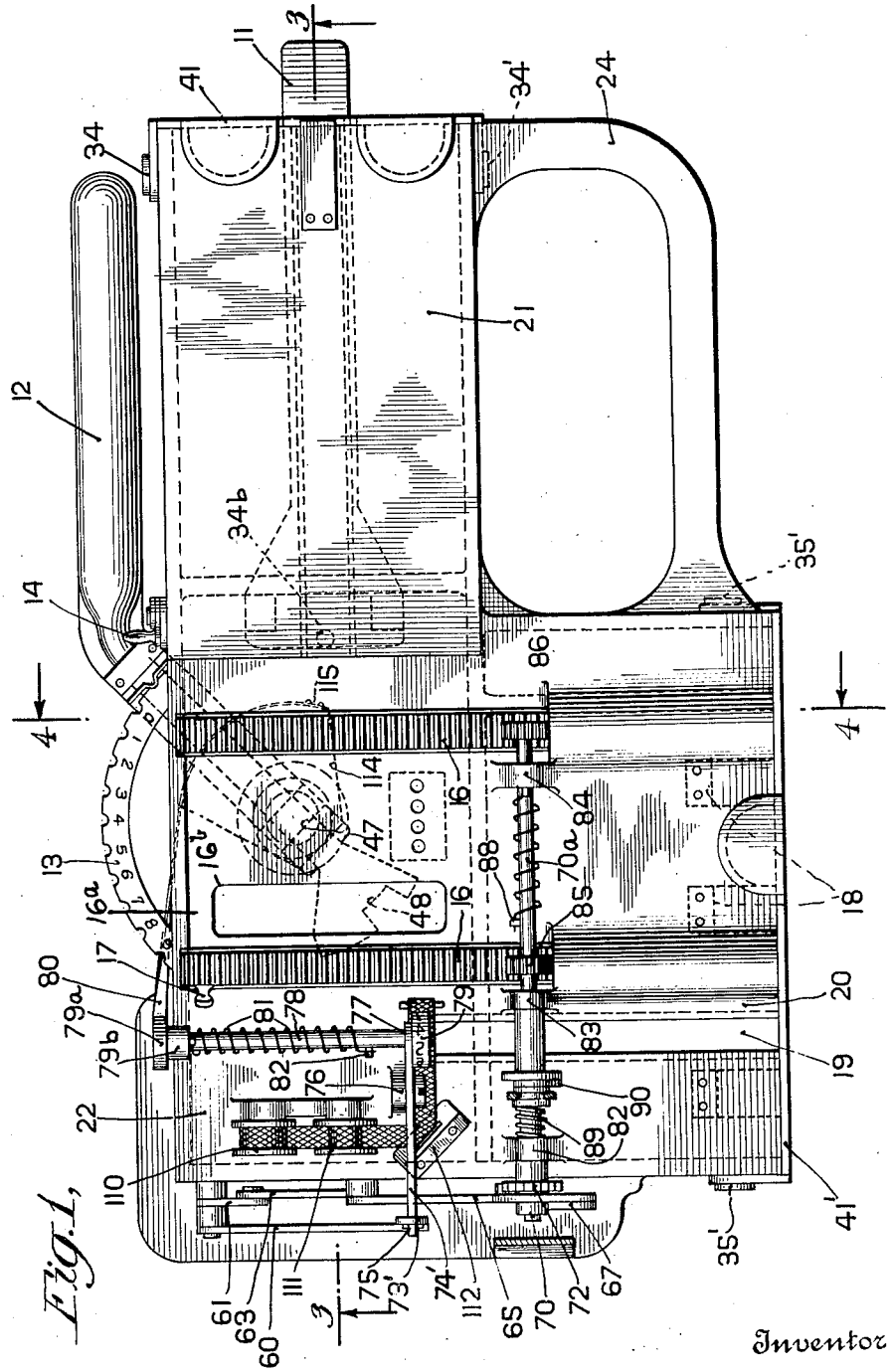


Fig. 1.

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PORTABLE PERFORATING AND PRINTING MACHINE

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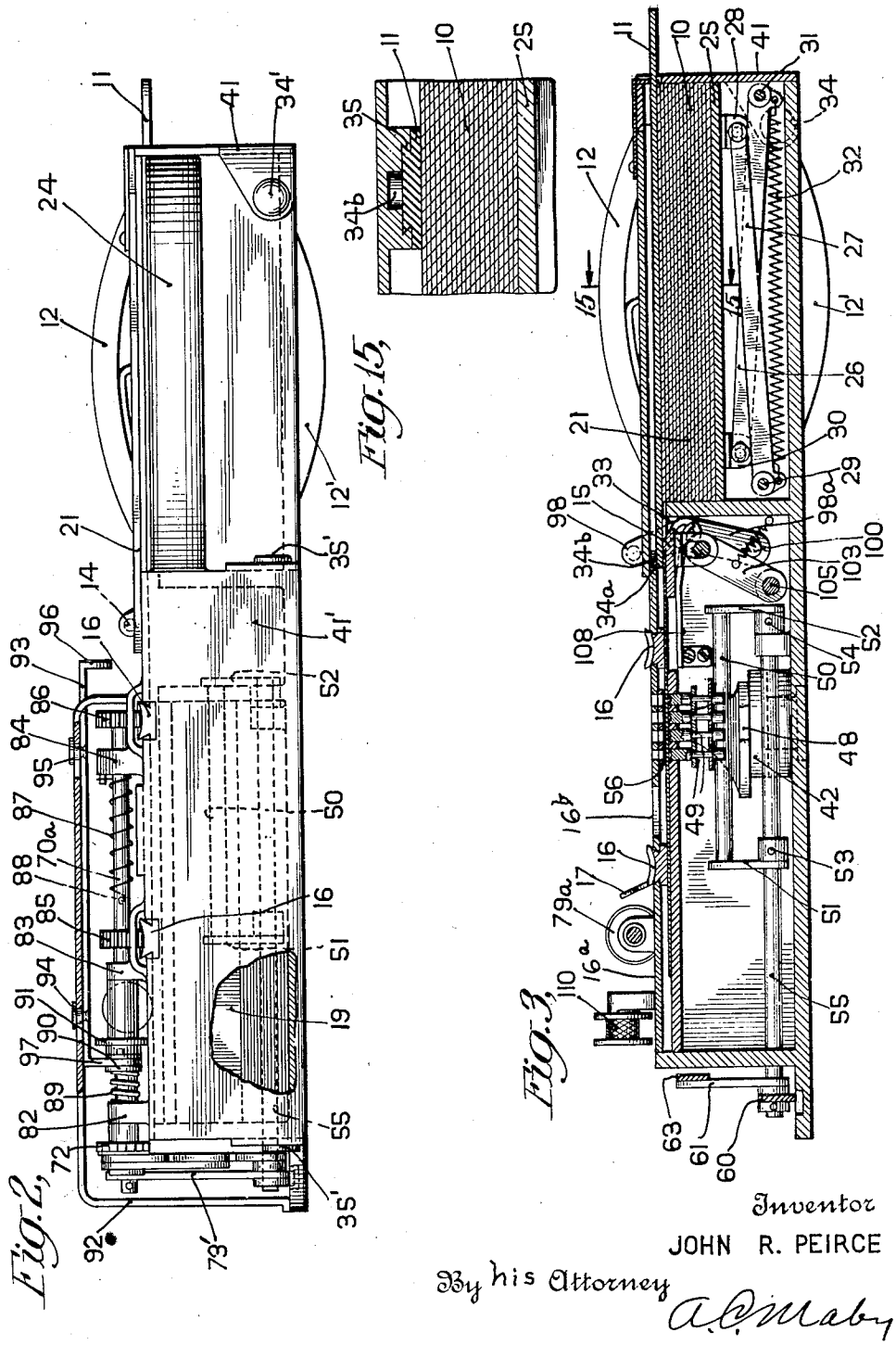


Fig. 2,

Fig. 15,

Fig. 3,

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PORTABLE PERFORATING AND PRINTING MACHINE

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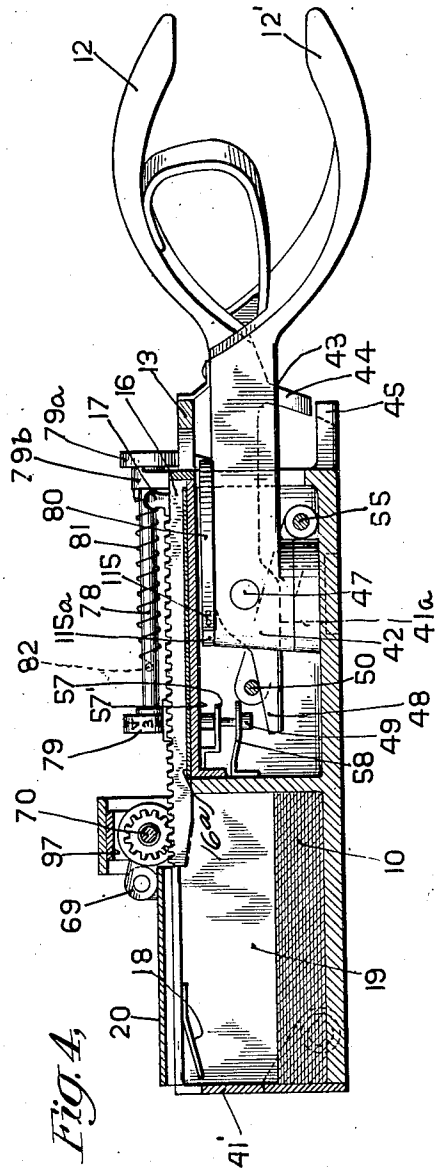


Fig. 4,

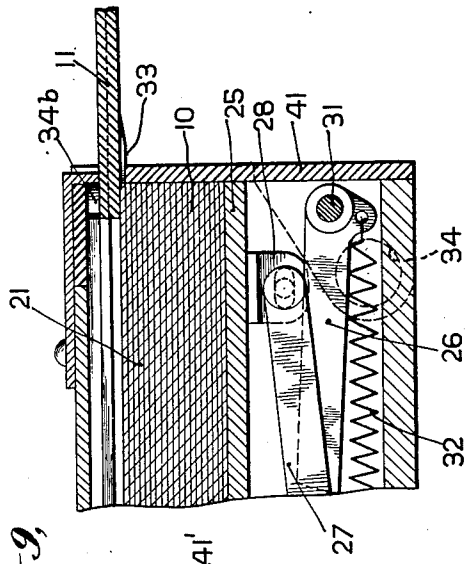


Fig. 9,

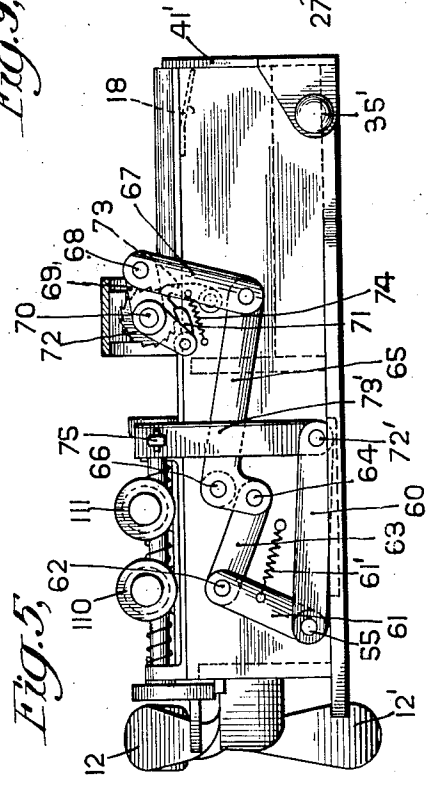


Fig. 5,

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PORTABLE PERFORATING AND PRINTING MACHINE

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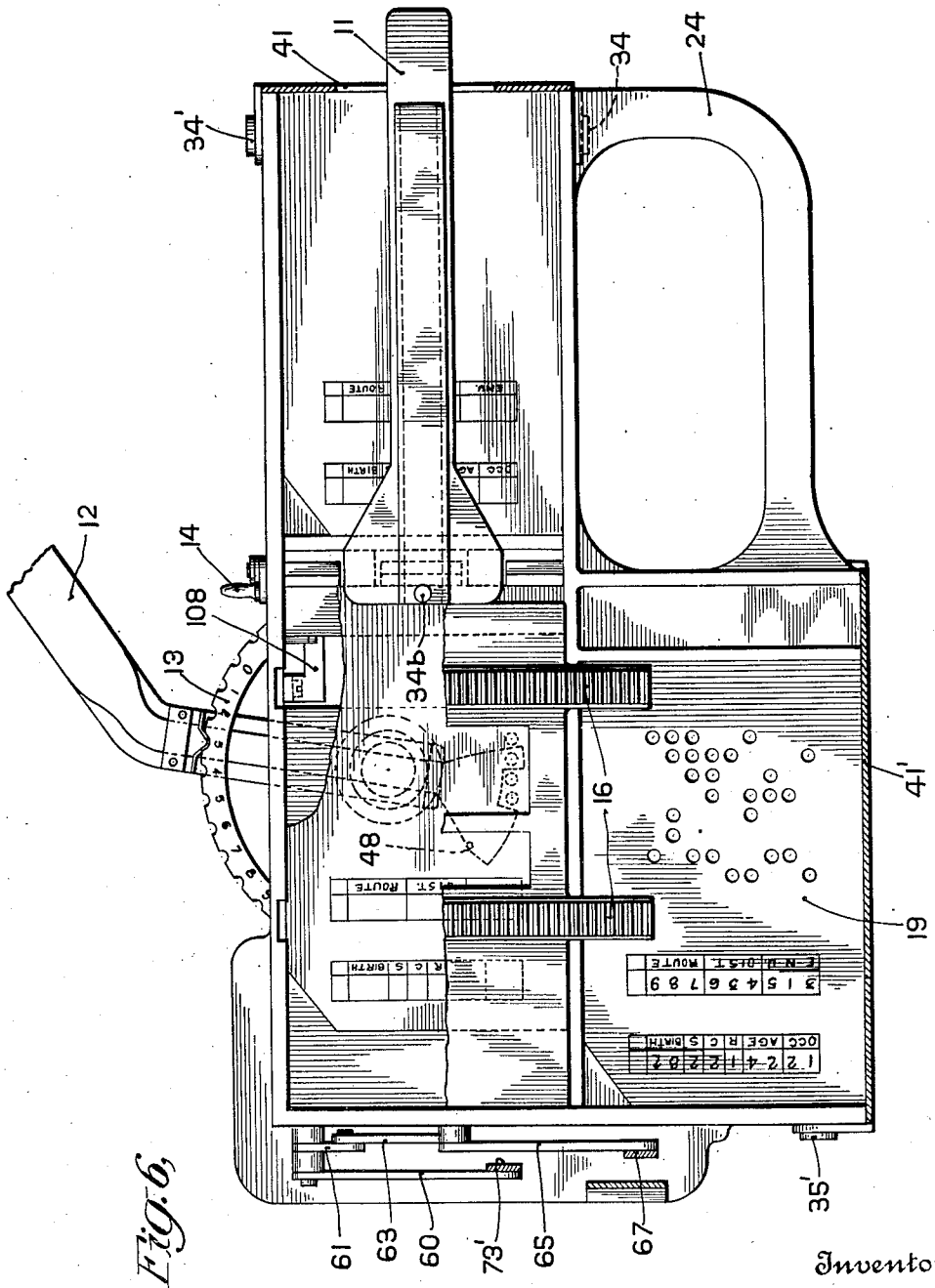


Fig. 6.

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PORTABLE PERFORATING AND PRINTING MACHINE

Filed April 26, 1927 6 Sheets-Sheet 5

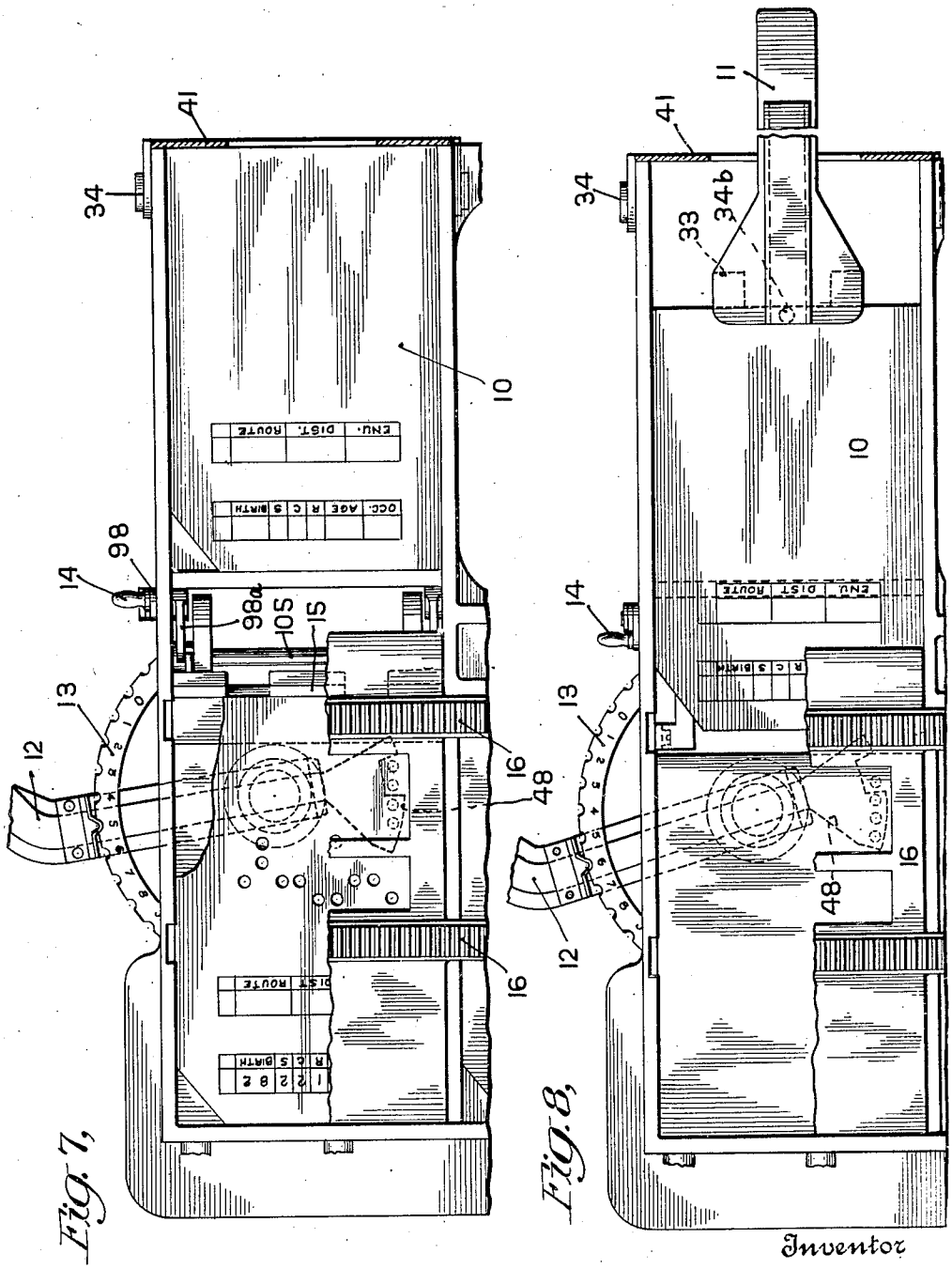


Fig. 7,

Fig. 8,

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PORTABLE PERFORATING AND PRINTING MACHINE

Filed April 26, 1927 6 Sheets-Sheet 6

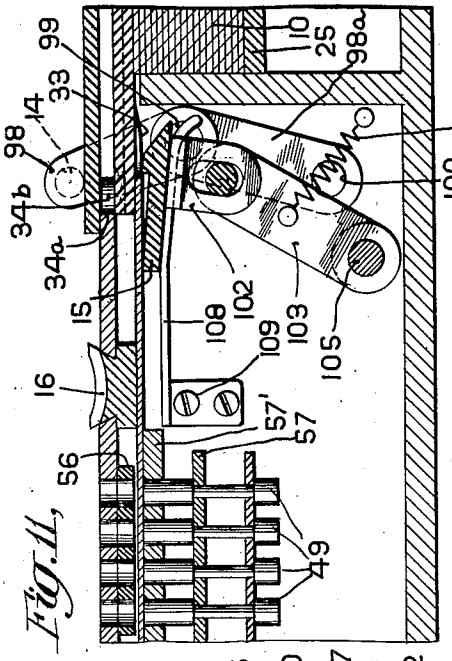


Fig. 11.

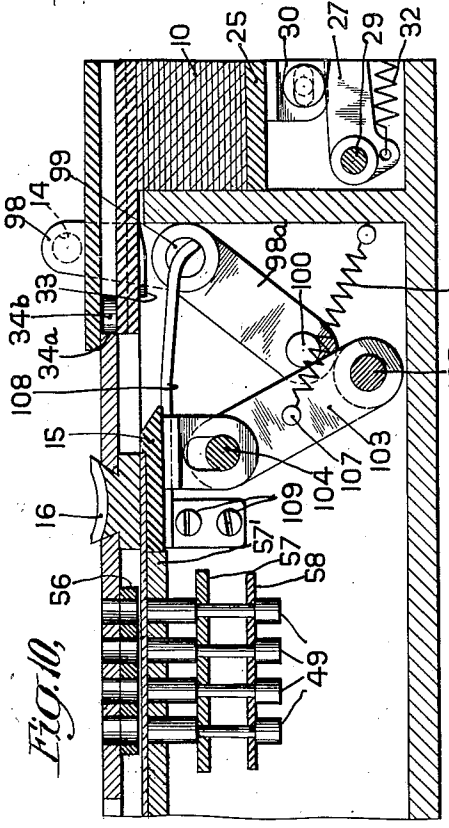


Fig. 10.

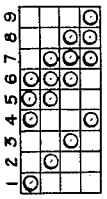


Fig. 14.

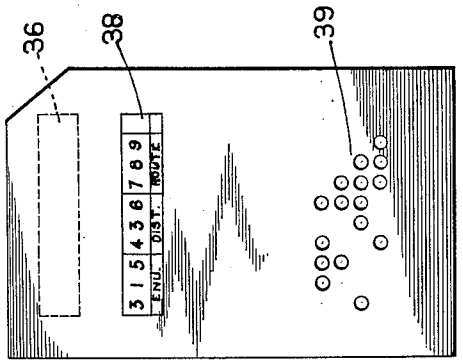


Fig. 13.

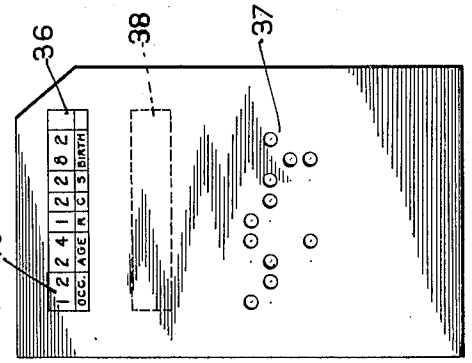


Fig. 12.

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Patented Sept. 9, 1930

1,775,172

UNITED STATES PATENT OFFICE

JOHN ROYDEN PEIRCE, OF NEW YORK, N. Y., ASSIGNOR TO INTERNATIONAL BUSINESS MACHINES CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

PORTABLE PERFORATING AND PRINTING MACHINE

Application filed April 26, 1927. Serial No. 186,622.

This invention relates to perforating machines and more particularly to record card perforating machines, the present embodiment being specifically adapted for producing record cards for use in connection with tabulating machines, cost accounting systems and other important work.

An object of my invention is to automatically feed and position record cards in perforating machines of the class disclosed to receive perforated and printed indicia.

Another object is to provide a hand punch in which cards are automatically removed from the perforating machine upon the completion of an operation and delivered to a receiving receptacle.

Another object is to provide an improved and easily manipulated portable hand punch and printing device.

Another object is to provide a perforating and printing device having a card supply magazine and card receiving receptacle, wherein the device is so compact that it may be carried in the coat pocket of the operator.

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 inspection of the drawings.

An understanding of the nature and purpose of the invention may best be derived from the following statement of a specific example of its use.

We will assume that a census is to be taken concerning certain data, such as age, race, color, etc., which data may be put into code form in order to utilize a record card for tabulating purposes. Each enumerator taking the census is given a punching and printing machine and he makes a house to house canvass of his territory. Upon receiving the desired information from each person interrogated, he punches and prints the information on a record card. After this operation he moves the punched card into another position in the machine to receive indicia pertaining to the enumerator's number, the district and route in which the census is taken. In other words, information is punched and printed in two different fields on the card.

The punching and printing machine is so constructed that the cards are fed from a supply magazine into the first punching and printing position, and by means of a crank cooperating with a card picker into the second punching and printing position. After the completion of the punching and printing operation in the second position on the card, the card is delivered into a receptacle provided on the machine. At the completion of the day's work the cards are taken out of the delivery receptacle and forwarded to the auditing department where they are held until the end of the census, at which time they are then fed through a tabulating machine for an accounting.

Heretofore it has been customary to take all of this information down by hand on a census form provided for same. Obviously, with this method, in order to utilize punched cards for means of an accounting, the cards had to be punched directly from the census sheets. This method is an expensive one and also consumes considerable time, whereas with my device a record card is perforated and printed as the original entry. So far as I am aware, no practical means has even been produced, or even proposed for the simultaneous printing and perforating of a record card as the original entry in census work.

This means I have succeeded in producing in a practical and efficient form, and in general the operation of my device is as follows:

A record card 10 is fed into the first punching and printing position as viewed in Fig. 6 by means of a slide rod 11. Assuming the card now in position to receive the first punching and printing information, the enumerator turns the handles 12 and 12¹ which are swivelly mounted on the machine, to the different positions shown on the indicator 13. As an example, should the person interrogated state his occupation as a painter, and the code for such an occupation is 12, the enumerator would swing the handles 12 and 12′ first into the notch 1, press the two handles together, resulting in a perforation being made on the card in the tenths column, and also of the simultaneous printing of the numeral 1 in the occupation column of the

printing section on the card. The handles are then turned to the position corresponding to the numeral 2 on the indicator 13 and are likewise pressed together, resulting in a perforation in the units column on the card and of the simultaneous printing of the numeral 2 in the occupation column of the printing section.

Referring now to Figures 12, 13 and 14, a detailed description of the meaning of the first and second punching and printing positions and also of the code will be disclosed.

Fig. 12 discloses a card bearing printed and perforated indicia in the first position, that is, the position to which the card has been fed by the slide rod 11.

Fig. 13 discloses a card with information printed and punched in the second position. While I have illustrated the results produced in the two positions on two separate cards, it will be understood that in actual practice all the information contained on these two cards is actually entered upon a single card.

It will be noted that the upper printing fields 36 and the upper perforated fields 37 bear indicia pertaining to the first punching and printing position. The lower printing field 38 and corresponding perforated information 39 bear information entered with the card in the second punching and printing position. As will also be noted in Fig. 12, the information to be recorded is punched in the upper punching field 37 and simultaneously printed in the upper printing field 36. The lower printing and punching fields 38 and 39 respectively, bear indicia pertaining to the enumerator, namely, his number, the district in which the census is being taken and also the route number.

Fig. 14 discloses the code heretofore mentioned and which may be used in connection with my printing and perforating machine. As previously described, the person interrogated stated his occupation as a painter, the code for such an occupation is 12. By referring to the code in Fig. 14 it will be noted that the punching device is so constructed that when the handles 12 and 12′ are moved to the punching positions, that in perforating the numeral 1, a perforation will be made in the upper or first space of the tenths column, the numeral 2 being perforated in the second space of the units column. Should it be desired to enter a number 6, holes will be punched in the three upper positions in the column in which the data is entered as shown in the units column of the sub-field designated "Dist." (Fig. 13). It is unnecessary for me to go into detail regarding the code as an inspection of Fig. 14 clearly discloses same.

Assuming that all the information desired in regard to the person being interrogated has been punched and printed on the record card in the first punching and printing position, the card is then returned by the racks 16 provided on the machine to its normal position, that is, the position to which it has been previously moved by the slide rod 11. A handle 14 through suitable linkage connected to a card picker when in the position shown in Fig. 11 aligns the picker so that it will grip the outer end of the card which is in the first punching and printing position. The handle is then turned to the position shown in Fig. 10 and the card is fed from the first punching and printing position shown in Fig. 6 to the second punching and printing position as viewed in Fig. 7. In the latter position the enumerator punches and prints information pertaining to his number, district, route, etc., as previously stated. The operation of punching and printing in this position is the same as that of the first punching and printing position.

Assuming now that the record card has had all the desired information punched and printed in both positions, and is now ready to be delivered to the delivery or receiving receptacle. This may be accomplished in either of two ways. First by successively pressing the handles 12 and 12′ together which will continue to feed the card step by step or by moving the handle 17 connected to one of the racks 16 to the left as viewed in Fig. 4. As soon as the racks start to protrude beyond the casing of the machine, the card is intercepted by a camming spring 18 which cams one end of the card down forcing it to drop into the delivery receptacle 19. The cards are later removed from the delivery receptacle by moving the end wall 41′ hinged at 35′ to the casing of the delivery receptacle in a downward direction.

An opening 16^b as disclosed in Figs. 1 and 3 may be provided in the top plate 16^a so that the card may be seen. The racks 16 are slidably mounted on the plate 16^a in the manner shown in Figs. 10 and 11.

The printing and spacing of the record card is accomplished through suitable linkage which will be hereinafter described.

For an understanding of the mechanism which is required for carrying out the operations above set forth, reference will be had to the accompanying drawings which illustrate the apparatus.

Fig. 1 is a plan view of my punching and perforating machine.

Fig. 2 is a side elevational view of the machine partly in section and showing the clutch arrangement for releasing the racks.

Fig. 3 is a sectional side elevational view taken on line 3—3 of Fig. 1.

Fig. 4 is a cross sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is an end view with a portion of the casing removed.

Fig. 6 is a plan view showing a card in the first punching and printing position and also

a completed card in the delivery receptacle.

Fig. 7 is a fragmentary view of a top plan view of the machine showing a card in the second position bearing punching and printing indicia.

Fig. 8 is a similar view of the machine showing a card being fed from the supply pocket into the first position to receive punched and printed information.

Fig. 9 is a sectional view showing the card picker, and means for holding the cards against same.

Figs. 10 and 11 are sectional views showing the card picker for feeding the card from the first to the second position; the section being shown here in different positions.

Figs. 12 and 13 are views showing the printing and punching in the first and second positions, respectively.

Fig. 14 discloses the code used in connection with my device.

Fig. 15 is a cross sectional view taken on line 15—15 of Fig. 3 disclosing the means for holding the card feeding rod in position.

The general plan of construction of my apparatus is illustrated in Figs. 1, 2 and 4. The device comprises a casing 20, a supply magazine 21, a punching and printing section 22, a discharging or delivery receptacle 19, and a carrying, or holding handle 24.

The supply magazine 21 comprises a card support 25 carried on parallel motion levers 26 and 27, (see Fig. 3). One end of lever 27 is pivoted to a depending lug 28 extending from the bottom of the support plate 25, and the other end of the lever is rotatably mounted on a shaft 29. Lever 26 is similarly pivoted to a depending lug 30 extending from the bottom of the support plate 25 and is also rotatably mounted at its other end upon a shaft 31. The above levers 26 and 27 are biased by a spring 32 to resiliently hold the cards 10 on the card support 25 in position to be moved by the picker 33. The picker 33, disclosed in Fig. 9, will be hereinafter described.

An end wall 41 (see Figs. 1 and 2) hinged to the supply magazine at 34 and 34′ is to enable the operator to insert the cards upon the card support 25 when the end wall is pulled down from the position shown in Fig. 2. A similar end wall 41′ is hinged at 35′ to the casing of the delivery receptacle 19 so that the cards may be removed from the delivery receptacle.

Referring now to Fig. 9. To feed a card to the first punching and printing position in the machine, the slide rod 11 is pulled from the position shown in Fig. 3 until the limit stud 34^b abuts the surface of the casing of the supply magazine as shown in Fig. 9. Carried by the forward end of the slide rod 11 is a card picker 33 which when in the position shown in Fig. 9 grips the outer edge of one of the cards 10. When the operator pushes the rod inwardly the card picker 33 grips the outer end of one of the cards and carries it along until the limit stud 34^b abuts the surface 34^a of the casing, thereby positioning the card in the first line position. In other words, when the slide rod 11 is pushed to the position shown in Fig. 3 a card is ready to receive perforated and printed indicia regarding the information to be recorded in the first punching and printing position.

Referring now to Fig. 15 the mounting of the slide rod 11 is disclosed. As will be noted, the slide rod is mounted in a dove tail shaped groove 35 in order that it may be held in proper sliding position.

The mounting of the handles 12 and 12′ is disclosed in Fig. 4. The handle 12′, as will be noted, is mounted on a swivel member 41^a, the forward end 42 of the handle 12′ being integral with the swivel. An opening 43 is provided in the handle 12′ so that the projection 44 on the upper handle 12 may slide through it. This projection 44 aligns itself with any one of several notches 45 provided in the base of the machine when the handles 12 and 12′ are pressed together, it being obvious that the projection 44 and the notches 45 are merely for the purpose of accurately aligning the punches and for preventing operation of the punch when it is not adjusted to an operative position. The handle 12′ is stationary, that is, there is no upward or downward movement of the handle. The handle 12 is mounted on a shaft 47 and carries a jaw 48 which strikes against the punches 49 when actuated by the handle 12.

The punches 49 are mounted in supporting plates 57 and 57′ and are adapted to be pressed into cooperation with the die plate 56 and are engaged at their lower ends by a spring member 58 cooperating with the collars on punches 49 for returning the punches from their upper to their lower or normal positions.

Prior to the jaw 48 engaging the punches 49 it will come in contact with a rod 50 (see Fig. 3) which rod is provided for spacing the record card 10, and also for actuating the printing mechanism. This rod has rigidly fixed to its ends links 51 and 52 respectively. These links are in turn pinned at 53 and 54 to a shaft 55; the link 52 being fixed to one end of the shaft 55. Fixed to the other end of the shaft 55 are arms 60 and 61. Pivoted at 62 to the arm 61 is another link 63 which in turn is pivoted at 64 to a bell crank 65. The bell crank is rotatably mounted on a shaft 66 and has pivoted at its other end a link 67. Pivoted at 68 to the link 67 is a member 69, loosely mounted on a shaft 70. Pivoted to the lowermost end of member 69 is a stepping pawl 71 spring pressed against the ratchet wheel 72. A retaining pawl 73, biased by a spring 74 is provided for holding the ratchet 72 to the position to which it

has been actuated by the stepping pawl 71. Each time the ratchet 72 is actuated by the stepping pawl 71 the record card 10 is spaced one column. Pivoted to the arm 60 at 72' is another arm 73' which is connected to an arm 74' by means of a pin and slot connection 75 (see Figs. 1 and 5). The arm 74' is in turn pivotally mounted at 76 and has journalled in its free end at 77 a shaft 78. Fixed to the end of the shaft 78 is a type wheel 79. When the jaw 48 comes in contact with the rod 50 the shaft 55 is rocked in a counterclockwise direction as viewed in Fig. 5. The movement of this shaft pulls the pawl 71 to the left as viewed in Fig. 5 to grip the next tooth of the ratchet 72. When the handles 12 and 12' are released spring 61' returns the linkage to normal position turning shaft 70 counterclockwise as viewed in Fig. 5. The purpose of the pin and slot connection at 75 is to provide slight play in order that the arm 73' may raise and lower the arm 74' about its pivot 76, thereby forcing the type wheel 79 against the card and thus printing a record.

The opposite end of shaft 78 is mounted in a floating bearing 79^b adapted to permit the shaft to rock up and down for printing. Also fixed to the shaft 78 is a wheel 79^a carrying a tape 80. This tape is connected at its other end to a quadrant 114 being fixed thereto at 115. The quadrant in turn is fixed to the handle 12' at 115^a. When the handles 12 and 12' are in normal position as viewed in Fig. 1 the jaw 48 will be in inoperative position with respect to the punches 49, the type wheel 79 will likewise be in a position presenting no type for printing. The movement of the handles to this position from the position shown in Fig. 6 will through the tape 80 rotate shaft 78 tensioning the spring 81. The spring 81 is fixed to the shaft 78 at 82 and at its other end to the bushing 79^b. Movement of the handles 12 and 12' from the position viewed in Fig. 1 to that of Fig. 6 will through the spring 81 rotate the shaft 78 and the type wheel 79 until the numeral 5 on the type wheel is in position to print on the card.

The shaft 70 is journalled in a bracket 82 and is coupled through clutch member 90 to a second shaft 70^a journalled in brackets 83 and 84. Fixed to the left end of the shaft 70, as viewed in Figs. 1 and 2, is the ratchet wheel 72 for actuating the racks 16 to space the card. The linkage through which this function is caused has heretofore been described. Rigidly fixed on the shaft 70^a are two pinion gears 85 and 86 which mesh with the racks 16. A spring 87, connected at one end to the shaft 70^a and at its other end to the bracket 84, winds about the shaft as the racks 16 advance. Loosely mounted on the shaft 70, between the bracket 82 and the clutch member 90, is another spiral spring 89 which cooperates with the clutch member 90. Adjacent to the clutch member 90 on shaft 70^a and rigidly fixed thereto is a clutch collar 91. When the clutch 90 is in engagement with the clutch collar 91, as viewed in Fig. 2, the rotation of the shaft 70 through ratchet 72 causes a tension to be put on the spring 87. The purpose of the spring 87 will be hereinafter described.

Referring particularly to Fig. 4 it will be seen that each of the racks 16 have undercut portions 16^a which are adapted to receive the record card. As the racks 16 are stepped by their related gears 85 they shift the record card laterally to permit punching and printing in the different card columns. As will be obvious from the description to follow the racks 16 feed the card for column printing and punching when either field of the card is in registration with the punches and type carriers. In addition, continuous stepping of the racks by lever 17, or what amounts to the same thing, by successive operations of handles 12 and 12', will feed the card until it is in registration with the receiving receptacle 19 (Fig. 4) in which the card will fall.

Presuming that a card has all the information punched and printed thereon pertaining to the first punching and printing position and the operator desires to return the racks 16 to their normal positions as viewed in Fig. 1. A slide rod 93, mounted on a support 92 fixed to the frame of the machine is provided for same. When the slide rod 93 is pushed inwardly, the clutch 90 will become disengaged allowing the racks 16 to return to their normal position under the tension of spring 87. Means for tensioning this spring has been clearly described in the above paragraph.

The spiral spring 89, previously mentioned, is provided for engaging the clutch 90 with its cooperating clutch collar 91 when the slide rod 93 is released. This slide rod is mounted in the support 92 by means of two studs 94 and 95 which slide in grooves provided for same. Fixed at the free end of the slide rod is a handle 96 and at the other end is a vertical member 97 integral with the rod 93 which member throws the clutch 90 out of engagement with its clutch collar 91 when the handle 96 is pushed inwardly.

Reference will now be had to Figs. 10 and 11 for a detailed description of the method provided for moving the card from the first punching and printing position to the second punching and printing position, shown in Fig. 7.

After the enumerator completes the perforating and printing of the information in the first position, he pushes the slide rod 93 inwardly disengaging clutch 90, thereby allowing the racks 16 to return to normal position, under the tension of the spring 87 previously described. As soon as the racks have

been returned to their normal position, the card is then ready to be stepped or moved to its second punching and printing position as shown in Fig. 7. A card picker 15 provided for this purpose will now be described. This card picker is fixed to a slotted member 102 which member is in turn connected to a link 103 by a pin and slot connection 104. The lower end of link 103 is pivotally mounted at 105. A handle 14 fixed to an arm 98 is pivoted at 99 to the machine, and has a lower extension 98a. Fixed at the lowermost end of the arm 98a is a stud 100 which abuts the edge of the link 103 when the handle 14 is turned to the right, as viewed in Fig. 10 causing the card to be fed into the second position. A spring 106 fixed at 107 to the link 103, and to the frame of the device at its other end, returns the picker 15 to the position shown in Fig. 11, when the handle 14 is released after the card has been positioned. A support, or guide 108, fixed to the frame of the device at 109 is provided for guiding the picker 15. As will be noted, this guide, or support is slightly curved downward at its free end and as the picker 15 begins to advance through the medium of the stud 100 and the slot and pin connection 104 the picker 15, due to the curvature of the support or guide 108, will grip the card and when the bail 98 is moved to the position shown in Fig. 10 will carry the card into the second punching and printing position. Also if desired a spring may be employed to raise the picker 15 to gripping position.

Reference will now be had to Fig. 1 which discloses the ribbon feeding device used in conjunction with type wheel 79. The method utilized is well known, and simply comprises two spools 110 and 111, mounted in a well known manner. The ribbon consists of a double layer type and is manually wound and unwound upon the spools. A ribbon guide 112, fixed to the casing of the machine, is provided for guiding the ribbon beneath the type wheel. While it is obvious that automatic ribbon feeding means may be employed, I have omitted same in order to avoid making the machine too large.

While I have shown, 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 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 perforating device, a perforating section, means for perforating a card, means for feeding a card step by step in respect to the perforating means, means for automatically returning the card to its initial position in the perforating section, and additional means for shifting the card while in a perforating position for perforating in a different field.

2. In a perforating device, including punches and a printing element, a single manipulative means for selectively actuating said punches, means controlled by said manipulative means for positioning said printing element and means brought into operation by the manipulative means for actuating the printing element to print upon the card.

3. In a record perforating device, means for perforating a record, means for feeding a record step by step in respect to the perforating means, means for returning the record to its initial position in the perforating section, said means being rendered operative by the operation of said feeding means, means for normally locking said returning means against operation and means for releasing said returning means for operation.

4. In a perforating device, including punches and a printing element, a single manipulative means for selectively actuating said punches, means controlled by said manipulative means for positioning said printing element and means brought into operation by said manipulative means for pressing the printing element against a record to print thereon.

5. In a perforating device, including punches and a printing element, a single manipulative means for selectively actuating said punches and printing element, means controlled by said selective means for positioning said printing element, and means for returning said printing element to inoperative position by said selective means.

6. In a perforating machine having a plurality of punching elements, a card picker for feeding the cards to the pnching elements, a guide for said picker, said guide being curved downwardly at one end to permit the card picker to be moved into cooperation with the card, and means for actuating said card picker to its normal or starting position.

7. In a perforating machine, a plurality of racks for shifting a record card, a plurality of punching elements, means for actuating said punching elements, means brought into operation by said first named means for advancing the racks, and means actuated by said racks for storing energy for subsequently returning the racks.

8. In a perforating machine, a plurality of racks for shifting a record card, a plurality of punching elements, means for actuating said punching elements, means brought into operation by said first named means for advancing the racks, means actuated by said racks for storing energy for subsequently re-

turning the racks, means for normally preventing operation of said energy storing device and means for rendering said device operative to restore the racks.

9. In a perforating machine, a card carriage, a plurality of punching elements, means for actuating said punching elements, means brought into operation by said first named means for advancing the card carriage and means actuated by the card carriage for storing energy to subsequently return the card carriage to its normal position.

10. In a record producing device, a plurality of punches, a type wheel having type characters thereon, a lever for selecting different combinations of punches for each position of the lever, said lever being adapted to turn said type wheel to selectively position said type characters for a printing operation and means for operating said punches and printing characters.

11. In a record producing device, means for perforating a record, a type wheel having type characters thereon, a single manipulative means for actuating said perforating means for punching a record at a predetermined point, said actuating means being adapted to rotate said type wheel to successively bring said type characters into operative position and for causing said characters to be depressed to print upon the record.

12. In a portable perforating machine having punching and printing elements, a single manipulative means for punching and printing data upon a record in predetermined horizontal fields, and means for shifting a record for punching and printing in additional horizontal fields.

13. In a card perforating device, a perforating station, a card supply station, and a card discharge station, manually operated means for feeding a card from the supply station to the perforating station, manually operated means including a lever for perforating and shifting a card for column perforating operations, and supplemental manual means for feeding a card from the perforating station to the discharge station.

14. In a card perforating and printing device, a combined perforating and printing station, a card supply station and a discharge station, manually operated means for feeding a card from the supply station to the combined perforating and printing station, manually operated means including an adjustable lever for perforating and printing upon a card and for shifting said card for column perforating and printing operations, and supplemental manually operated means for feeding said card to the discharge station.

In testimony whereof I hereto affix my signature.

JOHN ROYDEN PEIRCE.