

915,862.

W. N. HUNTER.
STAPLING MECHANISM.
APPLICATION FILED FEB. 10, 1906.

Patented Mar. 23, 1909.
3 SHEETS—SHEET 1.

FIG. 7.

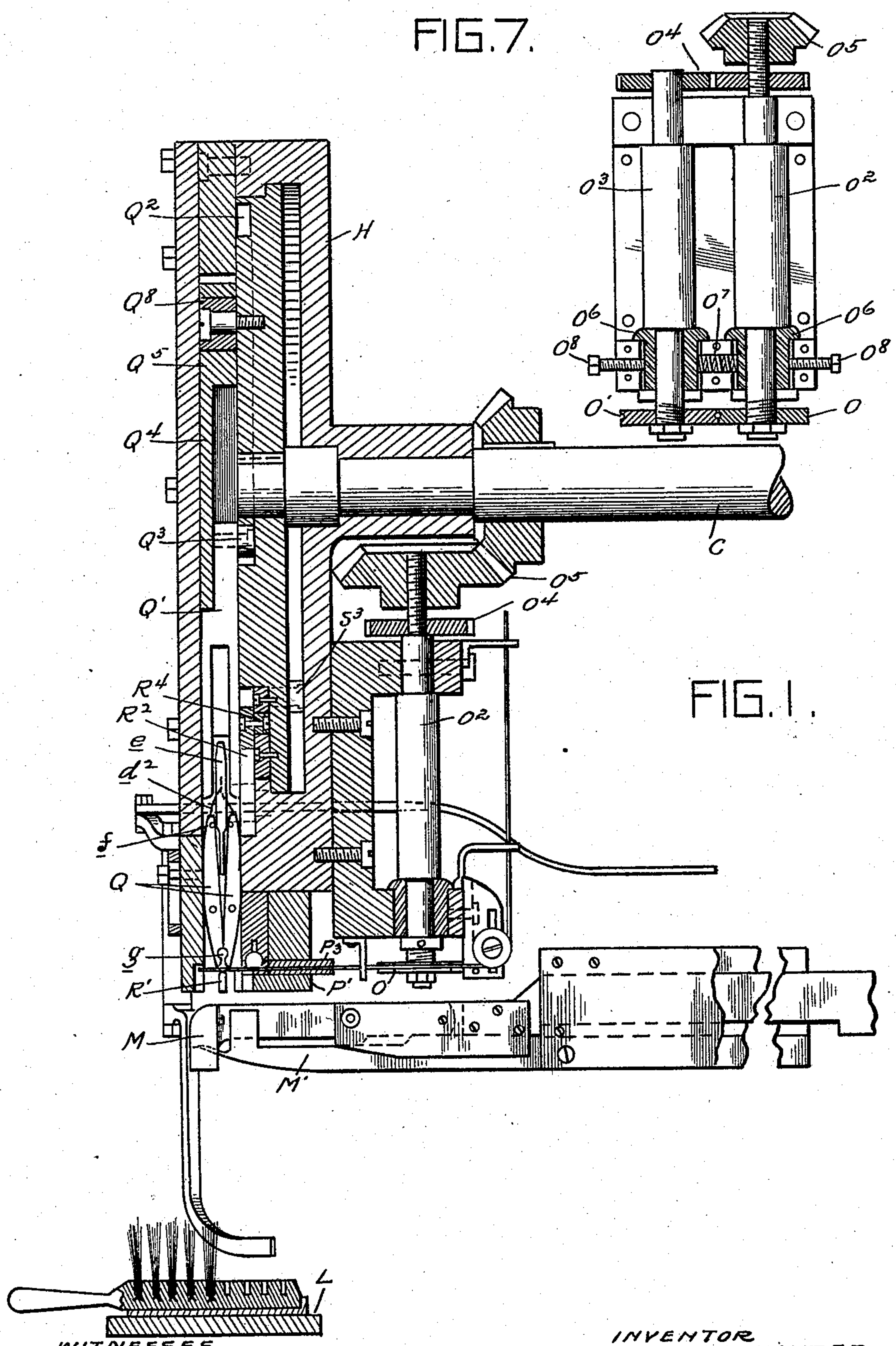


FIG. 1.

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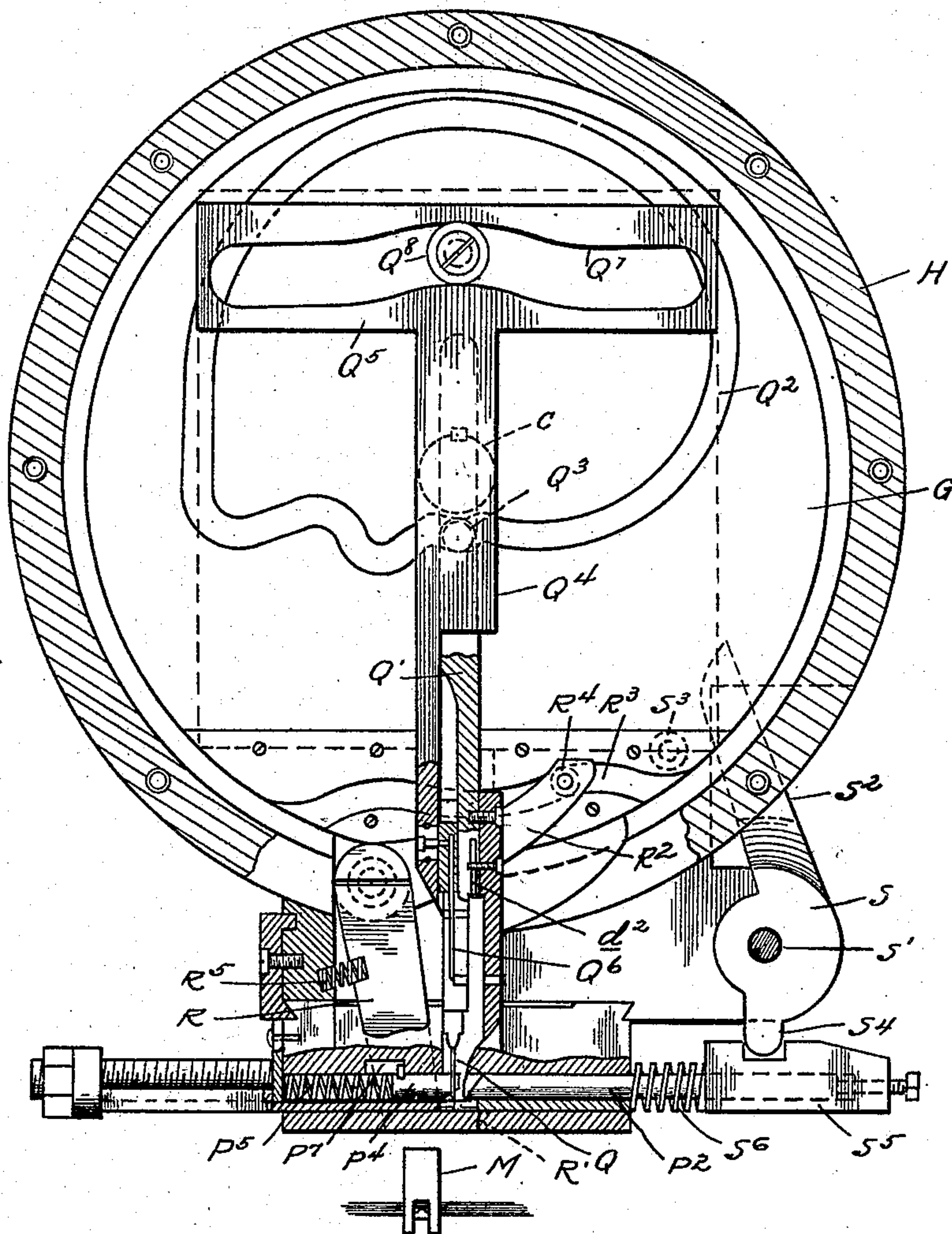


FIG. 2.

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3 SHEETS—SHEET 3.

FIG. 4.

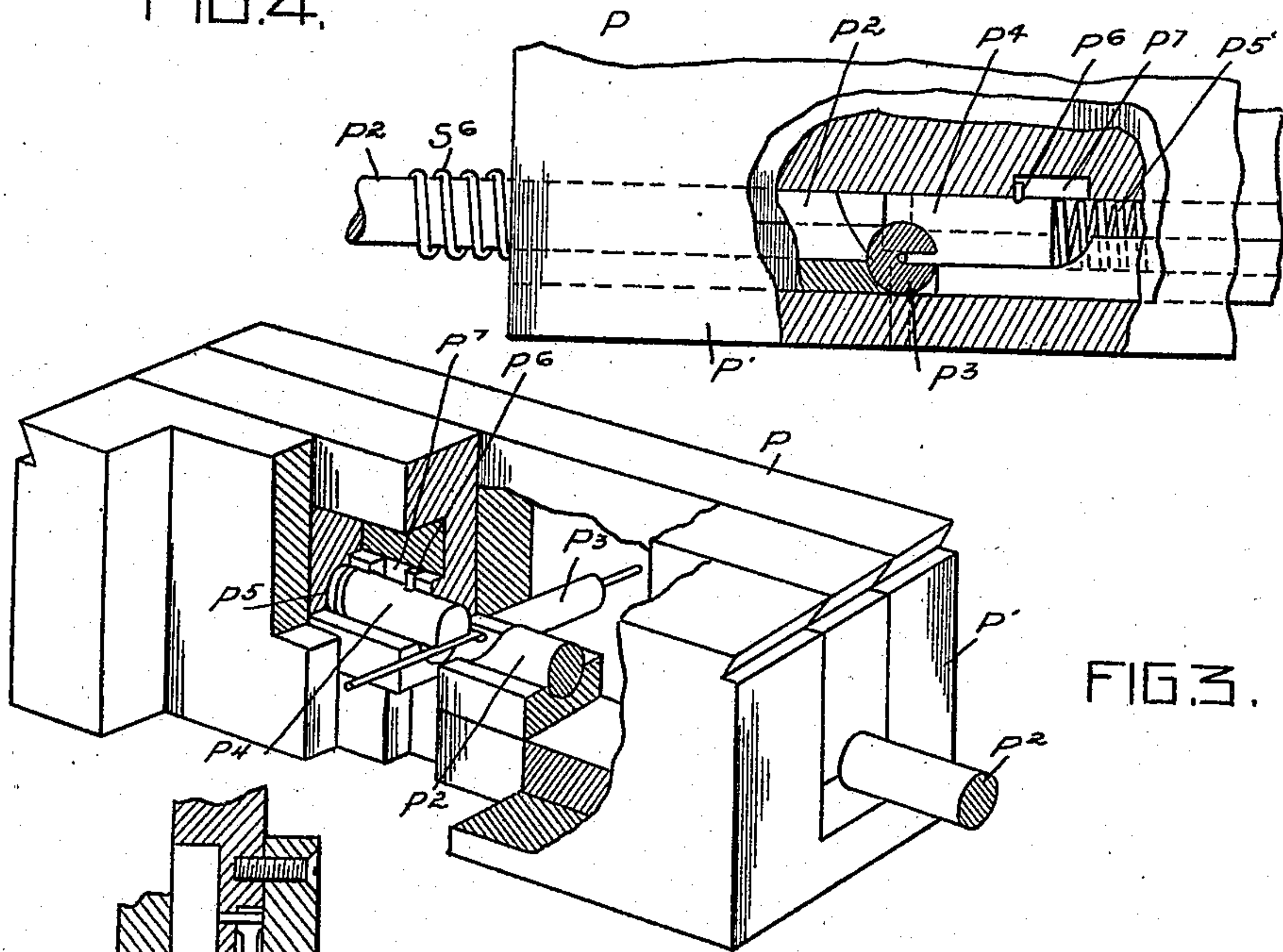


FIG. 3.

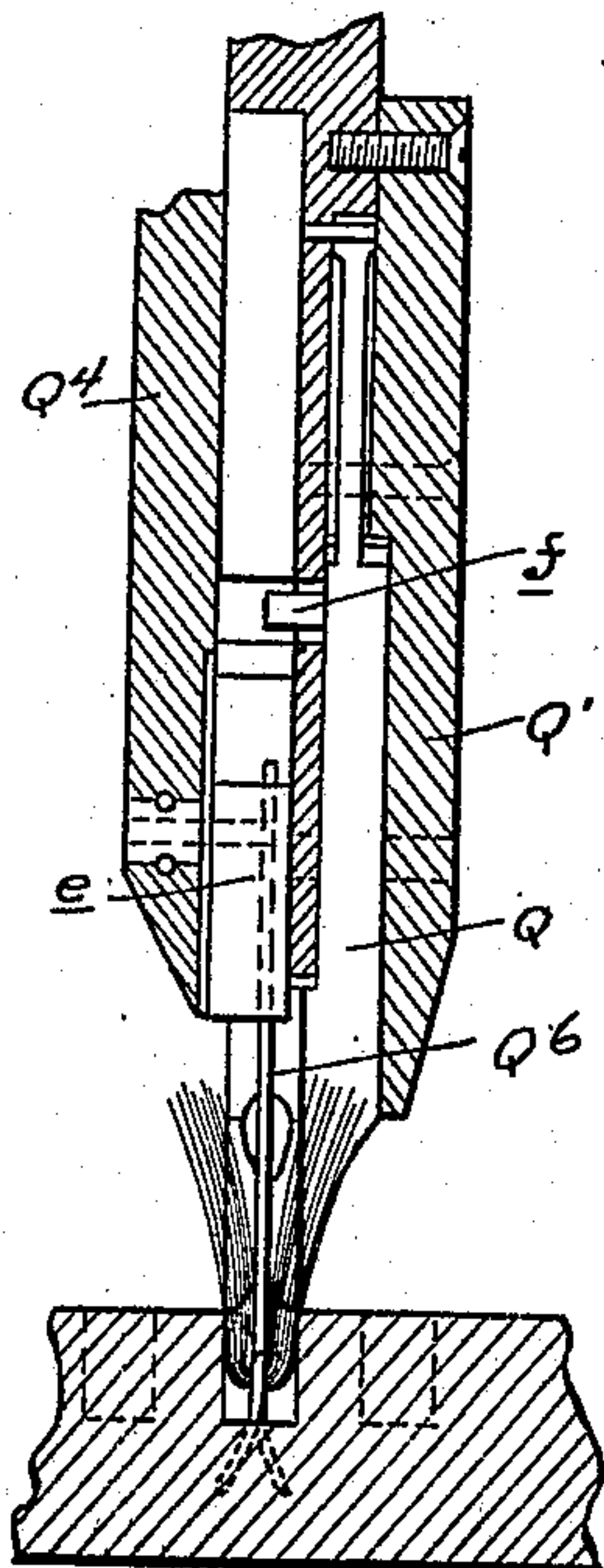


FIG. 5.

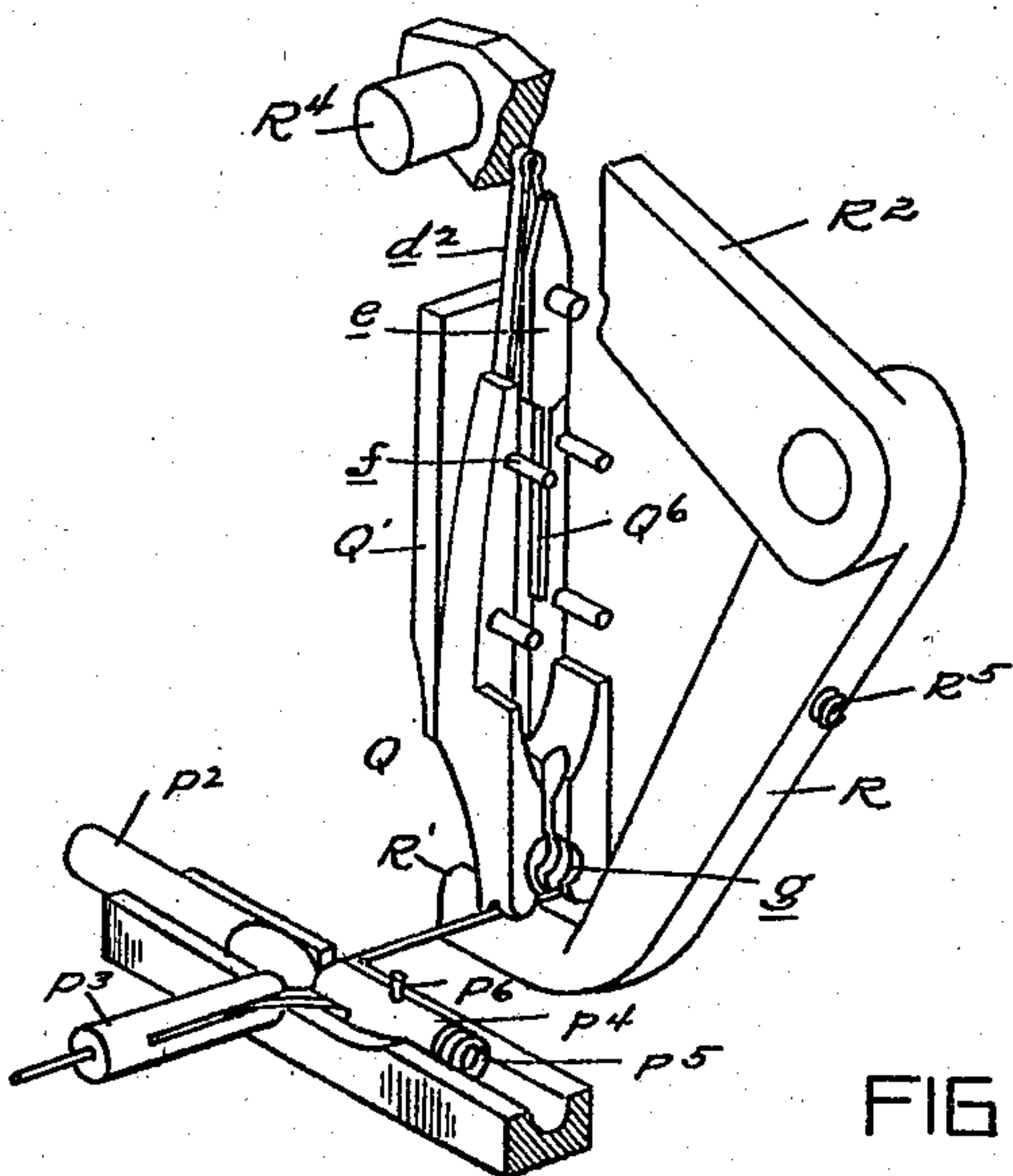


FIG. 6.

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UNITED STATES PATENT OFFICE.

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STAPLING MECHANISM.

No. 915,862.

Specification of Letters Patent.

Patented March 23, 1909.

Application filed February 10, 1906. Serial No. 300,454.

To all whom it may concern:

Be it known that I, WILLIAM N. HUNTER, a citizen of the United States of America, residing at Blanchester, in the county of Clinton and State of Ohio, have invented certain new and useful Improvements in Stapling Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to improvements in stapling mechanism, more particularly designed for use in connection with brush machines.

In the drawings, Figure 1 is a longitudinal section through a portion of the brush machine, to which my improvements are applied. Fig. 2 is a transverse section thereof. Fig. 3 is a sectional perspective view of the wire severing mechanism. Fig. 4 is a sectional elevation thereof. Fig. 5 is a vertical longitudinal section through the stapling mechanism, showing the staple driven. Fig. 6 is a perspective view of the staple forming mechanism. Fig. 7 is a sectional elevation of a wire feeding mechanism.

The brush machine in connection with which my stapling mechanism may be employed may be of any suitable construction and forms no part of my present invention except as hereinafter set forth. In general, this machine comprises a bunch grabber and carrier having the cooperating members M, M' which are laterally reciprocated to transfer the bunch in position for engagement with the stapling mechanism. The operating means for this mechanism is not illustrated and the parts are merely shown in one position to indicate their relation to the stapling mechanism.

Above the parts M, M' is arranged a rotary head G inclosed in a casing H, this head being revolved by a rotary shaft C on which it is mounted. This head is provided with suitable cams, which will be hereinafter specifically described, for operating various parts of the stapling mechanism, the arrangement being such that the staples are successively formed in a position above the parts M, M' and are then engaged with a bunch of bristles held by said parts M, M' and subsequently driven downward into engagement with the brush head, which is located on a shelf or work support L there beneath.

The stapling mechanism comprises means for feeding the wire and for cutting said wire into the required lengths for the staples,

and also for forming pointed ends thereon.

The feeding mechanism comprises a pair of rolls or rotary feeding disks O and O', the former being provided with a projecting segment which intermittently cooperates with the other disk to feed the wire. These disks O and O' are mounted upon shafts O² and O³, secured in bearings upon the casing H. At their upper ends they are connected together by gears O⁴ and are driven from the shaft C through the medium of bevel gears O⁵. At their lower ends, the shafts O² and O³ engage with adjustable bearings O⁶ which are yieldingly separated from each other by the spring O⁷ and upon opposite sides of said bearings are the adjusting screws O⁸ by means of which they may be adjusted in position to move the disks O and O' in proper relation for feeding. These disks O and O' are grooved for the reception of the wire and are preferably knurled so as to form a better hold upon the wire.

From the feeding disks O and O' the wire is passed horizontally into the cutter P. This consists of a block P' which has formed therein a recess containing a segmental die with which the punch P² engages. The wire is fed transversely through the recess preferably by the guide P³ which directs the wire across the segmental die at one side of the center thereof and preferably with the outer edge of the wire substantially tangential to the inner face of the segment of the recess. The wall of the segment on the side that the wire enters is cut away so that in the operation of the punch the wire will be sheared only upon the opposite side of the segment and this severing operation will cause the cutting of the wire obliquely so as to produce oppositely sharpened ends. The movement of the punch will carry with it the end of the unsevered portion of the wire but this movement is permitted without shearing or cutting out any portion of the wire by reason of the recess in the wall of the segment. In the return movement of the punch the wire is bent back again so as to be in position for another feeding operation, this being effected by the follower P⁴ which is actuated in one direction by the spring P⁵. The movement of this follower is limited by the stop pin P⁶ which engages the recess P⁷ in the block P'. From the cutter P the wire passes into engagement with a staple forming mechanism. This comprises a pair of jaws Q which are pivotally attached to the vertical reciprocating bar Q'. This bar is actuated

by a cam groove Q^2 in the rotary head G with which the roller Q^3 on the bar Q' engages. The bar Q' is slidably secured in the bar Q^4 which is provided with a T-shaped head Q^5 and is slidably secured in bearings on the casing H . This bar Q^4 has attached to its lower end the punch Q^6 which is adapted to cooperate with the jaws Q in the manner to be hereinafter set forth. The head Q^5 is provided with a cam slot Q^7 with which the crank roller Q^8 on the head of G engages. Thus in the rotation of the head G the bar Q^4 will be reciprocated through the actuation of the roller Q^8 and during this reciprocating movement an independent movement will be imparted to the bar Q' through the medium of the roller Q^3 engaging the cam slot Q^2 .

Pivotaly attached to the casing H is an anvil R . This is preferably in the form of a bell crank at the lower end of which is arranged a projecting lug R' forming the anvil proper. The outer arm R^2 of the bell crank engages with the cam slot R^3 in the head G through the medium of the roller R^4 , the roller R^4 moving on the outside of the member G after leaving the slot R^3 . This cam slot is so shaped that during the rotation of the head G the anvil R will be actuated to move the lug R' into the path of the jaws Q and retain it in that position for an interval, after which the bell crank is again actuated to withdraw said lug. The timing of the parts is such that during the feeding movement of the wire the jaws Q and their actuating bar Q' will remain stationary. Furthermore the jaws Q are held in close relation to each other by means of a punch cam e engaging the pins f on their upper ends, closing said jaws at their lower ends so as to permit the wire to be fed therein without danger of the end of the wire catching in between the jaws. When the wire has been fed the required distance movement will be imparted to the bell crank lever R carrying the lug or anvil R' upward. At the same time the punch cam e is withdrawn from engagement with the pins f and simultaneously the jaws Q are separated by means of the spring d^2 which is attached to the upper ends of the jaws and tends to draw said upper ends together and thus separate the lower ends. This permits said lug to press on said wire between the jaws. This will form a clamp for firmly holding the wire during the severing operation.

In order that the severed portion of the wire may be held from accidental disengagement from the jaws, it is desirable that the anvil shall press against the wire with a uniform tension, this tension being just sufficient to clamp the wire without bending it, I have therefore provided the actuating connection for the anvil with a slight lost motion and have arranged a spring R^5 which when the anvil is moved upward will yieldingly press the same against the wire in engage-

ment with the jaws. As soon as this section is severed movement is imparted to the bar Q' which will press the jaws downward and around the anvil lug R' , thereby bending the severed section of the wire into staple form. The anvil R' is then withdrawn out of the path of the jaws and the latter will continue their downward movement until the staple is engaged with the bunch which latter has been moved by the grabber mechanism previously described into the path of the staple. As soon as the staple has been engaged with the bunch the jaws Q will be moved toward each other so as to bend the ends of the staple together and around the bunch. This movement is effected preferably by a projecting lug e on the bar Q^4 which is adapted to pass between pins f on the jaws Q and acts as a cam to separate said jaws at their upper ends, thereby closing them together at their lower ends, and pinching the staple. Moreover the movement of the jaws will cause them to tightly grab the bunch, holding the same in the recess g at the lower end of the jaws. Simultaneously the grabber actuating mechanism will be actuated to return the grabber but before the bunch holding jaw is moved, the needle M' will be returned sufficiently to disengage from the lower edge of the bunch and permit the latter to be carried by the jaws Q out of engagement with the jaw M .

After the movement just described the jaws Q will be carried downward by the movement of the bar Q' until they contact with the upper face of the brush block, which is located on the table L and is arranged by the operator with one of its apertures in alignment with the jaws Q . As soon as this point is reached further movement of the jaws is arrested but the bar Q^4 will continue its movement carrying the punch Q^6 downward between the jaws until its lower end contacts with the upper end of the staple. Before contacting with the staple the cam e passes from engagement with the pins f on the jaws Q permitting the holding portions of the jaws to move apart by the actuation of the spring d^2 so as to disengage from the staple and allow the latter to be forced by the punch Q^6 downward in the aperture in the brush block.

During the continued movement of the punch in driving the staple downward and driving the same into the wood, the jaws Q remain stationary and also remain in this position during the initial upward movement of the punch, thereby operating as a presser foot which retains the block from being drawn upward by frictional engagement with the punch. As soon as the punch has been disengaged from the aperture in the brush head the jaws Q will be again moved upward by the actuation of the bar Q' and the parts will be returned to their initial positions.

The punch P^2 is actuated in its operation

by the lever S which is fulcrumed at S' on the casing H and has one arm S' extending into the path of the roller S³ on the rotary head G. The opposite side of this lever is provided
 5 with a lug S⁴ which engages a slot in the head S⁵ upon the punch P². Thus in the rotation of the head G the lever S will be actuated to reciprocate the punch P² at the proper time and the return movement of said punch is
 10 effected by the spring S⁶. The engagement of the lug S⁴ with the slotted head S⁵ is such that the punch P² is permitted a rotary adjustment in the die, and thus the cutting of the wire will not always be effected by the
 15 same portion of the punch.

From the description above given, it will be apparent that my construction of stapling mechanism has certain advantages, among which are; first that the wire feeding mechanism is such as to permit of accurate adjustment so as to insure proper operation at all times; second, the wire cutting mechanism sharpens both ends of the staple without
 20 wasting any portion of the wire; third, the staple forming jaws are closed together during the feeding of the wire above the same which avoids danger of catching the wire; fourth, the staple forming jaws remain in engagement with the brush during the driving
 25 of the staple and also during the initial return movement of the punch so as to prevent the drawing upward of the block.

What I claim as my invention is:—

1. In a stapling machine, the combination with a pair of stapling jaws, of means
 35 for feeding the wire across the ends of said jaws and means for operating said jaws adapted to hold the same together during the feeding of the wire and means for subsequently separating the same for the formation of the staple.

2. In a stapling machine, the combination with a pair of staple bending jaws and a cooperating anvil with means for feeding the
 45 wire across the path of said jaws, means for closing said jaws together during the feeding of the wire and means for subsequently opening said jaws into position to engage with the sides of said anvil.

3. In a stapling machine, the combination with wire feeding and severing mechanism, an anvil and a pair of cooperating pivoted jaws comprising a forming member between
 50 which the wire is fed, and means for yieldingly pressing said anvil and cooperating member toward each other to clamp and hold the portion of the wire severed prior to the forming operation.

4. In a stapling machine, the combination
 60 of wire feeding and severing mechanism, an anvil and a pair of pivoted cooperating forming

jaws between which the wire is fed, means for yieldingly pressing said anvil toward said jaws to clamp the portion of the wire severed, and means for subsequently
 65 relatively moving said jaws and anvil to form the staple.

5. In a stapling machine, the combination with a pair of staple forming jaws, of means for feeding the wire across the ends of said jaws
 70 and a staple driving punch adapted to hold the same together during the feeding of the wire and means for subsequently separating the same for the formation of the staple.

6. In a staple forming machine the combination of wire feeding and severing mechanism, of a pair of pivoted cooperating forming
 75 jaws between which the wire is fed, an anvil, a spring for yieldingly pressing said anvil toward said jaws to clamp the portion of the wire severed, and means for subsequently
 80 relatively moving said jaws and anvil to form the staple.

7. In a staple machine, the combination of wire feeding and severing mechanisms, an
 85 anvil and a pair of pivoted cooperating forming jaws between which the wire is fed, means for yieldingly pressing said anvil and jaws toward each other to clamp and hold the portion of the wire severed prior to the
 90 forming operation, and means for subsequently moving said jaws and anvil to form the staple.

8. In a stapling machine, the combination of wire feeding and severing mechanisms, of
 95 a pair of pivoted cooperating forming jaws, a pivoted bell-crank anvil, means for feeding the wire between said jaws and anvil, means for yieldingly pressing said anvil and jaws toward each other to clamp and hold the
 100 portion of the wire severed prior to the forming operation, and means for subsequently relatively moving said jaws and anvil to form the staple.

9. In a stapling machine, the combination
 105 of wire feeding and severing mechanisms, of a pair of pivoted cooperating forming jaws, a pivoted bell-crank anvil, means for feeding the wire across the ends of said jaws, means for operating said jaws adapted to hold the
 110 same together during the feeding of the wire, means for subsequently separating the same for the formation of the staple, and means for relatively moving said jaws and anvil to form the staple.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM N. HUNTER.

Witnesses:

CHRISTINE LUNGFITZ,
 JOHN A. KELLEY.