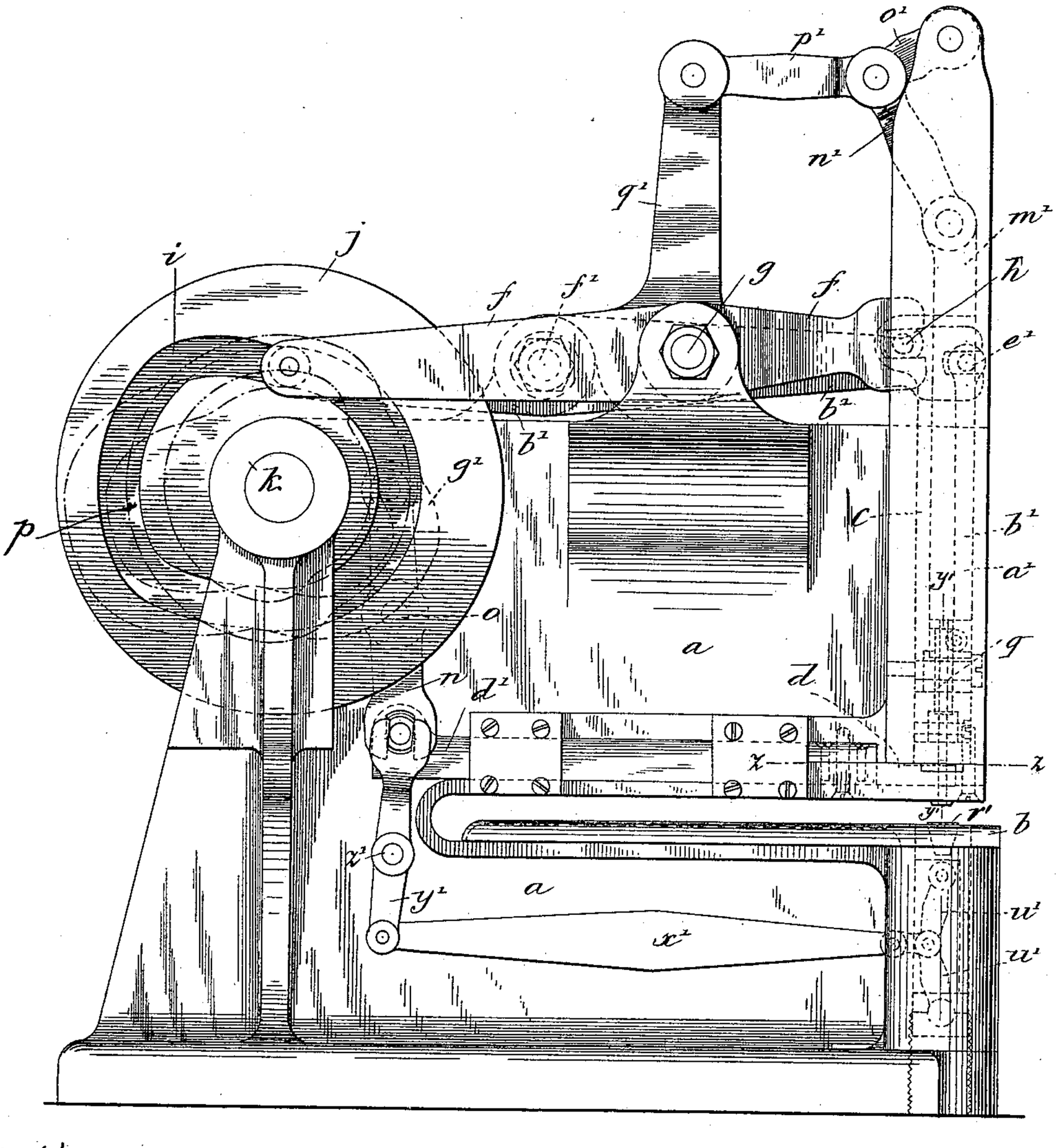
(No Model.) 4 Sheets—Sheet 1.

# J. COUPAL & R. STEPHENSON.

## MACHINE FOR MAKING AND DRIVING STAPLES.

No. 351,361. Patented Oct. 26, 1886.

Fig: 1.




Witnesses;
John A. Rennie
John Long.

Inventors
J. Coupal
R. Stephenson
by Wright Brown & Quinby
Attys.

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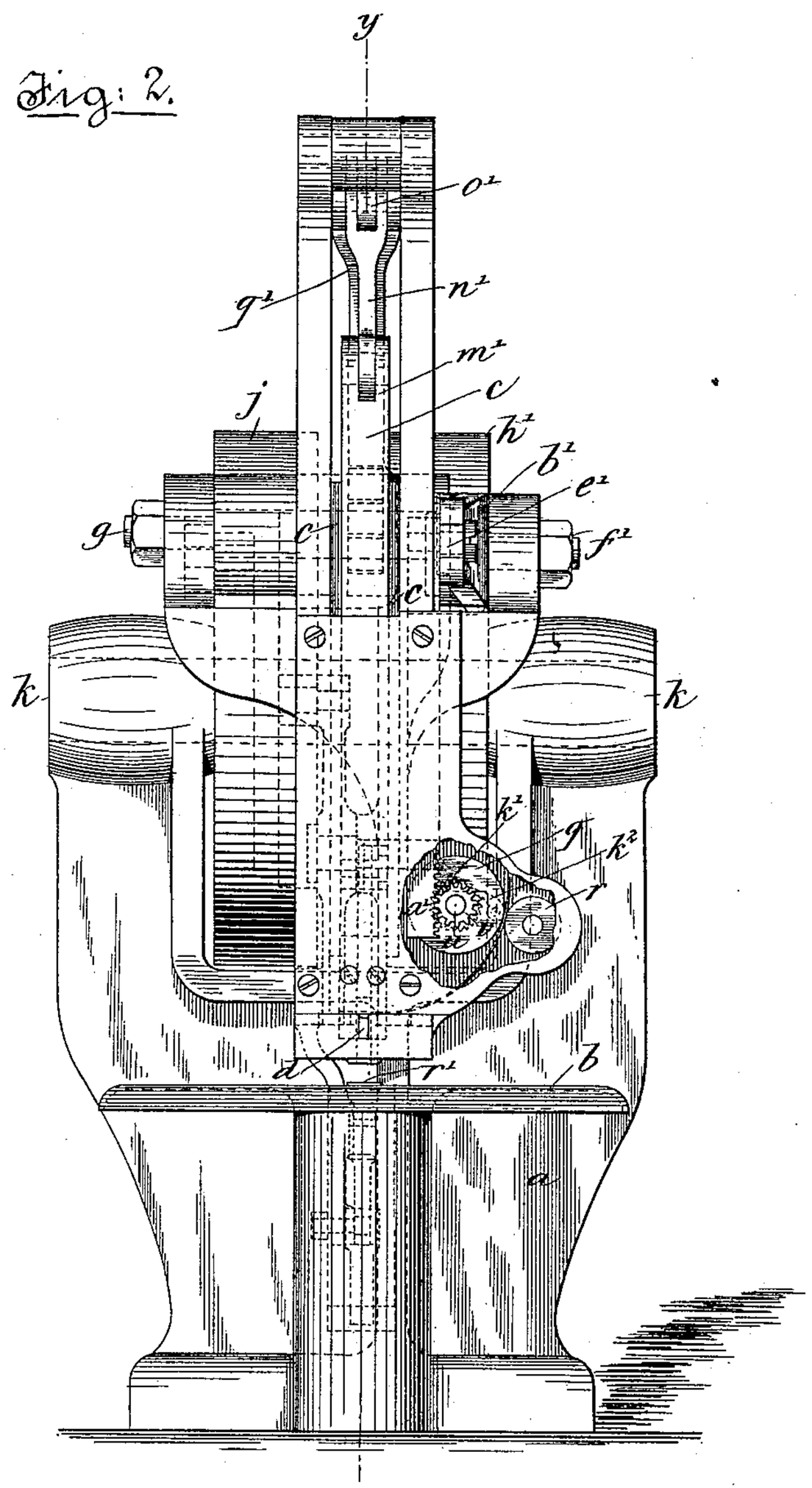
Fig. 2.




Witnesses:
John A. Rennie
John Long.

Inventors.
J. Coupal
R. Stephenson
by Wright, Brown & Quinby
Attys.

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# J. COUPAL & R. STEPHENSON.

## MACHINE FOR MAKING AND DRIVING STAPLES.

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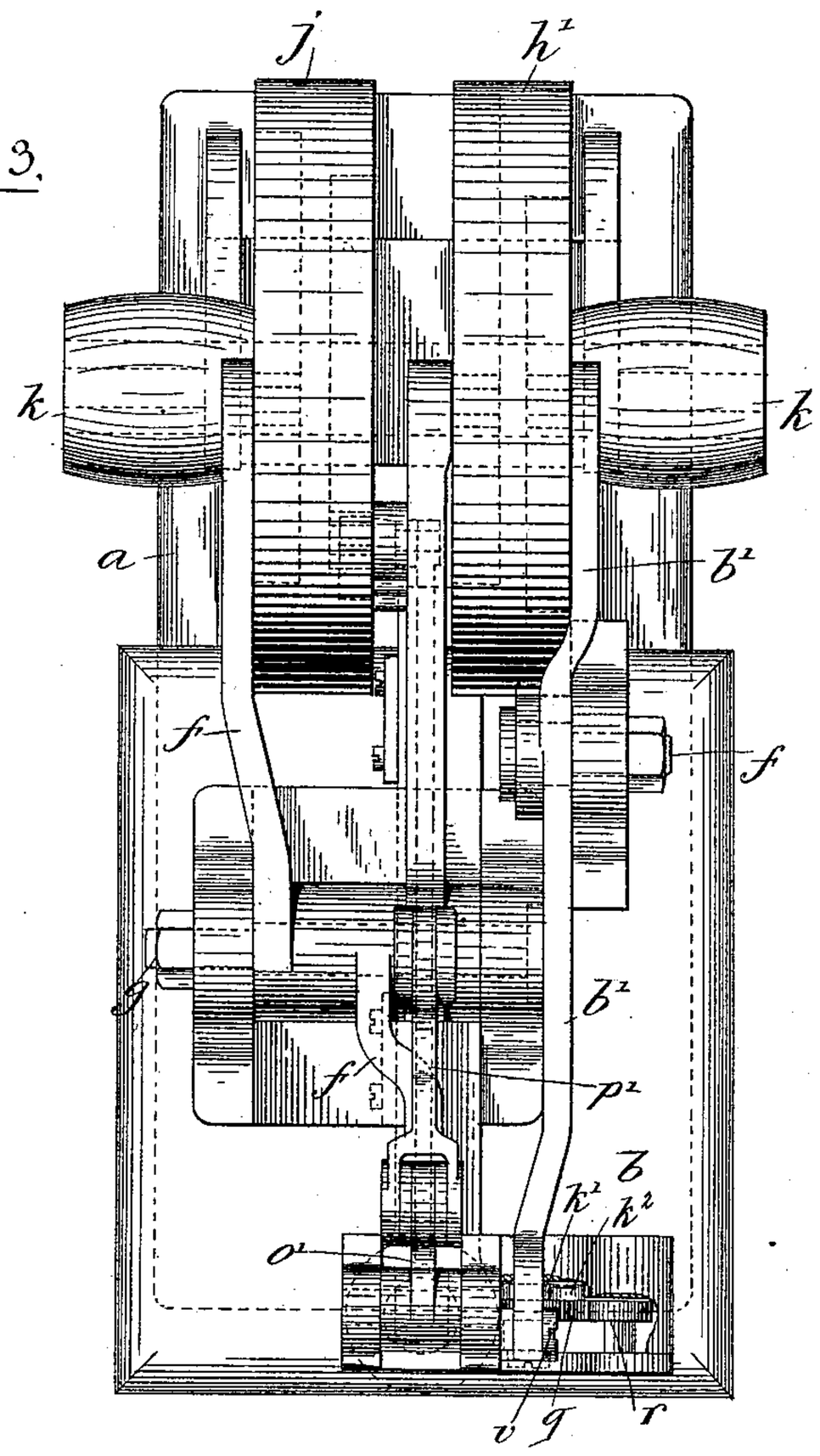
Fig: 3.




Witnesses;
John A. Rennie.
John Long.

Inventors
J. Coupal.
R. Stephenson
by Wright, Brown, Quinby & Otts.
Attys.

(No Model.) 4 Sheets—Sheet 4.

# J. COUPAL & R. STEPHENSON.

## MACHINE FOR MAKING AND DRIVING STAPLES.

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Fig: 6.

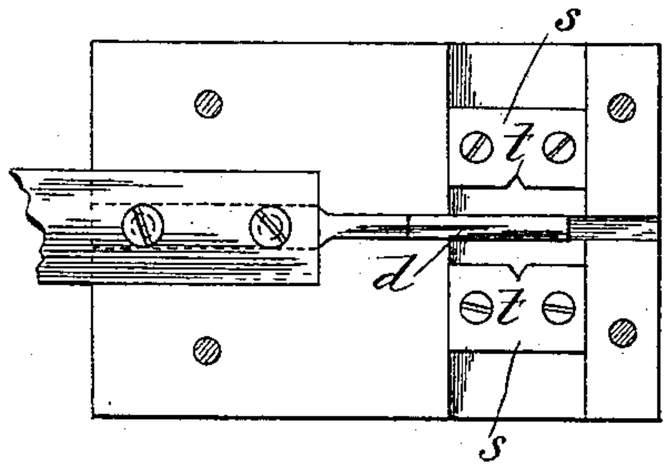



Fig: 8.

Fig: 9.

Fig: 7.

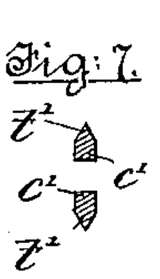



Fig: 10.

Fig: 4.

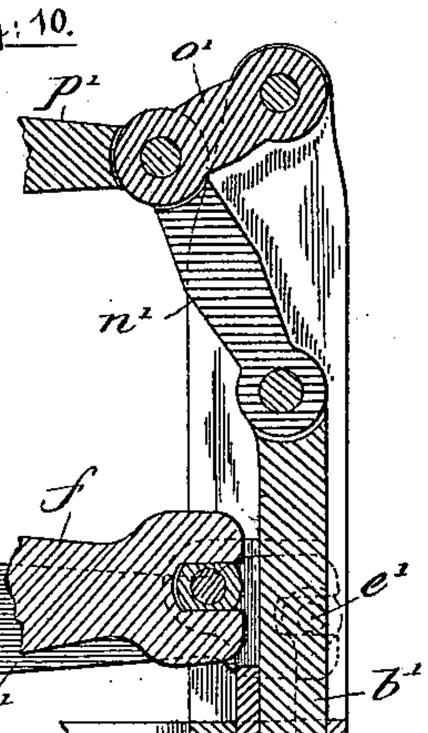



Fig: 11.

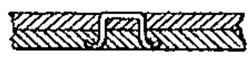
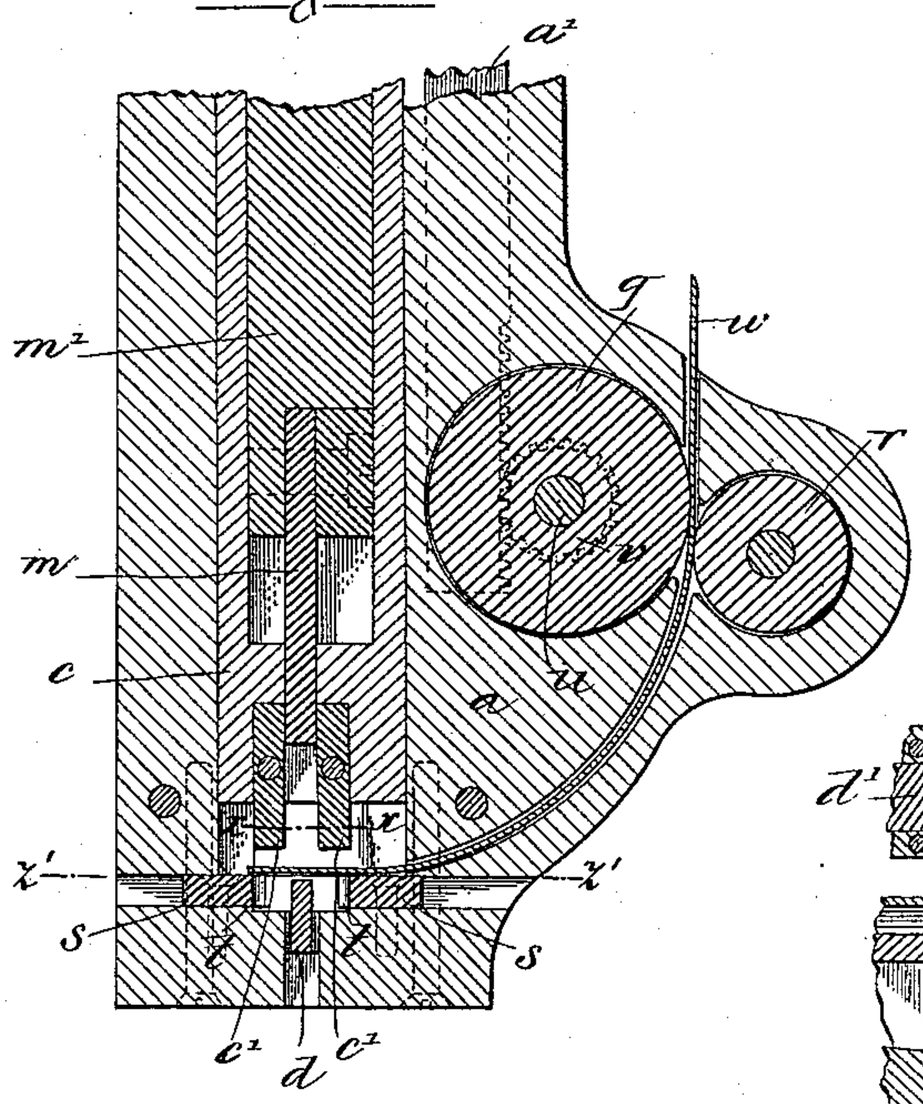


Fig: 5.




Witnesses:
John A. Rennie.
John Long.

Inventors
J. Coupal
R. Stephenson
by Wright Brown Quinby
Attys.

# UNITED STATES PATENT OFFICE.

JOSEPH COUPAL AND RICHARD STEPHENSON, OF QUINCY, MASSACHUSETTS.

## MACHINE FOR MAKING AND DRIVING STAPLES.

SPECIFICATION forming part of Letters Patent No. 351,361, dated October 26, 1886.

Application filed August 16, 1886. Serial No. 211,005. (No model.)

*To all whom it may concern:*

Be it known that we, JOSEPH COUPAL and RICHARD STEPHENSON, both of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making and Driving Staples, of which the following is a specification.

This invention has for its object to provide an improved machine for forming staples from a continuous wire, inserting said staples into the parts to be united thereby, and clinching or turning the prongs of the staples to permanently secure them to said parts.

The invention consists in the several improvements, which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of our improved machine. Fig. 2 represents a front elevation. Fig. 3 represents a top plan view. Fig. 4 represents a section on line *y y*, Fig. 2. Fig. 5 represents a section on line *y' y'*, Fig. 1. Fig. 6 represents a section on line *z' z'*, Fig. 5, looking downwardly. Fig. 7 represents a section on line *x x*, Fig. 5. Figs. 8, 9, 10, and 11 represent the wire in different stages of the operation.

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

In the drawings, *a* represents the supporting-frame, having a bed or table, *b*, to support the parts to be united by staples, a part of the frame overhanging or projecting over said bed, which is separated from said overhanging part by a narrow space or opening. (Best seen in Fig. 1.)

Fitted to reciprocate in a vertical guide in the overhanging portion of the frame is a slide, *c*, the lower end of which is provided with two downwardly-projecting studs, *c' c'*, which, with the lower end of the slide *c*, constitute a bending-fork, which co-operates with a single arm, *d*, in bending short lengths of wire into staple form, said arm being fitted to reciprocate horizontally in guides in the overhanging portion of the frame, and arranged and operated, as hereinafter described, so that when the bending-fork descends it will bend the length of wire over the arm *d*, as usual in many staple-forming machines. The slide *c*, with its bending-fork, is reciprocated vertically by means of a lever, *f*, pivoted at *g* to the frame *a*, and having a slot at one end, which receives a stud, *h*, on the upper end of said slide, and a cam-groove, *i*, in a disk, *j*, on a shaft, *k*, which is journaled in bearings in the frame. Said groove receives a stud or roller on the rear end of the lever *f*, and is formed to oscillate said lever. The slide *c* is reciprocated by its connection with said lever. The arm *d* is reciprocated horizontally, so that it is alternately held under the slide *c*, to co-operate with the bending-fork in bending the wire, and withdrawn from the bending-fork to permit the driver *m* to force the completed staple out from the bending-fork and into the pieces of material to be united. The means for reciprocating the arm *d* are a lever, *n*, pivoted at *o* to the frame *a*, and slotted at its lower end to receive a stud on the rear end of the slide *d'*, to which the arm *d* is affixed, and a cam-groove, *p*, in the disk *j*, said groove receiving a stud or roller on the upper end of the lever *n*, and oscillating said lever, so as to cause it to reciprocate the slide *d'* and arm *d*.

The wire *w*, to be converted into staples, is fed by feed-rolls *q r* upon two fixed plates, *s s*, Figs. 5 and 6, below the slide *c*. Said plates are provided with V-shaped recesses *t t*, (best seen in Fig. 6,) and the edges of said plates containing said recesses constitute female cutters or dies, which fit and co-operate with V-shaped male cutters or dies *t' t'*, Fig. 7, formed on the studs *c' c'* of the bending-fork. Said dies or cutters at each descent of the bending-fork sever the wire (which is of the flat kind) with a V-shaped cut, thus pointing the ends of the blank. The end of the main wire is left with a V-shaped recess after each blank is severed from it, as shown in Fig. 8, and when the wire is fed forward it is moved far enough to enable the cutters at their next operation to remove the portion of the wire containing said V-shaped recess, as shown in Fig. 9, and leave the end pointed, as shown in Fig. 10.

The feed-roll *q* is mounted loosely on a shaft, *u*, which is provided with a pinion, *v*, with which meshes a vertical rack, *a'*, which is fitted to slide in a guide in the frame *a*. Said rack has a stud, *c'*, at its upper end entering a slot in the forward end of a lever, *b'*, which is pivoted at *f'* to the frame *a*. Said lever is

provided at its rear end with a stud or roller, which enters a cam-groove, $g'$, in a disk, $h'$, on the shaft $k$. The rack $a'$ is reciprocated vertically by said lever and cam-groove, and rotates the shaft $u$ first in one direction and then in the other. Said shaft has a ratchet, $k'$, affixed to it, and the feed-roller $q$ has a pawl, $k^2$, engaging with said ratchet. When the shaft $u$ is rotated in one direction by the rack, the roll $q$ is rotated by the ratchet and pawl in the direction required to feed the wire. When the shaft $u$ is rotated in the opposite direction, the pawl $k^2$ slips on the ratchet $k'$, and the roll $q$ does not rotate. The roll $r$ is loose.

The driver $m$ is affixed to a bar, $m'$, which is fitted to reciprocate vertically in a way formed within the slide $c$, having the bending-fork, the driver being so located that when it is forced downwardly it will pass through the bending-fork and force the completed staple therefrom.

The driver-bar is pivoted at its upper end to a link, $n'$, forming one member of a toggle-joint, the other link or member, $o'$, of said joint being pivoted to the upper end of the link $n'$ and to a part of the frame $a$, as seen in Figs. 1 and 4. The meeting ends of said links are connected by a link, $p'$, with one arm of a bell-crank lever, $q'$, which is pivoted at $g$ to the frame $a$, and has on the end of its other arm a stud or roller entering a cam-groove in the disk $h'$ on the shaft $k$. The oscillations of the bell-crank lever $q'$, caused by said cam-groove, reciprocate the driver-bar and driver by means of the toggle-joint and the link $p'$, as will be readily seen.

$r'$ represents a staple-clinching anvil, which is affixed to the upper end of a block, $s'$, adapted to slide in the lower part of the frame $a$, and to project through an opening in the bed or table $b$, under the bending-fork and driver. The block $s'$ is supported by links $u'$ $u'$, constituting a toggle-joint, the lower link of said joint resting in socket $v'$, which is made adjustable by means of a screw, $w'$, so that the anvil can be vertically adjusted. The meeting ends of the links $u'$ $u'$ are connected by a rod, $x'$, with the lower end of a lever, $y'$, which is pivoted at $z'$ to the frame $a$, and is engaged at its upper end with the lever $n$, which operates the arm $d$, as shown in Fig. 1. The anvil $r'$ is alternately raised and lowered by the devices above described, as will be readily seen.

The operation is as follows: The parts to be united being placed on the table $b$, the machine is set in operation, the feed-rolls feeding the wire, which is severed and bent into staple form, as described. Before the staple is forced downwardly into the work by the driver the anvil is raised, and thus caused to press the work firmly against the throat $t^2$, through which the staple is forced by the driver. The driver then descends and forces the staple into the work and against the anvil, the latter clinching the ends of said prongs, as shown in Fig. 11, the staple being thus firmly embedded in the material.

It will be seen that the pressure of the work against the throat $t^2$ by the vertically-reciprocating anvil enables the staple-prongs to be driven straight, and prevents them from crippling or bending while they are penetrating the work.

This machine is intended, chiefly, for fastening together the overlapping ends of belting; but it may be used for any other purpose desired.

We do not limit ourselves to the described details of mechanism for operating the several essential parts of the machine, but may vary the same indefinitely.

We claim—

1. In a staple forming and driving machine, the combination of the notched or V-shaped male and female cutters or dies with the wire feeding and bending mechanism, as set forth.

2. In a staple forming and driving machine, the combination of the bending-fork and its slide, said fork having the V-shaped male dies or cutters, the fixed V-shaped female dies or cutters, the bending-arm, and the driver, as set forth.

3. In a staple forming and driving machine, the combination of the staple forming and driving mechanism, the throat $t^2$, through which the staples are driven, the movable clinching or upsetting anvil, and mechanism, substantially as described, for reciprocating said anvil, as set forth.

4. In a staple forming and driving machine, the combination of the staple forming and driving mechanism, the throat $t^2$, the work-supporting bed or table, the anvil movable in an opening in said table, and mechanism, substantially as described, for raising and lowering said anvil, as set forth.

5. The combination of the staple-forming mechanism, the driver, the cam $g'$, lever $q'$, and toggle-joint $n'$ $o'$, whereby said driver is positively operated, the upsetting-anvil, and the means for positively reciprocating the latter, as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 7th day of August, 1886.

JOSEPH COUPAL.
RICHARD STEPHENSON.

Witnesses:
C. F. BROWN,
H. BROWN.