

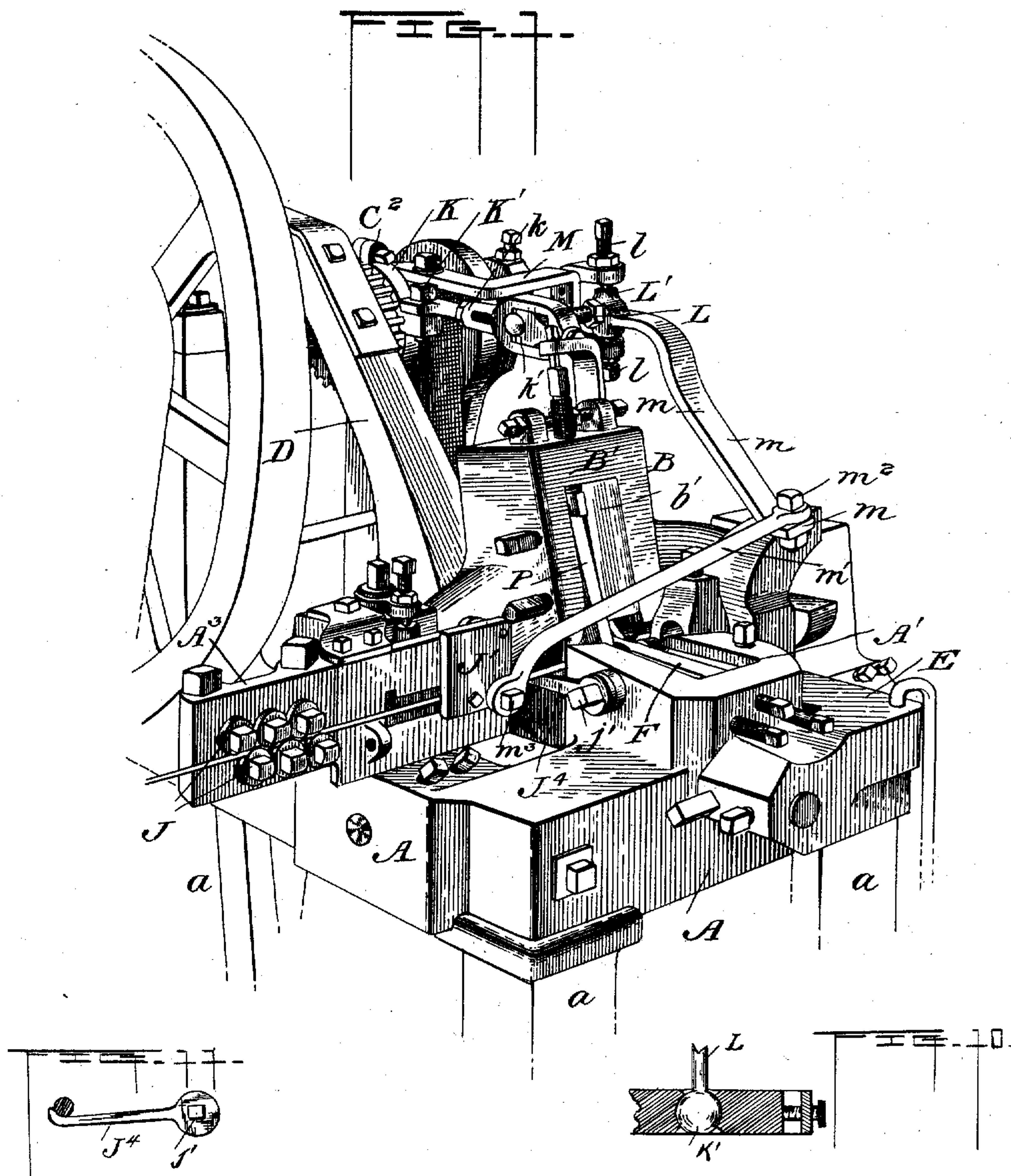
(No Model.)

3 Sheets—Sheet 1.

C. F. ROTH.
ATTACHMENT FOR CUT NAIL MACHINES.

No. 483,085.

Patented Sept. 20, 1892.



Witnesses

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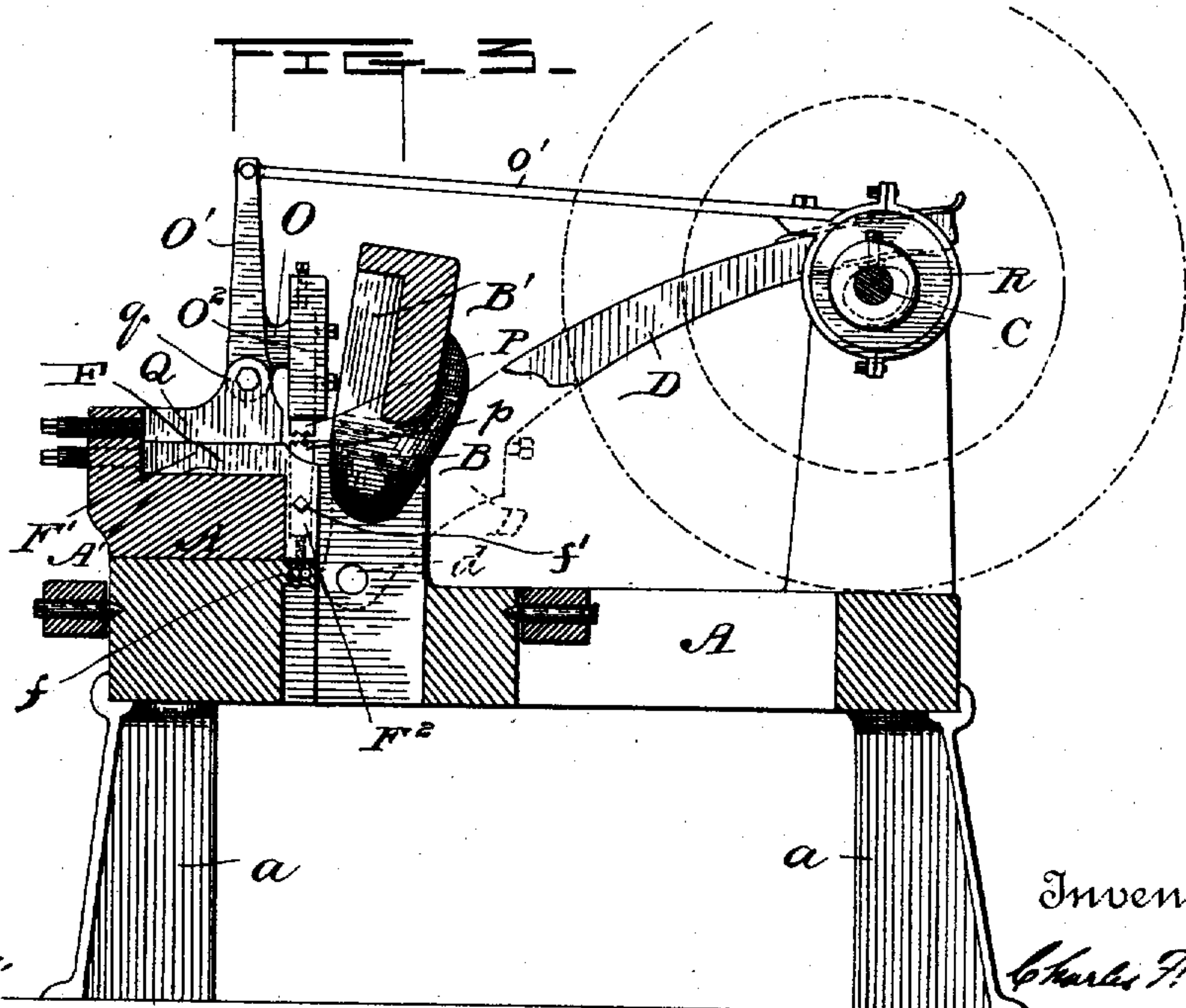
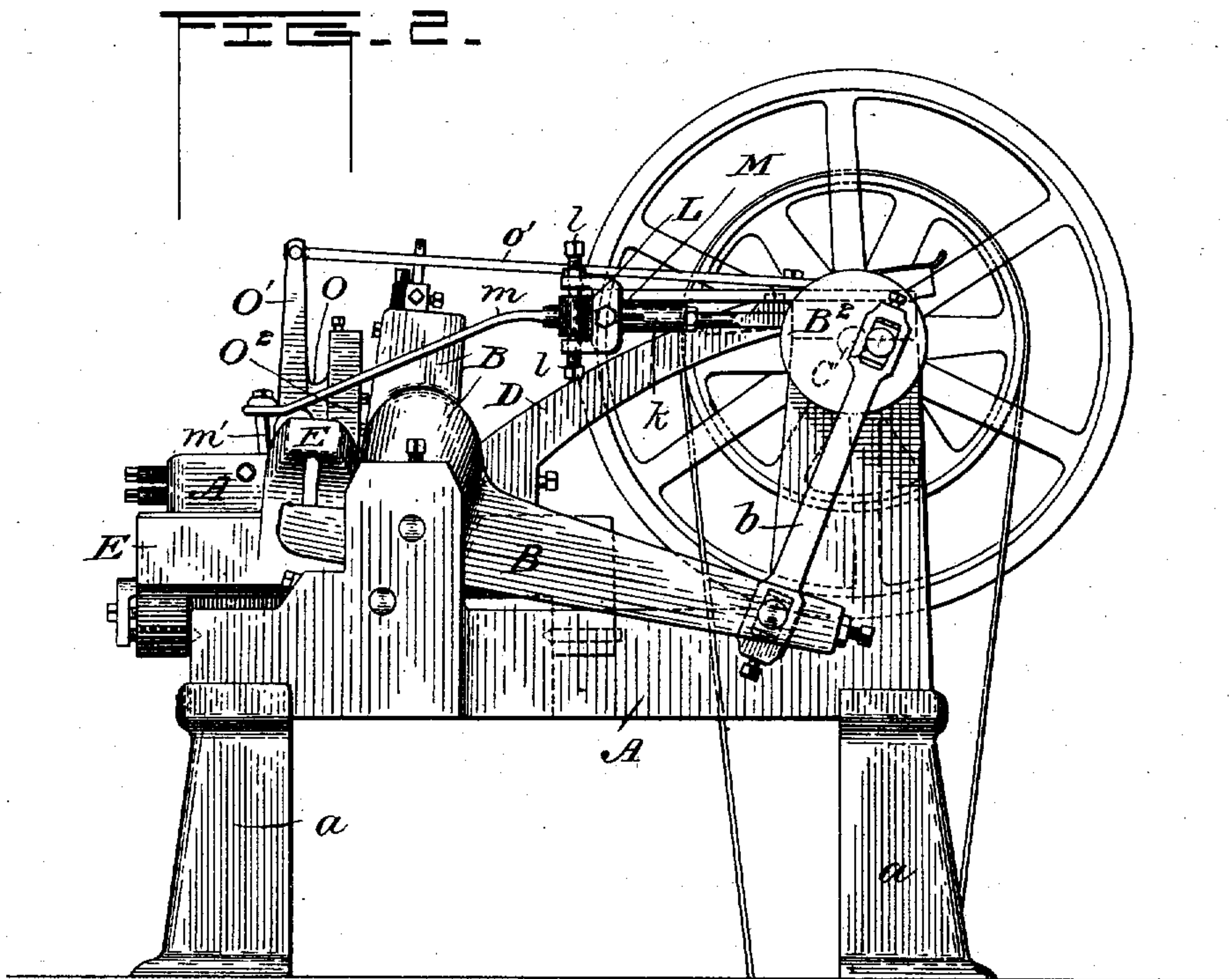
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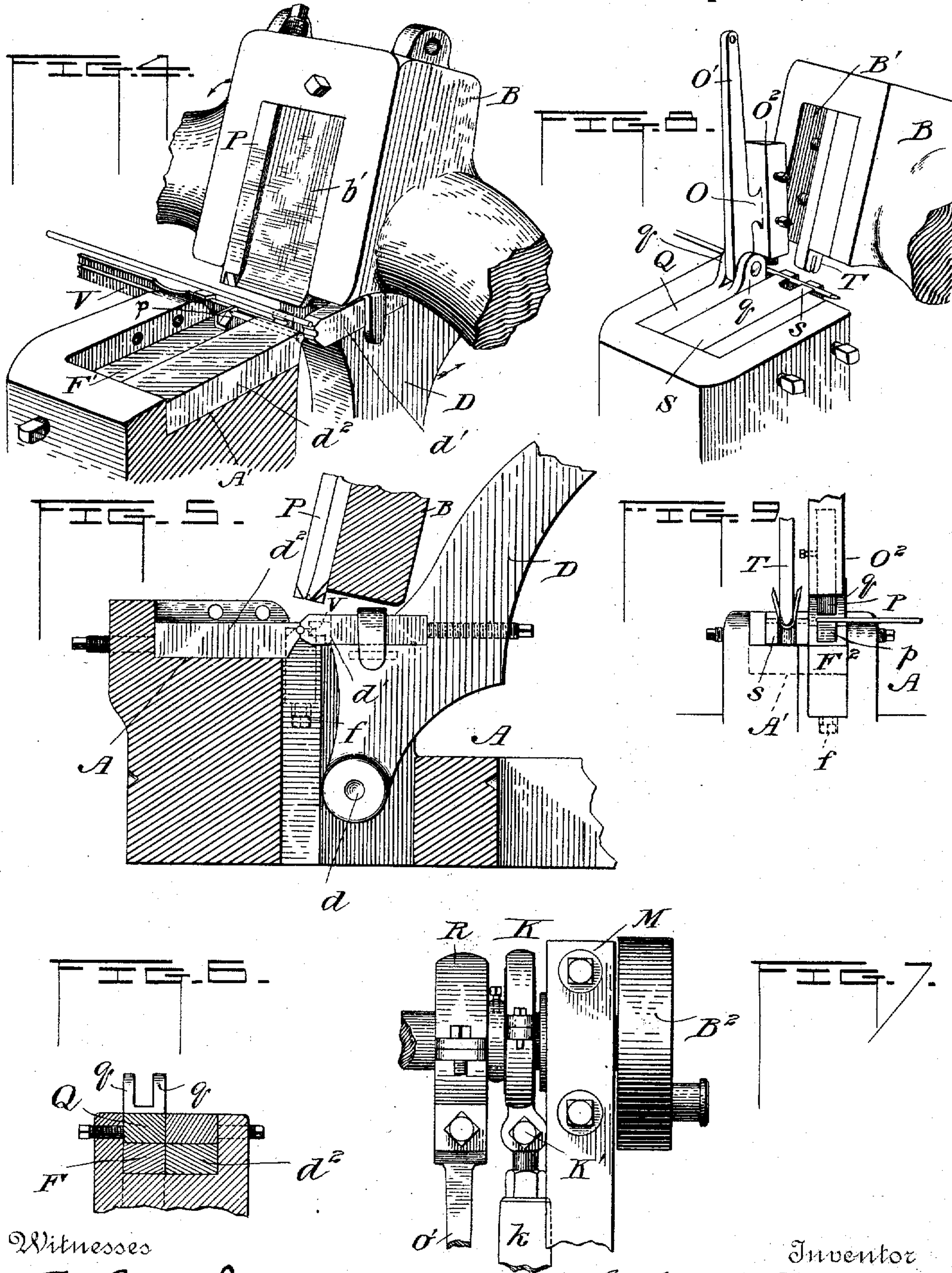
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Patented Sept. 20, 1892.



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UNITED STATES PATENT OFFICE.

CHARLES F. ROTH, OF IRONTON, OHIO, ASSIGNOR OF ONE-HALF TO THE
KELLY NAIL AND IRON COMPANY, OF SAME PLACE.

ATTACHMENT FOR CUT-NAIL MACHINES.

SPECIFICATION forming part of Letters Patent No. 483,085, dated September 20, 1892.

Application filed June 24, 1891. Serial No. 397,288. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. ROTH, a citizen of the United States, residing at Iron-
ton, in the county of Lawrence and State of
5 Ohio, have invented certain new and useful
Improvements in Wire-Nail, Staple, and Hook-
Making Attachments to Cut-Nail-Making Ma-
chines; and I do hereby declare the following
to be a full, clear, and exact description of the
10 invention, such as will enable others skilled in
the art to which it appertains to make and use
the same.

My invention relates to certain new and
useful improvements in wire-nail-making at-
15 tachments to cut-nail-making machines; and
the object is to provide simple and economi-
cal devices for rendering the ordinary cut-
nail-making machines convertible into a wire-
nail-making machine, so that the same may
20 be used for manufacturing either class of
nails and at a very small cost to the manu-
facturer, thereby greatly reducing the cost of
manufacturing wire nails.

It has been the common practice heretofore
25 in the manufacture of wire nails to employ
complex and expensive machinery which, on
account of the original cost of production and
the subsequent cost of maintenance, due to
the expense incident to the renewal of a mul-
30 tiplicity of parts when worn, has rendered the
same too expensive to be within reach of the
ordinary cut-nail manufacturer employing
cut-nail machinery, and as a result the use of
such wire-nail-making machines is necessarily
35 limited to a comparatively few of the more
wealthy manufacturers. In view of these cir-
cumstances it has been heretofore proposed to
provide the ordinary cut-nail-making machine
with attachments adapted to make wire nails,
40 and several patents have been issued cover-
ing such attachments; but all such machines
with which I am familiar have proven to be
inefficient and objectionable for various rea-
sons, particularly on account of the difficulty
45 experienced in feeding a sufficient length of
wire to the nail-forming mechanism before
the latter begins to operate, and it has been
exceedingly difficult to produce satisfactory
results in the manufacture of wire nails ac-
50 cording to present methods of feeding and by
the use of such attachments as have hereto-

fore been proposed for use in connection with
cut-nail-making machinery. To overcome
these difficulties, I have devised improved
mechanism for cutting and pointing the nail 55
prior to heading the same, combined with an
eccentric movement and intermediate mech-
anism for feeding the wire, arranged to oper-
ate in such relation to the nail-forming de-
60 vices as to utilize the full motion of the ma-
chine in feeding; and my invention consists
in the construction and arrangement of de-
vices for accomplishing such results, all as
hereinafter described, and particularly de-
65 fined in the claims at the end of this speci-
fication.

In the accompanying drawings, in which
like letters of reference are used to designate
like parts of the machine, Figure 1 repre-
70 sents a perspective view of an ordinary cut-
nail-making machine having my improved
wire feeding, cutting, and pointing devices
attached, thus being adapted for making wire
nails. Fig. 2 is a side elevation of a cut-nail
machine adapted for making wire nails and 75
having my improved detachable pointing-le-
ver mounted thereon. Fig. 3 is a longitudi-
nal vertical partial sectional elevation of Fig.
2. Fig. 4 is a detail perspective view show-
80 ing in part the recessed head of the cutting-
lever, the gripping-lever, and the lower bed-
socket or die-bed for holding the upper and
lower pointing-dies, illustrating, also, my
method of overfeeding. Fig. 5 is a sectional
elevation of the parts shown in Fig. 4. Fig. 85
6 is a detail sectional view of the bed-socket
for the lower die and pointer. Fig. 7 is a plan
of the double eccentrics and crank-disk on
main shaft. Fig. 8 is a detail perspective
view of parts arranged for making staples 90
and hooks. Fig. 9 is a rear view of the tool-
holder and bed-socket with attachments
shown in Fig. 8. Fig. 10 is a detail sectional
view illustrating a desirable form of ball-and-
95 socket or universal joint connecting the pit-
man and rod of the wire-feed mechanism
shown in Fig. 1. Fig. 11 is a detail view of
the adjustable spring-arm which underlies
the end of the wire as it is being fed into the
machine.

In adapting the ordinary cut-nail-making
machine to the manufacture of wire nails I

propose to use the usual nipper, gage, dies, and gripping devices of such machine, simply adding thereto my improvements to adapt such devices as are ordinarily employed for making cut nails to the manufacture of wire nails.

In the drawings, A designates the bed-frame of an ordinary cut-nail-making machine of the character now in common use in all cut-nail factories, said frame being supported upon suitable legs *a*.

B is the cutting-lever, which is connected to a crank-wheel B² on the main shaft C of the machine by a pitman *b*.

D is a gripping-lever, which is adapted to rock upon its pivotal supports at *d* and is actuated by a cam on the main shaft in the usual manner. This lever carries the moving gripping die or jaw *d'*, whose function is to grip the nail and hold the same during the upsetting operation of the heading-lever in forming the head of the nail.

E is the heading-lever, which has the usual toggle-jointed connection with the cutting-lever B, by which it is actuated, as in previous machines of this character.

The construction and arrangement of parts thus far described are the same as in cut-nail machines now in common use, and the several devices named are adapted to operate in the usual well-known manner, so that any further description thereof is not deemed necessary herein.

In order to adapt the cut-nail machine to make wire nails, I remove the bed-knife and bed-piece from the bed socket or recess A' of the frame and insert in the left-hand side thereof a bed-pointer holder F, Figs. 3 and 6, which has a horizontal arm F', adapted to lie in the bed in the place usually occupied by the bed-piece, and a depending socket-piece F², which is connected at its upper end to the inner end of arm F'. The lower pointer *p* rests in this socket and can be adjusted vertically by a set-screw *f* and laterally by a set-screw *f'*, tapped through the walls of the socket-piece. Then beside the pointer-holder I place in the bed a gripping die or jaw *d*², both pointer-holder F and said die *d*² being firmly held in the bed socket or recess and adjusted therein by the set-screws which hold the bed-piece and die of the cut-nail machine.

The cutting-lever B has a recessed head B', which rises above and beside the bed socket or recess A' of the frame, and in the recess of said lever is secured the moving knife or cutting-jaw *b'* of the cut-nail machine, and beside and at the left of this jaw *b'* I insert the upper pointer P, (see Figs. 1 and 4,) which is adapted to co-operate with the lower pointer *p* and compress a point on the wire after a proper length thereof has been passed into the machine. This upper pointer has a shear-edge, which is adapted to sever the wire during the pointing thereof and just before the pointing is completed, so that as the length of wire sufficient to form a nail is severed it

is simultaneously pointed. The particular form of the pointers is not an important part of my invention, as the forms thereof are old and well known. The gripping-die *d'* on lever D coacts with the die *d*² and clamps the severed piece of wire after it has been pointed and while it is being headed by the header similarly to the heading of cut nails.

In order to feed the wire properly to the machine, I attach to the left-hand side of the frame the wire guiding and straightening devices, which are mounted on a support A³, attached to the left-hand side of the frame.

J J designate a series of ordinary straightening-rolls mounted on the support A³, and J' is a laterally movable or reciprocating plate mounted in proper guides on support A³ and provided with an ordinary cam-gripping device—such as is commonly used in this class of machines—for feeding wire. The wire is passed from a coil through rolls J and between the cam-faces of the gripping-device, so that it is gripped by the cam as plate J' is moved inward and is released as the plate moves outward, thus feeding or drawing the wire in only during the inward movement of the plate. The end of the wire is passed into the machine and drawn inward between pointers *p* and P and slightly overlies the edge of die *d*² previous to the pointing operation. An adjustable spring-arm J⁴ is attached to the bed and underlies the end of the wire and will lift it up after any depression thereof to its proper position, so that the infeeding of the wire shall not be retarded or obstructed by the slight bending down of its ends during the severing of a nail-blank therefrom. The arm J⁴ may be set and secured in any desired position by means of the set-screw *j'*.

The plate J' is operated by the following mechanism: On the main shaft C of the machine I mount an eccentric K, the strap K' of which may be connected to the rear end of a short pitman or rod *k*, so as to prevent binding in the eccentric by allowing the pitman to swing slightly in a horizontal plane. The other end of pitman *k* is connected by a ball-and-socket or universal joint *k'* with a shaft or rod L, which passes through an opening in a pivotal post or stud L', centered upon set-screws *ll* in a bracket M, attached to the main frame and secured thereto by the same bolts that hold the cap-plates of the main shaft in position, as shown in Fig. 1. The post L' may be formed integrally with an arm *m*, as shown, or rigidly connected to said arm, the latter being adapted to be vibrated by the rocking of the post, and the extremity of arm *m* is pivotally connected by a rod *m'* to the plate J'. The screws *ll* and *m*² *m*³ are made tapering, so as to take up all lost motion or wear on said screws and post L'. The end of rod L, which passes through post L', is threaded, and on it are placed adjusting and set nuts, by which the position of the rod in relation to the post can be varied to set the ball-joint closer to or farther from the post, and thus

increase or diminish the vibration of the post imparted from the eccentric K and accordingly regulate the amount of infeed of the wire, so that the machine can be quickly ad-

5 justed to feed short or long lengths of wire, according to the number or length of nail it is desired to make.

From the foregoing description it will be observed that the rod L, post L', and arm m constitute, essentially, a vibrating bell-crank lever, whose shorter arm is adjustable, such shorter arm having a rocking connection with the eccentric-strap and its longer arm a piv-
10 otal connection to the wire-feed plate.

15 With the devices so far described I can produce wire nails rapidly, and I will briefly describe the operation of the machine thus far converted before proceeding with the description of the other attachments.

20 In the ordinary cut-nail-making machines the cutting-lever B and gripping-lever D act alternately, and I do not disturb their operations. However, I so adjust the wire-feed devices that when the cutting-lever B has moved
25 away from the bed-plate sufficiently to separate the pointers the infeed of the wire begins and continues during the time the pointer P is moving away from the pointer p and until it begins to move back toward the pointer p.

30 Thus I have ample time to feed the wire in gradually. As the cutting-lever closes upon the wire, the end of the wire is depressed slightly about one-quarter of an inch by the pointers and cutting knife or jaw of the cut-nail machine, which jaw I thus utilize to assist in depressing the end of the wire or nail
35 blank into position to be caught by the gripping-dies, and as the pointers close upon the wire the cutting-edge of pointer P at the moment the pointers complete their work severs
40 the wire blank, so that the pointers finally finish the point upon a severed nail-blank. As the pointers finish their work, the gripping-die in lever D is moved inward to clamp
45 the pointed blank, and as pointer P rises the blank is firmly gripped between dies d' d^2 , and while so gripped the header is moved inward and forms the head on the end of the wire blank in the same manner that it forms
50 the head on the cut nail.

I employ the ordinary nipping devices used in cut-nail machines to hold the end of the wire down while the pointers and cutter are operating thereon and until the dies d' d^2
55 clamp the pointed blank; but as such nipping devices are well known in the art and are actuated in accordance with the usual methods of operating the same in cut-nail machines I have not deemed it necessary to
60 enter into a detailed description thereof nor to illustrate the connections for operating the same. Now while the nail blank is clamped by jaws d' d^2 and while the header is operating (during which time the cutting-lever B is
65 rocking backward and the pointers are separated) the wire-feed mechanism is working and drawing into the machine between the

cutters a length of wire sufficient to produce another nail simultaneously with the heading of a previously-pointed blank. This is
70 only possible in such machines by making the head after the wire is pointed, because, as has heretofore been done, when the head is first formed and then the point the wire must lie in one position until the heading,
75 pointing, and severing are completed, and therefore the wire cannot be fed in for a new nail until the other nail is entirely completed. Hence it has been necessary to jerk
80 the wire forward violently and quickly, putting great strain on the parts, thus causing breakage and frequently preventing perfect nails by the slipping of the wire, and also necessitating frequent renewal of parts of the
85 wire-feed devices. By my method, however, the heading is done after the blank is severed and while the blank lies a little below the line of infeed of the wire, so that the heading operation does not interfere with the infeed.
90 Both infeed and heading can be done simultaneously, so that by my machine I can feed in the wire during the heading operation, whereas heretofore the feed necessarily had to be stopped during the heading. As the heading operation requires about one-half the
95 movement of the cutting-lever, I have just so much more time to feed my wire as is required for the cutting-lever to make a one-half of its complete movement. In other machines all this time was lost.

As thus far described I have utilized all the working parts of the cut-nail machine, simply altering the cutters and pointers and adding a wire-feed; but my invention does not end
100 here, because as it may be found inconvenient to remove the cutters from the cutting-lever, it being more difficult to adjust them therein than in the bed, I employ an auxiliary pointing device, as shown in Figs. 2 and 3. This
105 device consists of an oscillating or vibrating arm O, which is pivoted on a rock-shaft journaled in studs q q , rising from a base-plate Q. O' is an upstanding lever rigidly connected to arm O, so as to vibrate the latter when shifted.
110 The base-plate Q is preferably set in recess A' or socket of bed A above and resting upon the bed-pointer holder and bed-die and is clamped therein by the set-screws that hold the bed-knife of the cut-nail machine. On
115 the end of the arm O is formed an upstanding socket-piece O², adapted to receive the upper pointer P, (which when this device is used is removed from the cutting-lever,) and is provided with set and adjusting screws for
120 holding the pointer. I then connect eccentric R, on shaft C, beside eccentric K or in other convenient position (the cog C², shown in Fig. 1, which has no function when the machine is used for wire-nail making, being
125 removed to give place to this eccentric) to the end of lever O' by an eccentric strap and pitman O', as best shown in Fig. 3, so that the
130 pointer will be operated from the eccentric independently of cutting-lever B. When

these devices are employed, the wire is fed straight into the machine and there is no need of overfeeding it, as is the case when the cutting-lever B is used, for by shifting eccentric R, I can get any desired time for the movement of arm O, and instead of making the point alternately with and previously to making the head, as I do when using lever B, I place the eccentric R so that it will cause the pointer P to operate and make the point almost at the same time that it is headed—that is to say, I shift the pointers so that they work almost simultaneously with the gripping-dies d' d'' —being enabled to make them do so by shifting eccentric R, so that the grippers and pointers, when using this attachment, work nearly simultaneously instead of alternately, and I am thus still enabled to utilize the full motion of the machine in feeding.

It will be noted that in the usual cut-nail machine the bed-die and bed-piece are placed above and rest upon a steel filling or rest, which is fitted in the bed-socket, and in placing my bed-pointer holder in position upon such machine for the purpose of making wire nails I remove such steel filling or rest and secure my improved bed-pointer holder in the bed-socket in the position occupied by said steel rest and bed-die.

In order to adapt the machine to be used for making staples and hooks, I provide a bed-die S, having a forked end s, as shown in Figs. 8 and 9, which in such use of the machine takes the place of the lower die in the bed-socket beside the base-plate Q, to which is pivoted the oscillating arm or angle-lever O O'. Then I remove the cutting-knife from the recessed head or socket in the cutting-lever and substitute in place thereof a bending die or tool T, by which when a sufficient length of wire has been fed into the machine and pointed and severed, as in the nail-making operation, the severed blank will be forced by the bending-die T between the bifurcated portion of the die S, as indicated in Fig. 9, so as to bend the same into the form of a staple or hook, the operation of bending, pointing, and severing the staple-blank being exactly similar to the method of feeding, pointing, and severing the nail, except that the gripping of the blank after severing by the gripping-dies is unnecessary, the nippers serving to hold the blank during the operation of pointing the same and to release it immediately after it is caught by the bending-die, so as to permit the severed blank to be bent into the form of a staple. Thus it will be seen that with my improved attachments an ordinary cut-nail machine is adapted to be readily converted into a wire-nail-making machine by simply removing the cut-nail-making tools and substituting therefor the wire-nail-making tools in the manner indicated in Fig. 1, or by means of the auxiliary pointing devices indicated in Figs. 2 and 3

and by substituting other tools for those last mentioned the device may be readily converted into a staple-making machine, and these several changes and operations are accomplished by means of a simple and inexpensive arrangement of devices, which can be procured at a very small cost, so as to render a single cut-nail machine convertible into a wire-nail machine or staple-making machine at will.

From the foregoing description, taken in connection with the accompanying drawings, the operation of my invention as a whole will be readily understood; but to recapitulate briefly: When I put the pointer in the cutting-jaw, I first point the nail and simultaneously sever it from the length of wire and then retain it by a suitable nipper V, as shown in Fig. 4, (the nipper being actuated as in the cut-nail machine,) until the jaws grip it. Then the instant the blank is severed and the pointer P rises I begin to feed in another length of wire right over the one that is still in the dies, so that when the jaws have released their hold on the nail the pointer and cutting-knife come down and press the wire that has been fed in down on a line with the jaws and cut it off, thereby getting the full time of each motion of the machine or revolution of the shaft for a feed by the use of an eccentric and connections, as herein described, which will evenly and smoothly feed in the wire, instead of a cam or knocker, which will feed the wire in with sudden thrusts or jerks, and when the auxiliary pointing device is used I can so arrange the motion by means of the eccentric that I can point the nail while the dies are gripping it or a little in advance of the dies, and thus I will still have nearly the entire time of motion of the machine for feeding the wire. Furthermore, by mounting the lower pointer in the removable holder F, I am enabled to adjust it more readily, as the holder can be removed as readily as one of the dies or knives in the bed-recess, so that it is not necessary to go under the machine to adjust it, as has been necessary heretofore with cut-nail machines and wire-making attachments to such machines.

It will of course be understood that various modifications in the construction and arrangement of parts herein described may be made without departing from the essential features of my invention, and hence I do not desire to be limited to the exact construction described and shown; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a wire-nail machine, the combination of mechanism for gripping and heading a nail-blank with mechanism for feeding a length of wire for another nail beside the nail-blank while the latter is being operated upon by the gripping and heading dies, substantially as specified.

2. In a wire-nail machine, the combination

of the gripping and heading mechanism with mechanism for feeding in a nail-blank beside a previously-infed blank while the latter is being operated upon by the gripping and heading dies, and mechanism for pointing the second blank simultaneously with the release of the finished nail by the gripper and header, substantially as described.

3. In a wire-nail machine, the combination of mechanism for feeding the wire into the machine beside a previously-cut nail-blank while the latter is being operated upon by the gripping and heading dies, mechanism for pointing and severing a nail-blank from the wire simultaneously with the release of the finished nail by the gripper and header, and mechanism for gripping and heading a severed blank while another length of wire is being fed into the machine over the severed blank, substantially as described.

4. In a cut-nail-making machine adapted to make wire nails, the combination, with the cutting-lever, of the moving knife or cutting-jaw, the upper pointing-tool mounted in said lever, and the feeding attachment adapted to feed in a length of wire while a previously-fed blank is being operated upon, substantially as described.

5. The combination, with the cutting-lever carrying the moving knife or cutting-jaw and the upper pointing-tool, of the bed-pointer holder, the lower pointing-tool, and means for feeding a length of wire while a previously-fed blank is being finished, substantially as described.

6. The combination, with the cutting and gripping devices and the feeding mechanism for feeding a length of wire to the machine beside a previously fed and severed blank, of a spring-arm adapted to lift and maintain the uncut end of the blank in position to be acted upon by the cutting and pointing tools, substantially as described.

7. The combination, with the main shaft and the eccentric thereon, of the wire-feed plate, a vibrating bell-crank lever having a rocking connection with the eccentric-strap and a pivotal connection with the feed-plate, and adjusting means for varying the feed of the wire, substantially as described.

8. The combination, with the wire-feed plate and the mechanism for simultaneously pointing and severing a nail-blank, of the vibrating arm, the pivot-post, the rod connected therewith, the pitman and universal joint connecting said pitman and rod, and the eccentric for actuating said vibratory arm to feed a length of wire beside the previously-infed blank, substantially as described.

9. The combination, with the wire-feed plate and the mechanism for pointing and severing a nail-blank, of a vibratory arm connected to said plate, the pivot-post rigidly secured to said arm, the shaft or rod adjustably connected to said pivot-post, the pitman, the ball-and-socket joint connecting said pitman with

said rod, and the eccentric for actuating said vibratory arm, substantially as described.

10. In a convertible cut-nail and wire-nail making machine, the combination, with the gripping-lever and heading-lever of the cut-nail machine and suitable gripping and heading devices, of a pointing-lever, a removable upper pointing-tool holder adapted to be used interchangeably with the cutting and pointing levers of the cut-nail machine, and a feeding attachment adapted to feed a length of wire while a previously-fed blank is being operated upon, substantially as described.

11. In combination with the main shaft, the eccentrics mounted thereon, the wire-feeding mechanism, substantially as described, connected with one of said eccentrics, the gripping mechanism, and the pointing-lever carrying the upper pointing-tool, connected with and adapted to be operated by the other eccentric, substantially as described.

12. The combination, with the cutting-lever having a recessed head or socket, of the upper pointing and cutting dies or tools mounted therein, the bed-socket for the lower dies, removable and interchangeable dies mounted in said bed-socket, whereby the machine is adapted for making nails or staples, and feed mechanism for feeding a length of wire while a previously-fed blank is being operated upon, substantially as described.

13. The combination, with the cutting-lever and the bed-socket, each adapted to receive removable dies, of the gripping, cutting, and heading devices, and feed mechanism adapted to utilize the full motion of the machine by advancing a length of wire to the dies beside a previously-fed blank and while the latter is being operated upon, substantially as described.

14. The herein-described removable bed-pointer holder having a horizontal arm and a depending socket-piece connected to the extremity of said arm, substantially as described.

15. In a nail-machine, the combination of the removable bed-pointer holder having a horizontal portion adapted to lie in the bed-piece recess and a socket portion connected to the inner end of the horizontal portion, with the pointer or tool removably secured in said socket-piece, substantially as described.

16. The combination, with the wire-feeding attachment and the cutting and gripping devices of a cut-nail machine, of the bed-pointer holder, the upper pointing-tool, and an auxiliary attachment, substantially as described, for operating the upper pointing-tool, substantially as described.

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

CHARLES F. ROTH.

Witnesses:

JOS. P. SHAW,
F. E. BRAMMER.