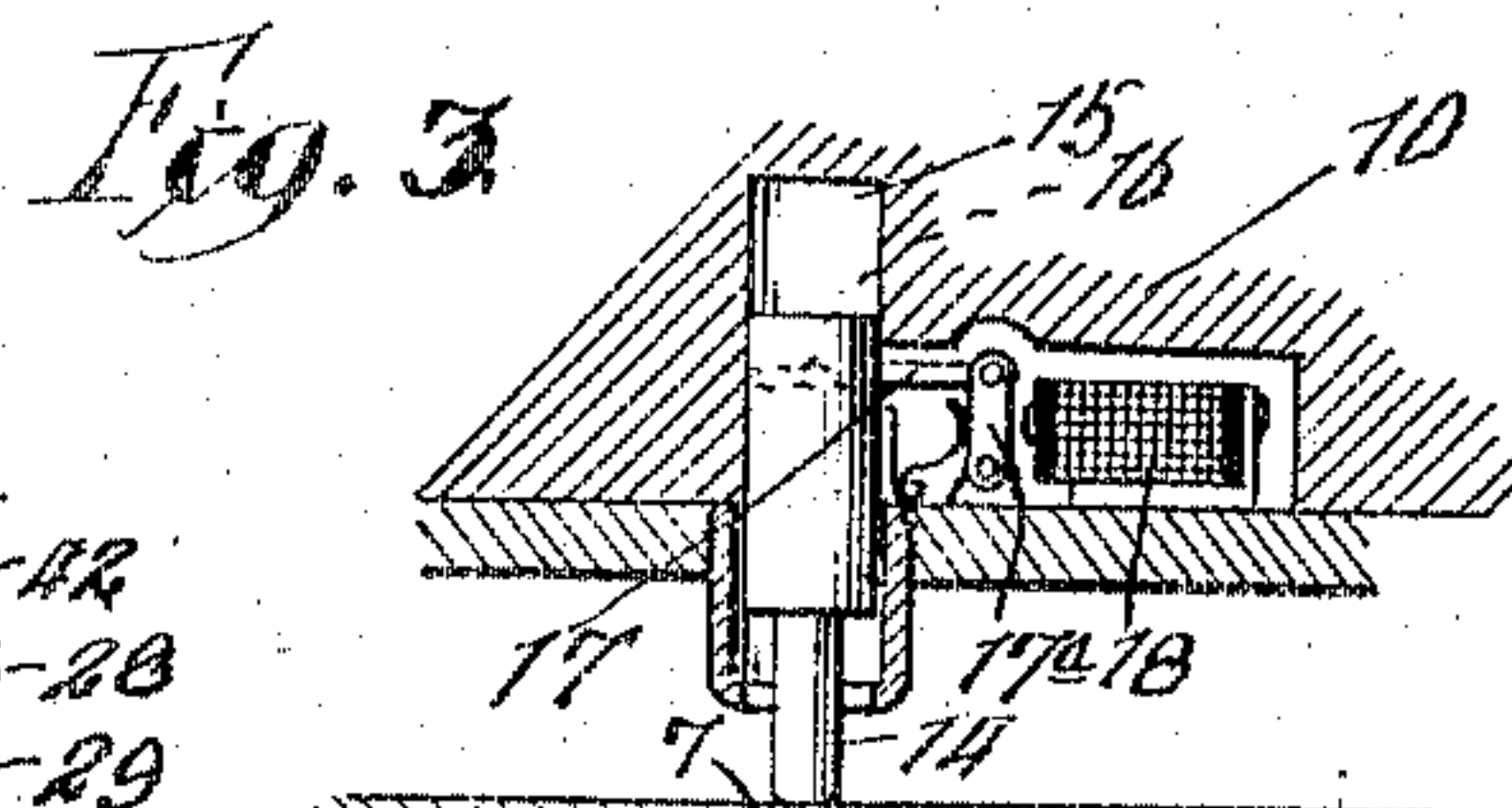
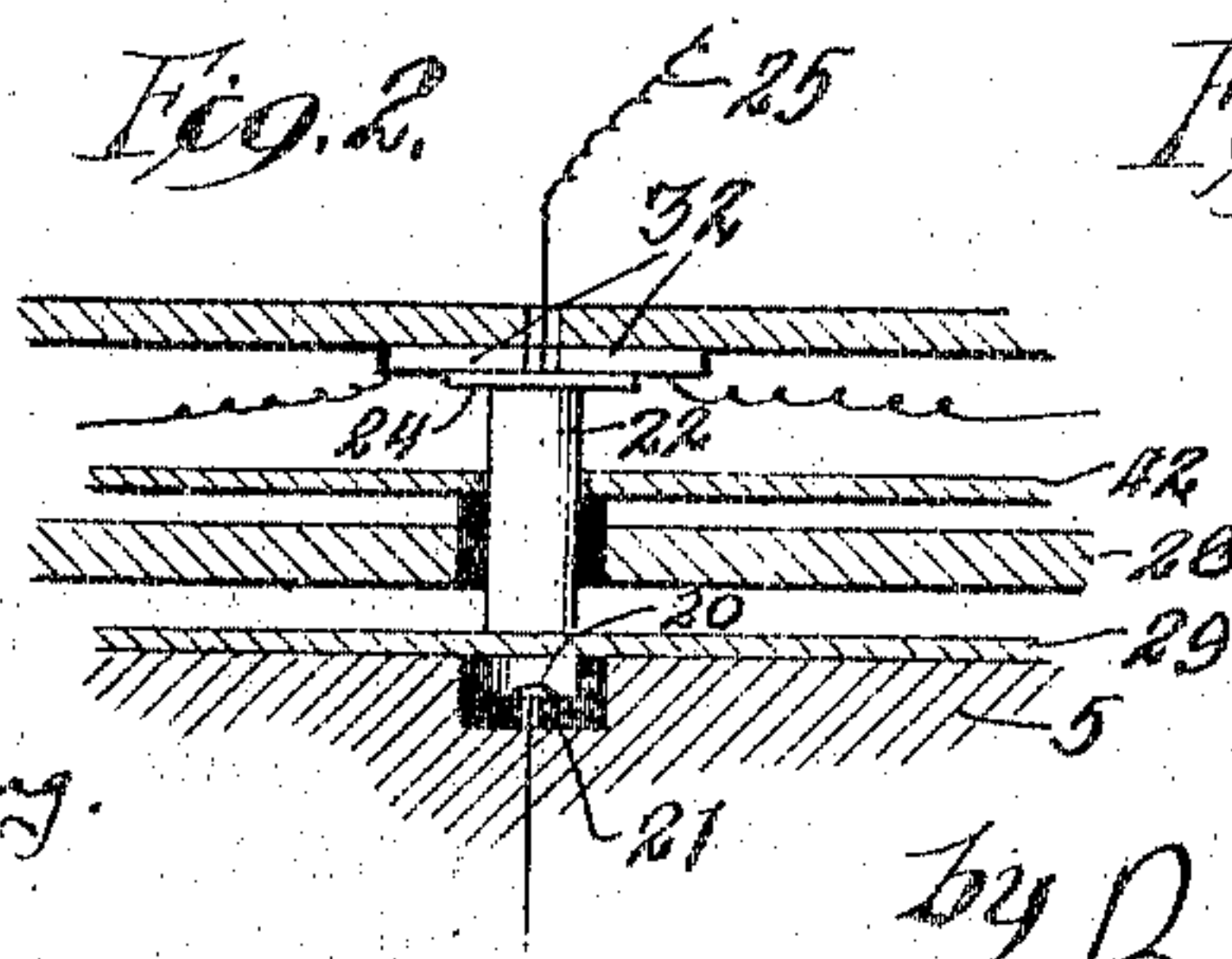
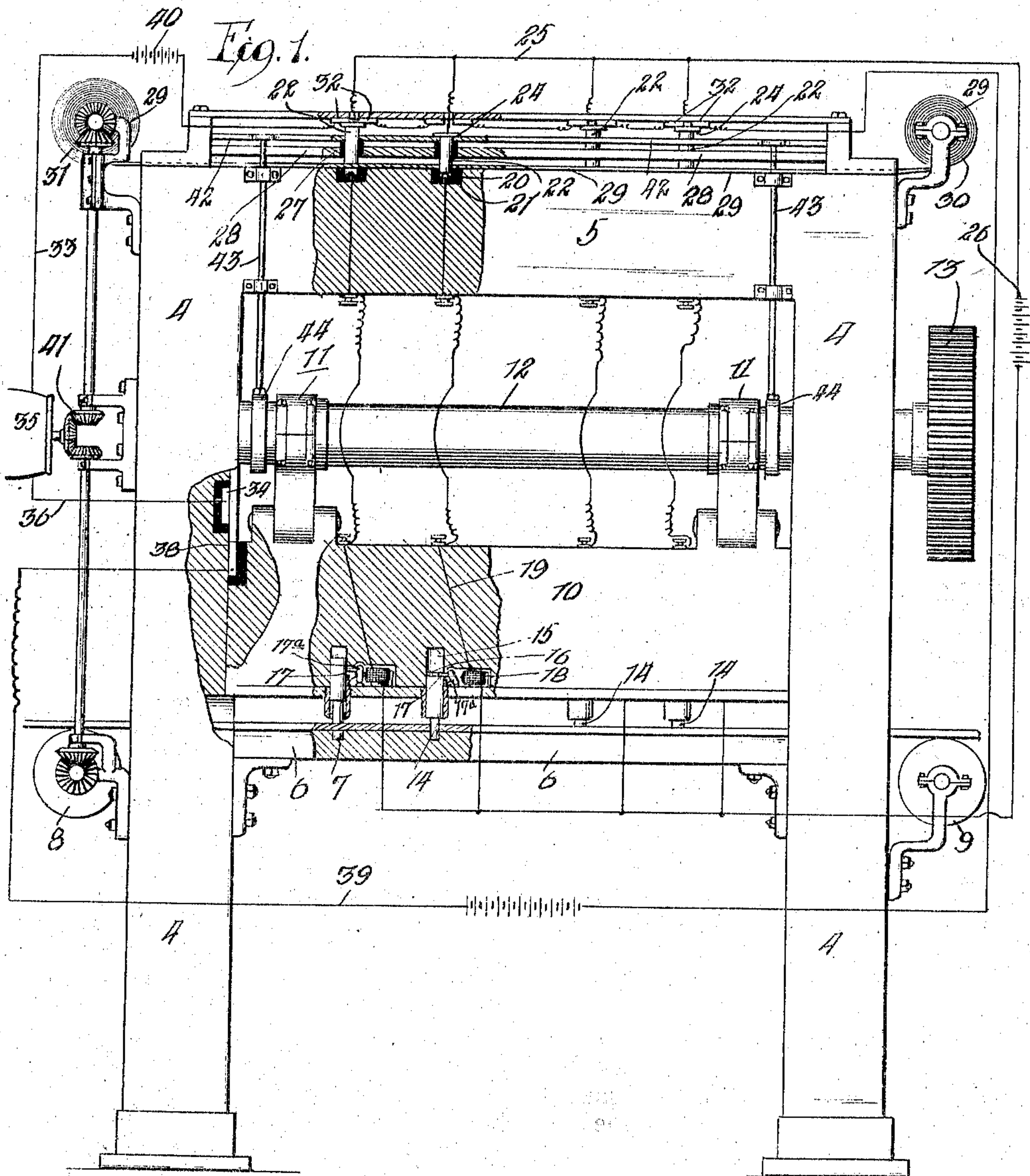


F. THOMPSON.
 MULTIPLE PUNCH PRESS.
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966,965.

Patented Aug. 9, 1910.



Witnesses:

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UNITED STATES PATENT OFFICE.

FRANK THOMPSON, OF CHICAGO, ILLINOIS.

MULTIPLE-PUNCH PRESS.

966,965.

Specification of Letters Patent.

Patented Aug. 9, 1910.

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To all whom it may concern:

Be it known that I, FRANK THOMPSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Multiple-Punch Presses, of which the following is a specification.

The object of this invention is to provide a multiple punch press the dies of which will be automatically actuated in accordance with a prepared pattern so that the holes will be made in the work in exact accordance with the marks in the pattern, thereby permitting a large number of plates to be successively fed through the press and automatically punched in exact accordance with one another. This method of punching the plates obviates the necessity for manually adjusting the punch for each hole or series of holes in each plate and at the same time enables the holes to be punched with much greater exactness and rapidity than would be possible if the ordinary practice were followed.

In carrying out the details of the present invention a pattern in the form of a strip of thin fiber, strong paper, or sheet metal, is employed, which is automatically fed through the machine at a speed either the same as, or proportionate to the feeding speed of the work, which pattern has formed therein holes or marks which are adapted to be brought into register with suitable actuating devices to throw the designated dies into commission so that, with the descent of the punch, the commissioned dies will punch the designated holes in exact accordance with the marks on the pattern.

In the present embodiment of the invention electrical means have been shown for carrying out the details of the invention, but it is not the intention to limit the invention strictly to the employment of such electrical actuating means since pneumatic or mechanical means might be employed without departing materially from the spirit of the invention.

Further objects will appear from the detailed description of the invention, which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings Figure 1 is a front elevation of a multiple punch press partly

broken away to show the automatic actuating means of the present invention; Fig. 2 an enlarged sectional detail of one of the electrical contact blocks; and Fig. 3 an enlarged sectional detail of one of the die members.

The invention is shown as applied to a multiple punch press of a well known style comprising a frame having uprights 4—4 which are connected by the cross head 5. The uprights support a table 6 provided with a plurality of female die recesses 7. The table serves to support the work which is fed in at a predetermined speed over rollers 8 and 9, or in any other suitable manner. The punch is provided with the usual reciprocating head 10, which is guided in the uprights 4 and actuated by suitable eccentric mechanism 11, mounted upon a shaft 12, which is actuated by means of a spur gear 13. The details above described are standard and a further description is deemed unnecessary. Obviously the mechanism for imparting reciprocation to the head 10 might be of any well known style other than that here used for purposes of illustration. The reciprocating punch head serves as a mounting for a plurality of male die members 14, each of which normally projects below the plane of the punch head, and is adapted to be retracted into a socket recess 15 when brought in contact with the surface of the work unless such retraction be prevented by the mechanism to be hereinafter described. Each of the socket recesses 15 has leading therefrom a guide recess 16 immediately above the upper end of the male die member 14, which guide recess 16 extends at right angles to the die recess 15 and serves as a guideway for a slidable stop plate 17 which is adapted to be projected across the die recess immediately above the upper end of the die when in its lowermost position, so that the die will be held against retraction when brought into contact with the work and thrown into commission to punch a hole with the descent of the punch head. The stop member 17 is connected with a spring supported lever 17^a which is adapted to be repelled by the energizing of an electromagnet 18, and this movement of the lever serves to thrust forward the stop member into a position behind the die so that the latter will be held against retraction when the punch head descends, and will thus be held in position to punch

through the work and enter the female die. The magnet has leading therefrom an energizing circuit wire 19 which is carried up through the punch head 10 and through the cross head 5, or in any other suitable manner, and terminates in a contact point 20, which is preferably located in an insulating cup 21. The contact point 20 coöperates with a contact block 22, which is shouldered at its upper end 24 and is connected with a return circuit wire 25 which leads through a battery 26, or other source of power, and back to the repelling magnet 18. The contact block 22 is entered through an insulating sleeve 27 in a guide bar 28, which is elevated slightly above the surface of the cross head 5 to provide a space for the travel of the pattern 29, which pattern is fed from a reel 30 to a reel 31 at a speed equal to or proportionate with the travel of the work. The upper or enlarged end of the contact block, when raised, will engage a pair of separated contact members 32 and bridge the space between them, thereby serving to close one of the sections of a circuit which may be termed the feed circuit and which is formed by connecting the contact members of adjacent pairs and completing the circuit by suitable wires 33 and 36 which actuate a motor 35 and connect with a contact block 34 located in the guideway for the reciprocating punch head. The circuit from the motor is continued through a contact block 38 in the edge of the reciprocating punch head, which block, in turn, is connected by means of a wire 39 with the opposite end of the series of contact members 32.

A dynamo 40, or other source of power, is located at a suitable point in the circuit to actuate the motor when the circuit is completely closed. The coöperating contact blocks 34 and 38 are so located that the feeding circuit will be broken with every descent of the reciprocating punch head, but will be again closed when the punch head rises sufficiently to elevate the punch members above the plane of the work. The motor 35 serves to drive the pattern reel 31 and the feed roller 8 at an equal or a proportionate rate of speed through the medium of suitable gearing 41, or in any other suitable manner. It will be understood that each one of the male die members is constructed and wired in the manner above described, and that each one coöperates with a contact block constructed and wired in the manner heretofore described, and that the number and arrangement of the dies can be varied indefinitely to meet the conditions or requirements of actual usage. In order to elevate the entire series of contact blocks 22, after each downward reciprocation of the punch head, sufficiently to clear the surface of the pattern and permit the latter to be fed forward the contact blocks are all entered through a return bar

42 which is supported upon rods 43 actuated by means of cams 44 so constructed as to momentarily raise such of the contact blocks as may previously have dropped through holes in the pattern. This raising of the contact blocks will be simultaneous with the initial engagement of the contact blocks 34 and 38, so that the feed circuit will be completely established at the instant that the punch head begins to lift the punch members above the surface of the work.

In use, the work is fed over the rollers 8 and 9 at a speed equal to or proportionate with the travel of the pattern which is fed through the space intermediate the contact blocks 22 and the contact points 20. The pattern is preferably formed of thin flexible fiber, or heavy paper, or sheet metal suitably insulated, and the pattern is provided at the points intended to indicate punch holes, with holes of a size to permit the ends of the contact blocks to drop through the pattern, and rest upon the contact points 20. When one or more contact blocks are thus dropped through the pattern holes, the feed circuit will be broken at one or more points, thereby serving to stop the feed motor, so that the progress of the pattern and the work will be simultaneously arrested. As the feed circuit is broken one or more die circuits will be closed, and with the closing of each die circuit the repelling magnet in such circuit will throw the stop member into position behind the male die member so that with the next descent of the die head, such of the male die members as have been thus thrown into commission will be held against retraction and forced through the work, thereby forming one or more punch holes in accordance with the specifications of the pattern. With each descent of the punch head the feed circuit will be broken, and this regardless of whether any of the punch members have been thrown into commission. This simultaneously stops the pattern and the work to permit the dies to act if any be thrown into commission and arrests the progress of the pattern until the return movement of the punch head allows the die members to drop in their sockets and assume a position which will permit the stop members to be thrown in accordance with the holes formed in the pattern. Simultaneously with the initial rise of the punch head, the entire series of contact blocks 22 will be momentarily lifted to close the feeding circuit at all points which starts the motor and moves the pattern sufficiently to carry the holes with which the contact blocks were previously in register, out of register therewith, so that with the succeeding descent of the bar 42 the blocks will all be held elevated by contact with imperforate portions of the pattern until the movement of the pattern brings succeeding holes in register with the contact

blocks. The arrangement of the dies and the contact blocks by which they are actuated can be varied indefinitely, depending upon the multiplicity of variations which it is desirable to provide for in the operation of the press. Further variations can be obtained by keying the contact blocks as regards their size and shape so that they will register only with designated holes in the pattern. In like manner the particular method herein disclosed of wiring the mechanism and of actuating the contact blocks and dies might be varied considerably without departing from the spirit of the invention. In like manner many other details of the mechanism can be modified or changed without materially changing the nature of the invention.

What I regard as new and desire to secure by Letters Patent is:

1. In a multiple punch press, the combination of a reciprocating punch head provided with a plurality of die sockets, a plurality of male dies adapted to be retracted into said sockets when unimpeded; stop members adapted to be moved into said sockets to prevent the retraction of the male die members, electrical mechanism actuated in accord with markings on a pattern for throwing the stop members into position to set the designated die members, and means for moving the pattern and the work in accord with one another and for stopping the pattern and the work simultaneously with the setting of a die, substantially as described.

2. In a multiple punch press, the combination of a reciprocating punch head provided with a plurality of die sockets, male dies adapted when unimpeded to be retracted into said sockets, stop members adapted to be moved behind said die members to prevent retraction, means actuated in accordance with markings on a pattern for moving said stop members, means for feeding the work and the pattern in unison with one another, and for stopping the feeding movement simultaneously with the setting of the stop members, and means for releasing all of the stop members after each reciprocation of the punch head, substantially as described.

3. In a multiple punch press, the combination of a reciprocating punch head, a plurality of male die members adapted to be thrown into and out of commission, means actuated by markings on a pattern for throwing designated die members into commission, and means for throwing all of the die members out of commission with each reciprocation of the punch head, substantially as described.

4. In a multiple punch press, the combination of a reciprocating punch head, a plurality of male die members adapted to be thrown into and out of commission, means

actuated by markings on a pattern for throwing designated die members into commission, means for throwing all of the die members out of commission with each reciprocation of the punch head, means for feeding the pattern and the work in unison with one another, and means adapted to stop the feed simultaneously with the setting of any one of the die members, substantially as described.

5. In a multiple punch press, the combination of a reciprocating head provided with a plurality of die sockets, male members normally projecting from and adapted to be moved back into said sockets, stop members adapted to be moved into said sockets to prevent retraction of the die members, means for feeding the work and the pattern in unison with one another, electrical contact members adapted to be held apart by imperforate portions of the pattern and adapted to be moved into contact when in register with perforations in the pattern, electrical means and connections adapted to be influenced when said contact members are brought together for throwing the stop members and setting the male dies, electrical means and connections for stopping the feed of the pattern and the work by said movement of the contact members, substantially as described.

6. In a multiple punch press, the combination of a reciprocating head provided with a plurality of die sockets, male die members normally projecting from and adapted to be moved back into said sockets, stop members adapted to be moved into said sockets to prevent retraction of the die members, means for feeding the work and the pattern in unison with one another, electrical contact members adapted to be held apart by imperforate portions of the pattern and adapted to be moved into contact when in register with perforations in the pattern, electrical means and connections adapted to be influenced when said contact members are brought together for throwing the stop members and setting the male dies, electrical means, and connections for stopping the feed of the pattern and the work by said movement of the contact members, and means for moving back the contact members to normal position with each reciprocation of the punch head, substantially as described.

7. In a multiple punch press, the combination of a reciprocating punch head provided with a plurality of die sockets, male die members normally adapted to project below and adapted to be retracted back into said sockets, stops adapted to be moved into said sockets to prevent retraction of the die members, means for feeding a pattern and for feeding the work in unison with one another, contact blocks and contact points in register with one another above and below

the line of travel of the pattern and adapted to be brought into contact when in register with perforations in the pattern, electrical means adapted to be actuated by movements of the blocks, circuit wires connected with the contact blocks and contact points for actuating said electrical means when the contact blocks and points touch one another, a motor for feeding the pattern and the work, and a circuit leading to said motor and adapted to be influenced to stop said motor simultaneously with the movement of any contact block into engagement with its contact point, substantially as described.

8. In a multiple punch press, the combination of a reciprocating head provided with a plurality of die sockets, male die members normally projecting from and adapted to be moved back into said sockets, stop members adapted to be moved into said sockets to prevent retraction of the die members, electrical contact members adapted to

be held apart by imperforate portions of a pattern and adapted to be moved into contact when in register with perforations in the pattern, electrical means and connections adapted to be influenced when said contact members are brought together, for throwing the stop members and setting the male dies, means for feeding the work and the pattern in unison with one another, an electrical circuit controlling said means, said electrical circuit comprising a stationary contact, and a movable contact on the reciprocating punch head, said movable contact adapted to come into electrical connection with the stationary contact when the punch head is in its upper or disengaged position, substantially as described.

FRANK THOMPSON.

Witnesses:

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