

Nov. 16, 1937.

E. G. RIX

2,099,230

PERFORATING MACHINE.

Filed Feb. 15, 1936

7 Sheets-Sheet 1

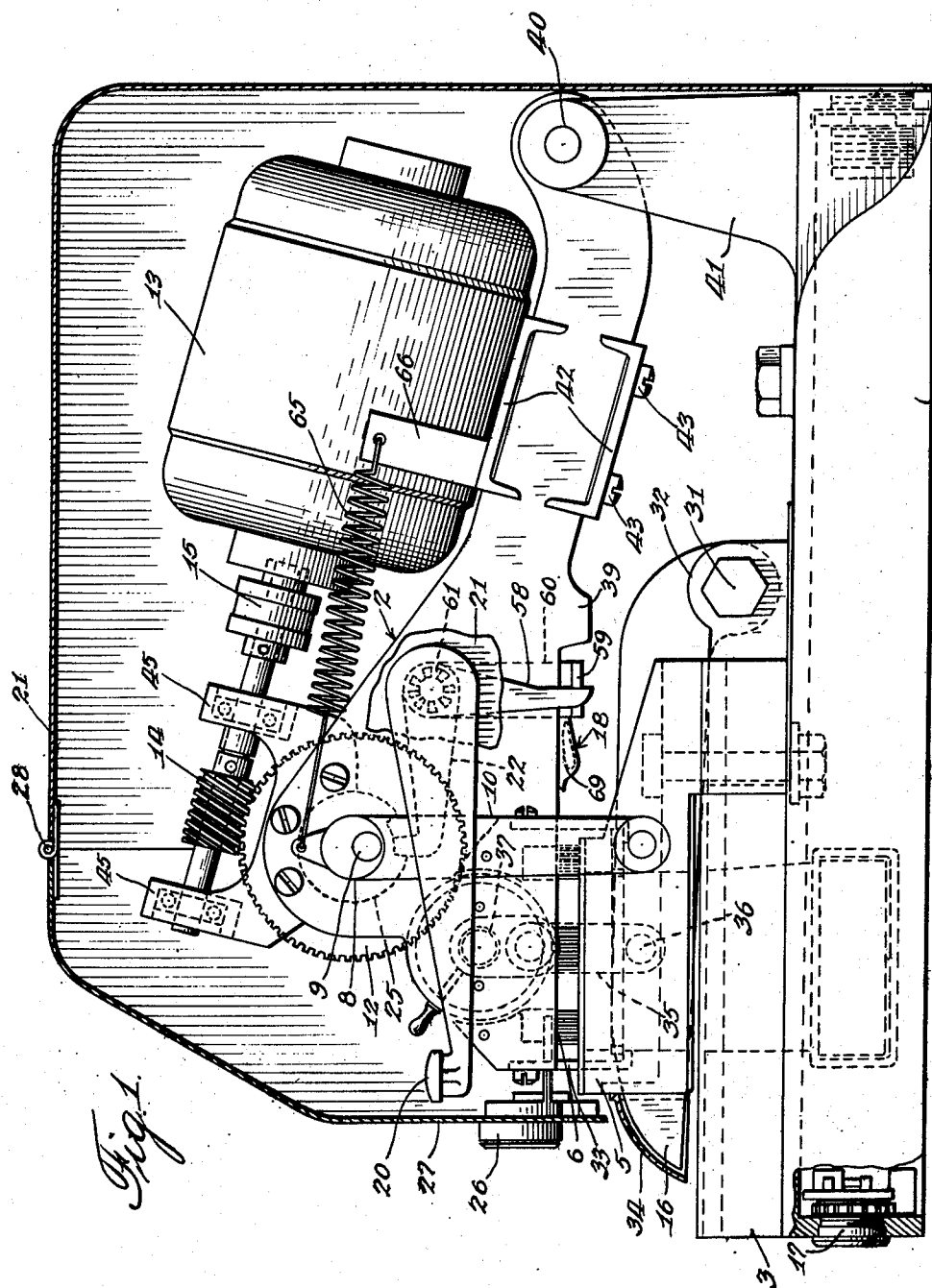


Fig. 1.

Inventor:
Edward S. Rix.
By: Jms. Addington, Atty. & S. J. Schildt.
CHAS.

Nov. 16, 1937.

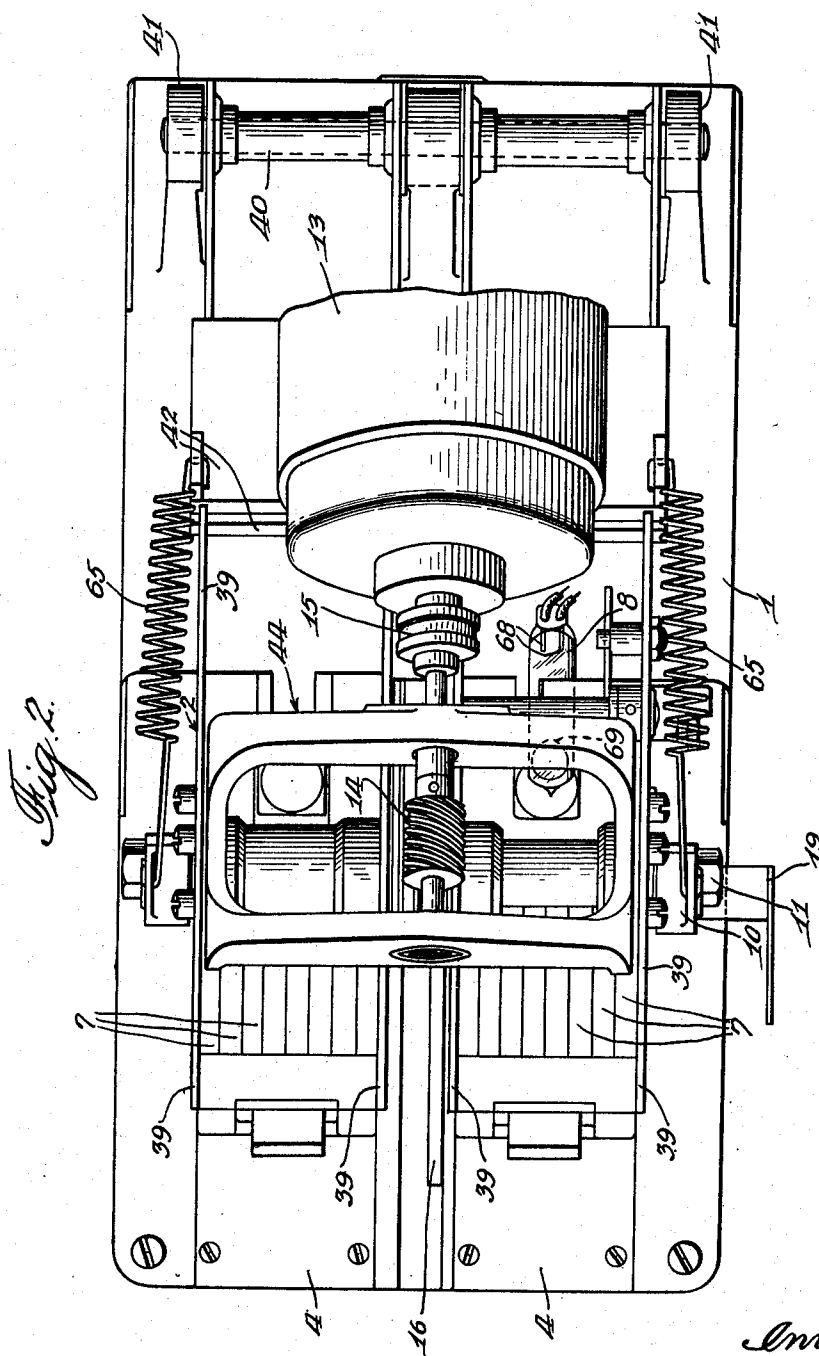
E. G. RIX

2,099,230

PERFORATING MACHINE

Filed Feb. 15, 1936

7 Sheets-Sheet 2



Inventor:
Edward G. Rix.
By Jms. Addington, Atty & Schell.
Attys.

Nov. 16, 1937.

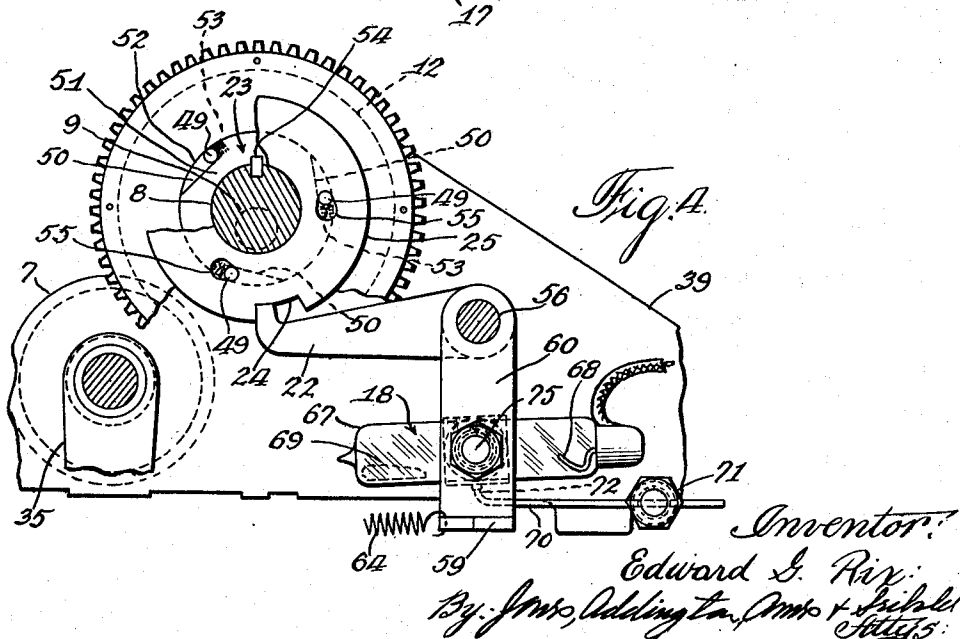
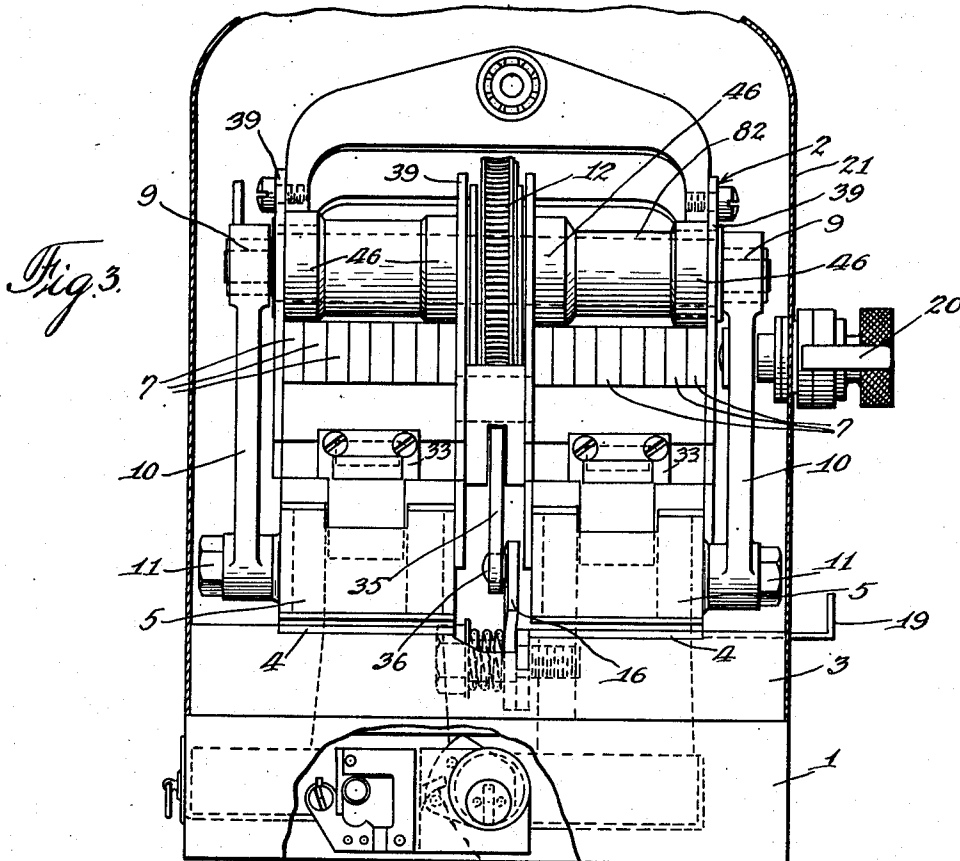
E. G. RIX

2,099,230

PERFORATING MACHINE

Filed Feb. 15, 1936

7 Sheets-Sheet 3



Inventor:
Edward S. Rix
By: J. M. Addington, Atty. & Counsel

Nov. 16, 1937.

E. G. RIX

2,099,230

PERFORATING MACHINE

Filed Feb. 15, 1936

7 Sheets-Sheet 4

Fig. 5.

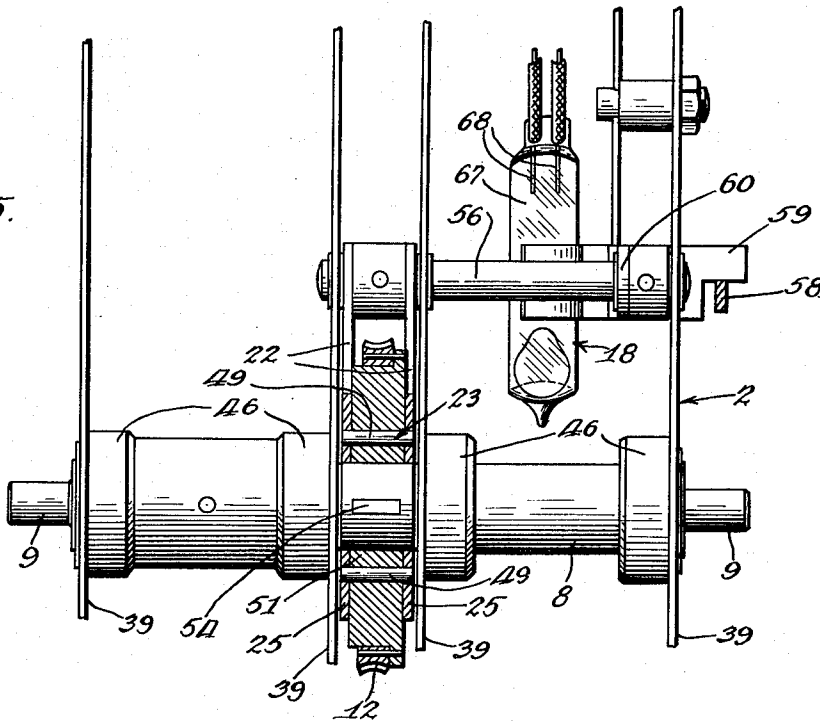
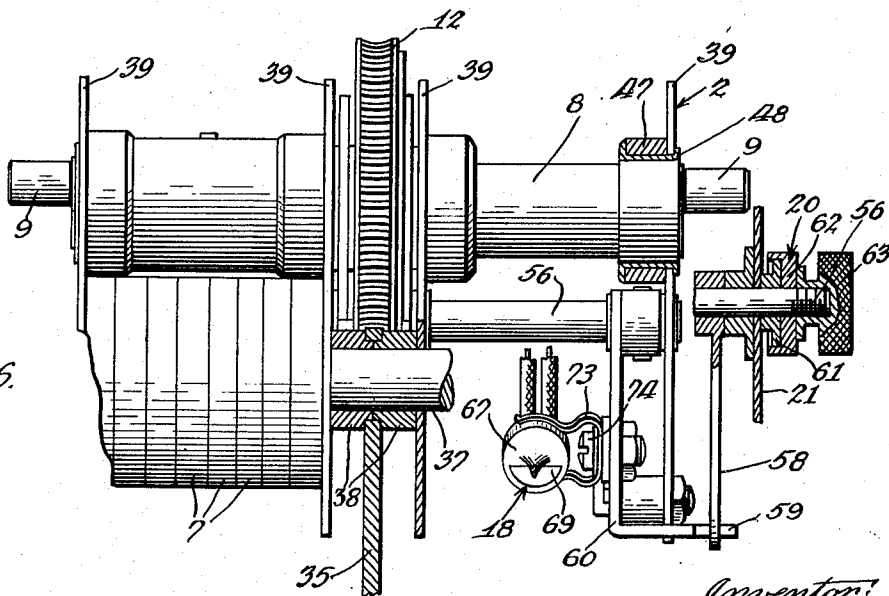


Fig. 6.



Inventor:
Edward S. Rix
By: J. M. Addington, Attorney

Nov. 16, 1937.

E. G. RIX

2,099,230

PERFORATING MACHINE.

Filed Feb. 15, 1936

7 Sheets-Sheet 5

Fig. 7.

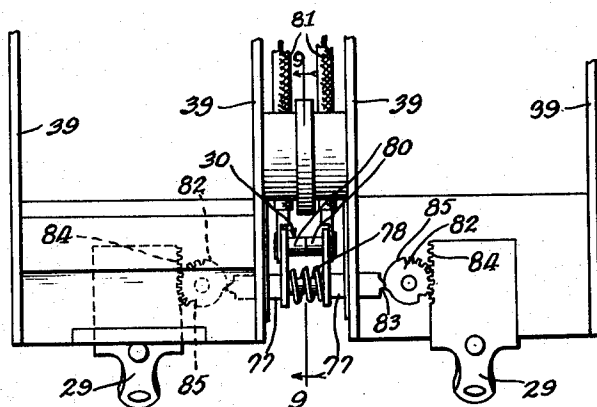


Fig. 8.

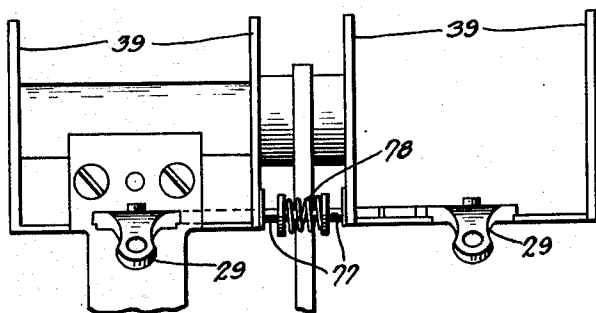
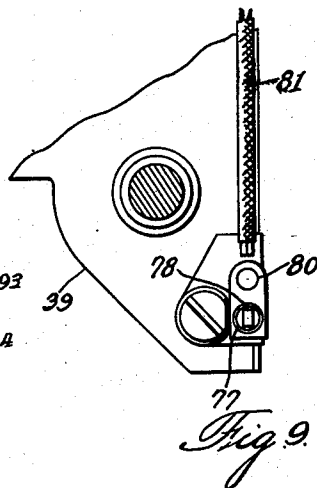
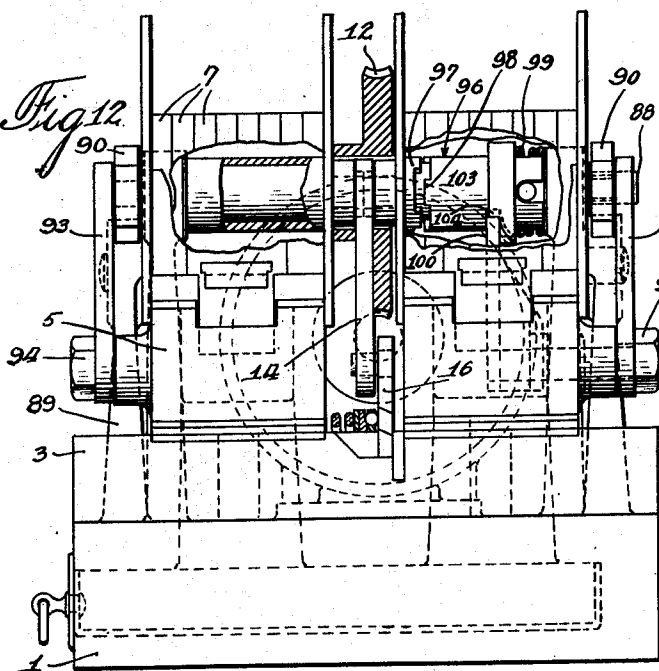


Fig. 12.



Inventor:
Edward G. Rix.
By: J. M. R. Adkins, Jr.,
Attorney & Counselor at Law.

Nov. 16, 1937.

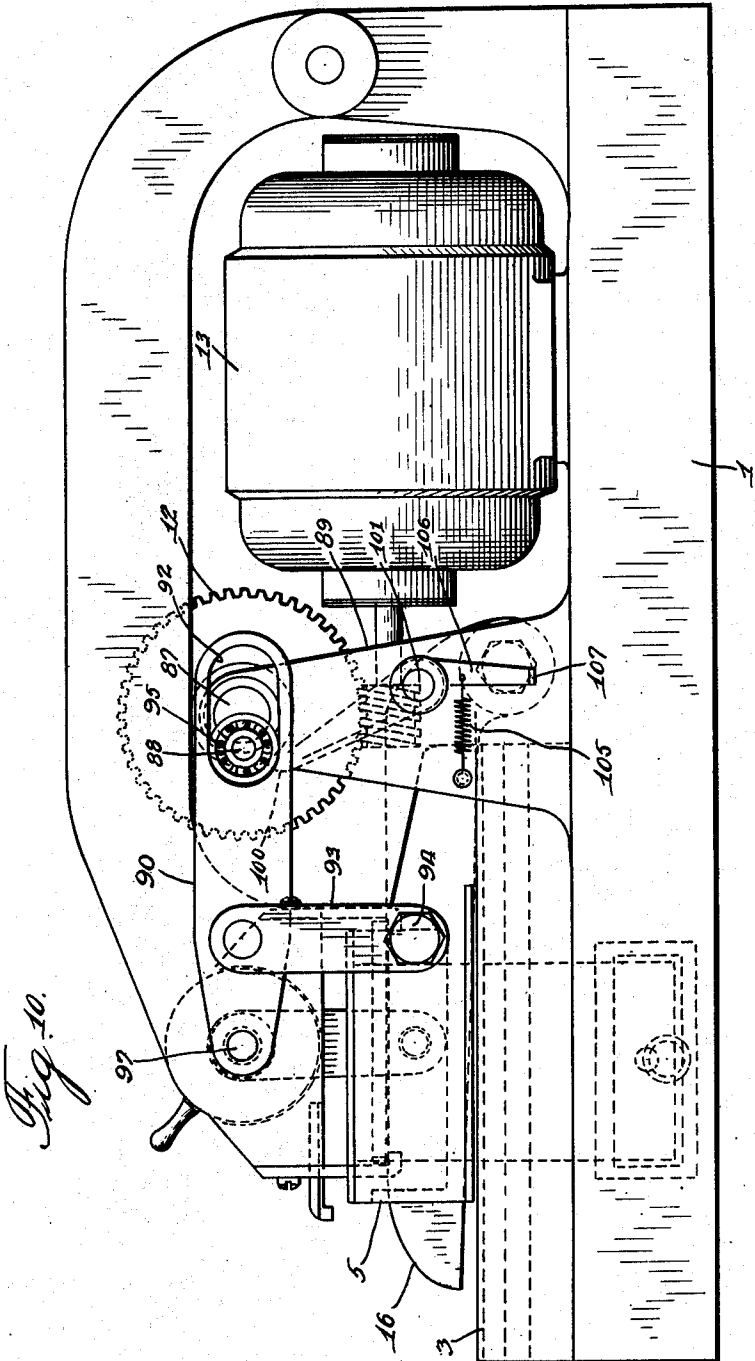
E. G. RIX

2,099,230

PERFORATING MACHINE

Filed Feb. 15, 1936

7 Sheets-Sheet 6



Inventor:
Edward E. Rix
By: John A. Addington, Attorney
Atty.

Nov. 16, 1937.

E. G. RIX

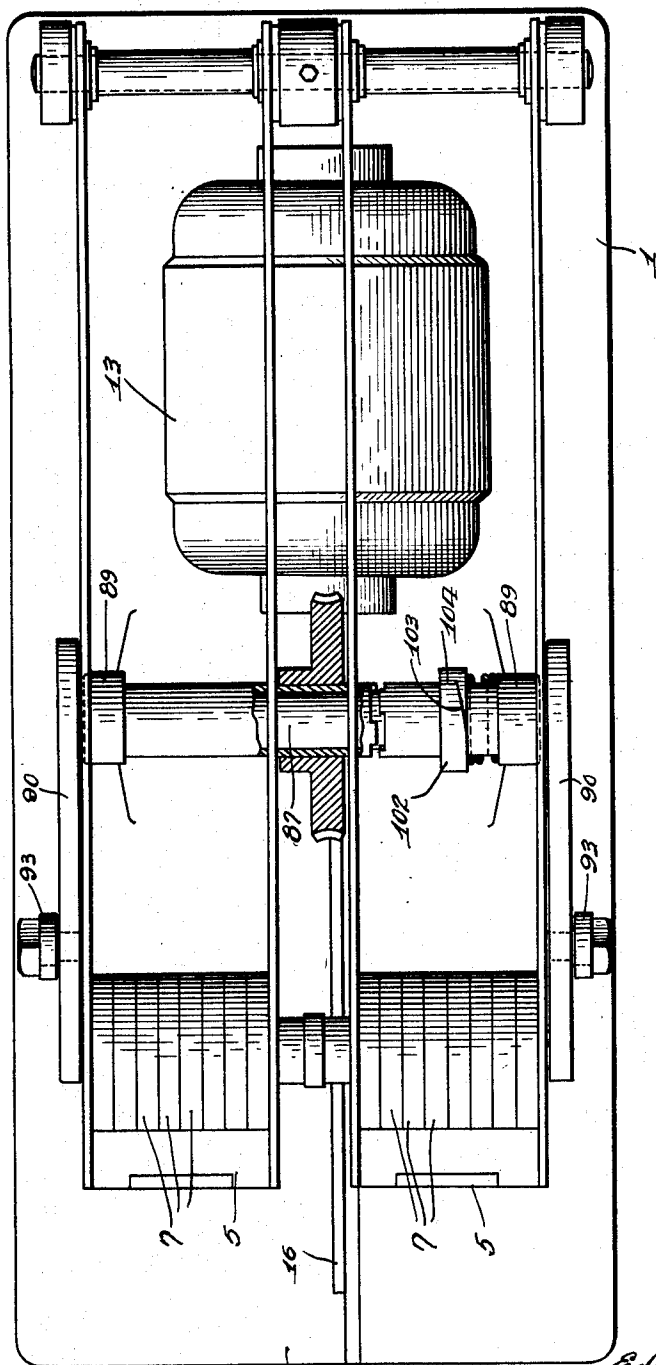
2,099,230

PERFORATING MACHINE

Filed Feb. 15, 1936

7 Sheets-Sheet 7

Fig. 11.



Inventor:
Edward G. Rix:
By: J. M. Addington, Atty. & S. H. L. L.
Attys.

UNITED STATES PATENT OFFICE

2,099,230

PERFORATING MACHINE

Edward G. Rix, Chicago, Ill., assignor to American Perforator Company, Chicago, Ill., a corporation of Illinois

Application February 15, 1936, Serial No. 64,116

16 Claims. (Cl. 101—26)

My invention relates to a perforating machine.

One of the objects of my invention is to provide an improved power driven perforating machine which will avoid the use of a powerful continuously running motor, a heavy flywheel, and the foot-operated dog clutch construction at present commonly employed.

A further object of my invention is to provide such a construction in which the electric motor is mounted on the oscillatable perforator head, thereby simplifying the transmission.

A further object of my invention is to provide such a construction in which the up-and-down movement of the perforator head is effected by the use of a crank shaft mounted on the perforator head, having a crank at each end so as to equalize the pull on both sides of the head.

A further object is to provide a construction as indicated above, in which two sets of spaced punches are used and in which a knife is provided for severing the two perforated portions of the sheet.

A further object of my invention is to provide an electric perforator in which operator-controlled means are provided for releasing the perforator head for movement, placing the motor in driving relation with respect to the perforator head and closing the motor circuit prior to the punching operation and in which automatic means are provided for disconnecting the motor from driving relation with respect to the perforator head, stopping the perforator head in a definite position and opening the motor circuit subsequent to the punching operation.

A further object of my invention is to provide a perforator in which the perforator head is operated by a crank shaft and link mechanism and in which the lower end of the link is so secured as not to interfere with the insertion of the paper.

A further object of my invention is to provide a perforating and cutting machine in which the die shoe, punch holders, and knife are mounted as a removable unit.

A further object of my invention is to provide improved means for preventing operation of the machine by means of a key-controlled switch.

A further object of my invention is to provide an improved perforator entirely enclosed and having a door provided with a lock to prevent changing of the punch controlling wheels and the removal of selector keys.

A further object of my invention is to provide an electric perforator in which the operating handle is mounted on a removable cover.

A further object is to provide an improved perforator in which the handle mounted on the enclosure can be readily adjusted to any desired position.

Further objects and advantages of the invention will appear from the description and claims.

In the drawings, in which two embodiments of my invention are shown,

Figure 1 is a side elevational view of a power-driven perforating machine, part of the casing being broken away;

Fig. 2 is a plan view with the casing removed;

Fig. 3 is a front view with part of the casing removed;

Fig. 4 is a side elevational view of the clutch, switch, and associated parts, portions being shown in section;

Fig. 5 is a plan view of the construction of Fig. 4, parts being broken away;

Fig. 6 is a front view of the construction of Figs. 4 and 5, parts being broken away;

Fig. 7 is a plan view showing the tellers' plugs and associated parts;

Fig. 8 is a side elevation of part of the construction of Figs. 7 and 9;

Fig. 9 is a partial section taken on line 9—9 of Fig. 7;

Fig. 10 is a side elevational view showing another form of perforator with the casing removed;

Fig. 11 is a plan view of parts of the construction shown in Fig. 10; and

Fig. 12 is a front view of the construction of Figs. 10 and 11, parts being broken away.

Referring to the drawings in detail, and first to Figs. 1 to 9 inclusive, the construction shown comprises a base 1, a perforator head or frame 2 oscillatably mounted thereon, a die shoe 3 secured to the base, a pair of die plates 4 secured to the die shoe, a pair of spaced punch holders 5 mounted above the die plates 4, respectively, two sets of punches 6 (one set for each punch holder 5), means for operating selected punches comprising two sets of coaxial, rotatably adjustable punch-selecting and actuating rings 7 mounted on the perforator head or frame, a crank shaft 8 also rotatably mounted on said frame with its axis parallel to the axis of the rings 7, a pair of cranks 9 (one at each end of said crank shaft), a pair of links 10, each having one end connected with one of said cranks 9 and its other end connected to a fixed pivot member 11, a worm gear 12 through which said crank shaft extends, a motor 13 mounted on the oscillatable frame 2, a worm 14 on the motor shaft 15, meshing with

said worm-gear 12, a pivoted knife or shearing blade 16 for automatically severing the stub from the receipt at the time of the punching operation, operator-controlled means for closing the motor circuit, releasing the crank shaft 8 for rotation and placing the motor in driving relation with respect to the crank shaft prior to the punching and cutting operation, and automatic means for stopping the crank shaft 8 in a definite position, disconnecting the motor from driving relation with respect to the crank shaft and opening the motor circuit subsequent to the punching and cutting operation.

Before describing the construction in further detail, I will briefly outline the operation.

The apparatus may be used for receipting bills, one portion of which bill is to be returned to the customer as a receipt and the other stub portion of which is to be retained by the company. In order to place the apparatus in operative condition, the key-controlled switch 17 is operated to close one of the switches for the motor circuit. The motor circuit, however, is not yet complete as there is an operator-controlled switch 18 in series with the key-controlled switch 17. When a bill is to be receipted, it is inserted in the space between the die plates 4 and the punch holders 5, the edges of the bill being brought up against the positioning guide 19 to insure correct positioning. The operator then presses down on the operating handle or lever 20 carried by the casing 21, which releases a pair of latches 22 which have been holding the crank shaft 8 in a definite position, allows a roller clutch 23 to engage between the motor 13 and the crank shaft 8, and closes the switch 18 to complete the motor circuit. This starts the motor which operates to rotate the crank shaft a single revolution through the worm 14 on the motor shaft and the worm gear 12 on the crank shaft 8. The construction is such that a single depression of the operator's lever 20 will cause a single rotation of the crank shaft 8. The crank shaft 8, in this complete rotation, will cause a complete up-and-down oscillatory movement of the perforator head 2 because of the connection of the cranks 9 with the links 10. When the crank shaft has about completed its revolution, the pivoted clutch releasing and latching members 22 will drop into notches 24 in the clutch-controlling rings 25 which will cause a release of the motor 13 from driving relation with respect to the crank shaft 8 and will stop the crank shaft in a definite position. This dropping in of the latch members 22 into the notches 24 also acts to open the motor switch 18 so that the motor will stop shortly after the stopping of the crank shaft.

To obtain access to the working parts of the apparatus, it is only necessary to unlock the lock 26 on the door 27 at the front end of the casing 60 and swing this door upwardly about its hinge 28.

There are in general two different conditions in which this apparatus may be used. Under one condition, there may be a number of assistant cashiers or tellers, all using the same machine under the supervision of a manager or head cashier. Under the other condition, there is no head cashier but a number of cashiers or tellers, each having the same responsibility.

In the system in which there is no head cashier, but a number of cashiers or tellers, each having the same responsibility, each of the cashiers or tellers will have a key for operating the lock switch 17 for the motor circuit, a key for opening the cover or door 27 which exposes the dating wheels, and a pair of "tellers' plugs" 29 (Figs. 7,

8, and 9). These "tellers' plugs" have two functions,—one to cause the sheet to be perforated with the particular teller's number and the other to provide an additional control for the motor circuit. These plugs control a contact device 30 which is in series with the key-controlled motor switch. When both of these plugs 29 are in, this contact device is closed to place the motor circuit in operative condition.

With this system and with this construction, it will be seen that each of the tellers can limit her responsibility by removing her own "tellers' plugs", which will place the machine in inoperative condition. If another teller should want to use the machine, she would have to insert her own individual "tellers' plugs" with her own number on them, thus making her responsible for any operations performed while these plugs are in the machine.

In the system in which there is no head cashier, it is desirable that the removal of the "tellers' plugs" should disable the machine, as otherwise a dishonest cashier might operate the machine to receipt a bill, leaving no clue as to who operated the machine. With this system, the circuit may be opened and closed at three points. One point is that controlled by the key-controlled switch 17; the second point is that controlled by the "tellers' plugs" 29, and the third is that controlled by the depression of the control lever 20.

In the system in which there is one head cashier and a number of assistant cashiers or tellers, the head cashier will be the only one who has a key for the hinged cover 27 which exposes the dating wheels 7. In this system, it will not be necessary for the "tellers' plugs" to have any circuit-controlling function, since the assistant cashiers or tellers cannot have access to the interior of the case. In this system, when there is a change in tellers, the head cashier will have to unlock the cover 27, remove the "tellers' plugs" of the teller who is being relieved, insert the plugs of the relieving teller, and lock the cover again.

The head cashier controls the door 27 through which access is had to the "tellers' plugs" and the dating wheels. This door is to be locked at all times so that the teller will not have access to the dating wheels or her "tellers' plugs". If a teller had a key to this door, she might remove her keys or set the dates back to the discount date and control of the machine would be lost. However, as the head cashier has possession of this key at all times everyone's responsibility may be fixed. This is the practice in larger offices where a head cashier always controls the setting of the dates and the "tellers' plugs".

The practice for smaller offices, where no cashier in particular is considered responsible for the other's receipts, is to control the machine so that the machine will not operate until the "tellers' plugs" are inserted into the machine. This gives complete control because when the "tellers' plugs" are out of the machine, the machine cannot be operated. The "tellers' plugs" always register the operator's number and this being the case, whenever a bill is receipted, the bookkeeping department will always know who is responsible for the receipting of the bill.

Referring to the construction more in detail, the shearing knife 16 is pivotally mounted at 31 on a rearward extension 32 of the die shoe 3, and the punch holders 5 are rigidly secured to the die shoe so that the sub-assembly of die shoe, dies, punch holders, punches, and knife may be readily removed as a unit, simply by removing 75

the front lifter plates 33 from the perforator head, disconnecting the links 10 from the punch holders and removing the screws which secure the die shoe to the base. In order to prevent possible injury to the operator from the front end of the knife when the cover is removed, a housing 34 is provided which extends over the front end of the knife 16 and is mounted on the punch holders 5.

The knife 16 is operated by means of a link 35 pivotally secured at 36 to the knife and having its upper end pivotally secured with respect to the shaft 37 on which the arbors for the punch-controlling rings 7 are mounted, as shown in Fig. 6. In order to hold the parts in their proper relation, this pivotal connection is effected by means of a pair of spacer rings 38 surrounding the arbor shaft 37 and having reduced portions extending into the opening in the upper end of the knife operating link 35. The two spacer rings 38 are identical in design.

The rotatable punch-selecting and operating rings 7, the arbors on which they are mounted, the lifter plates for the punches and the lifter hooks 33 for these lifter plates may be of any usual or suitable construction commonly used in this type of apparatus and these parts are not described in detail, as no claim for novelty is made with respect to these per se.

The oscillatable frame or head 2 comprises four identical plates 39 which are secured together to form a rigid framework, one set of rings 7 with its arbor being mounted between one pair of plates 39 and the other set of rings with its arbor being mounted between another set of plates 39. The pivot shaft 40 on which the frame is oscillatably mounted extends through the rear ends of all four of these plates 39 and is rockably mounted in suitable brackets 41 extending upwardly from the base 1. The motor 13 is rigidly secured to this oscillatable frame by means of a pair of channel members 42 having their side flanges notched to receive the edges of the four plates 39, the channel members being rigidly clamped together by means of clamping screws 43. The two outside frame plates are tied together by means of a bearing bracket 44 having spaced bearings 45 in which the shaft for the worm 14 is mounted. The crank shaft is mounted in four anti-friction bearings 46 secured to the frame plates, respectively. In order to provide an inexpensive, neat and durable mounting for the anti-friction bearings, a countersunk opening is provided in the frame plate and a bearing supporting collar 47 (Fig. 6) is turned down to provide a reduced portion which will fit snugly in the smaller part of the opening in the plate and this reduced portion of the collar is then swaged outwardly over the countersunk portion of the opening, as shown at 48, to rivet the collar 47 securely in place. The arbor shaft 37, crank shaft 8, bearing bracket 44, motor support 42 and rock shaft 40 combine with the frame plates 39 in such a way as to provide a very rigid, substantial, and yet light construction.

The clutch construction for controlling the connection and disconnection of the motor drive with respect to the crank shaft is of the roller type, as shown in Figs. 4 and 5, comprising a plurality of rollers 49 operating in recesses 50 in the driven clutch ring 51 and engageable and disengageable with respect to the inner cylindrical surface 52 of the worm gear 12 which constitutes the driving clutch member. These rollers 49 are urged into binding relation with respect to the

driving and driven clutch members by means of coil compression springs 53 seated in suitable pockets in the driven clutch ring. The driven clutch ring 51 is secured to the crank shaft by means of a key 54. For controlling the clutching and declutching operation, the pair of clutch-controlling plates or discs 25 are provided, located on opposite sides of the ring gear 12 and having openings 55 into which the ends of the clutch rollers 49 extend. These clutch control discs are themselves controlled by the pair of latches or detents 22 engageable and disengageable with respect to the notches 24 in the edges of the clutch control discs 25. These detents 22 are mounted on a rockshaft 56, which rockshaft is rockably mounted in three of the frame members 39. This rockshaft 56 is operated to effect the releasing operation of the detents 22 by means of the operating hand lever 20, which is rockably mounted on the casing 21. This operating lever 20 is mounted on a rockshaft 56 which is rockably mounted in a bearing 57 mounted on the casing 21 (Fig. 6). This rockshaft 56 carries on the inner side of the casing a rock arm 58 which extends downwardly into position to engage the finger 59 on the rock arm 60, which is mounted on the rockshaft 56 which carries the clutch-controlling detents 22. The relation between the actuating rock arm 58 and the actuated rock arm 60 is such that it does not interfere with the up-and-down movement of the actuated rock arm which takes place when the perforator head 2 is oscillated. Suitable spring means are provided for returning the actuated rock arm 60 and the hand lever 20. A suitable stop is provided to limit this spring return movement.

In order that the operator may adjust this operating arm to suit his own convenience, an adjustable connection is provided between the operating lever 20 and the rockshaft 56. This adjustable connection may be effected by providing the rock arm with a radially serrated plate portion 61 (Figs. 1 and 6) cooperating with a correspondingly serrated portion 62 on the operating arm. A nut 63 threaded on the end of the rockshaft 56 and bearing on the lever serves to hold the serrated portions in engagement with each other to hold the operating arm in the desired adjusted position.

In operation, when the teller presses down on the operating lever, it will cause the detents 22 to move out of the notches 24 in the clutch-controlling plates 25. This closes the motor circuit, as will be described in detail hereinafter, and places the driven clutch ring 51 in connected condition with respect to the driving worm gear 12. This clutch connection is effected by means of the coil compression springs 53 which will push the clutch rollers 49 forward into wedging engagement with the driving and driven clutch members, the clutch control plates 25 also being pushed ahead in this operation. The motor will cause the worm gear 12 to revolve, carrying with it the crank shaft 8, until the clutch control plates 25 have about completed a revolution, when the detent members 22 will again engage in the notches 24 on the clutch-controlling plates, a coil tension spring 64 being provided to effect this latching engagement of the detent. This releases the clutch, stops the crank shaft 8 in a definite position and, as will be described hereinafter, breaks the motor circuit.

The de-clutching operation is effected by the clutch-controlling plates 25 which hold the clutch rollers 49 against movement because of

the fact that these rollers extend into the holes 55 in the clutch plates. This stopping of the movement of the clutch rollers 49 releases them from wedging engagement with the driving and driven clutch member, causing the crankshaft 8 to stand still while the ring gear 12 travels ahead. However, the motor will soon stop, as its circuit is broken.

In order to improve the operation of the clutch and prevent a rebound action of the driven clutch member 51, due to the action of the coil compression springs 53 after the detents 22 have dropped into place, I provide a pair of coil tension springs 65 (Fig. 1), each secured in one end to the upper end of the operating link and secured at the other end to an arm 66 extending upwardly from the motor support 42. These springs are strong enough to prevent any rebound action of the coil compression springs 53. Without these springs 65, it will be seen that the coil compression springs 53 might cause a slight backward rotation of the crank shaft 8 after the detents 22 have stopped the clutch-controlling discs 25. This rebound action would tend to bring the rollers 49 again into binding engagement with the driving and driven clutch members, resulting in a frictional action on the rollers and a drag on the motor, both of which are undesirable. The first might cause the burning of the surfaces of the friction rollers. This rebound action is prevented because of the fact that the heavy tension springs 65 are more than sufficient to overcome the tendency of the clutch springs 53 to rotate the crank shaft 8 in a reverse direction. It will be seen that the action of these heavy tension springs 65 is such as to tend to draw the crank pins 9 to the right, as viewed in Fig. 1, which will have the effect of tending to rotate the crank shaft in a counterclockwise direction against the rebound action of the clutch springs 53. This action of the heavy tension springs thus has another advantage in that it tends to give the crank shaft 8 an initial send-off when the detents 22 release the clutch plates 25, which assists the motor in starting the crank shaft.

The operator-controlled motor switch 18 is of the mercury contact type comprising a tiltable tube 67 having contact members 68 at one end and a floating mercury contact 69, movable from one end to the other of the tube as it tilts. This mercury contact switch is itself rockably mounted on the rock arm 60 and is caused to oscillate, as the rock arm moves, by means of a spring member 70 (Fig. 4) having one end adjustably, but fixedly, secured to one of the frame plates 39 by means of a clamping screw 71, and having its point 72 in engagement with the lower side of the rock frame 73 on which the mercury contact tube is mounted. The rock frame 73 is pivotally mounted on the rock arm 60 by means of a pivot screw 74. The engagement between the spring 70 and the rock frame 73 of the mercury contact tube is in effect a pivotal connection. With this construction, it will be seen that when the operating lever 20 is depressed to cause the detents 22 to release the crank shaft 8 for movement, it will cause the axis 75 of the rock frame 73 to move to the right, as seen in Fig. 4, which, in turn, will cause the mercury tube 67 to oscillate in a clockwise direction, since the lower part of the tube-carrying rock frame 76 is in effect held against movement by its engagement with the spring arm 70. This clockwise movement of the mercury tube will cause the

mercury contact 69 to roll to the right hand end of the tube to complete the motor circuit. Conversely, when the crank shaft has about completed its revolution and the detents 22 drop into the notches 24 in the clutch control plates, the axis of the rock frame 73 will move to the left, as seen in Fig. 4, causing the mercury tube to oscillate in a counterclockwise direction to break the motor circuit.

To secure the exact timing relation desired between the clutch control and the switch opening and closing, the spring may be adjusted to the right or left, as desired, and held in its adjusted position by means of the clamping nut 71.

In the above described system in which there is no head cashier and in which each teller has a pair of "tellers' plugs" 29 which must be inserted in order to render the motor circuit effective, the construction shown in Figs. 7, 8, and 9 is used. This construction comprises a pair of plungers 77 slidably mounted in the plate members 39, a coil compression spring 78 acting between these plungers tending to separate them, a pair of contacts 80, one mounted on each of the plungers 77 to which the flexible conductors 81 forming part of the motor circuit are secured, a pair of segmental pinion cam members 82, one cooperating with a follower portion 83 on each of the plungers 77, and the two "tellers' plugs" 29, each having a rack portion 84 for cooperation with one of the segmental pinion members 82, these plugs 29 being slidably insertable in suitable guideways in the perforating head. These "tellers' plugs" are provided with properly arranged punch-controlling perforations, the arrangement of the perforations being such that when the plugs are inserted a number or designation corresponding to the individual teller will be punched in the paper operated on. Each segmental pinion cam member 82 is provided with a positioning notch 85 in its edge which receives the follower portion 83 on one of the plungers 77 to hold the pinion cam 82 in a definite position upon the removal of the plug 29. When the plug 29 is inserted, the rack portion 84 on the plug engages the toothed portion of the pinion, causing it to rotate so that when the plug is fully inserted the raised portion 86 of the cam engages the follower 83 on the plunger 77. The sliding movement of the plunger 77 thus effected is such that when both plugs 29 are inserted the contacts 80 will be in engagement with each other and the circuit placed in condition so that when the lever 20 is operated the motor circuit will be completed.

In Figs. 10, 11, and 12 is shown a construction in which the motor 13 is not mounted on the perforator head and in which the motor circuit is not automatically opened after each perforating operation. In this form the base 1, die shoe 3, punch holders 5, knife 16, punch-controlling rings 7, etc., may be substantially the same as in the form previously described. A somewhat different form of clutch between the motor and crank shaft is shown, although the roller clutch previously described might be used. In this form a crank shaft 87 having a crank 88 at each end is rotatably mounted on standards 89 extending upwardly from the base. Transmission is provided from the motor 13 to this crank shaft 87 and mechanism is provided whereby a single rotation of the crank shaft 87 will cause a complete up-and-down movement of the perforator head. The mechanism, whereby rotation of the crank shaft causes oscillation of the perforator

head and knife, comprises a pair of links 90, one on each side of the perforating head, each link having one end pivotally secured on an extension 91 of the arbor on which the punch-controlling rings 7 are mounted and its other end having a slot 92 in which the crank pin 88 operates, and a second pair of links 93, each having its upper end pivotally secured to the slotted link 90 and its lower end pivotally secured to the punch holder at a point 94 above the plane of the paper being operated on so that this link 93 does not interfere with the free insertion of the paper. An antifriction bearing 95 may be provided between the crank pin 88 and the slot 92 in the link 90. With this construction, it will be seen that a single complete rotation of the crank shaft 87 will cause a complete up-and-down movement of the perforator head.

The transmission from the motor to the double crank shaft comprises the worm 14 mounted on the motor shaft, the worm gear 12 surrounding the crank shaft and coaxial therewith and a trip-controlled clutch 96 acting between the worm gear and the crank shaft.

The clutch construction comprises a dog clutch member 97 secured to and rotatable with the worm wheel 12, a second dog clutch member 98 splined on the crank shaft 87 so as to rotate therewith but so as to be axially movable with respect thereto and a coil compression spring 99 tending to hold the dog clutch members in engagement with each other. The holding, releasing, clutching and declutching action is effected by means of an oscillatable operator-controlled finger 100 pivotally mounted at 101 and having its tip portion cooperating with a cam formation on the splined clutch member 98. This cam formation comprises a collar 102 on the clutch member having a spiral or helical cam portion 103 engaged by the side of the tip of the finger for throwing the clutch out and a stop shoulder 104 engaged by the edge of the tip of the finger for stopping the crank shaft in a definite position after the declutching operation. A coil tension spring 105 secured to a downwardly extending finger 106 on the rock shaft carrying the trip finger 100 tends to hold the trip finger in engagement with the cam formation. This downwardly extending finger has a laterally extending portion 107 engageable with the manually operable trip lever 20 carried by the casing. When this manually operable lever 20 is depressed, it causes the tip of the trip finger 100 to move out of engagement with the detaining shoulder 104 and allows the slidable clutch member 98 to move into engagement with the rotating clutch member 97 which is driven by the worm wheel 12. This causes one complete rotation of the crank shaft, the rotation of the crank being automatically stopped to hold the crank shaft in a definite position by the dropping in of the trip finger 100 into the depression on the cam formation, which causes the helical formation 103 on the cam to ride along the side edge of the tip of the trip finger to shift the slidable clutch member 98 axially out of engagement with the driving clutch member 97. The crank shaft is again stopped in definite position by engagement of the edge of the end of the trip finger 100 with the stop shoulder 104 on the cam formation.

Further modifications will be apparent to those skilled in the art and it is desired, therefore, that the 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. Apparatus for mutilating sheets comprising an oscillatable head which when oscillated effects the mutilating operation, a rotary electric motor mounted on said oscillatable head and mechanism whereby rotation of said motor effects oscillation of said head.

2. Apparatus for mutilating sheets comprising an oscillatable head which when oscillated effects the mutilating operation, a rotary electric motor mounted on said oscillatable head, mechanism whereby rotation of said motor effects oscillation of said head, and means for automatically opening the motor circuit on the completion of the punching operation.

3. Apparatus for mutilating sheets comprising an oscillatable head which when oscillated effects the mutilating operation, a rotary electric motor mounted on said oscillatable head, mechanism whereby rotation of said motor effects oscillation of said head, and means for automatically disconnecting the motor from driving relation with respect to the oscillatable frame and opening the motor circuit subsequent to the punching operation.

4. A sheet mutilating apparatus comprising a stationary portion, a mutilating head oscillatably mounted on said stationary portion, a rotary motor mounted on said oscillatable head, a crank shaft mounted on said head, a link having its upper end connected to the crank and its lower end secured to said stationary portion, transmission from the motor to the crank shaft including a one-way drive roller clutch coaxial with said crank shaft, and automatic means for opening the clutch after the mutilating operation comprising means for holding the driven end of the clutch against rotation to release it from the driving member of the clutch.

5. A sheet mutilating apparatus comprising a stationary portion, a mutilating head oscillatably mounted on said stationary portion, a rotary motor mounted on said oscillatable head, a crank shaft mounted on said head, a link having its upper end connected to the crank and its lower end secured to said stationary portion, transmission from the motor to the crank shaft including a one-way drive roller clutch, stop means for releasing the clutch and stopping the rotation of the crank shaft, and spring means acting on said link for holding the clutch rollers out of clutching engagement when the crank shaft is held and for giving the crank shaft an initial impulse when the crank shaft is released for rotation.

6. Apparatus for mutilating sheets comprising a reciprocable head, sheet mutilating means controlled by the reciprocation of said head, means for controlling the reciprocation of said head comprising a motor and a clutch for connecting and disconnecting the motor with respect to the head, a trip member for controlling the clutch, a removable casing for housing the head, motor, clutch and trip, and trip operating means carried by said casing operable from the outside of the casing and freely disengageable and engageable with respect to the trip member in removing and replacing the casing.

7. In a perforating device of the character described the combination with a plurality of reciprocable punches, a reciprocable head for operating said punches, and means for reciprocating said head comprising an electric motor, of a member insertable and removable with respect to said head for controlling certain of said punches, and

means controlled by the insertion and removal of said member for controlling the motor circuit.

8. In a perforating device of the character described the combination with a plurality of reciprocable punches, a reciprocable head for operating said punches, and means for reciprocating said head comprising an electric motor, of a member having a rack portion insertable and removable with respect to said head for controlling certain of said punches, and means controlled by the insertion and removal of said member for controlling the motor circuit comprising a pinion with respect to which said rack portion is engageable and disengageable in the insertion and removal of said member.

9. Apparatus for mutilating sheets comprising a base having a substantially horizontal throat adjacent its front end for the insertion of the sheets to be mutilated, an oscillatable head pivotally mounted on said base to swing about a horizontal axis adjacent the rear of said base, mutilating means carried by said oscillatable head for mutilating the sheets inserted in said throat, and means for effecting oscillation of said head comprising a rotary electric motor mounted on said head in front of said horizontal axis and in the rear of said mutilating means.

10. Apparatus for mutilating sheets comprising a base having a substantially horizontal throat adjacent its front end for the insertion of the sheets to be mutilated, an oscillatable head pivotally mounted on said base to swing about a horizontal axis adjacent the rear of said base, mutilating means carried by said oscillatable head for mutilating the sheets inserted in said throat, means for effecting oscillation of said head comprising a rotary electric motor mounted on said head in front of said horizontal axis and in the rear of said mutilating means, a horizontal crankshaft parallel to said axis mounted on said head in front of said motor, a link pivotally connecting the crank of said shaft with the base, and transmission between the motor and crankshaft.

11. Apparatus for mutilating sheets comprising a base having a substantially horizontal throat adjacent its front end for the insertion of the sheets to be mutilated, an oscillatable head pivotally mounted on said base to swing about a horizontal axis adjacent the rear of said base, mutilating means carried by said oscillatable head for mutilating the sheets inserted in said throat, means for effecting oscillation of said head comprising a rotary electric motor mounted on said head in front of said horizontal axis and in the rear of said mutilating means, a horizontal crankshaft parallel to said axis mounted on said head in front of said motor, a link pivotally connecting the crank of said shaft with the base, and transmission between the motor and crankshaft comprising a worm wheel rotatable with said crankshaft and a worm meshing with said gear and rotatable with the motor shaft.

12. Apparatus for mutilating sheets comprising a base having a substantially horizontal throat adjacent its front end for the insertion of the sheets to be mutilated, an oscillatable head pivotally mounted on said base to swing about a horizontal axis adjacent the rear of said base,

mutilating means carried by said oscillatable head for mutilating the sheets inserted in said throat, and means for effecting oscillation of said head comprising a rotary electric motor mounted in front of said horizontal axis and in the rear of said mutilating means.

13. Apparatus for mutilating sheets comprising a base having a substantially horizontal throat adjacent its front end for the insertion of the sheets to be mutilated, an oscillatable head pivotally mounted on said base to swing about a horizontal axis adjacent the rear of said base, mutilating means carried by said oscillatable head for mutilating the sheets inserted in said throat, and means for effecting oscillation of said head comprising a crankshaft parallel to said axis mounted on said head, and a link pivoted to said base above said throat and connected to the crank of the crankshaft.

14. Apparatus for mutilating sheets comprising a base having a substantially horizontal throat adjacent its front end for the insertion of the sheets to be mutilated, an oscillatable head pivotally mounted on said base to swing about a horizontal axis adjacent the rear of said base, mutilating means carried by said oscillatable head for mutilating the sheets inserted in said throat, and means for effecting oscillation of said head comprising a rotary electric motor mounted on said head in front of said horizontal axis and in the rear of said mutilating means, a horizontal crankshaft parallel to said axis mounted on said head in front of said motor, a link pivotally connecting the crank of said shaft with the base, transmission between the motor and crankshaft, a clutch between said motor and crankshaft, and automatic means for disconnecting said clutch after the mutilation.

15. Apparatus for mutilating sheets comprising a base having a substantially horizontal throat adjacent its front end for the insertion of the sheets to be mutilated, an oscillatable head pivotally mounted on said base to swing about a horizontal axis adjacent the rear of said base, mutilating means carried by said oscillatable head for mutilating the sheets inserted in said throat, and means for effecting oscillation of said head comprising a rotary electric motor mounted on said head in front of said horizontal axis and in the rear of said mutilating means, a horizontal crankshaft parallel to said axis mounted on said head in front of said motor, a link pivotally connecting the crank of said shaft with the base, transmission between the motor and crankshaft, a clutch between said motor and crankshaft, and automatic means for disconnecting said clutch and stopping said motor after the mutilating operation.

16. Apparatus for mutilating sheets comprising an oscillatable head which when oscillated effects the mutilating operation, a rotary electric motor mounted on said oscillatable head, mechanism whereby rotation of said motor effects oscillation of said head, and means for automatically disconnecting the motor from driving relation with respect to the oscillatable head after the mutilating operation.

EDWARD G. RIX.