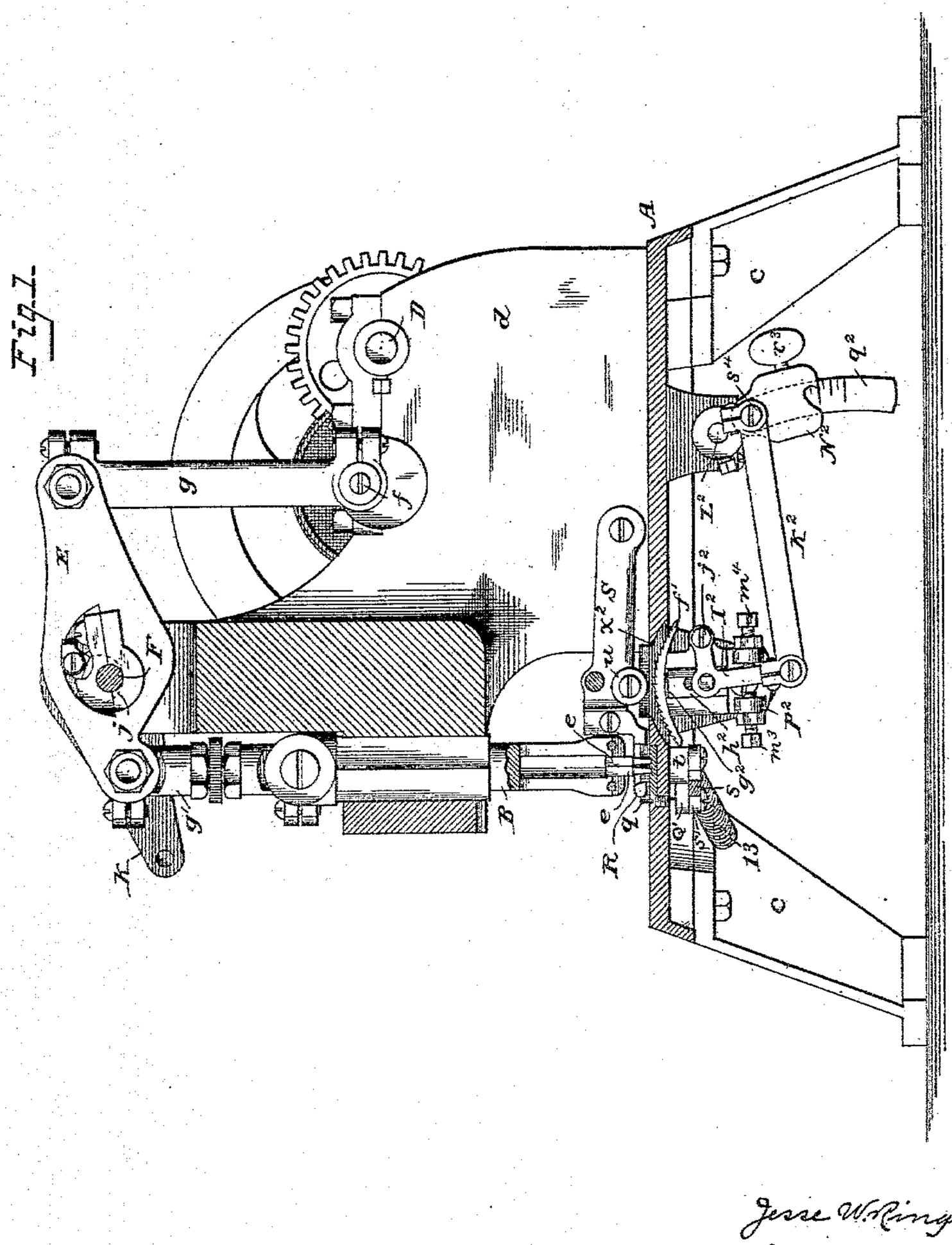
(No Model.) 7 Sheets—Sheet 1.

J. W. RINGROSE & D. A. HAUCK.

PUNCHING MACHINE FOR FLY NETS.

No. 356,793. Patented Feb. 1, 1887.



Attest:
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(No Model.) 7 Sheets—Sheet 2.

J. W. RINGROSE & D. A. HAUCK.

PUNCHING MACHINE FOR FLY NETS.

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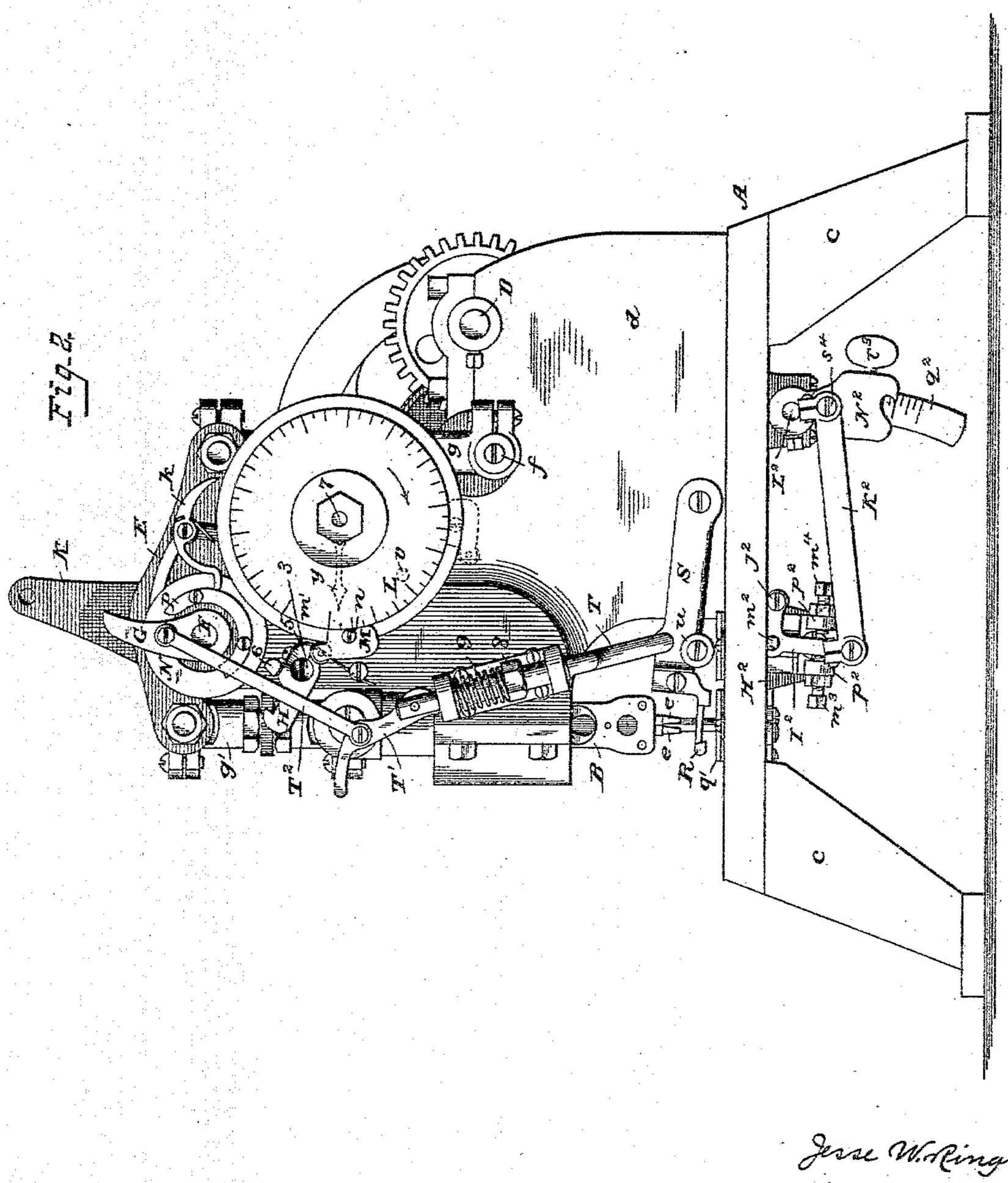
Fig. 2.



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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 7 Sheets—Sheet 3.

J. W. RINGROSE & D. A. HAUCK.

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Fig. 2.

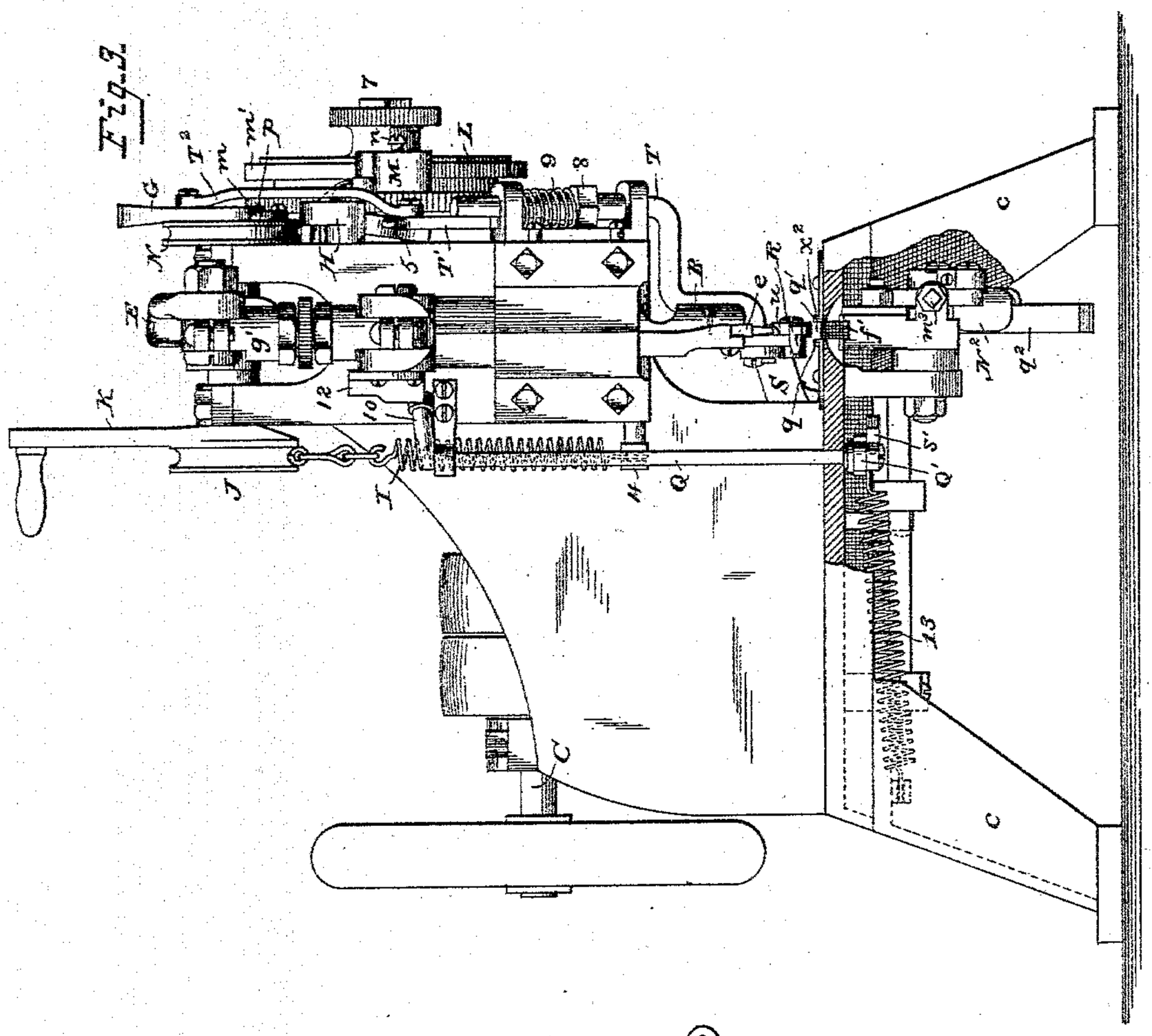
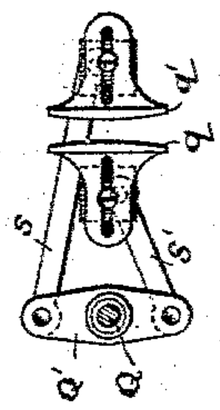


Fig. 5.



Attest:
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J. W. RINGROSE & D. A. HAUCK.

PUNCHING MACHINE FOR FLY NETS.

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Fig. 6.

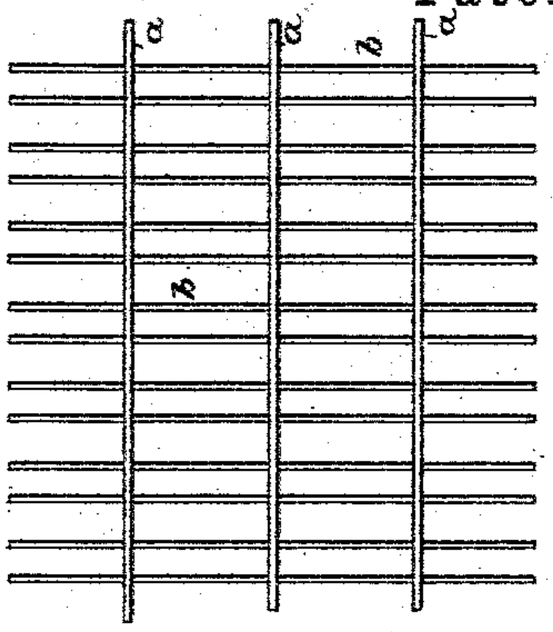

Fig. 4.

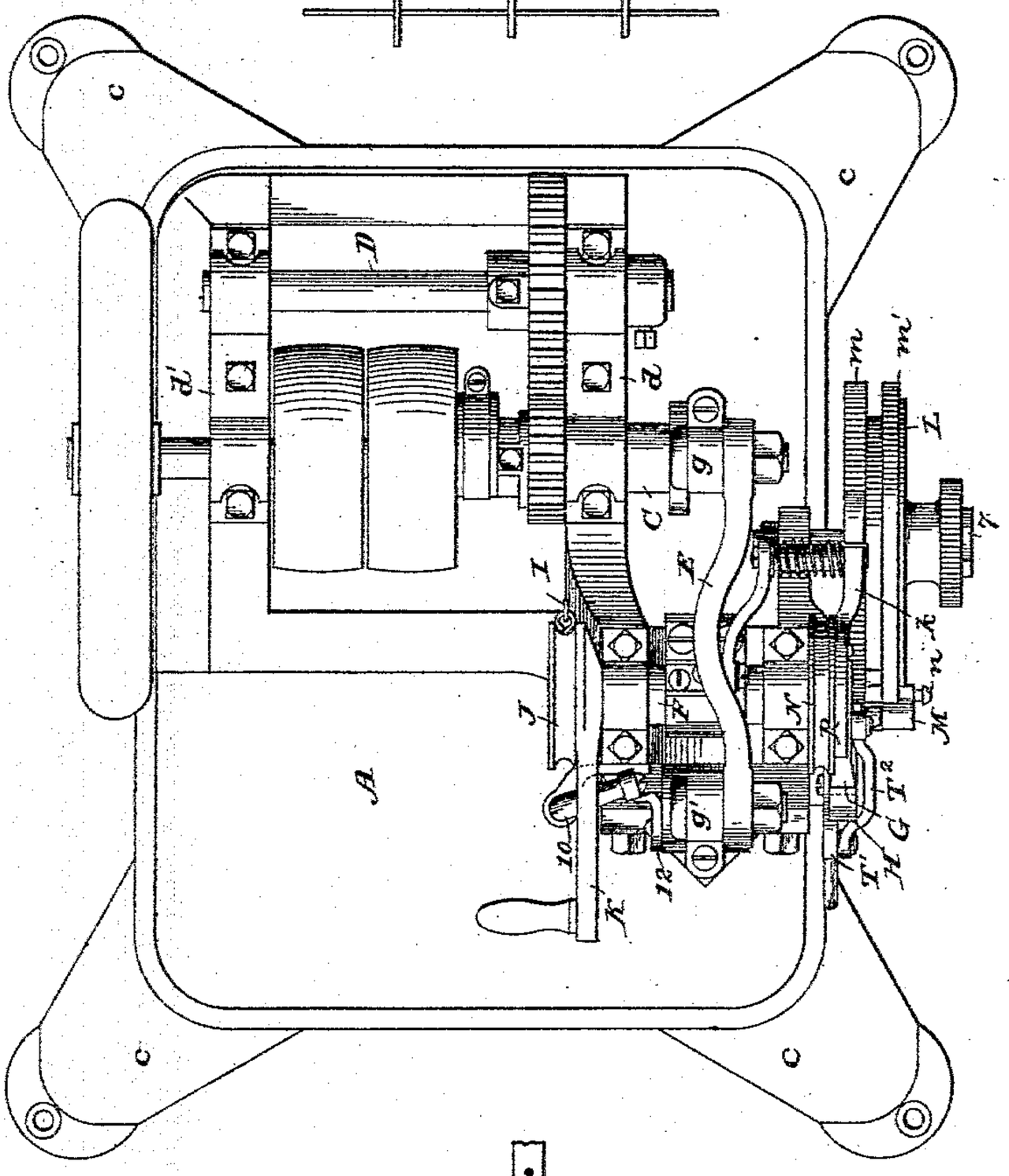

Fig. 7.

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J. W. RINGROSE & D. A. HAUCK.

PUNCHING MACHINE FOR FLY NETS.

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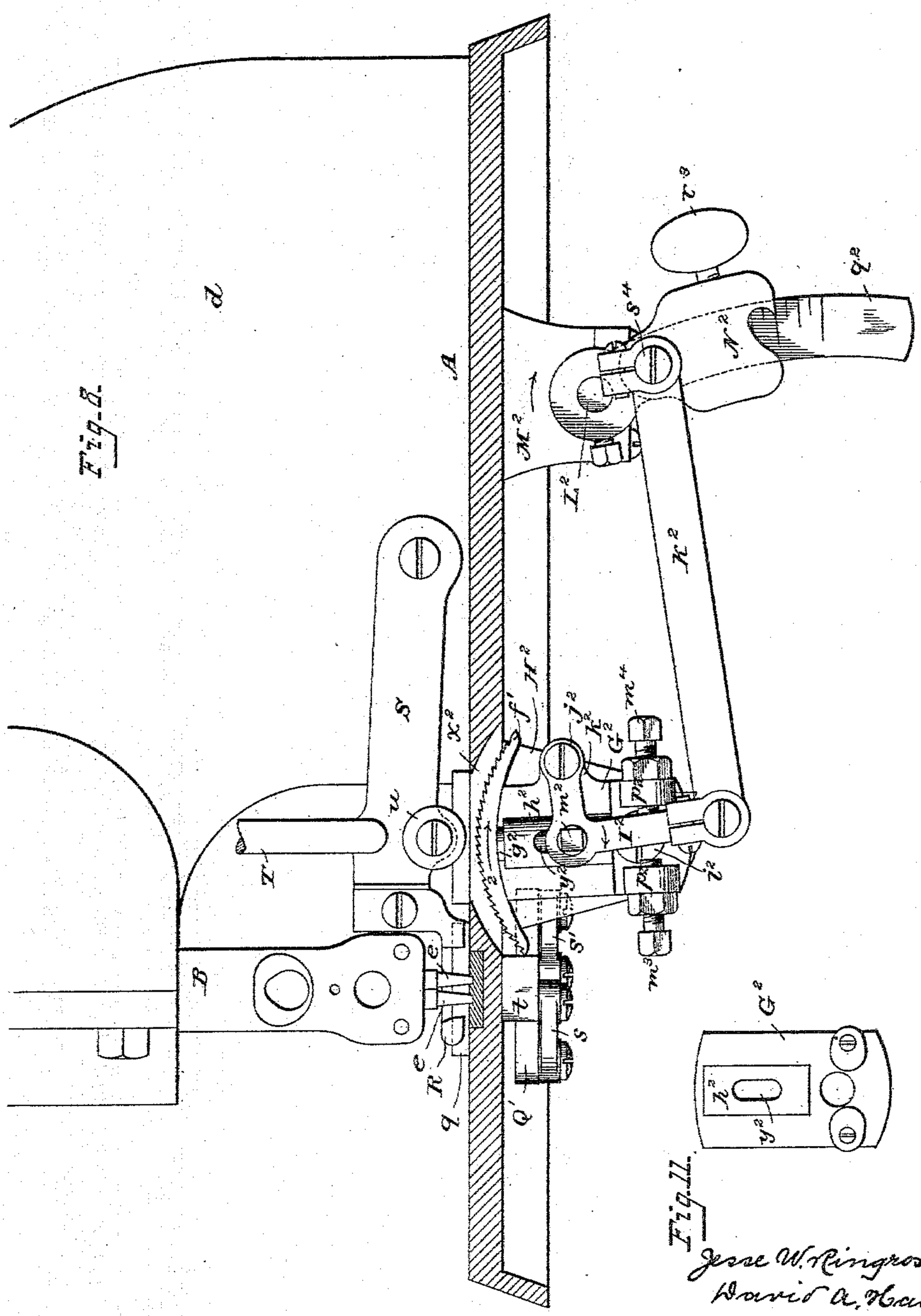

Fig. 8.

Fig. 11.

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J. W. RINGROSE & D. A. HAUCK.

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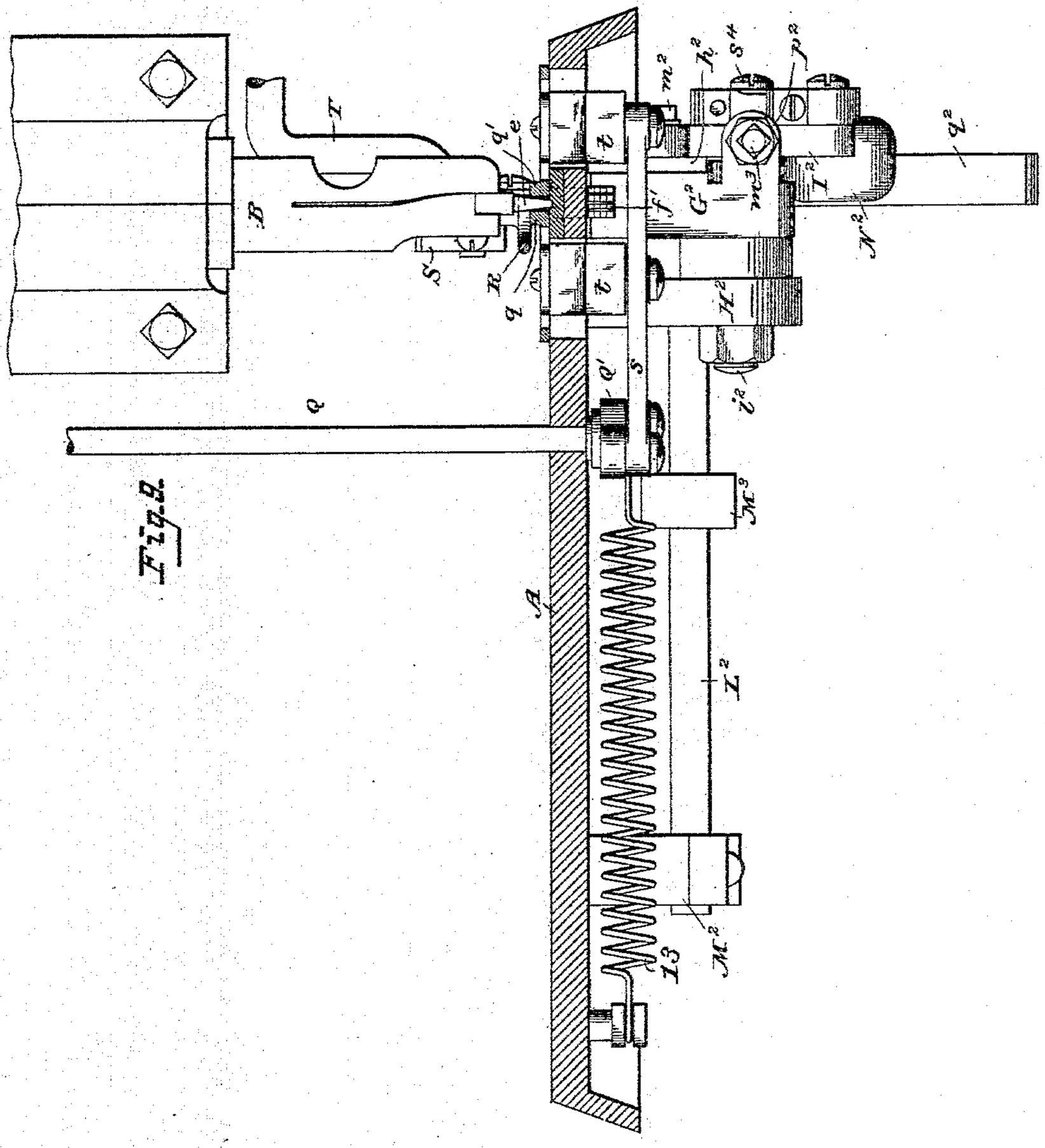

Fig. 2.

Attest:
Court. A. Cooper,
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J. W. RINGROSE & D. A. HAUCK.

PUNCHING MACHINE FOR FLY NETS.

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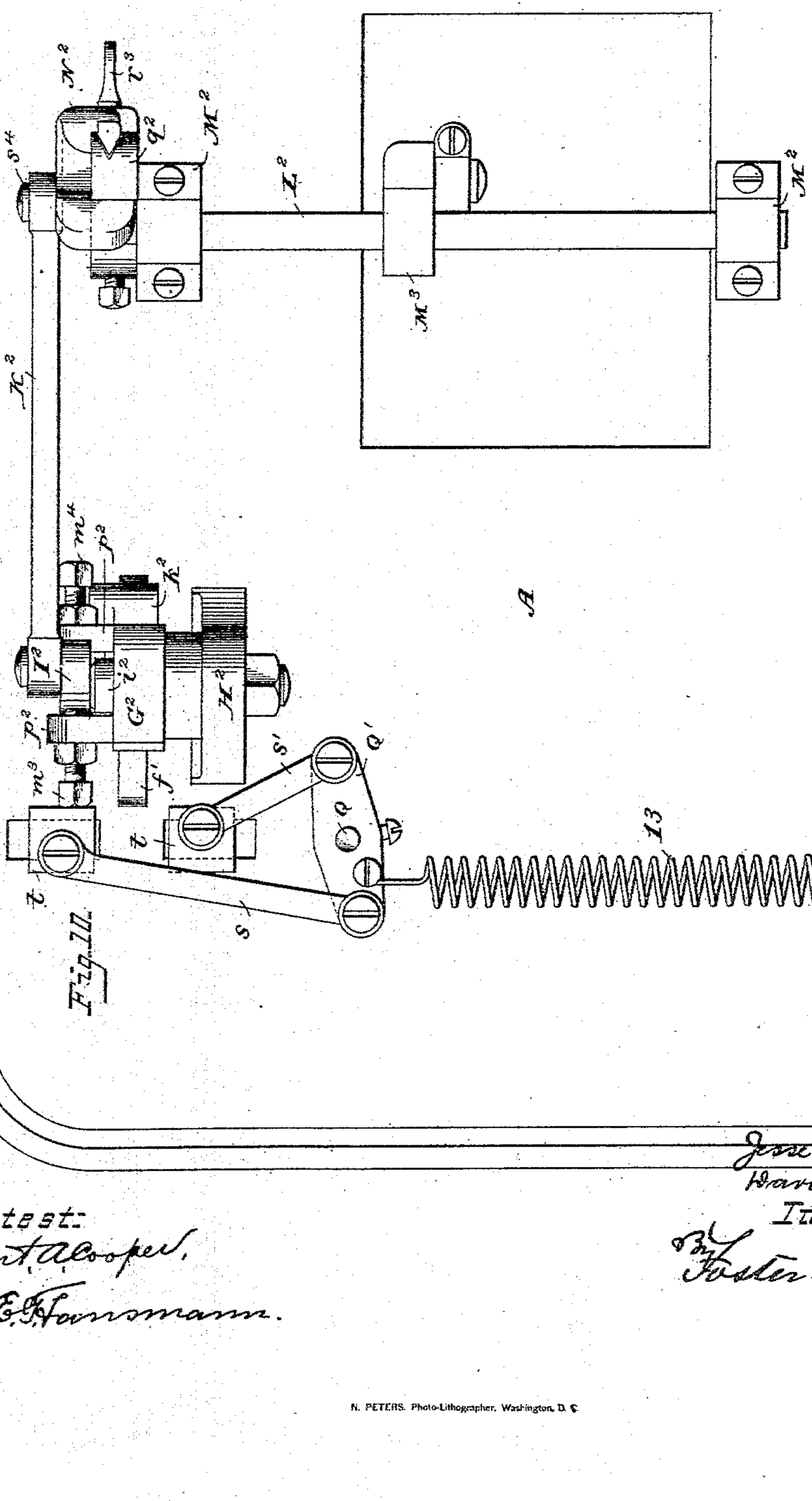

Fig. 11.

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UNITED STATES PATENT OFFICE.

JESSE W. RINGROSE AND DAVID A. HAUCK, OF MECHANICSBURG, PENNSYLVANIA; SAID HAUCK ASSIGNOR TO SAID RINGROSE.

PUNCHING-MACHINE FOR FLY-NETS.

SPECIFICATION forming part of Letters Patent No. 356,793, dated February 1, 1887.

Application filed May 27, 1886. Serial No. 203,450. (No model.)

To all whom it may concern:

Be it known that we, JESSE W. RINGROSE and DAVID A. HAUCK, citizens of the United States, residing at Mechanicsburg, Cumberland county, Pennsylvania, have invented certain new and useful Improvements in Punching-Machines, of which the following is a specification.

Our invention has for its object to punch or cut openings at regular intervals in strips of leather or other materials, and to absolutely insure the cutting of a predetermined number of perforations in each strip; and the invention consists in combining with the punch certain registering mechanism whereby to plainly indicate to the attendants each perforation made, and certain throw-out mechanism, whereby the operation of the punch upon the strip is automatically arrested as soon as the desired number of openings have been made.

The invention also consists in certain details of construction, fully described hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 is an elevation, in part section, of a punching-machine illustrating our invention. Fig. 2 is side elevation. Fig. 3 is a front elevation, part of the base being in section. Fig. 4 is a plan. Fig. 5 is a plan illustrating the centering clamps and connections. Figs. 6 and 7 are views illustrating the construction of ordinary leather fly-nets. Fig. 8 is a view illustrating the feed devices; Fig. 9, a side view in part section; Fig. 10, an inverted plan; Fig. 11, a detached view showing a modification of the stop.

In the manufacture of leather fly-nets for horses it is common to make them of longitudinal leather strips *a*, Fig. 6, and smaller cross-strips, *b*, the strips *a* having transverse perforations *x*, Fig. 7, for the passage of the strips *b*. The perforations *x* are formed by the action of a cutter in a punching-machine, and it is common for the attendant to count the strokes of the punch and arrest its action when the requisite number of perforations have been made. This mode of operation has proved most objectionable, as the attendant, through forgetfulness, carelessness, or having his attention called from his work, frequently miscounts and the strips are removed from the machine with more or less than the desired number of perforations, and the mistake is not discovered until the net is partially put together, resulting in considerable loss of time, and sometimes of material, to make the needed correction. To remedy this difficulty we provide a punching-machine, of any suitable construction, with a registering mechanism, which clearly indicates on a register each stroke of the punch, the index-hand or other pointer being capable of being set to zero prior to the introduction of each strip; and we also provide automatic means for throwing the punch out of action as soon as any predetermined number of perforations have been made.

Referring to the accompanying drawings, wherein is illustrated one form of machine which we have found to be very effective, the bed A of the machine is supported in an elevated position on legs *e e*, and supports two standards, *d d'*, and the former is extended to constitute a head, in which slides a bar, B, socketed at the lower end to receive two detachable hollow cutters, *e e;* but a single cutter of any desired shape may be substituted for the two cutters, the cutter or cutters, with the bar, constituting what we term the "punch." The punch-bar is reciprocated vertically by the revolution of a counter-shaft, C, geared to and deriving motion from a driving-shaft, D, and carrying an eccentric-pin, *f*, connected by a rod, *g*, to a lever, E, which is connected to the bar B by a link, *g'*.

The lever E vibrates upon the eccentric portion or bearing *j* of a shaft, F, which constitutes the fulcrum, and carries at the outer end an arm, G, which, when the bearing *j* is in its lowest position, engages with the shoulder of a catch, H, pivoted to a pin, 3, on the side of the head, the parts then being in position to operate upon the strip, which is guided and fed below the cutter, as fully set forth hereinafter.

When the catch H is withdrawn from the arm G, the shaft F is released and will turn automatically to raise the bearing *j* to its highest position, thereby elevating the punch-bar and cutter, so that the latter will no longer

operate on the strip, although the strip is fed and the cutter reciprocated, thus arresting the punching action without arresting the motion of the machine.

The shaft F is turned automatically to raise the lever E by a spring, I, connected by a link to the periphery of a grooved wheel, J, on the end of the shaft F, and at the lower end to a stud, 10, projecting from the head, and a handle, K, serves to turn back the shaft to lower the lever and bring the arm G into engagement with the catch H, which is thrown upward by a spring, 5, and limited in its movement by a stop, 6.

The registering or counting device is made the means of throwing back the catch H and releasing the arm G when the requisite number of holes have been punched.

In the construction shown the registering device is a disk, L, turning on a stud, 7, projecting from the side of the head and graduated and rotated to the extent of one graduation at each complete movement of the cutter through the medium of any suitable connecting devices. Thus the lever E actuates a spring-pawl, *k*, which engages with a ratchet, *m*, in the periphery of the disk L, and feeds the latter one step at each stroke of the lever.

When the cutter is not to be thrown automatically out of operation, a pointer, *y*, (dotted lines, Fig. 2,) connected to the stud 7, may serve to indicate to the attendant the number of perforations made; but as this would render it necessary to keep close attention to the register, and as it is difficult to arrest the machine suddenly, we prefer to throw the cutter out of action without arresting the machine, and this is effected by providing the disk L with an adjustable stop, which by its contact with the catch H throws the latter away from the arm G.

As shown, the stop consists of a block, M, with a recess to receive a peripheral rib, *m'*, on the disk, and a set-screw, *n*, by which it may be set in any position. A friction-roller on the block M prevents frictional contact with the catch H. A pin, *v*, (dotted lines, Fig. 2,) strikes a stop on the head and prevents the disk from being turned back beyond its zero position, and the block M is then set at as many points from zero as corresponds to the number of openings to be punched. The arm G is turned down and engages with the catch, and the operation of the machine begins and continues until the desired number of perforations have been made, when the stop strikes the catch, throws the latter from the arm G, and the cutters are then lifted out of operation.

To enable the disk to be set back to zero after the cutters are raised, the shaft F is provided with a disk, N, having a curved rib, P, of such length as to make contact with the tail of the pawl *k* and lift the latter out of engagement with the ratchet *m*, except when the arm G is down and locked to the catch H.

The strip to be punched is fed forward step by step, as hereinafter described.

It is necessary to center and hold the strip prior to the descent of the cutters, as the strip, being round, would otherwise be displaced. This is effected by the use of two movable jaws, (or one fixed and one movable jaw,) *q q'*, on the bed-plate below the head, and separated when the strip is introduced and fed, and brought together when it is punched. One of many possible means for imparting motion to these jaws consists of a vertical rock-shaft, Q, extending through the bed-plate, carrying at the lower end a cross-bar, Q', Fig. 5, connected by rods *s s'* with slides *t t*, extending through the base-plate and carrying the jaws *q q'*, so that when the shaft is turned in one direction the jaws are separated, and when turned in the opposite direction they are brought together, at which time the perforation is effected.

The shaft Q is provided at the upper end with an arm, 10, which, when struck by a lug, 12, on the cutter-bar, is swung in one direction, a spring, 13, connected to a stud and to one end of the cross-bar Q', beneath the base-plate, turning the shaft in the opposite direction.

A presser-foot, R, is carried by a lever, S, pivoted to the standard *d*, said lever also carrying a roller, *u*, which acts as an additional presser-foot and occupies a position directly above a slot, x^2, in the bed-plate, into which slot extends the serrated feeding-claw *f'* of the feed-device. The lever S is connected to rise and fall with the arm G, or to be lifted when the catches are carried out of operative position. This may be done in different ways—for instance, by a rod hung to the eccentric bearing *j* and extending downward and connected to the lever S; or, as shown, the lever S may be connected to a rod, T, sliding in ears on the head, and to the upper end of which is pivoted a cam-lever, T', which when turned lifts the rod, and a rod, T^2, connects the lever T' to the arm G.

As it is requisite for the presser-foot to rise when the feed takes place, this is permitted by giving the rod T a spring-bearing by means of a nut, 8, on the rod bearing on a coiled spring, 9, arranged between the nut and one of the guide-ears, and the lifting of the presser-foot is effected by the lifting of the strip and its upward bearing on the roller *u* by the action of the feed-claw. The feed-claw *f'* is secured to a bar, g^2, sliding in a bearing, h^2, upon a plate, G^2, the latter being pivoted by a bolt, i^2, to a bracket, H^2, extending downward from the bed of the machine, so as to vibrate in a vertical plane, carrying with it the feed-claw, to which a vertical reciprocating motion is also imparted, so as to bring it against and carry it from the material to be fed.

In order to impart the desired vertical motion to the bar g^2 and its claw, we make use of an L-shaped lever, I^2, pivoted by a pin, j^2, at one edge to an ear, k^2, of the plate G^2, and connected at the other end to a reciprocating rod, K^2, and a pin, m^2, extends from the corner of the lever through a slot, y^2, in the bearing h^2 into the bar g^2, so that as the rod K^2 is

moved back and forth longitudinally the lever I^2 will be vibrated upon the pin j^2, and the bar g^2 and its claw will be raised and lowered.

The extent of the vibration of the lever K^2 and the vertical movement of the feed-claw are regulated by means of two set-screws, m^3 m^4, extending through ears p^2 p^2 upon the plate G^2, with their ends in position to be struck by the vertical arm of the lever as it vibrates between them.

The extent to which the vibrating plate G^2 is moved upon its pivot depends upon the extent to which the rod K^2 is moved in either direction after striking the set-screws m^2 m^3.

The reciprocation of the rod K^2 is effected by means of a rock-shaft, L^2, turning in brackets M^2 at the under side of the bed-plate, and provided with an arm, q^2, to which the rod K^2 is jointed, and the extent of the reciprocation of the rod K^2 is changed by changing the position of the pin s^4, to which the end of the rod is pivoted. As one means of adjusting the pin s^4, it is shown as extending into a slide, N^2, movable upon the arm q^2, and the latter is preferably curved, so that any change in the position of the pin to carry it to or from the axis of the shaft L^2 will not change the position of the lever I^2. A set-screw, r^3, serves as a means of securing the slide N^2 in position after adjustment.

By the construction shown all the movements of the feed-claw f' are effected by the rocking of the shaft L^2, which derives its motion from any moving part of the machine. Thus as the shaft rocks in the direction of its arrow, Fig. 8, the lever I^2 is first carried in the direction of its arrow, and the feed-claw f' is lifted until the vertical arm of the lever I^2 strikes the end of the set-screw m^3, when the upward movement ceases. As the lever takes its bearing against the set-screw, the continued movement of the rod K^2 carries the plate G^2 and the feed-claw in the direction of the arrow 2 until the shaft L^2 ceases its movement. As the movement of the shaft L^2 is reversed, as hereinafter described, the lever I^2 is carried downward, and the claw is quickly drawn from contact with the work, and continues to descend until the lever I^2 strikes the end of the set-screw m^4, when the plate G^2 will be carried back to its first position.

In the manufacture of many articles—as, for instance, in the punching of thongs for fly-nets—it is sometimes necessary to impart an extended movement to the thong after each operation of the cutter. In order in such cases to insure the constant and uniform contact of the claw with the material, we impart to the claw a curved edge coinciding with a circle the center of which is the pin i^2, around which the claw vibrates, so that whatever may be the extent of movement of the claw its working-edge will always occupy the same relation to the material. By the proper adjustment of the screws m^3 m^4 and the slide N^2 the extent to which the claw is elevated and the amount of movement imparted thereto may be regulated with the greatest facility, but wholly independently of each other.

Any other suitable adjustable stops may be substituted for the set-screws m^3 m^4—as, for instance, eccentric stops, as shown in Fig. 11—and the pin s^4 may be adjustable in a slot in the arm q^2, instead of being carried by a slide.

Without limiting ourselves to the precise construction and arrangement of parts shown, we claim—

1. The combination, with a punch, of a register, and connections, substantially as described, between said punch and register to move said register forward one point at each operation of said punch, and to limit automatically the operations of said punch, as and for the purpose specified.

2. The combination, with a punch constructed to make successive perforations in a traveling strip, of mechanism, substantially as described, to throw the tool out of operation on the strip, and a register to control said mechanism and to indicate each operation of said punch, as and for the purpose specified.

3. The combination of the punch and operating devices, register, devices, substantially as described, for throwing the punch out of action, and a stop arranged to be operated by the register to operate said devices, substantially as set forth.

4. The combination, with a punch and a register to indicate each operation of said punch, of mechanism, substantially as described, connected to said punch and register, to throw said punch out of operation when said register has completed its movement, as and for the purpose set forth.

5. The combination, with a punch and a register to indicate each operation of said punch, of an adjustable stop operated by said register, and connections, substantially as described, between said stop and punch to throw said punch out of operation when said stop reaches its limit of movement, as and for the purpose specified.

6. The combination of the strip punching and feeding mechanism, mechanism, substantially as described, for throwing the punch out of action on the strip, a register, and a stop adjustable on the register and arranged to operate the throw-out mechanism, substantially as described.

7. The combination of the punch, lever to reciprocate said punch, movable bearing of said lever, registering index-disk, and devices, substantially as described, to move said disk at each operation of the punch, with an adjustable stop carried by said disk, and connections, substantially as described, between said movable bearing and stop, whereby the latter moves the former when the stop approaches a predetermined position, as and for the purpose set forth.

8. The combination, with the punch, operating-lever, and a movable bearing therefor, of appliances, substantially as described, for altering the position of the bearing, and a stop

actuated from a registering device arranged to make contact with and move said appliances, substantially as described.

9. The combination, with the punch, of an operating-lever, a shaft having an eccentric bearing forming the fulcrum of said lever, and an adjustable stop to throw the punch out of operation after punching a predetermined number of holes, substantially as described.

10. The combination, with the punch, lever, and shaft having an eccentric bearing for the lever, of a spring connected to turn the shaft, a catch to hold the shaft from turning, and a registering device provided with a stop arranged to operate said catch, substantially as described.

11. The combination, with the punch, shaft, spring, and catch, of a registering-disk and a stop consisting of a block adjustable in respect to the disk, substantially as described.

12. The combination, with the punch, shaft, lever, disk, and stop, of a spring for turning the shaft, an arm on the shaft, and a catch arranged to engage with the arm and to make contact with the stop, substantially as described.

13. The combination of the punch, lever, registering-disk, ratchet, and a pawl adapted to be operated on the vibration of the lever to move the ratchet, substantially as described.

14. The combination, with the punch, lever, shaft having an eccentric bearing for the lever, spring, and detent, of a registering device carrying a stop to move the detent, and a pawl arranged to move the disk on the vibration of the lever, substantially as described.

15. The combination, with the shaft, lever, punch, and registering-disk, ratchet, and pawl, of an adjustable bearing, substantially as described, for the pawl, holding the latter out of operative position when the punch is raised to throw the cutter out of action, substantially as described.

16. The combination, with the punch, register, and mechanism, substantially as described, to throw said punch out of operation, of a presser-foot, and means, substantially as described, to lift said foot when said punch is thrown out of operation, as and for the purpose specified.

17. The combination of the punch, mechanism, substantially as described, to throw said punch out of operation, feed, presser-foot, lifting-rod, and a spring for depressing said presser-foot, as and for the purpose set forth.

18. The combination, with a reciprocating punch, of centering-jaws, and mechanism, substantially as described, to automatically and intermittently move said jaws into contact with the strip, as and for the purpose set forth.

19. The combination, with the punch, of centering-jaws $q\,q'$ on the base-plate, shaft extending from above the base-plate to connections with the jaws below the base-plate, and connections between the shaft and punch above the base-plate, whereby the shaft is rocked on the reciprocation of the punch, substantially as described.

20. The combination, with the punch and jaws $q\,q'$, of the rock-shaft Q, cross-arm Q', and rods $s\,s'$, substantially as described.

21. The combination, with a base-plate, A, of a plate, G^2, pivoted to vibrate in a vertical plane, a feed-claw, f', connected to a rod sliding in bearings upon the plate G^2, a lever pivoted to the plate and to the rod carrying the feed-claw, a rock-shaft, L^2, and a connecting-rod, K^2, jointed to the crank of the rock-shaft and to the lower end of the lever, substantially as set forth.

22. The combination of the bed-plate A, plate G^2, pivoted to vibrate vertically below the bed-plate and carrying a rod, g^2, supporting a feed-claw, a lever, I^2, pivoted at one end to the plate G^2, and at the corner to the rod g^2, and extending between stops m^3 m^4, and a reciprocating rod, K^2, connected to the end of the lever, substantially as set forth.

23. The combination, with the vibrating plate G^2 and rod and segment carried by the plate, of a lever, I^2, pivoted to the plate and connected to the rod, a rock-shaft, L^2, provided with an arm, and a connecting-rod, K^2, pivoted to the lever and to a pin adjustable upon the arm of the rock-shaft, substantially as set forth.

24. The combination, with the pivoted plate G^2, lever I^2, rod g^2, and claw f', of the rock-shaft L^2, having a curved arm carrying an adjustable pin, and a rod extending between said pin and the end of the lever, substantially as set forth.

25. The combination, with the vibrating plate carrying a bar, g^2, of a feed-claw, f', having a serrated edge curved to correspond with a circle having its center coincident with the fulcrum of the plate, and devices, substantially as described, for reciprocating the bar and the plate, for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JESSE W. RINGROSE.
DAVID A. HAUCK.

Witnesses:
CLARA SWARTZ,
J. L. SHELLEY.