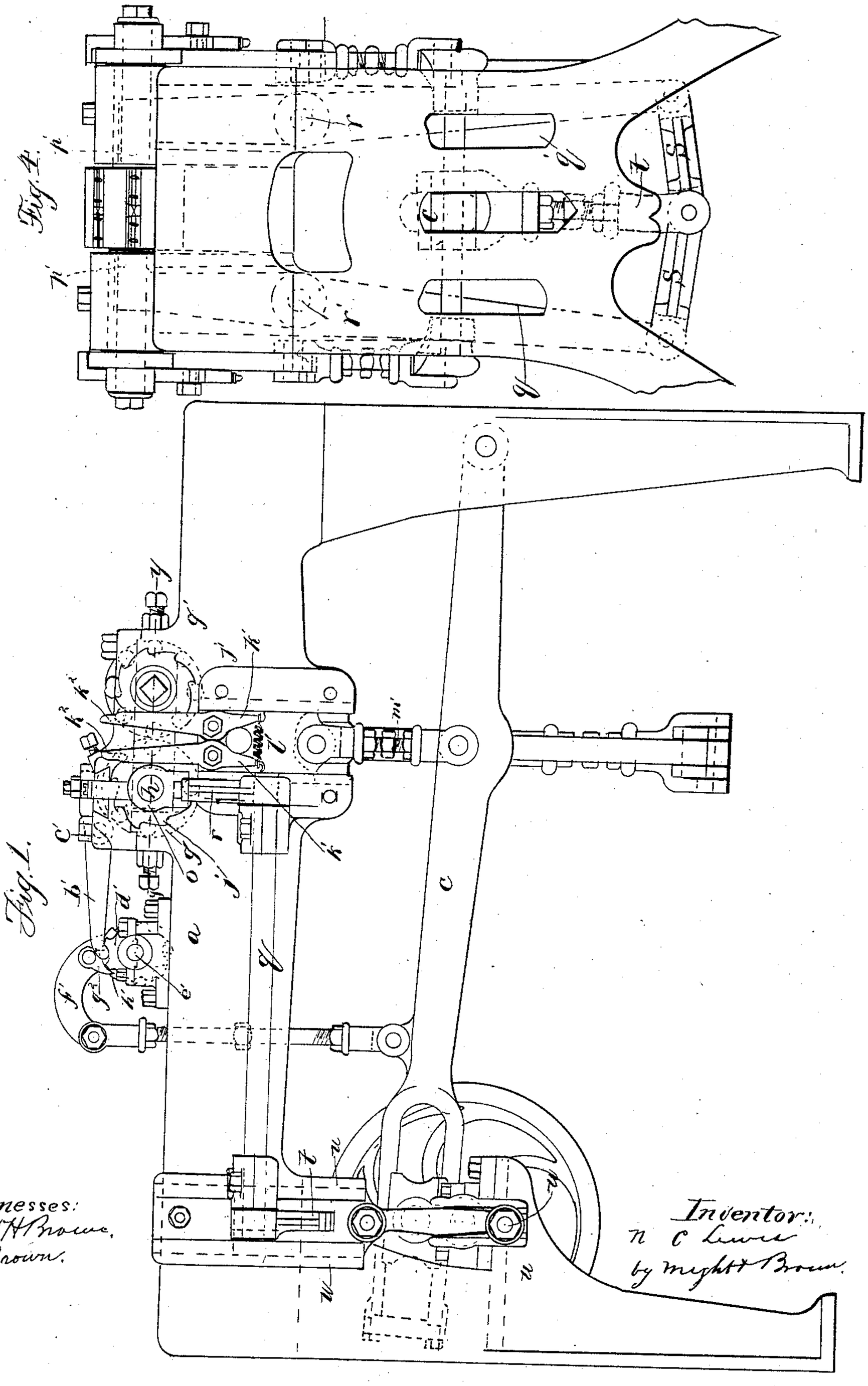
(No Model.) 3 Sheets—Sheet 1.

N. C. LEWIS.

WIRE NAIL MACHINE.

No. 328,237. Patented Oct. 13, 1885.



Witnesses:
C. W. Hall Brown.
H. Brown.

Inventor:
N. C. Lewis
by Wright Brown.

(No Model.)

3 Sheets—Sheet 2.

N. C. LEWIS.

WIRE NAIL MACHINE.

No. 328,237. Patented Oct. 13, 1885.

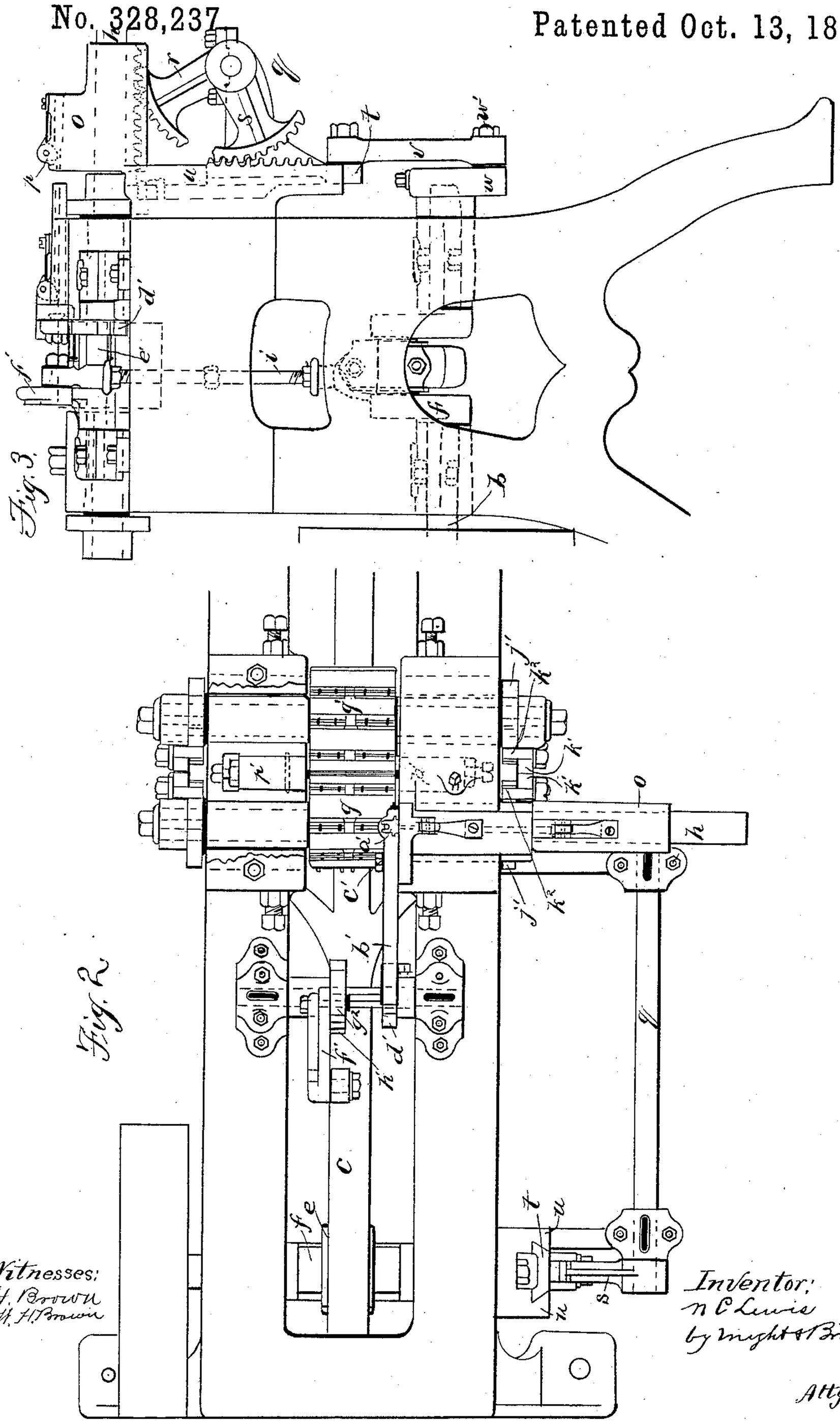


Fig. 3.

Fig. 2.

Witnesses:
H. Brown
C. H. Brown

Inventor:
N. C. Lewis
by Wright & Brown
Attys.

(No Model.)

3 Sheets—Sheet 3.

N. C. LEWIS.

WIRE NAIL MACHINE.

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Fig. 7.

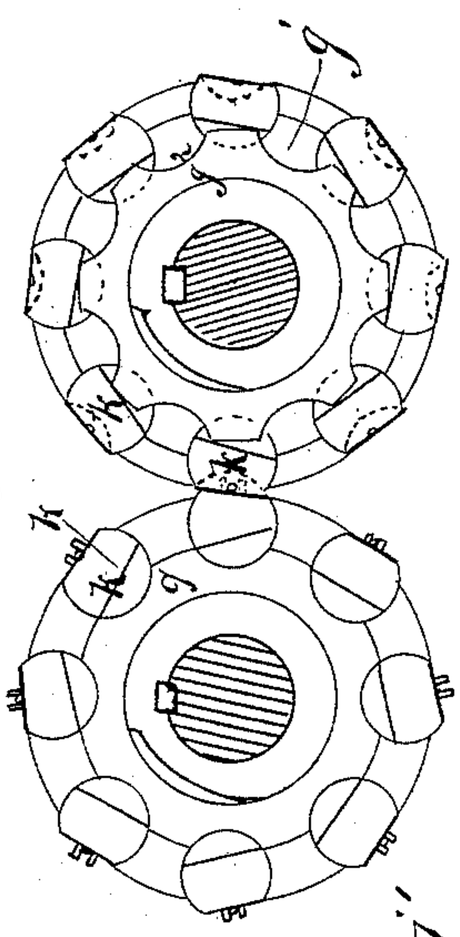
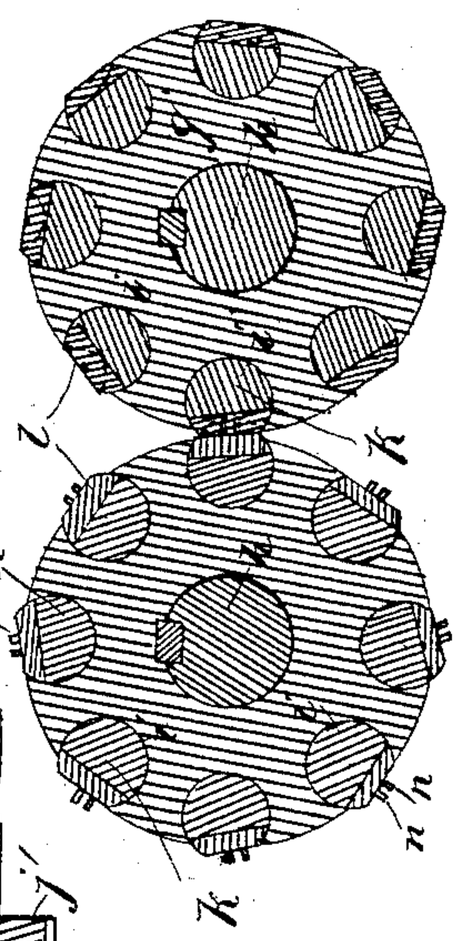
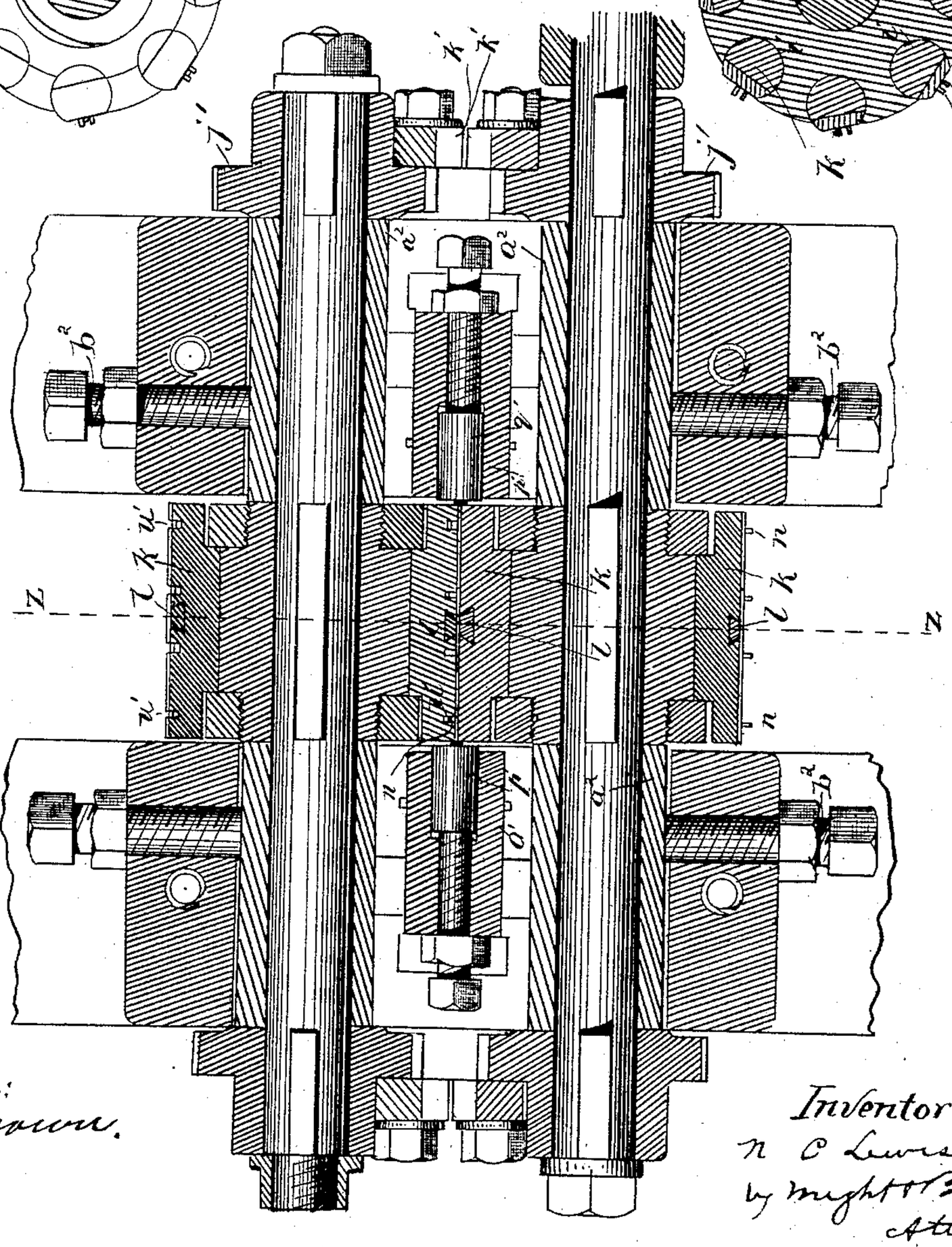


Fig. 6.





Witnesses:
C. M. H. Brown.
H. Brown.

Inventor
N. C. Lewis
by Wright & Brown
Attys

UNITED STATES PATENT OFFICE.

NATHAN C. LEWIS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CLINTON LOVELL, OF SAME PLACE.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 328,237, dated October 13, 1885.

Application filed August 25, 1884. Serial No. 141,420. (No model.)

To all whom it may concern:

Be it known that I, NATHAN C. LEWIS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Wire-Nail Machines, of which the following is a specification.

This invention has for its object to provide an improved machine for rapidly forming small nails or tacks from wire; and it consists in the improved mechanism hereinafter described and claimed.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of my improved machine. Fig. 2 represents a top view. Figs. 3 and 4 represent end elevations. Fig. 5 represents an enlarged section on line *y y*, Fig. 1. Fig. 6 represents a section on line *z z*, Fig. 5. Fig. 7 represents an end view of the parts shown in Fig. 6.

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

In the drawings, *a* represents the supporting-frame, at one end of which is journaled the driving-shaft *b*.

c represents a lever pivoted at one end at *d* to the frame *a*, and having at its opposite end a slot which receives a slide, *e*, swiveled on a crank, *f*, on the driving-shaft, the lever *c* being therefore oscillated by the rotation of said shaft.

g g' represent two cylinders secured to parallel arbors *h h*, which are mounted in bearings in the frame *a*. Said cylinders are provided with longitudinal sockets or recesses *i* in their peripheries, and in said sockets are placed blocks *k k*, which are adapted to turn loosely in the sockets. Each block *k* has in cross-section the form of a cylinder cut away at one side to form a flat surface. The sockets *i* are correspondingly formed—that is to say, said sockets if continued outside the peripheries of the cylinders *g g'* would be cylindrical, the openings formed by the intersection of the walls of the sockets with the peripheries of the cylinders being of about the same width as the flat surface on the blocks *k*, as shown in Figs. 6 and 7. At the middle of the length of the flat surface of each block *k*, and extending transversely across the same, is a half-die, *l*, formed to co-operate with a like half-die on a block in the other cylinder in severing a length of wire and forming pyramidal points on the ends of the parts into which the wire is severed.

The cylinders *g g'* are rotated positively step by step, by means hereinafter described, and at each step the flat faces of two blocks, one in each cylinder, are brought together, so that the half-dies on said blocks are caused to meet and sever and point a piece of wire interposed between them.

The blocks *k*, as before stated, are adapted to turn in their sockets, so that when the dies *l* meet they remain momentarily in contact entirely across the flat faces of the blocks *k*, the blocks turning in their sockets to permit such contact. The effect of the dies *l l* on the wire is therefore the same as if the dies moved toward each other in opposite directions in cutting the wire.

It will be seen that if the dies were rigidly attached to the cylinders they could not have the flat acting faces nor the extended contact above described, and therefore would not act so efficiently on the wire.

The wire from which the nails are formed is fed from a reel to a point over the center of the cylinder *g*, and is received between pins *n n* on the blocks *k* of said cylinder.

The feeding mechanism is composed of a slide, *o*, adapted to reciprocate on the arbor of the cylinder *g*, and adapted to grasp the wire when the slide is moved inwardly, the wire passing through an orifice in the slide. The slide is reciprocated by means of a rock-shaft, *q*, journaled in bearings on the frame *a*, and provided at one end with an arm, *r*, having a gear-segment meshing with a rack on the slide *o*, (see Fig. 3,) and at the other end with an arm, *s*, having a gear-segment meshing with a rack on a vertical slide, *f*, which is adapted to move in guides *u u* on one side of the frame *a*. The slide *f* is connected by a pitman, *v*, with a crank, *w*, on the driving-shaft *b*, the rotation of said shaft reciprocating the slide *f*, and causing the latter to oscillate the rock-shaft *g*, which in turn reciprocates the feeding-slide. The length of the feed movement is determined by an adjustable

wrist-pin, w', which connects the pitman v with the crank w and enables the throw of the pitman to be regulated. The feed movement is equal to the length of two of the nails to be produced, and after each feed movement a section of wire of the length above indicated is severed from the continuous wire by a cutter, a', Fig. 1, affixed to the shorter arm of a lever, b', which is pivoted at c' to the frame a, and bears at the end of its longer arm on a spur-wheel, d', the arbor e' of which is mounted in bearings on the supporting-frame. Said spur-wheel is rotated step by step by means of an arm, f''', mounted loosely on the arbor e', and provided with a dog, g^2, engaging the teeth of a ratchet-wheel, h', secured to said arbor. The arm f' is connected by a rod, i', to the lever c, and is therefore oscillated by said lever and caused to rotate the spur-wheel intermittingly. The rotation of the spur-wheel causes the lever b' to oscillate. The downward movements of its shorter arm cause the cutter a' affixed thereto to co-operate with a suitable fixed cutter, and sever the wire after a suitable length of it has been fed between the pins n n. The cylinders g g' are rotated step by step by means of a ratchet-wheel, j' j', affixed to their arbors, and two levers, k' k', pivoted to a slide, l', Fig. 1, which is adapted to move between the vertical guides on the frame a, and is connected by a rod, m', with the lever c, whereby said slide is reciprocated. The levers k' k' have projections k^2 k^2 at their upper ends, which are formed to engage with the teeth of the ratchet j' when the slide l' is moving downwardly, and simultaneously rotate the cylinders g g' in opposite directions. The movement thus imparted to the cylinders is sufficient to bring two of the dies l l into contact and cause them to cut and point the length of wire held by the pins n n of one of the dies l. When the slide l' stops at the end of its downward movement, the projections k^2 k^2 bear against the teeth of the ratchets j' j', so as to prevent said ratchets from moving after the slide has stopped. The cylinders are thus positively held after each movement, the pins n n of the highest block k in the cylinder g being in position to receive the wire when the cylinders stop. While the wire is clamped between the blocks k k and their dies l l, two headers or hammers, p' p', move simultaneously against and upset the opposite ends of the wire against the ends of the blocks k k, which act as anvils for this purpose. (See Fig. 5.) The headers p' p' are secured to the upper ends of levers q q', Fig. 4, which are pivoted to the frame of the machine at r' r', and are connected at their lower ends by toggle-joint links or members s' s', with an adjustable rod, t', which is suspended from the lever c. The oscillations of the lever c are thus caused to oscillate the levers q q', and cause the headers p' p' to alternately approach and recede from the ends af the blocks k k.

The operation as a whole is as follows: The wire is first fed forward between the pins of the highest block k in the cylinder g. The cutter a' then severs the wire to admit the next length fed forward. While the cutter is rising and the feeding slide is moving backward, the cylinders g g' are rotated one step, carrying the last severed length of wire toward the meeting-point, and bringing two blocks k k together at said meeting-point, one of said blocks having a length of wire between its pins n n. When the cylinders stop, the feed-slide moves the wire forward, and at the same time the headers act, on the ends of the wire held by the meeting blocks and dies. The cutter a again acts, and thus the operation is continued, two complete nails being formed at every step or movement of the cylinders g g'. In the present instance each cylinder has eight blocks; hence sixteen nails will be formed by each complete rotation of the cylinders.

The blocks k on the cylinders g' have recesses u' to receive the pins n on the blocks of the cylinder g, as shown in Fig. 5, and by dotted lines in Figs. 6 and 7.

It is obvious that the details of construction of the operating mechanism above described may be variously modified without departing from the spirit of my invention.

The arbors h h' of the cylinders g g' are mounted in boxes a^2 a^2, which are laterally adjustable in slots in the frame a, and are backed by screws b^2 b^2, whereby the boxes and the cylinders g g' may be adjusted relatively to each other. (See Fig. 5.)

I claim—

1. In a wire-nail machine, the socketed cylinders g g', the blocks k k, swiveled in the sockets of the cylinders, said blocks being flat on their outer surfaces and provided with dies, combined with mechanism for rotating said cylinders step by step, as set forth.

2. In a wire-nail machine, the combination of the socketed cylinders g g', having the swiveled blocks, formed as described, and provided with dies, mechanism for rotating said cylinders step by step, and mechanism for supplying lengths of wire to the cylinders, as set forth.

3. In a wire-nail machine, the combination of the socketed cylinders g g', having the swiveled blocks k k, formed as described, and provided with dies, mechanism for rotating said cylinders step by step, mechanism for supplying lengths of wire to the cylinders, and two headers and operating mechanism therefor, substantially as described, whereby said headers are caused to upset the ends of the wire held by two of the blocks k k, as set forth.

4. The combination of the cylinders g, having swiveled die-blocks provided with pins or holders n n, and the cylinder g', having corresponding die-blocks, with recesses u' to receive the pins n, as set forth.

5. In a wire-nail machine, a rotary die-holder provided with a series of dies on its

perimeter, each formed to partially sever and point a blank of wire centrally, and holders accompanying each die, whereby nail-blanks may be held in operative relation to said dies, combined with mechanism, substantially as described, for rotating said holder step by step and thereby bringing each die and the accompanying blank successively to a given point, and a die co-operating with each die in the rotary holder at said given point, whereby the blanks are successively severed and pointed, as set forth.

6. In a wire-nail machine, a rotary die-holder provided with a series of dies on its perimeter and holders accompanying each die, combined with mechanism, substantially as described, for rotating said holder step by step and thereby bringing each die and the accompanying blank successively to a given point, a die co-operating with each die in the rotary holder at said given point, whereby the blanks are successively severed and pointed, and two headers and operating mechanism therefor, substantially as described, whereby the headers are caused to upset the ends of the wire when they reach the point where they are acted on by the dies, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 11th day of August, 1884.

NATHAN C. LEWIS.

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