

(No Model.)

3 Sheets—Sheet 1.

L. E. CURTIS.
AUTOMATIC CUT NAIL MACHINE.

No. 424,925.

Patented Apr. 1, 1890.

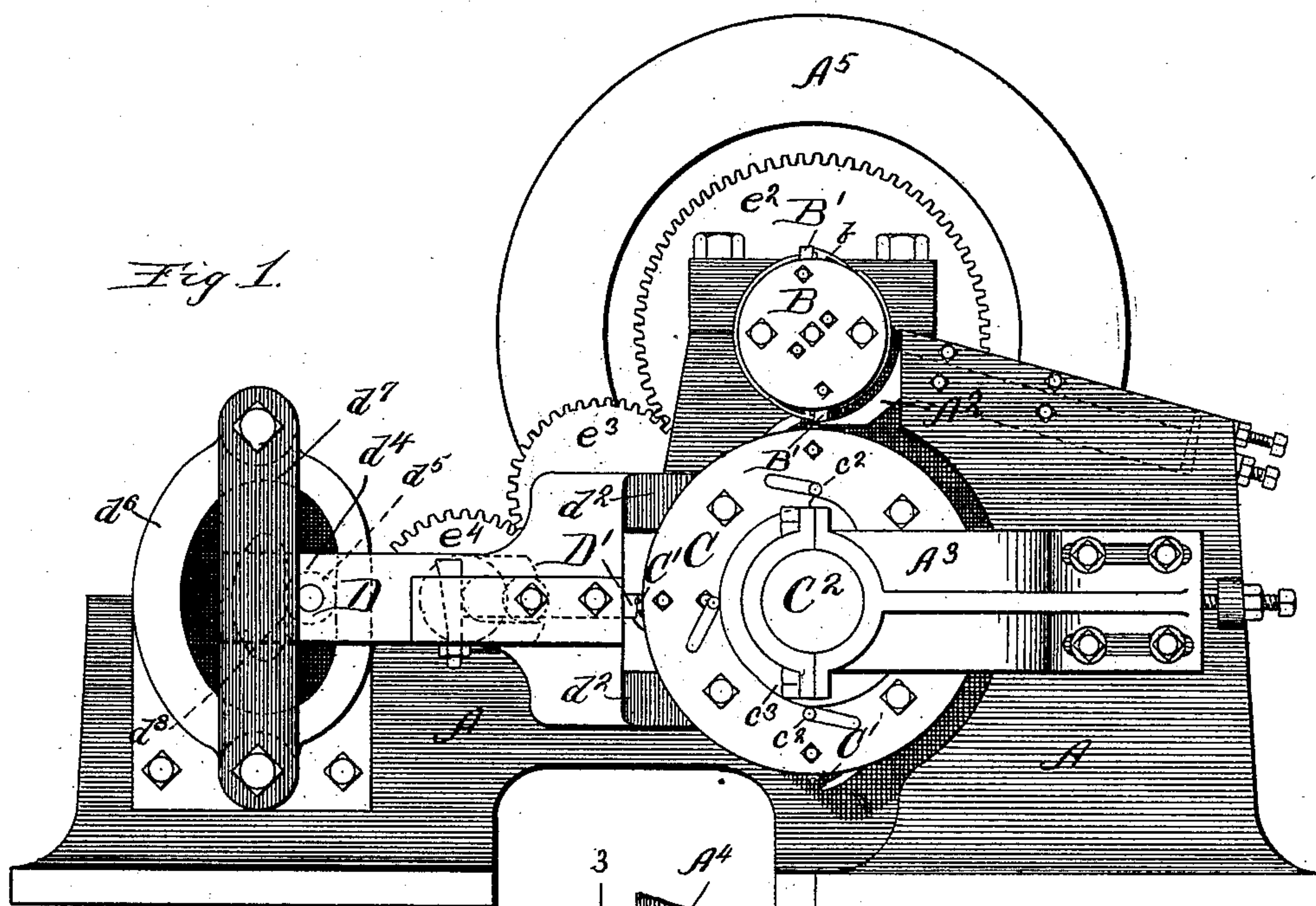
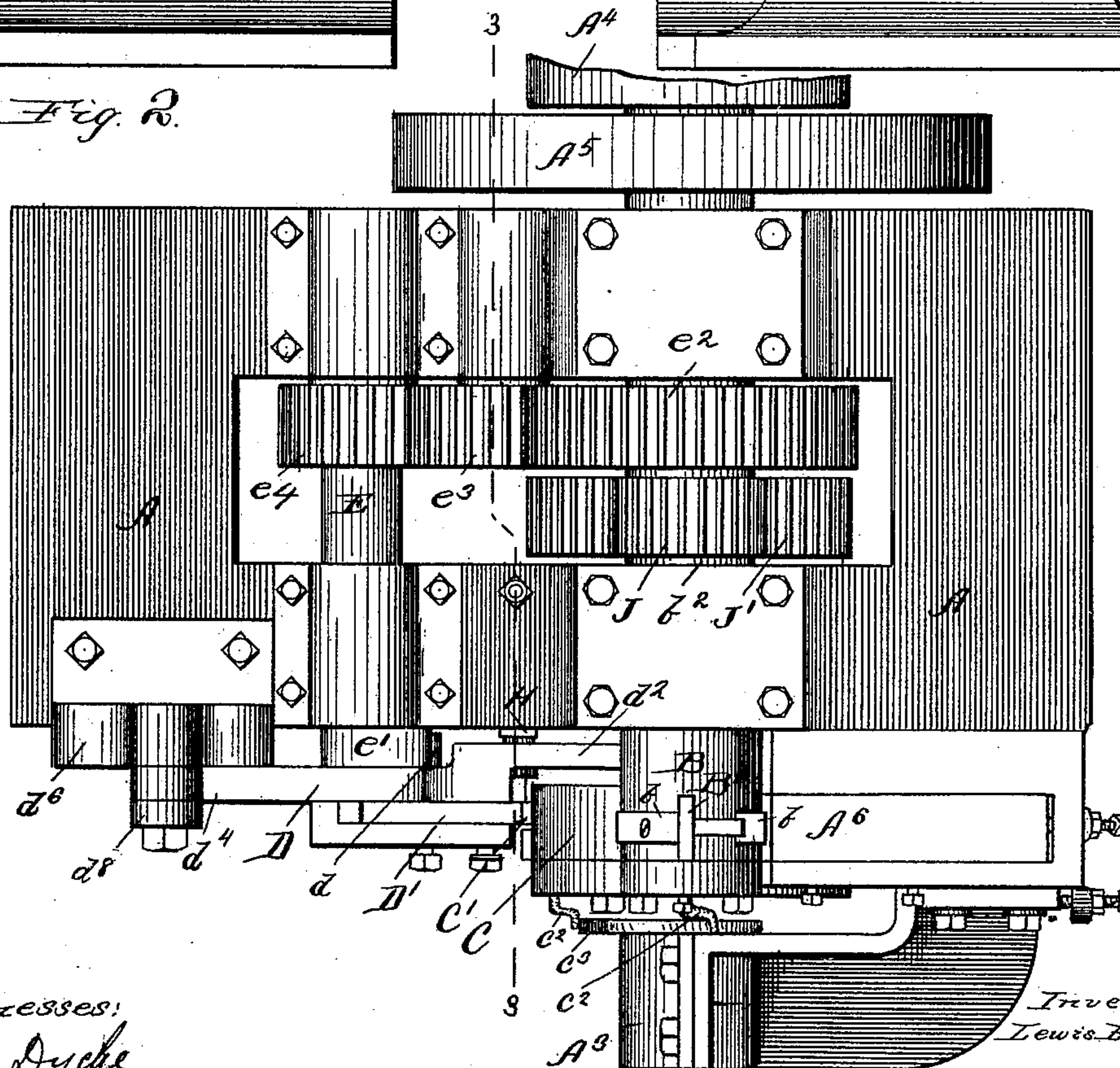


Fig. 2.



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Inventor:
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By *[Signature]* Frank F. Reed
His Attorney

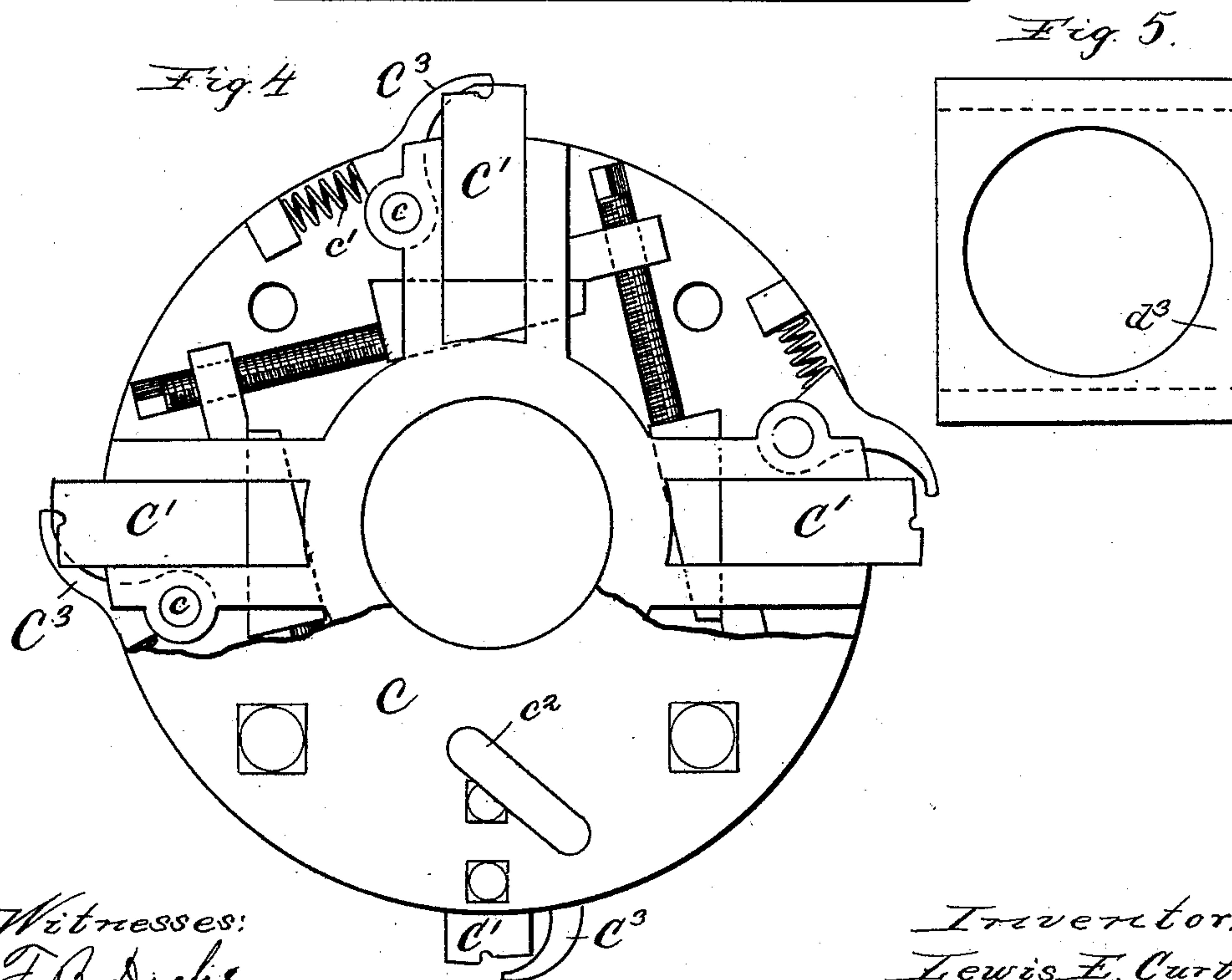
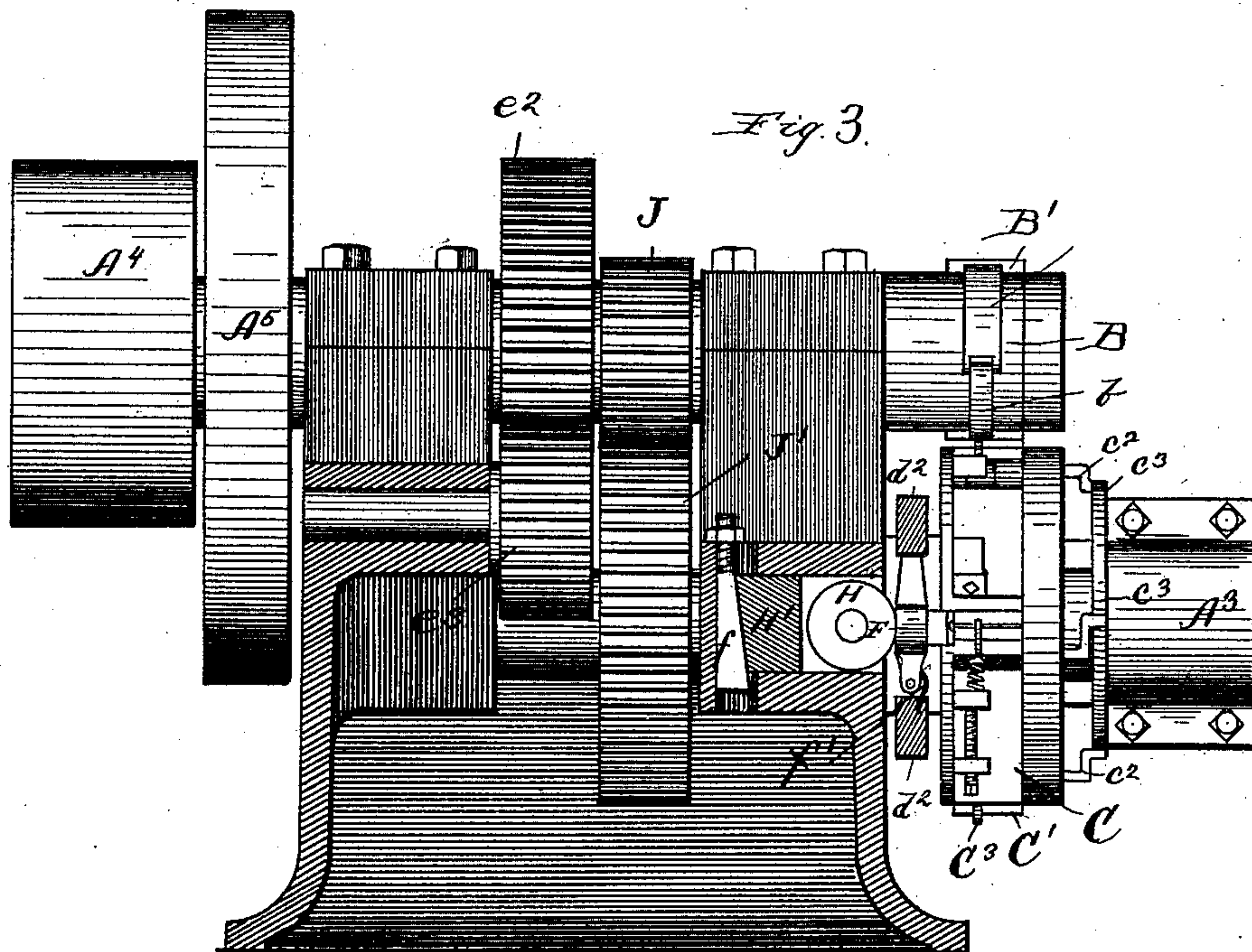
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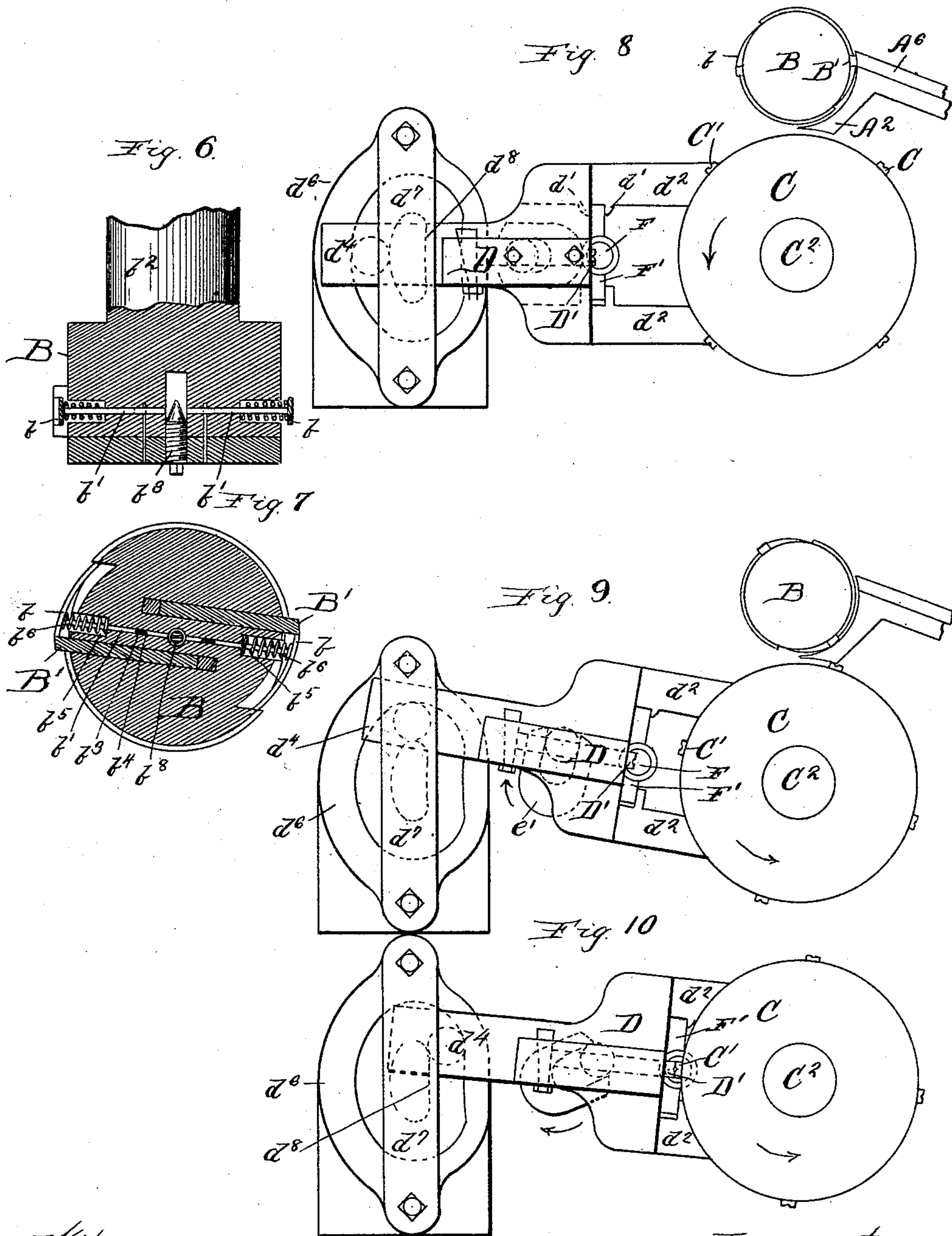
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Inventor:
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3 Sheets—Sheet 3.

No. 424,925.

Patented Apr. 1, 1890.



Witnesses:
J. B. Dyche


Inventor:
Lewis F. Curtis.

By Frank F. Reed
His Attorney

UNITED STATES PATENT OFFICE.

LEWIS E. CURTIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE W. COPE,
OF SAME PLACE.

AUTOMATIC CUT-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 424,925, dated April 1, 1890.

Application filed October 2, 1889. Serial No. 325,806. (No model.)

To all whom it may concern:

Be it known that I, LEWIS E. CURTIS, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Automatic Cut-Nail Machines; and I do declare that the following is a full, clear, and exact description of the said invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to automatic cut-nail machines; and the object thereof is to produce a machine of cheap, durable, and simple construction which will be capable of a high rate of speed and of accuracy in its operation.

My invention relates more particularly to that class of cut-nail machines shown and described in Letters Patent to D. C. Sweet and Frank Allison, dated December 20, A. D. 1887, and numbered 375,302, and also to Frank Allison, dated December 18, A. D. 1888, and numbered 394,903. In the class of machines shown and described in the above-mentioned Letters Patent great difficulty has been experienced in gripping or clamping the nail-blank firmly and uniformly at both edges preparatory to and during the heading operation, for the reason that the dies carried in the rotating die or die-heads meet at their lower edges first, and thereby force the nail-blank to the upper edge of the score, and as the nail-blank passes the center of rotation its upper edge will be compressed to a greater extent than its lower edge, and as a result an imperfect nail will be produced. In my invention this difficulty is overcome by the use of one (1) rotary die-head instead of two (2) and by the use in connection with said rotating die-head of an oscillating and reciprocating bar or frame in which is mounted the opposing die. This oscillating and reciprocating bar is supported at one end by the shaft of the rotating die-head, and at its center engages in a slotted crank, from which it receives motion, the direction of the motion being governed by the engagement of the other end of the bar in a cam. This motion, which is imparted to the die-holding bar at the time the dies come in contact, is in a direct line toward the cen-

ter of the rotating die-head, and the object of this particular motion is to keep the contact-faces of the dies parallel with one another at all times during the period of contact, so that the nail-blank will be firmly and equally gripped or clamped upon both its edges at all times during the registration of the dies.

My invention will be more fully understood by reference to the accompanying drawings, in which similar letters of reference indicate like parts in the similar figures.

In the drawings I have shown in Figure 1 a side elevation of the machine embodying my invention, and in Fig. 2 a plan view of my machine. Fig. 3 is a vertical line section taken on lines 3 3 of Fig. 2. Fig. 4 is a detail elevation of the rotating die-head. Fig. 5 is a detail view of the bearing-block on the shaft of the die-head. Fig. 6 is a detail longitudinal view of the cutting-head. Fig. 7 is a cross-section of the same. Figs. 8, 9, and 10 are detail views showing the operation of the die-head and the oscillating bar.

In the drawings, A represents the frame of the machine, B the cutting-head, and B' the cutters mounted therein.

C is the die-head, and C' the dies, secured in the head C.

D is the oscillating frame or bar carrying the opposing die D'. The end of this bar D is bifurcated, as shown by d^2 d^2 , so as to pass over a bearing-block d^3 , mounted upon the shaft C² of the die-head C. The other end of the bar is provided with an extension d^4 , which has mounted thereon at the side nearest the frame a roller d^5 , which engages the cam d^6 , attached to the frame A. This cam d^6 is furnished with a plate or bearing-piece d^7 , which fits over the extension d^4 , so as to stay the bar in its motion.

Motion is given to the bar D by means of a shaft E, provided at one end with a slotted crank e' , in the slot of which fits a roller d , secured to the bar at or near the center and upon the side nearest the frame. It will therefore be seen that as the shaft E revolves in the direction of the arrow shown in Figs. 8, 9, and 10 the bar will be given an oscillating motion upon the shaft C² as a pivot, and as the roller d^5 passes around the cam it will give

a reciprocating motion to and from the die-head C in a line directly toward its center—that is to say, the face of the die fixed in the end of the reciprocating bar will always be tangential to the radius drawn from the face of the die set in the die-head C to the center of the die-head. The cam d^6 is provided with a part d^8 concentric with the shaft C^2 of the die-head, so that the blank will be held between the two (2) dies for a short distance while the head is being formed on the nail-blank. Motion is given to the shaft E by the gears e^2 , e^3 , and e^4 , the gear e^2 being mounted upon the shaft b^2 of the cutting-head B. There are four (4) dies carried in the die-head C at quadrants in its circumference and only one (1) in the bar D, and consequently the latter will be compelled to make four (4) oscillations to one (1) rotation of the die-head.

Between the two (2) limbs d^2 of the bar, and directly behind the end of the die D' , is placed a heading-tool F, which is mounted in the vibratory holder F' , pivoted to the lower arm d^2 of the bar D and guided at its upper end by the guides or ways $d' d'$ on the upper arm d^2 . Placed directly behind the header when the header is in operation is a cam or roller H, mounted in the slide H' , which is fitted into the frame A so as to be adjusted to and from the header, for the purpose of making a larger or smaller head upon the nail-blank. This adjustment is accomplished by the wedge-bolt f , fitting behind the block H' and between it and the frame. The header as it passes on its downward course engages the cam or roller H and is forced against the blank held between the dies, and thus the head of the nail is formed; but as the header moves backward and upward the roller H will not be in the path of the header, the header being operated by it only in its downward path. The spring f' returns the header-frame to place. The cutting-head B is provided with gages to determine the thickness of the nail-blank, and these gages consist of the curved plate b , having a shank b' , extending to or near the center of the cutting-head. A taper-bolt b^8 is placed in the center of the cutting-head, against the taper part of which the shank b' of the gage impinges. By turning this bolt in, so that the shank of the gage will strike it at its larger diameter, it will be seen that the movement of the gage inward will be limited, and the blank cut from the nail-plate will be smaller than if the shank engaged with it at its smaller diameter. The shank of the gage is slotted, as shown at b^3 , and a pin b^4 passed through the slot, so that the gage is limited in its outward movement.

Underneath the gage-plate b , and in a socket b^5 in the cutting-head B, is placed a coil-spring b^6 , which forces the gage out against the pressures of the nail-plate. This spring also serves to eject the nail-blank into one of the dies C' after it has passed the guide or curved block A^2 .

The die-head C is also furnished with nippers C^3 for clamping the blank into and against the dies C' between the time it leaves the curved block A^2 and the time when the die D' operates upon it. These nippers C^3 are pivoted at c and held in engagement by the springs c' . The pivot c of the nippers extends out through the die-head, and is furnished with crank-arms c^2 , which engage a cam c^3 , mounted upon the frame of the machine. This cam serves to open the nippers to release the nail. The shaft C^2 of the die-head is driven from the shaft b^2 of the cutting-head by the gears $J J'$. Upon the shaft C^2 is placed a collar or bearing d^3 for the support of the ends $d^2 d^2$ of the bar D.

A^2 is a support for the end of the shaft C^2 .

A^4 is the band-wheel, and A^5 is the balance-wheel.

A^6 is the stationary knife, mounted on the frame of the machine.

The operation of the machine is as follows: The blank having been cut by the cutters B' , A^6 is pressed against the curved guide A^2 , and the rotation of the cutter B' will carry the blank down to the point of delivery, and the gage b under pressure of the spring b^6 will force the blank into the die C' , where it will be clamped by the nippers C^3 , after which the die C' and nippers C^3 will carry the blank around and down to the point of contact with the reciprocating die D' , where it will be firmly gripped and held between the two (2) dies while the header is passing the roller or cam H, after which the nippers will be opened by the cam C^3 and the nail released.

Having thus described my invention, what I claim is—

1. In an automatic nail-machine, the combination of a rotating die-carrying head and dies therein and the oscillating reciprocating die-carrying bar and the die therein, substantially as shown and described.

2. In an automatic nail-machine, the combination of a rotating die-carrying head with the dies therein, the oscillating reciprocating die-carrying bar with a die therein, the crank e' , and the cam d^6 , substantially as shown and described.

3. In an automatic nail-machine, the combination of a rotating die-carrying head with the dies therein and the oscillating reciprocating die-carrying bar with a die therein, said bar being provided with a heading-tool, substantially as shown and described.

4. In an automatic nail-machine, the combination of a rotating die-carrying head with the dies therein, the oscillating reciprocating die-carrying bar with a die therein, provided with a heading-tool, and a cam for operating the header, substantially as shown and described.

5. In an automatic nail-machine, the combination of a rotating die-carrying head with the dies therein and the oscillating reciprocating die-carrying bar with a die therein,

said bar being pivoted upon the shaft of the rotating die-head, substantially as shown and described.

5 6. In an automatic nail-machine, the combination of a rotating die-carrying head with the dies therein, the oscillating reciprocating die-carrying bar with a die therein, the rotating cutter, and curved guide, substantially as shown and described.

10 7. In an automatic nail-machine, the combination of a rotating die-carrying head with the dies therein and the oscillating reciprocating die-carrying bar with a die therein, pivoted upon the shaft of the rotating die-head, and provided with a bearing-block, substantially as shown and described.

15 8. In a nail-machine, the combination of the

cutting-head and its cutters with the gage and adjusting-bolt, substantially as shown and described.

20 9. In a nail-machine, the combination of the cutting-head and its cutters, the gage and adjusting-bolt, and the ejecting-spring, substantially as shown and described.

25 10. In a nail-machine, the combination of the cutting-head and its cutters with a gage so arranged that its movement is parallel with the cutting-face of the cutters, substantially as shown and described.

LEWIS E. CURTIS.

Witnesses:

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