(No Model.) 6 Sheets—Sheet 1.

# P. A. COUPAL.

## STAPLE DRIVING MACHINE.

No. 438,100. Patented Oct. 7, 1890.

Fig. 3.

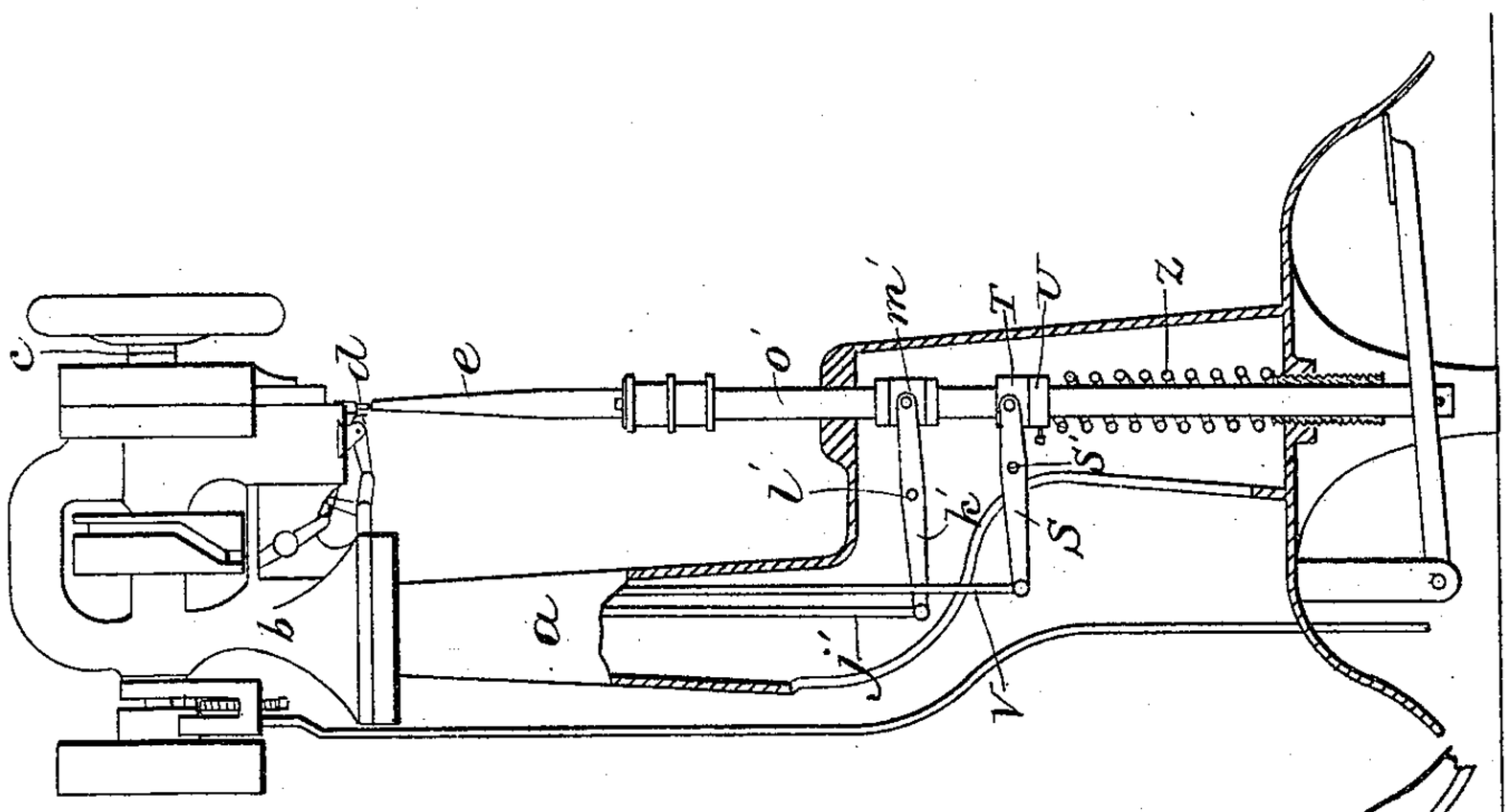



Fig. 2.

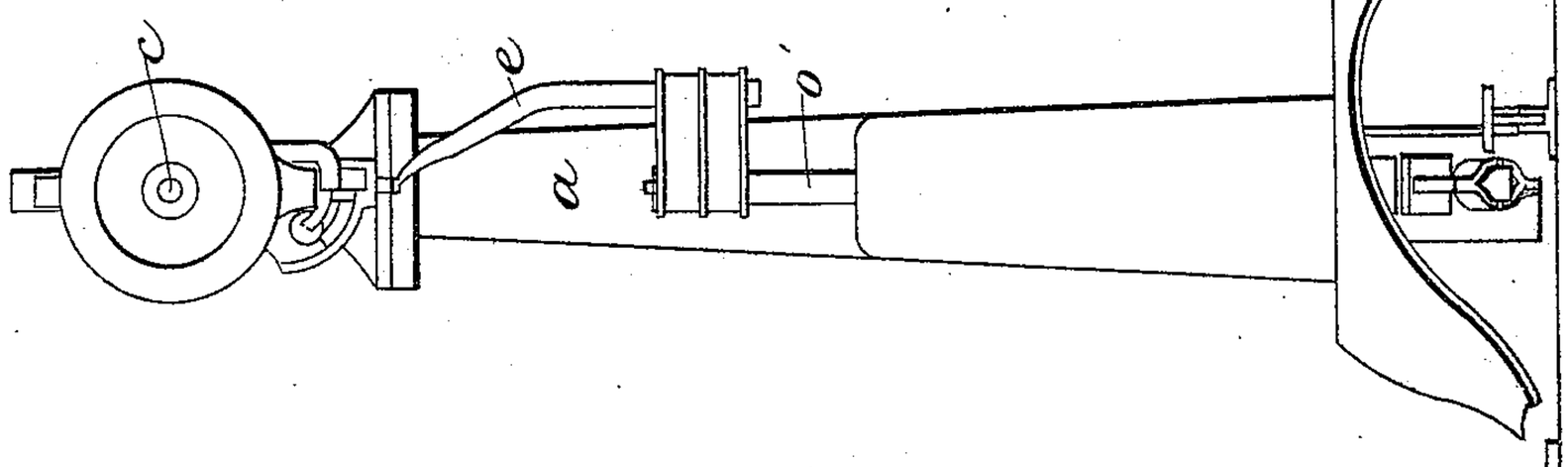
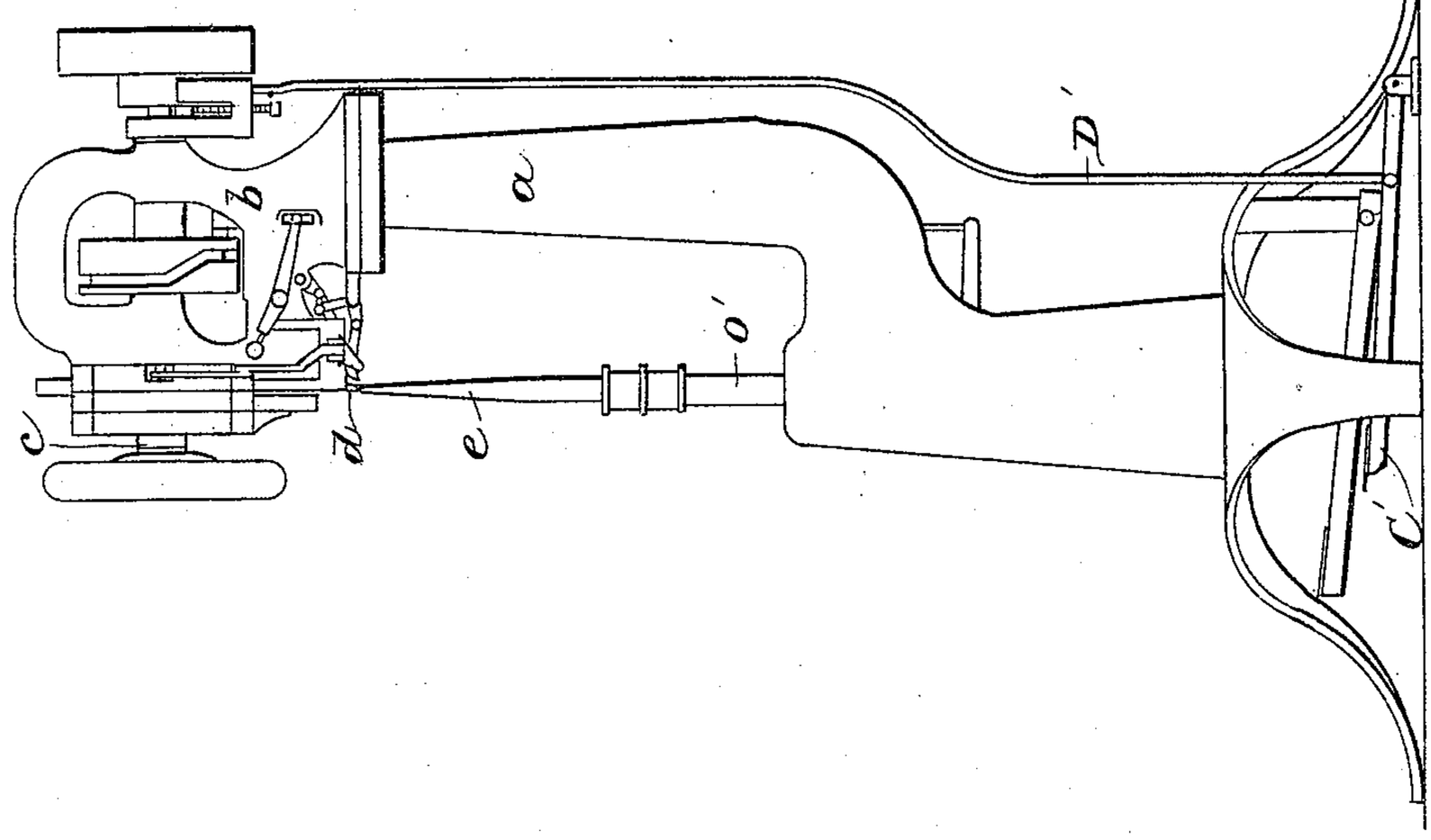



Fig. 1.




Witnesses.
H. Brown.
W. B. Ramsay.

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(No Model.) 6 Sheets—Sheet 2.

# P. A. COUPAL.

## STAPLE DRIVING MACHINE.

No. 438,100. Patented Oct. 7, 1890.

Fig. 7.

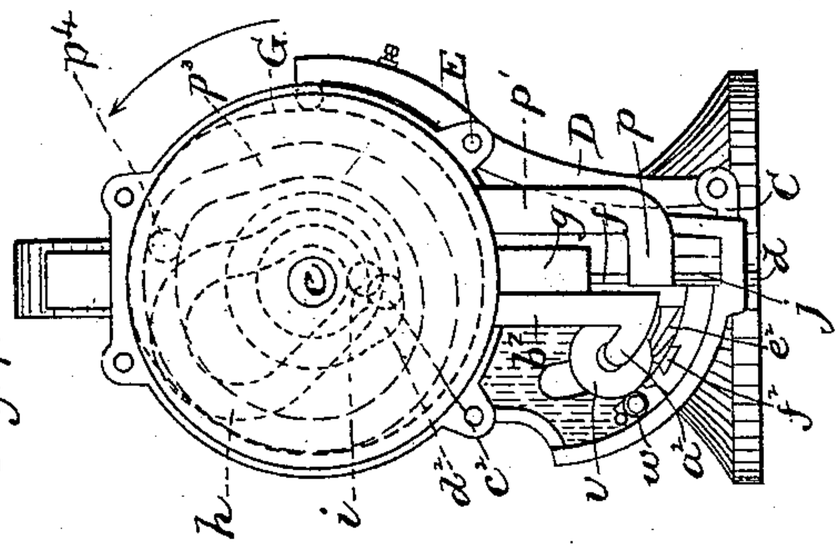



Fig. 8.

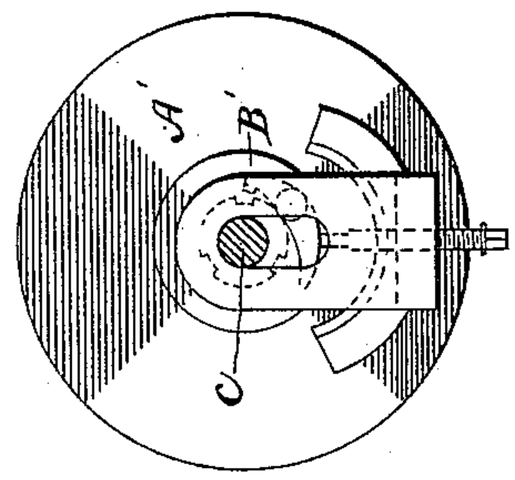



Fig. 6.

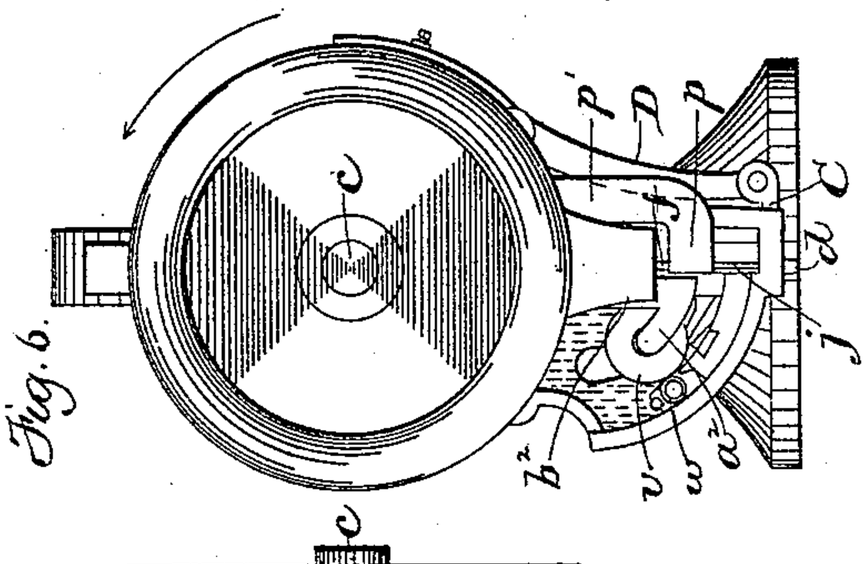



Fig. 9.

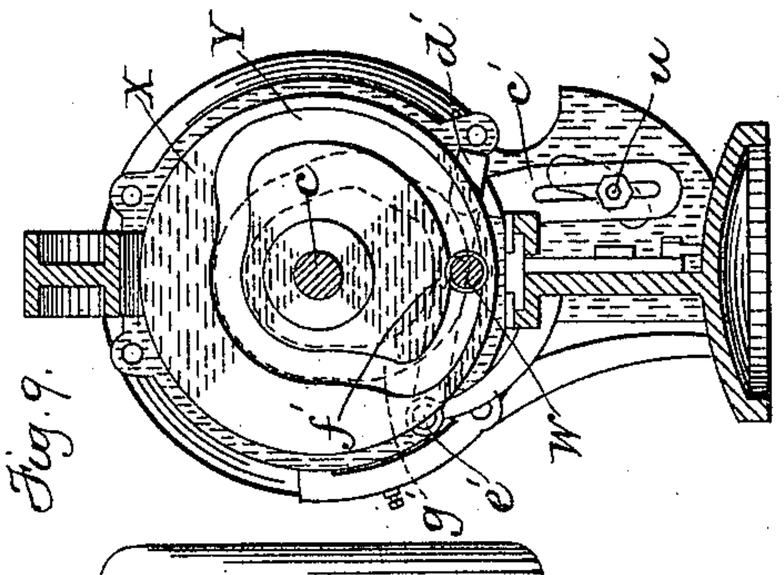



Fig. 4

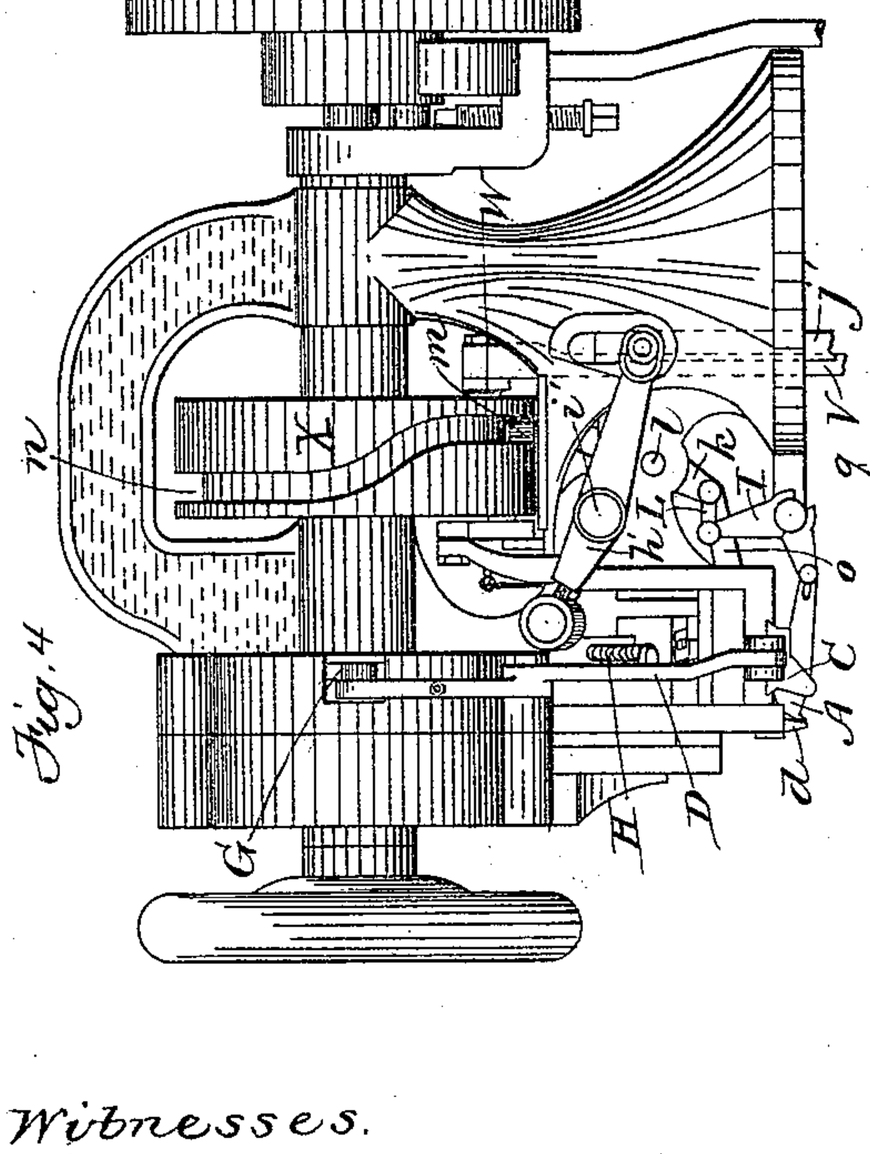
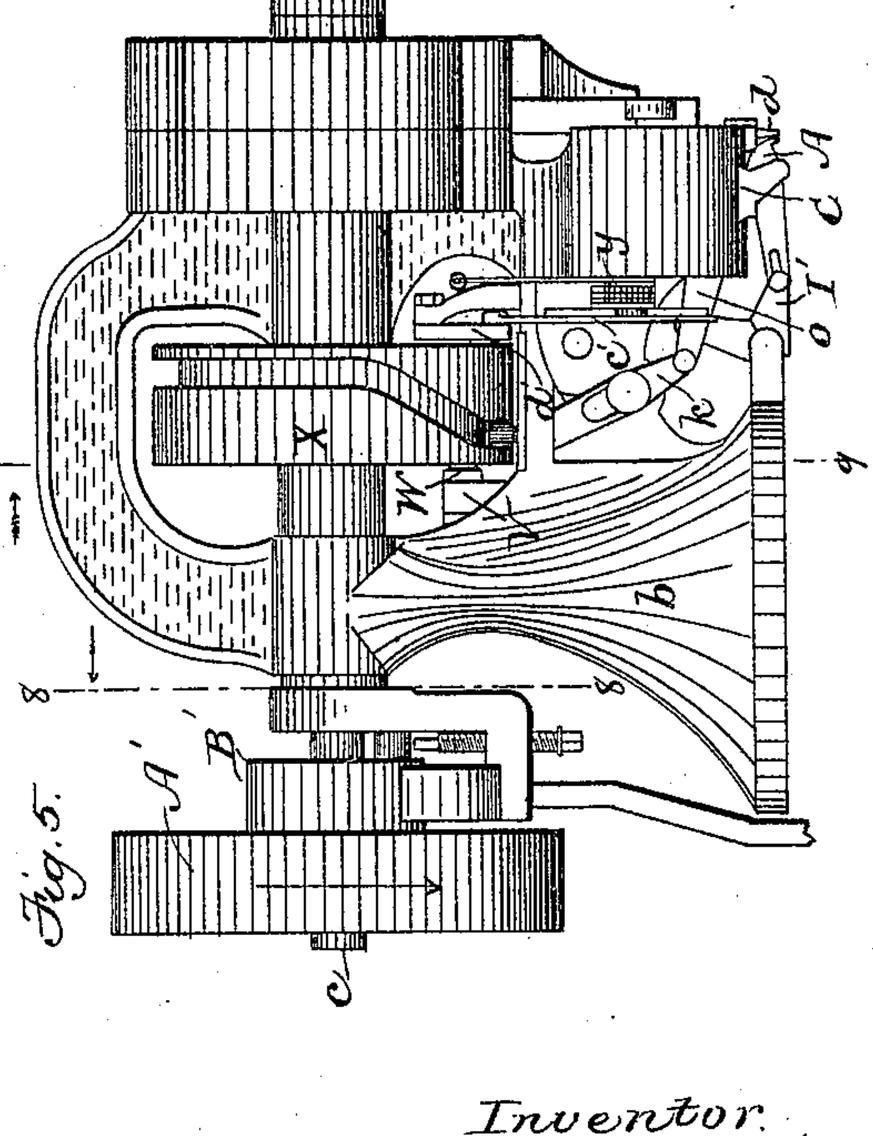



Fig. 5.




Witnesses.
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(No Model.)

6 Sheets—Sheet 3.

# P. A. COUPAL.

## STAPLE DRIVING MACHINE.

No. 438,100. Patented Oct. 7, 1890.

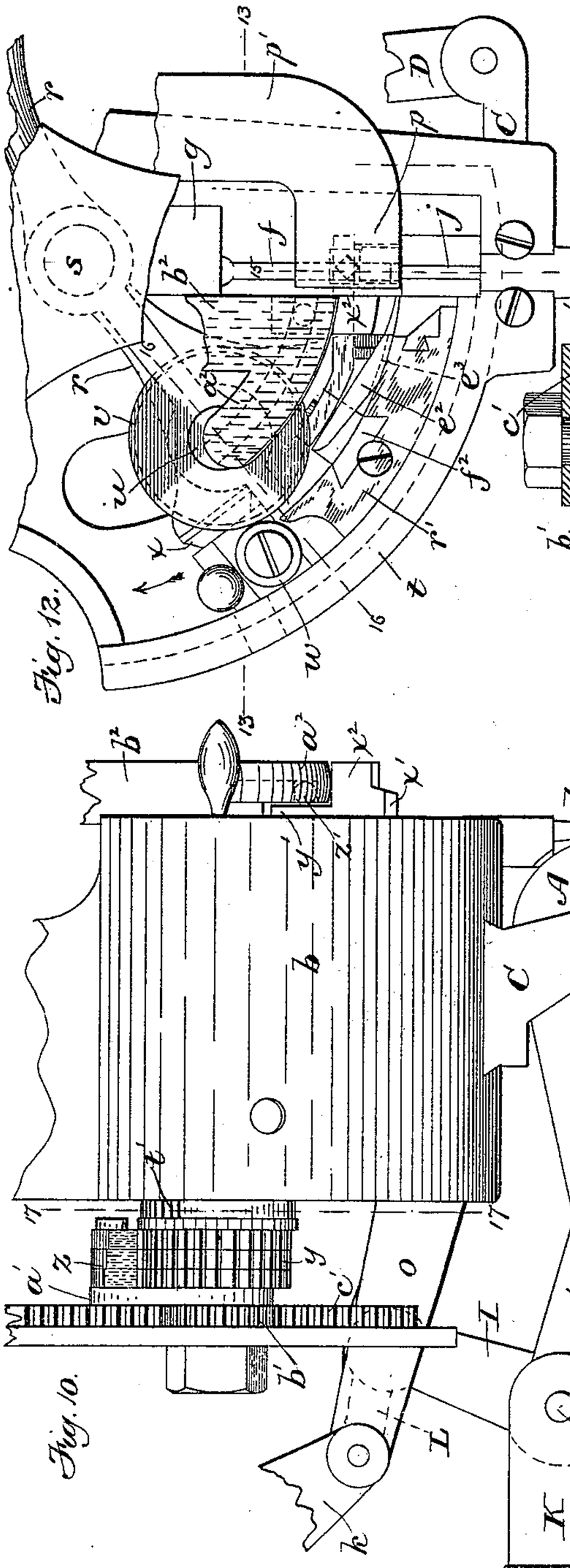

Fig. 12.

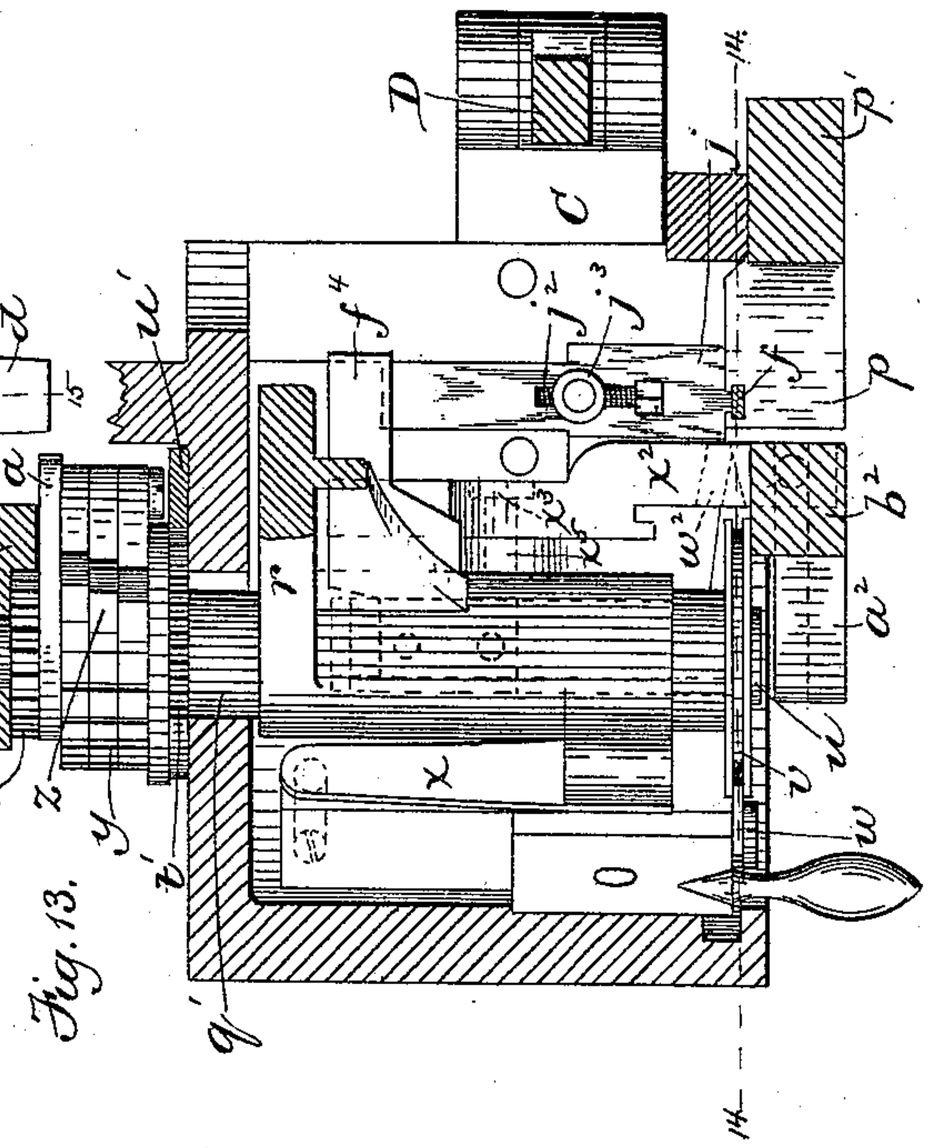

Fig. 13.



Fig. 10.

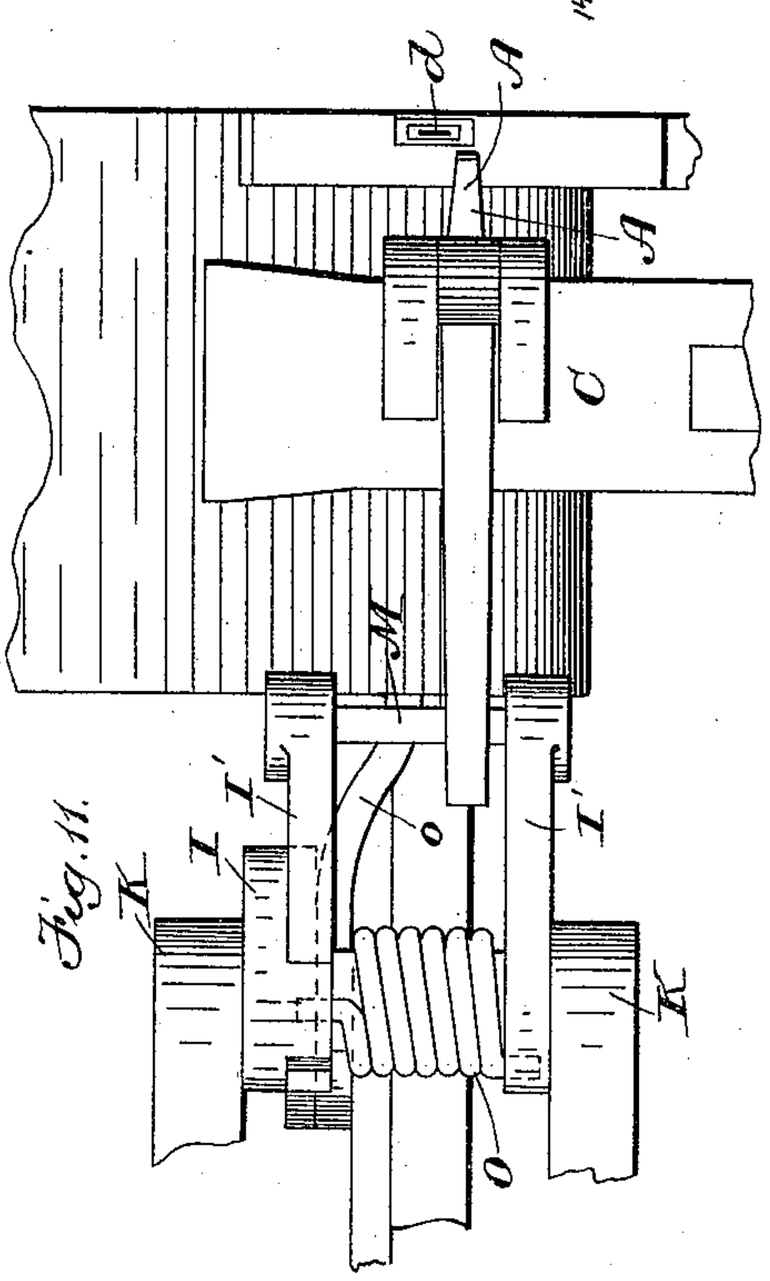

Fig. 11.

Witnesses.
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# P. A. COUPAL.

## STAPLE DRIVING MACHINE.

No. 438,100. Patented Oct. 7, 1890.

Fig. 20.

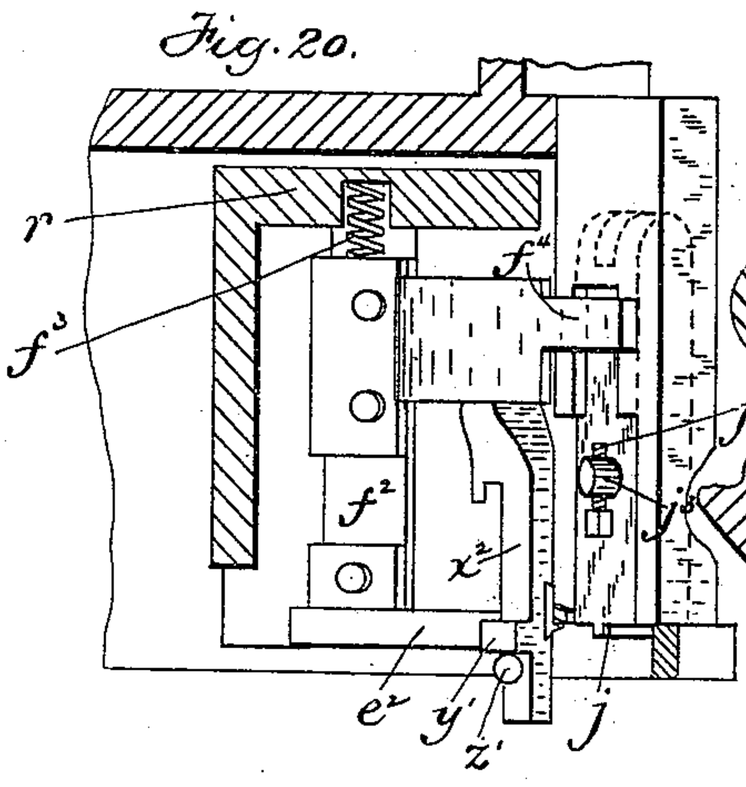



Fig. 14.

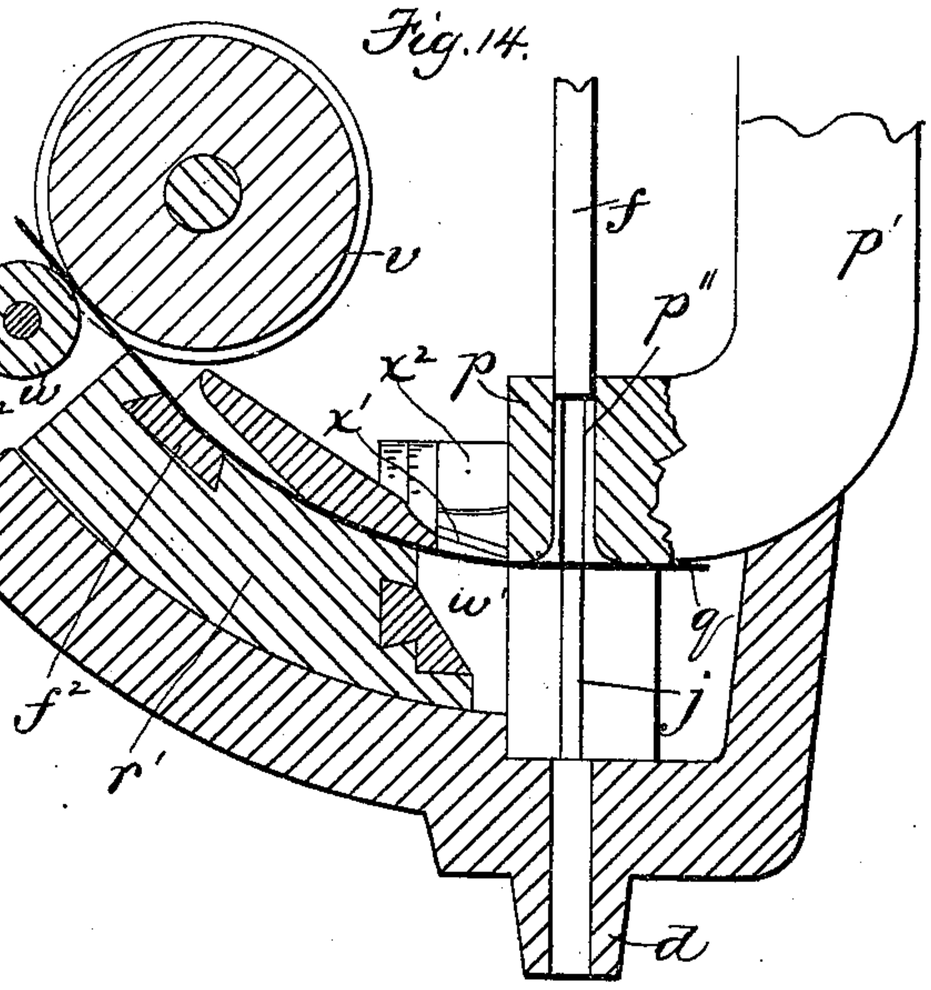



Fig. 15.

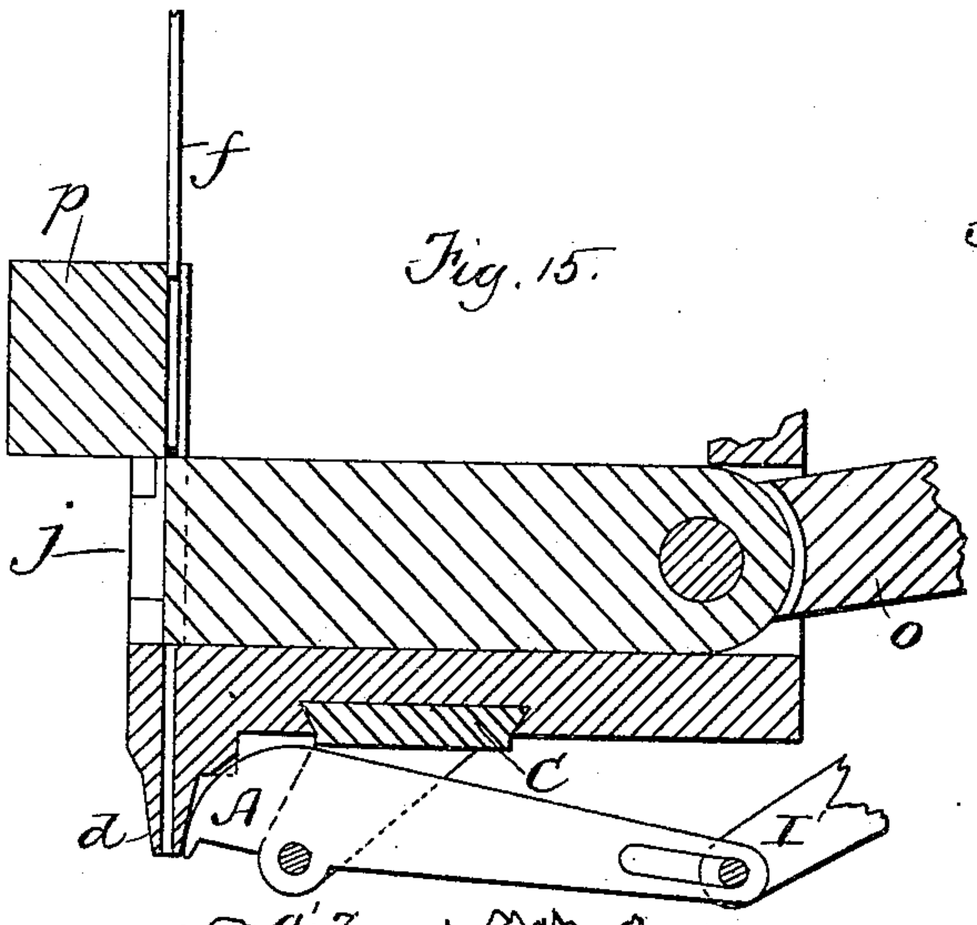



Fig. 17.

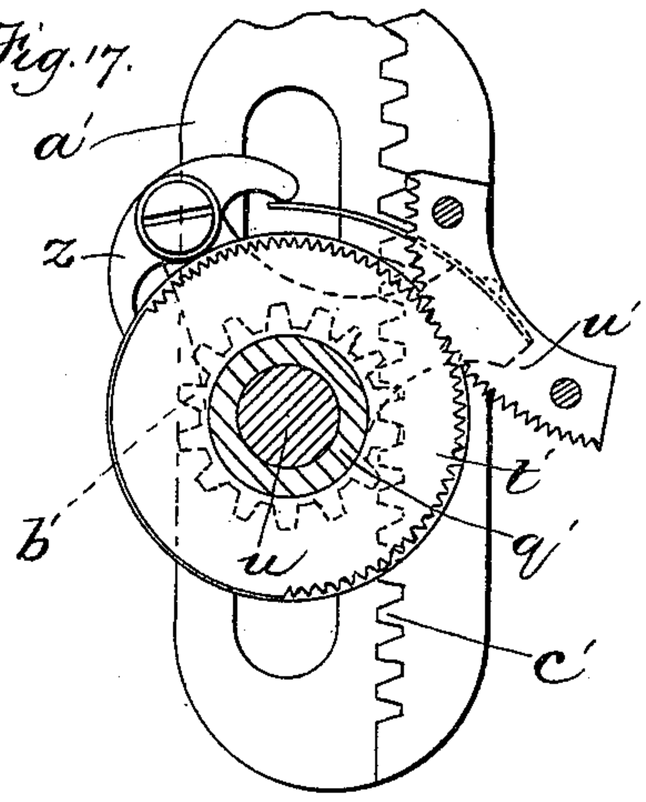
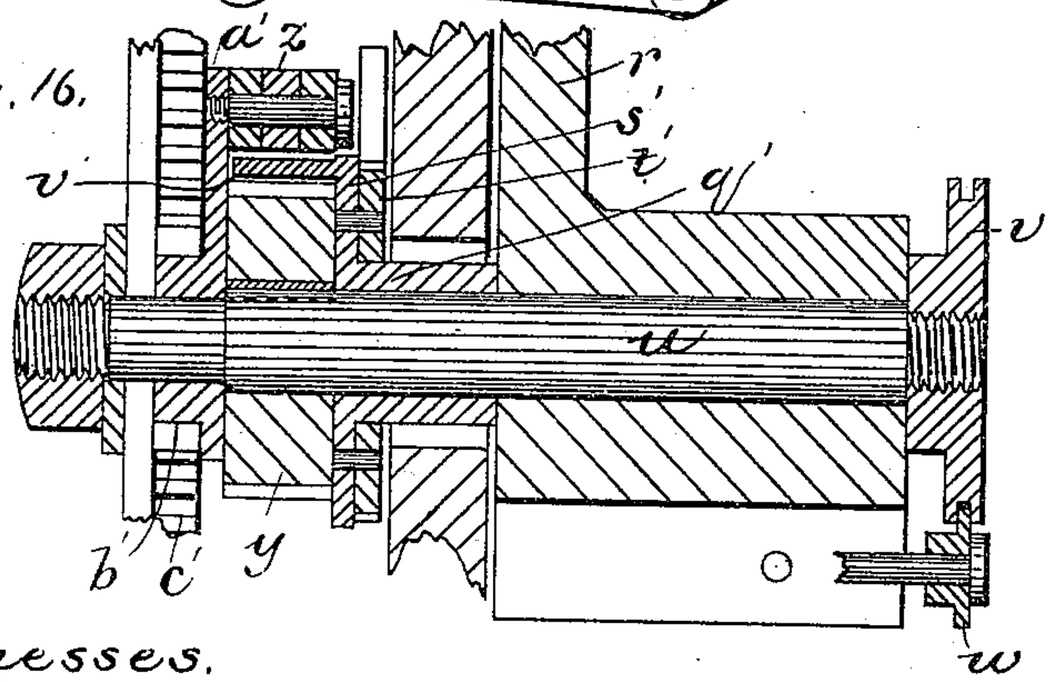



Fig. 16.




Witnesses.
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(No Model.) 6 Sheets—Sheet 5.

# P. A. COUPAL.

## STAPLE DRIVING MACHINE.

No. 438,100. Patented Oct. 7, 1890.

Fig. 19.

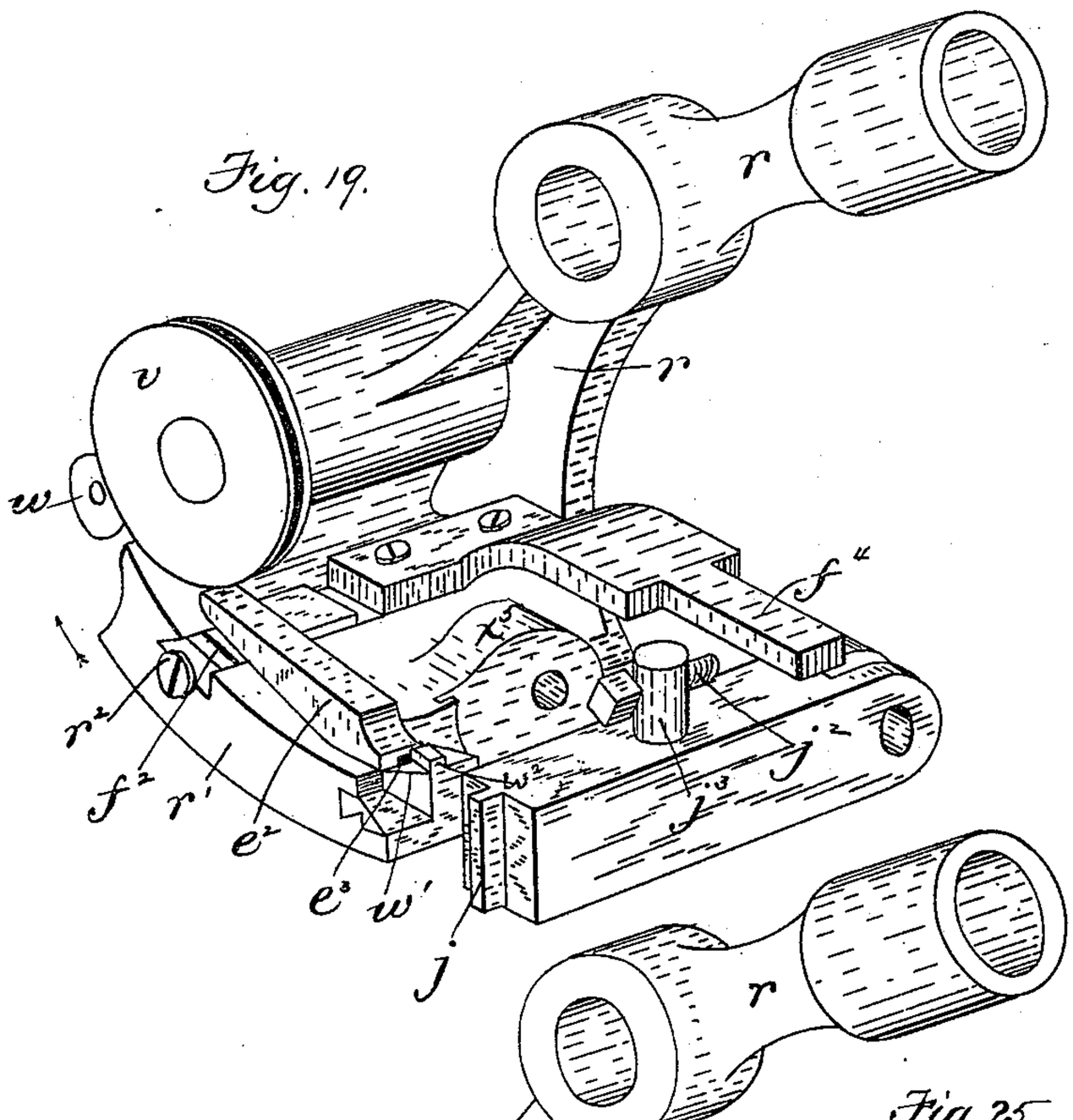



Fig. 18.

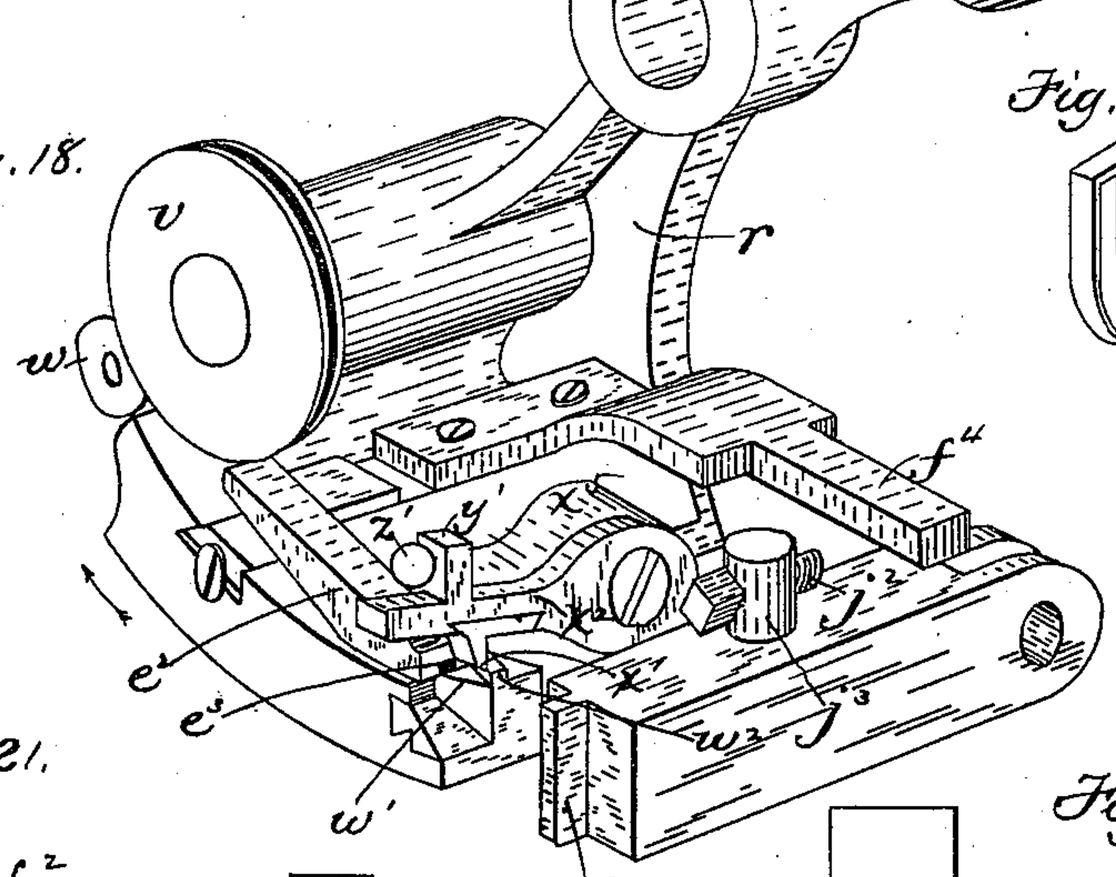



Fig. 25.

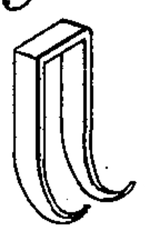


Fig. 24.

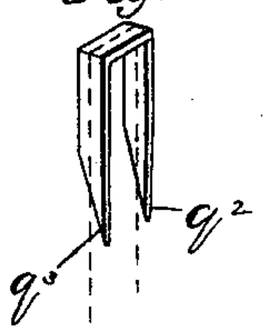



Fig. 21.

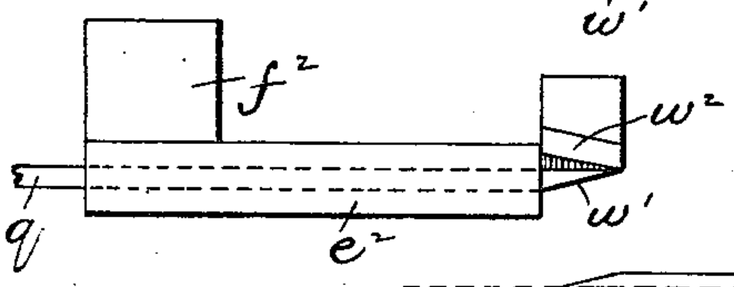



Fig. 22

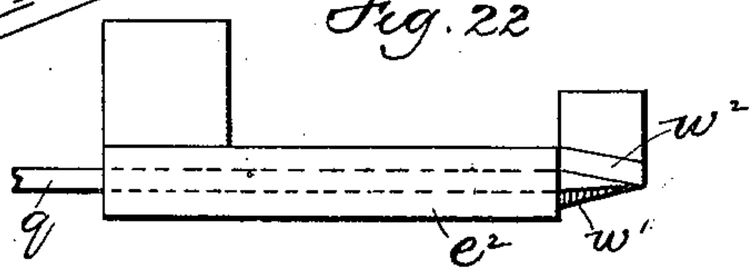
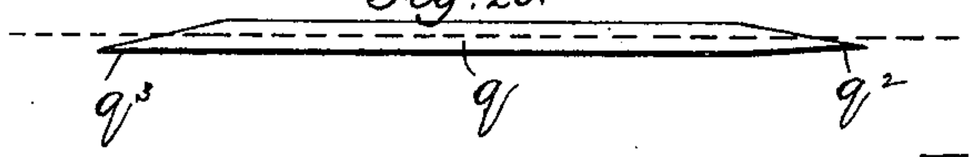



Fig. 23.

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## STAPLE DRIVING MACHINE.

No. 438,100. Patented Oct. 7, 1890.

FIG. 28.

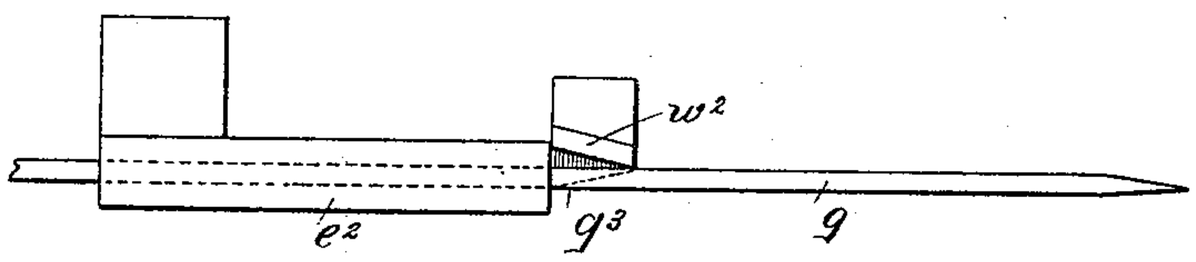



FIG. 29.

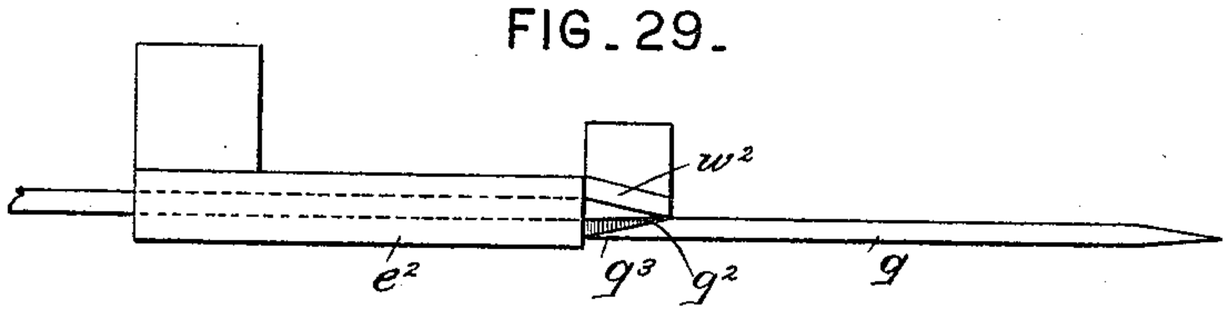



FIG. 26.

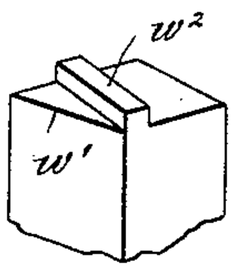



FIG. 26a.

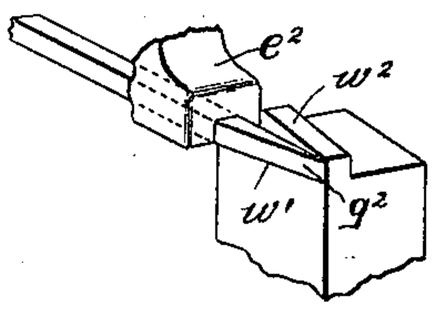
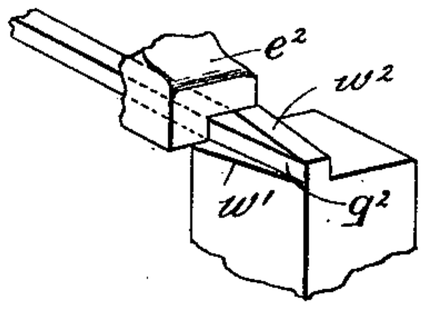



FIG. 27.




Attest:
Geo. T. Smallwood.
Isaac Behrend

Inventor
Peter A. Coupal
By Wright Brown Crosby
his attorneys.

# UNITED STATES PATENT OFFICE.

PETER A. COUPAL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AUTOMATIC STAPLE NAILING MACHINE COMPANY, OF SAME PLACE.

## STAPLE-DRIVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 438,100, dated October 7, 1890.

Application filed January 6, 1890. Serial No. 336,042. (No model.)

*To all whom it may concern:*

Be it known that I, PETER A. COUPAL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making and Driving Wire Staples, of which the following is a specification.

This invention has for its object to provide a machine adapted to make staples from a continuous wire and drive the same into a boot or shoe sole for the purpose of securing said sole to the inner sole and upper, and to automatically vary the length of the staples so that their length may correspond to the particular portion of the boot or shoe bottom into which they are driven, so that the staples driven may be automatically conformed in length to variations in the thickness of the boot or shoe bottom and to any thickness of bottom that may be employed.

The invention has most particularly for its object to vary the length of the staples without causing any variation in the length of the legs of each staple, so that in changing from the production of a shorter to the production of a longer staple the increase in length will be distributed uniformly, both legs being correspondingly lengthened. This is a feature of much importance, it having been found very difficult, if not impossible, heretofore to effect a change in the length of the staples without making at least one staple with legs of unequal length.

The invention also has for its object to produce staples having pointed legs, the points of which are substantially in line with one of the longitudinal sides of the legs, or, in other words, are beveled on one side without cutting out chips or pieces of the wire in forming said beveled sides.

The invention also has for its object to provide various other improvements looking to the production of an efficient and simple machine for making and driving staples into boot or shoe bottoms.

The invention consists, first, in an organized machine in which are combined an anvil and a reciprocating former, which co-operate in bending a length of wire into a staple, the anvil being arranged to retreat from the staple after the bending operation, cutters arranged to sever the wire preparatory to the operation of bending it into a staple, a reciprocating driver arranged to drive each staple into a boot or shoe bottom presented to the machine, a work-supporting horn arranged to support the boot or shoe bottom for the action of the driver, a wire-feeding device whereby the wire is fed forward for each staple, and connections between the work-supporting horn (which is vertically movable) and the wire-severing cutters and wire-feeding devices, whereby any changes in the vertical position of the horn—such as would be caused by variations in the thickness of the work interposed between the horn and the throat of the machine—are caused to effect two results—namely, to increase the feed of the wire so that the forward end of the latter will project an increased distance over the anvil, thus increasing the length of one leg of the staple next formed, and, secondly, the cutters will be moved away from the anvil a distance corresponding to the increase in the feed movement of the wire, so that the other leg of the staple will have a corresponding and equal increase in length.

The invention also consists in the combination, with the wire-cutters arranged to sever the wire diagonally, and thereby form pointed ends on the main wire and on the severed length, of means for bending one of the pointed portions, so that the point, instead of being left in the plane of one edge of the wire, as it would be without the bending operation, is left in the plane of the opposite edge of the wire, thus giving both legs of the staple a tendency to turn in the same direction.

The invention also consists in various other details and combinations of parts relating to a staple making and driving machine, all of which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a machine embodying my invention. Fig. 2 represents an end elevation of the same. Fig. 3 represents an elevation of the opposite side from that shown in Fig. 1, parts of the machine being broken away.

Figs. 4 and 5 represent elevations of the opposite side of the machine, on a larger scale than in Figs. 1 and 3. Fig. 6 represents an end elevation on the same scale as Figs. 4 and 5. Fig. 7 represents an end elevation with the hand-wheel on the forward end of the driving-shaft removed. Fig. 8 represents a section on line 8 8, Fig. 5, looking to the left. Fig. 9 represents a section on line 9 9, Fig. 5. Fig. 10 represents an elevation of a portion of the machine, taken from the same side as Fig. 5, but on a larger scale. Fig. 11 represents a bottom view of the mechanism shown in Fig. 10. Fig. 12 represents an end elevation of a portion of the machine, showing on a larger scale portions of the construction shown in Figs. 6 and 7. Fig. 13 represents a section on line 13 13, Fig. 12. Fig. 14 represents a section on line 14 14, Fig. 13. Fig. 15 represents a section on line 15 15, Fig. 12. Fig. 16 represents a section on line 16 16, Fig. 12. Fig. 17 represents a section on line 17 17, Fig. 10, looking toward the left. Fig. 18 represents a perspective view of the oscillatory carrier which supports the wire-feeding and the wire-cutting devices. Fig. 19 represents a perspective view of the slide or head carrying the feed-rolls and wire cutting and bending devices. Fig. 20 represents a top view of portions of the mechanism shown in Fig. 19. Fig. 21 represents a top view of the lower cutter and the point-bending device after the wire-severing and before the point-bending operation. Fig. 22 represents a view similar to Fig. 21, showing the point-bending device in the position it occupies after the bending of the point. Fig. 23 represents a view of the wire blank after the point-bending operation. Fig. 24 represents a perspective view of the staple made from said blank. Fig. 25 represents a perspective view showing the turning of the points of the staple when it is clinched. Fig. 26 represents a perspective view of one of the wire-severing cutters and the wire-bending shoulder thereon. Fig. 26$^a$ represents a similar view, showing a part of the wire-guide and the wire therein before the point-bending operation. Fig. 27 represents a view similar to that shown in Fig. 26$^a$, the wire-guide and wire being shown after the point-bending operation. Figs. 28 and 29 represent views which are respectively counterparts of Figs. 21 and 22, but show in addition the blank severed from the main wire by the cutters.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the supporting standard or pedestal, on which is mounted the head or frame *b*, supporting the driving-shaft *c*. To said shaft are affixed the cams, hereinafter described, which give motion to the various parts of the machine.

*d* represents the throat, through which the staples are driven into the work, and *e* represents the horn that supports the work under the throat *d*.

*f* represents the driver, which is attached to a vertically-movable slide *g*, fitted to move in a guide in the head or frame *b*, and is reciprocated by means of a cam-groove *h* in a disk on a driving-shaft, said groove being shown in dotted lines in Fig. 7, and receiving a trundle-roll *i* on the slide *g*. The driver is reciprocated vertically by the rotation of the driving-shaft, and when it descends it enters the staple-receiving channel in the throat *d* and drives the staple therefrom, as hereinafter described.

*j* represents the anvil or former, over which the wire is bent into a staple. Said anvil is horizontally movable in a guide in the head *b*, and is reciprocated by means of a lever *k*, pivoted at *l* to the head *b*, and having a trundle-roll *m* at its upper end engaged with the cam-groove *n* in a disk on the driving-shaft, and a link *o*, connecting the lower end of said lever *k* with the rear end of the anvil, as shown in Fig. 15.

*p* represents the former, which bends the wire into a staple over the anvil *j*. Said former has a slot $p^2$, which is adapted to receive the anvil *j* when the former is depressed, the sides of said slot and the sides of the anvil co-operating in bending the wire into a staple. In Fig. 14 the wire *q* is shown extending across the anvil and under the former, the former being raised preparatory to its descent to bend the wire into a staple. The shank $p'$ of the former extends upwardly and is provided at or near its upper end with a trundle-roll $p^4$, which enters a cam-groove $p^3$ in a disk on the driving-shaft, whereby the former is vertically reciprocated by the rotation of said shaft.

*r* represents a lever, which is mounted to oscillate upon a stud *s*, affixed to the head *b*, said lever having its outer end formed as a segmental slide or head $r'$, which is supported and adapted to move upon a segmental guide *t*, formed on the head *b*. The lever *r* is provided with a bearing for a feed-roll shaft *u*, which is journaled to rotate freely in said bearing, and is provided at one end with a feed-roll *v*, the periphery of which has a groove formed to receive the wire *q*.

*w* represents an idle-roll, which is pressed by a spring *x* against the roll *v* and into the groove thereof, said idle-roll keeping the wire in operative engagement with the roll *v*. The roll *v* is rotated to feed the wire by the following means, namely: a ratchet-wheel *y*, affixed to the shaft *u*, a dog or pawl *z*, pivoted to an arm $a'$, which is mounted to oscillate loosely upon the shaft *u* and has a pinion $b'$ formed upon it, and a rack $c'$ meshing with said pinion, said rack being pivoted at its connected at $e'$ to the head or frame *b* and upper end to a lever $d'$, which is pivotally carries a trundle-roll $f'$, Fig. 9, which enters a cam-groove $g'$ in a disk upon the driving-shaft. The rotation of the driving-shaft causes the lever $d'$ to oscillate vertically and reciprocate the rack $c'$, the latter by its en-

gagement with the pinion $b'$ causing the arm $a'$ to oscillate, and thereby carry the pawl $z$ back and forth over the ratchet $y$, the movement of the pawl in one direction causing it to rotate the shaft $u$ and feed-roll $v$, as will be readily seen.

The work-supporting horn $e$ is vertically movable, as already stated, so that its upper end or anvil, which supports the under surface of the boot or shoe bottom, is separated from the throat $d$ by a space equal to the thickness of said bottom, said space being variable according to the thickness of the bottom. I have provided means whereby the vertical position of the horn, or, in other words, the extent of its separation from the throat $d$, will determine the extent of the feed movement given to the feed-roll $v$ by the pawl $z$ and its operating mechanism above described. To this end I connect one arm of the lever $r$ with a lever $h'$, Fig. 4, which is pivoted at $i'$ to the head or frame $b$, and is connected at its opposite end with a vertical rod $j'$, which extends downwardly and is connected at its lower end with a lever $k'$, which is pivoted at $l'$ to the standard $a$, and is connected at one end with a collar $m'$ on the standard $o'$, that supports the horn $e$. When the horn is depressed, it communicates to the lever $r$, through the described intermediate devices, a motion in the direction indicated by the arrow in Figs. 12 and 18.

$q'$ represents a sleeve or collar mounted to rotate loosely upon the feed-roll shaft $u$, and provided with a flange $s'$, to which is affixed a gear-wheel $t'$, which meshes with a rack-segment $u'$, attached to the frame or head $b$.

To the flange $s'$ is attached a segmental shield $v'$, which partially covers the ratchet-wheel $y$ and is adapted to throw the pawl $z$ out of engagement with the teeth of said ratchet during a greater or less part of the movement of the said pawl when the latter is moving forward to rotate the ratchet.

The described movement of the lever $r$ in the direction indicated in Figs. 12 and 18 by the depression of the horn causes the fixed gear-segment $u'$ to rotate the gear $t'$ and the flanged sleeve $q'$, thereto affixed, in such direction as to draw the shield $v'$ backwardly, so that it will permit the pawl $z$ to remain in engagement with the ratchet during a greater portion of its forward movement than before, so that the extent of the feed movement imparted to the feed-roll $v$ is increased by the depression of the horn, the extent of the increase depending upon the extent of the said depression. This increase in the extent of the feed movement causes the feed-roll to feed the wire farther across the anvil $j$, so that the leg of the staple formed on the right-hand side of the anvil as viewed in Fig. 14 will be increased. The same movement of the lever $r$ is caused to correspondingly increase the other leg of the staple by the following means: Attached to the segmental head $r'$ on the lever $r$ is a cutter $w'$ of hardened steel. $x'$ represents a corresponding cutter on a lever $x^2$, which is pivoted at $x^3$ to an ear $x^5$ on the segmental head $r'$. Said lever $x^2$ has a lug or ear $y'$, which projects upwardly and is provided with a trundle-roll $z'$, which engages a groove in a segmental head $a^2$, formed on a vertical slide $b^2$, which is fitted to move in a guide in the head or frame $b$, said slide having at its upper end a trundle-roll $c^2$, which enters a cam-groove $d^2$ in a disk on the driving-shaft. The rotation of the driving-shaft reciprocates the slide $b^2$ vertically and causes the lower edge of its segmental head $a^2$ to press downwardly upon the lever $x^2$, thereby depressing the cutter $x'$ on said lever and causing said cutter to co-operate with the cutter $w'$ in severing the wire $q$, said cutters being arranged to extend diagonally across the path of the wire, so that in severing it they give each end formed by the severing operation a diagonal form, whereby both ends are pointed.

It will be seen that the cutters $w'$ and $x'$ are both carried by the lever $r$ and its head $r'$, so that the described movement of the lever $r$, caused by a depression of the horn, will move the cutters $w'$ and $x'$ away from the anvil $j$ to an extent equal to the increase above described in the feed movement of the wire by the feed-roll. The other leg of the staple—namely, that which is formed by bending down the end of the wire between the anvil and the cutters—is thus made of the same length as the opposite leg, the increase in the length of the staple being therefore equally distributed.

$e^2$ represents a wire-guide attached to a dovetail slide $f^2$, which is fitted in a dovetail guide in the head $r'$, the wire $q$ passing through a channel $e^3$ in said guide between the feed-roll and the cutters $w'$ and $x'$.

On the upper surface of the cutter $w'$ is formed a shoulder $w^2$, which is oblique to the cutting-edge of said cutter and is arranged so that when the wire-guide $e^2$ is moved from the position shown in Figs. 21, 26ª, and 28 to that shown in Figs. 22, 27, and 29 the pointed end of the wire in said guide will be pressed by said movement against the shoulder $w^2$ and will be bent by contact with the latter, the point $q^2$ of the wire being thereby bent outwardly, as shown in Figs. 22, 23, 27, and 29. The adjacent point $q^3$ on the rear end of the blank, or the portion of wire that has been cut off, is not bent by this operation, but remains in line with the outer edge of the wire, because the wire is severed by the cutters before the bending operation, so that the blank is detached from the portion of the wire that is engaged by the wire-guide $e^2$. Hence when said wire-guide is moved, as described, to bend the point $q^2$ against the shoulder $w^2$ the blank remains in the position in which it was when severed from the wire, as shown in Fig. 29, and is not moved laterally. Figs. 28 and 29 show the parts in the same positions as in Figs. 21 and 22, and also show the blank $q$ in

the position it occupies during the operation of bending the point $q^2$. The bending of the point $q^2$ by the above-described operation is sufficient to carry said point across the longitudinal center of the wire and bring it in line, or nearly so, with the point $q^3$, so that when the staple formed from the blank is driven both its legs will be clinched in the same direction, as shown in Fig. 25. It will be seen, therefore, that the staples may be driven into the sole of a boot or shoe in such position that the legs of the staple will be turned or clinched inwardly toward the center of the sole, so that there will be no liability of the staples being turned outwardly and passing through the edge of the sole.

The slide $f^2$ is moved to cause the wire-guide $e^2$ to bend the wire, as described, by means of a screw or stud $j^2$ in a post $j^3$ on the anvil $j$, (see Figs. 19 and 20,) and an arm $f^4$, attached to the slide $f^2$ and arranged to be moved by contact with the stud $j^2$ when the anvil is moved backwardly to clear it from the staple, said movement of the anvil carrying the wire-guide to its bending position. (Shown in Fig. 22.) When the anvil is moved forward, a spring $f^3$, interposed between the rear end of the slide $f^2$ and a part of the lever $r$, presses the slide and wire-guide outwardly, the outward movement being limited by a stop-screw $r^2$, attached to the lever-head $r'$.

A represents a feed-dog, which is pivoted at B to an ear on a slide C, which is fitted in a dovetail groove in the head $b$, said dog being located just behind the throat $d$. (See Figs. 10 and 11.) The slide C is reciprocated horizontally to give the feed-dog its forward or work feeding and backward or retracting movements by means of a lever D, which is pivoted at E, Fig. 7, to an ear on the head $b$, and is arranged to bear at its upper end against a cam G on the driving-shaft, the lower end of said lever being pivoted to the slide C. The cam G is formed to oscillate the lever D by the aid of a spring H, Fig. 4, which holds the upper end of the lever against the cam G. The feed-dog is oscillated on its pivot B, so that it is depressed during its horizontal movement one way and raised during its horizontal movement the other way. Said oscillating movements of the cam are effected by means of a bell-crank lever I I′, mounted on a stud J, which is journaled in ears K K on the head $b$, and a link L, connecting the arm I of the bell-crank lever with the oscillating lever $k$, which imparts motion to the anvil $j$. The arm I of the bell-crank lever is adapted to oscillate to a certain extent independently of the arms I′, and is connected thereto by a spiral spring O, Fig. 11. One end of said spring is connected with the arm I and the other end with one of the arms I′, said arms I′ being connected by a pin M, which passes through a slot N in the rear end of the dog A. The spring O gives the feed-dog a yielding pressure on the work, as will be readily seen.

The machine is provided, as usual in nailing-machines in which the work is supported by a horn, with suitable means whereby the horn is positively depressed after the driving of each staple to permit the feeding of the work, said means being a lever S, Fig. 3, pivoted at S′ to the standard $a$ and engaged at one end with a collar T on the horn-standard $o'$, a rod V, connected with the other end of said lever, and a stud W, Figs. 4, 5, and 9, at the upper end of said rod entering a cam-groove Y, Fig. 9, in the rear side of the disk X on the driving-shaft. The collar T rests loosely on a collar U, which is attached to the standard $o'$, and when the rod V is raised by the action of the cam-groove Y the lever S is turned so as to depress the collar T and the horn-standard and horn. A spring Z raises the horn as far as the collar T will permit.

The driving-shaft is provided with a driving-pulley A′, having a hub B′. Said pulley is normally loose on the shaft and is provided with a suitable clutch, whereby it is connected with the driving-shaft by a depression of a treadle C′, Fig. 1, said treadle being connected by a rod D′ with the automatic clutch. Any suitable clutch mechanism may be employed.

The operation of the machine is as follows: The anvil being in its forward position under the former, and the former being raised above the anvil, the wire is fed forward by the feeding devices across the anvil, the length of wire fed across the anvil and the distance of the wire-cutters from the anvil being determined by the thickness of the stock between the throat $d$ and horn $e$, the wire being fed farther across the anvil and cut off farther from the anvil when a sole of maximum thickness is interposed between the throat and horn than when a thinner sole is so interposed. The cutters sever the wire immediately after the feeding thereof, and the former thereupon descends and bends the severed length of wire into a staple. The anvil is then moved backwardly, leaving the staple, which is immediately thereafter driven by the descent of the driver, the wire-guide $e^2$ being moved with the anvil to bend the point $q^2$, as above described. The feed-dog is depressed and engages the bottom of the sole while the driver is descending and is moved to feed the sole forward to position to receive another staple while the driver is ascending.

As already indicated, a very important feature of my invention is the provision of means for the automatic adjustment of the cutters relatively to the anvil and the automatic adjustment of the length of the feed movement given to the wire, both of said adjustments being determined simultaneously by the position of the horn. It is not new to adjust the length of the feed movement of a continuous wire by the position of the horn in a machine which makes single nails, said adjustment being effected by means of a shield, which is connected by intermediate mechanism with the

horn, and determines the extent of rotation imparted to a feed-roll by an oscillating pawl, but I am the first, so far as I am aware, to combine automatic means for the adjustment of the length of the wire-feed with automatic means for the adjustment of the wire-severing cutters, and staple-forming devices so arranged relatively to the wire and cutters that the automatic adjustment of the feed determines the length of one leg of the staple, and the automatic adjustment of the cutters determines the length of the other leg. Hence I do not limit myself to the particular details of mechanism herein described, whereby said adjustments are simultaneously effected.

The provision of means for bending one of the points formed on the wire so that both points will be at one and the same side of the longitudinal center of the wire that forms the staple is also an important feature, and is new with me, hence the means for effecting said bending may be variously modified without departing from the spirit of my invention.

I claim—

1. In a machine for making and driving staples, the combination, substantially as hereinbefore described, with an anvil, a bender or former, a driver, and operating mechanism whereby a length of wire may be bent into a staple and driven by the action of said parts, of a vertically-moving work-supporting horn, a wire-feed arranged to move the wire across the anvil, wire-cutters movable toward and from the anvil, mechanism for operating said feed and cutters, and mechanism intermediate of the horn and the feed and cutters through which the feed movement of the wire and the position of the cutters may be simultaneously adjusted by the position of the horn to adjust the length of the staples to the thickness of the stock.

2. In a machine for making and driving staples, the combination, substantially as hereinbefore described, with an anvil, a bender or former, a driver, a wire-feed, and mechanism for operating said parts, of a vertically-movable work-supporting horn, a pair of cutters movable toward and from the anvil, mechanism for operating said cutters, and mechanism intermediate of the cutters and horn, whereby the position of the cutters relatively to the anvil is determined by the position of the horn to adjust the length of the staples to the thickness of the stock.

3. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and mechanism for operating said parts, of a vertically-movable work-supporting horn, a pivoted lever, as $r$, a wire-feeding roll on a shaft journaled in a bearing on said lever, connections between said lever and the horn through which the lever is moved on its pivot by movements of the horn, a ratchet affixed to the feed-roll shaft, a segmental shield carried by a collar which is loosely mounted on said shaft, a gear on said collar and a fixed gear on the supporting-frame, through which the position of the shield is varied by the movements of the lever, a pawl adapted to engage said ratchet, and means for reciprocating said pawl over the ratchet, the said shield covering a portion of the ratchet and being interposed more or less between the ratchet and pawl by the movements imparted to it by the movements of the lever, as set forth.

4. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and mechanism for operating said parts, of a vertically-movable work-supporting horn, a pivoted lever, as $r$, a wire-feeding roll on a shaft journaled in a bearing on said lever, connections between said lever and the horn through which the lever is moved on its pivot by movements of the horn, a ratchet affixed to the feed-roll shaft, a segmental shield carried by a collar which is loose on said shaft, a gear on said collar, and a fixed gear on the supporting-frame through which the position of the shield is varied by the movements of the lever, a pawl adapted to engage said ratchet, an arm carrying said pawl, a loose gear $b'$ on the feed-roll shaft affixed to said arm, a rack $c'$, meshing with said gear, and means for reciprocating said rack and thereby reciprocating or oscillating the pawl, as set forth.

5. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and mechanism for operating said parts, of a vertically-movable work-supporting horn, a pivoted lever, as $r$, a wire-feeding roll on a shaft journaled in a bearing on said lever, connections between said lever and the horn through which the lever is moved on its pivot by movements of the horn, a ratchet affixed to the feed-roll shaft, a segmental shield carried by a collar which is loose on said shaft, a gear on said collar, and a fixed gear on the supporting-frame through which the position of the shield is varied by the movements of the lever, a pawl adapted to engage said ratchet, an arm carrying said pawl, a loose gear $b'$ on the feed-roll shaft affixed to said arm, a rack $c'$, meshing with said gear, a lever $d'$, to which said rack is pivoted, said lever being pivoted to the supporting-frame, and a cam $g'$, engaged with said lever to oscillate the latter and reciprocate the rack, the latter being adapted by its pivotal connections with the lever $d'$ to oscillate and conform to the movements of the feed-roll shaft caused by the oscillations of the lever $r$, as set forth.

6. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and operating mechanism for said parts, of a vertically-movable work-supporting horn, a pivoted lever, as $r$, a pair of wire-cutters carried by said lever, one of said cutters being affixed to the lever and the other pivoted thereto, connections between the lever and horn through which the lever is moved on its pivots by movements of the horn

to carry the cutters toward or from the anvil, and means for operating said pivoted cutter, as set forth.

7. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and operating mechanism for said parts, of a vertically-movable work-supporting horn, a wire-feed arranged to feed the wire across the horn, wire-cutters arranged to sever the wire diagonally at one side of the horn, and thereby form points thereon, and a point-bending device and mechanism to operate it, whereby one of said points is bent, as set forth.

8. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and operating mechanism for said parts, of a vertically-movable work-supporting horn, a pivoted lever, as $r$, a wire-feeding roll carried by said lever, mechanism for operating said feed-roll, a fixed and a pivoted cutter carried by said lever and arranged to sever the wire diagonally and thereby form points thereon, connections between the lever and horn through which the lever is moved on its pivot by movements of the horn, a point-bending device on said lever, and operating mechanism for said bending device, whereby one of the points formed by the action of the cutters is bent, as set forth.

9. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and operating mechanism for said parts, of a vertically-movable work-supporting horn, a pivoted lever $r$, a wire-feeding roll, and a pair of wire-severing cutters carried by said lever, a wire-guide $e^2$, between said roll and cutters, an inclined shoulder $w^2$ on the lever, a slide fitted to move on the lever and carrying said guide, and means, substantially as described, for reciprocating said slide and thereby causing the wire-guide to bend one of the points formed by the cutters against the shoulder $w^2$, as set forth.

10. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and operating mechanism for said parts, of a vertically-movable work-supporting horn, a pivoted lever $r$, having a segmental head $r'$, a fixed segmental guide $t$, supporting said head, connections between the said lever and the horn through which the segmental head of the lever is moved on its supporting-guide toward and from the anvil by movements of the horn, a cutter $w'$, affixed to said head, a cutter $x'$, attached to an arm pivoted to the head, a slide $b''$, having a segmental head $a''$ bearing on said arm, and means for reciprocating said slide, the head thereof being adapted to depress the cutter $x'$ in any position to which it may be moved, as set forth.

11. In a machine for making and driving staples, the combination, with an anvil, a bender or former, a driver, and operating mechanism for said parts, of a vertically-movable work-supporting horn, a lever $r$, pivoted to the frame of the machine, wire-feeding and wire-cutting devices carried by said lever, and the means for connecting said lever with the horn, said means comprising the lever $h'$, engaged with the lever $r$, the lever $k'$, engaged with the horn-supporting standard, and the connecting-rod $j'$, as set forth.

12. In a machine for making and driving staples, the combination, with a driver and suitable wire feeding and cutting devices, of the anvil, the cam $n$, lever $k$, and link $o$, whereby said anvil is alternately projected and retracted, the former $p$, the vertical slide $p'$, carrying said former, and the cam $p^3$, engaged with said slide to reciprocate it, as set forth.

13. The combination, with wire cutting and driving mechanism, and a fixed supporting-frame therefor, of a slide C, movable in a guide on said frame, a feed-dog pivoted to said slide, the lever D and cam G, whereby the slide C is reciprocated, and the bell-crank lever I I′, link L, lever $k$, and cam $n$, whereby the feed-dog is vertically reciprocated, as set forth.

14. The combination, with the feed-dog A and its carrying-slide C, of the bell-crank lever composed of the arms I and I′, mounted on a stud J and connected by a spring O, whereby one of said arms is enabled to move independently of the other, and devices connected to one of said arms for oscillating the bell-crank lever, the other arm being engaged with the feed-dog, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 31st day of December, A. D. 1889.

PETER A. COUPAL.

Witnesses:
C. F. BROWN,
W. C. RAMSAY.