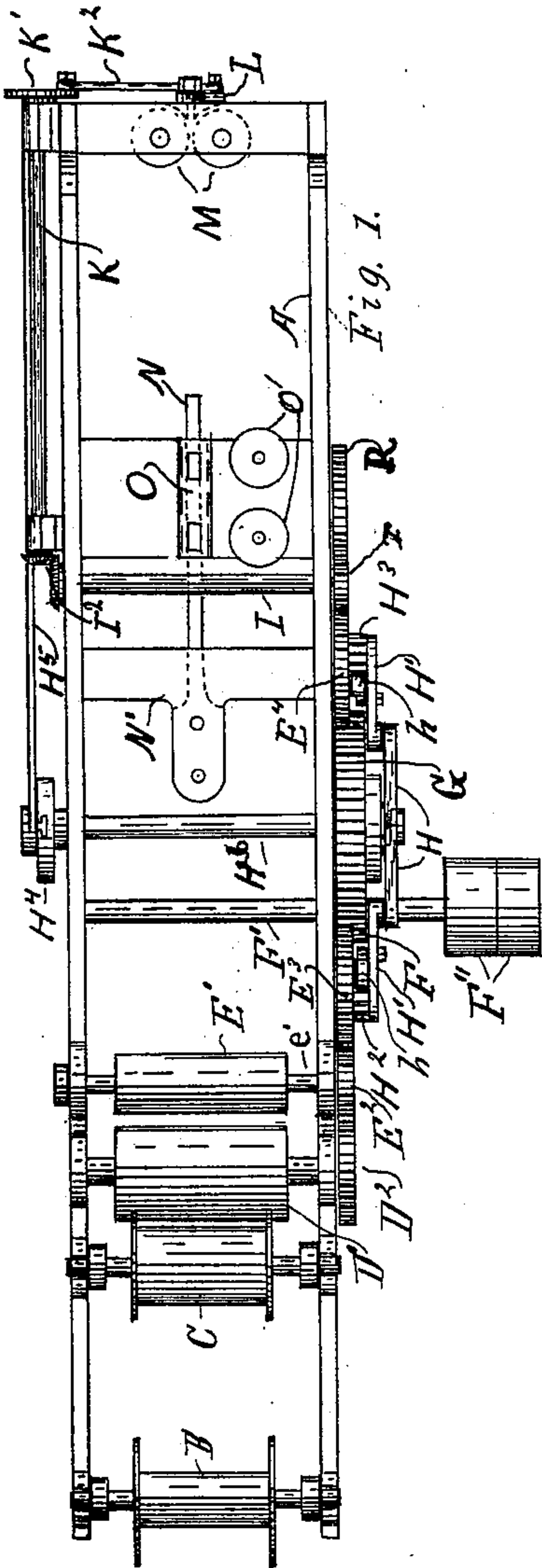


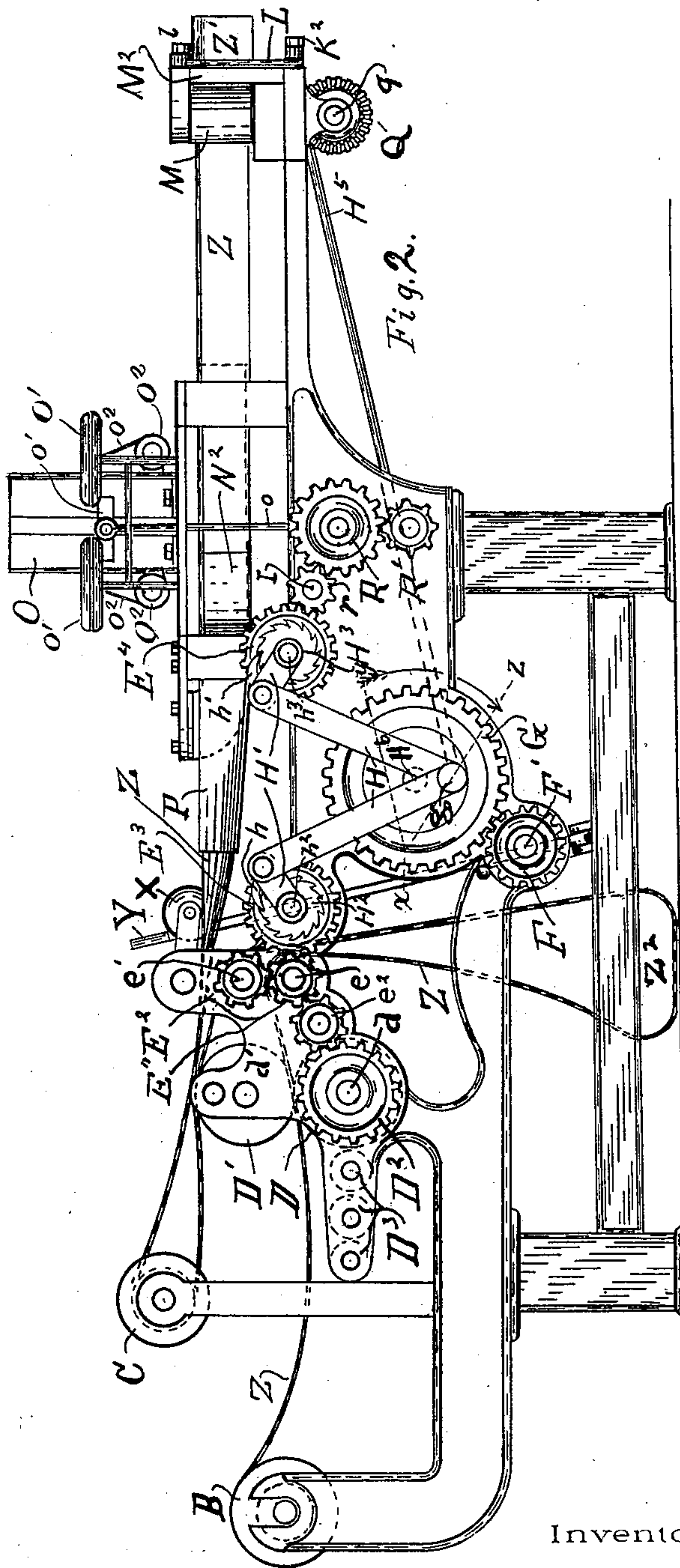
3 Sheets—Sheet 1.

No. 592,687.

Patented Oct. 26, 1897.



Mabelle St. Jones.
Byron E Parks



Benona A. Blakeney
By. Ethiel J. Gilley
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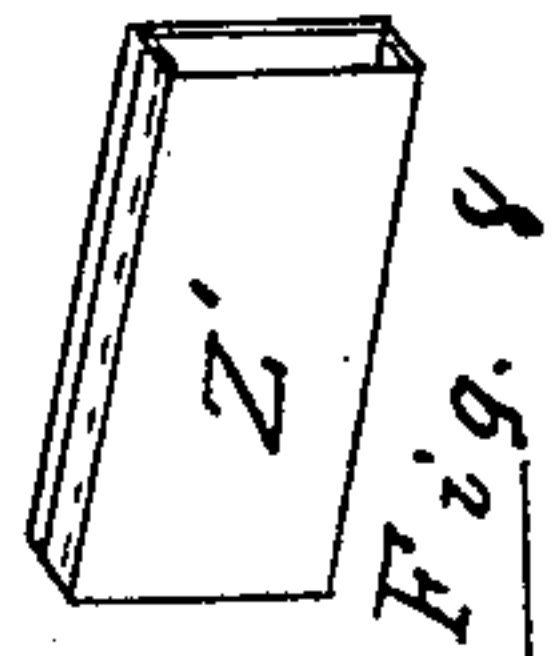
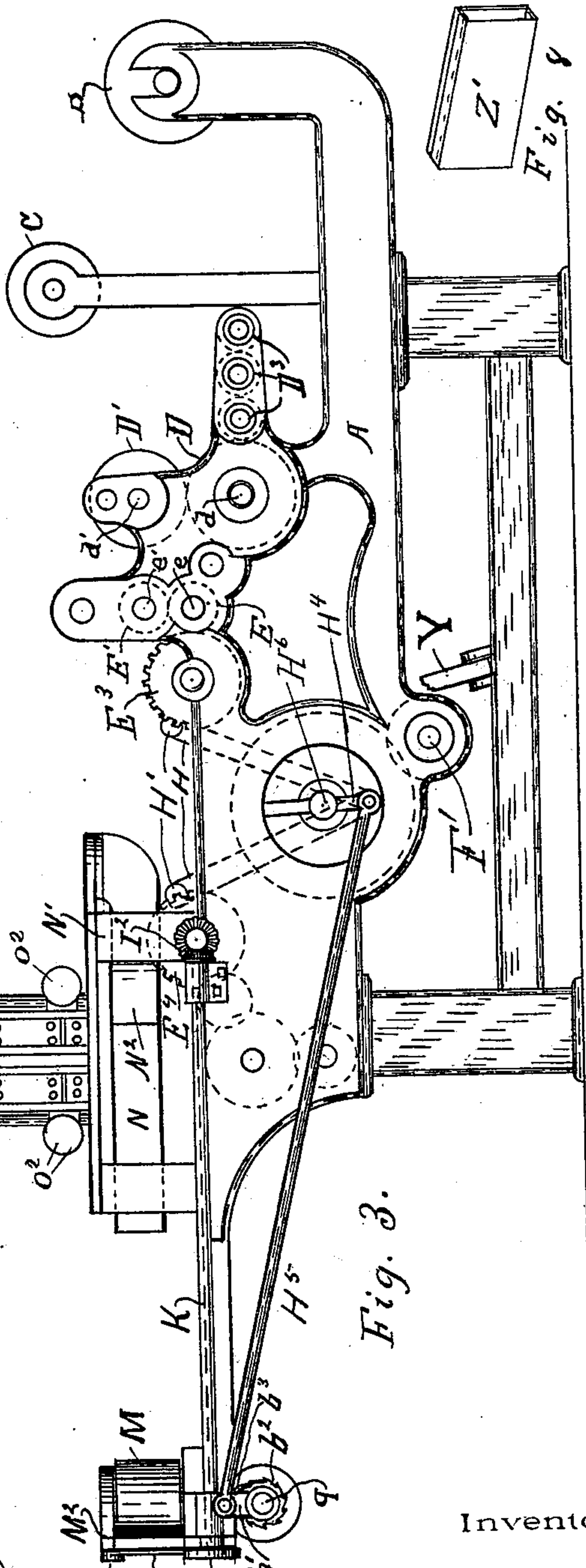
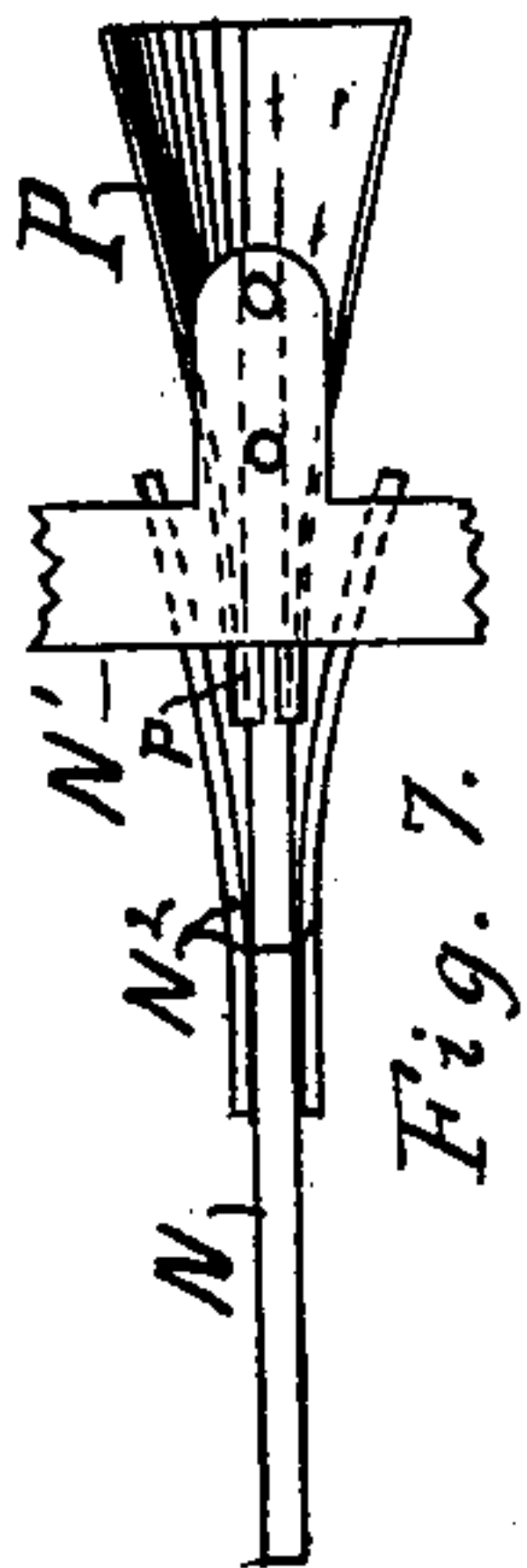
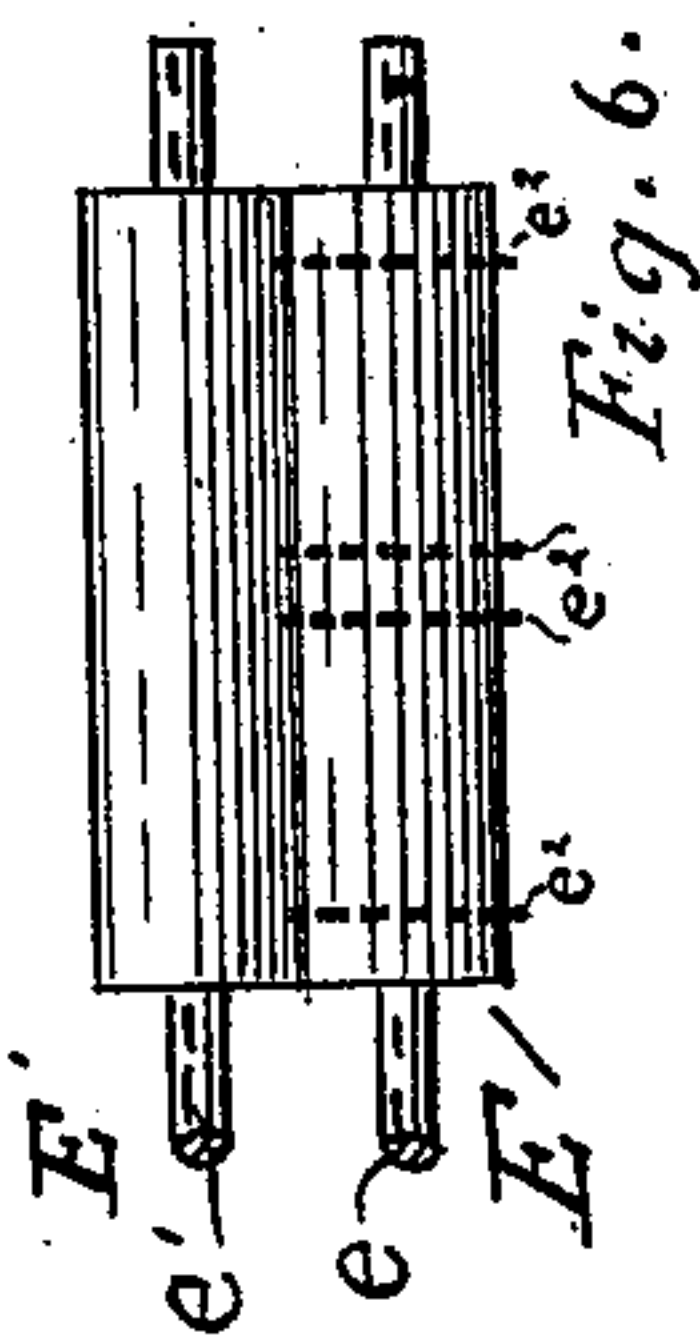
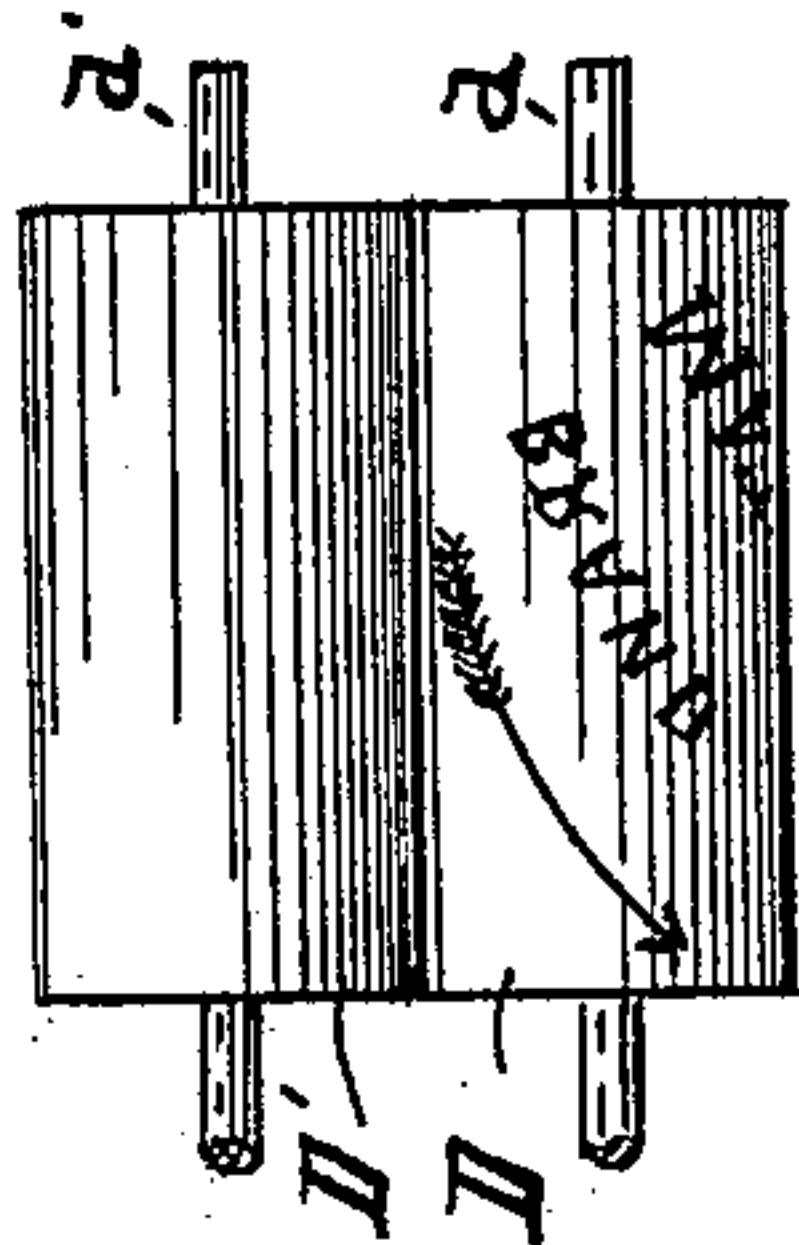
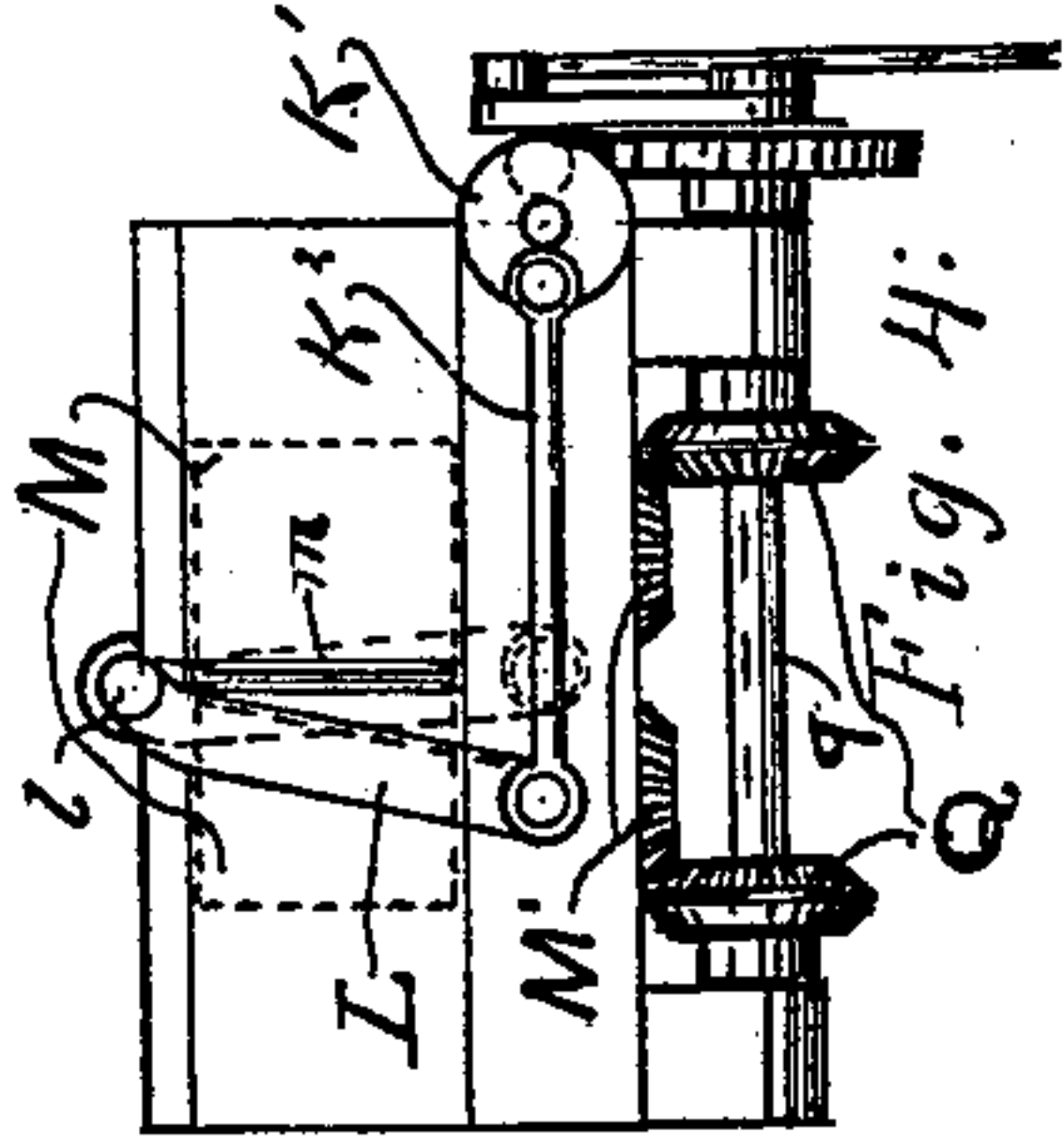
(No Model.)

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B. A. BLAKENEY.
BOX MACHINE.

No. 592,687.

Patented Oct. 26, 1897.



Witnesses.

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(No Model.)

3 Sheets—Sheet 3.

B. A. BLAKENEY.
BOX MACHINE.

No. 592,687.

Patented Oct. 26, 1897.

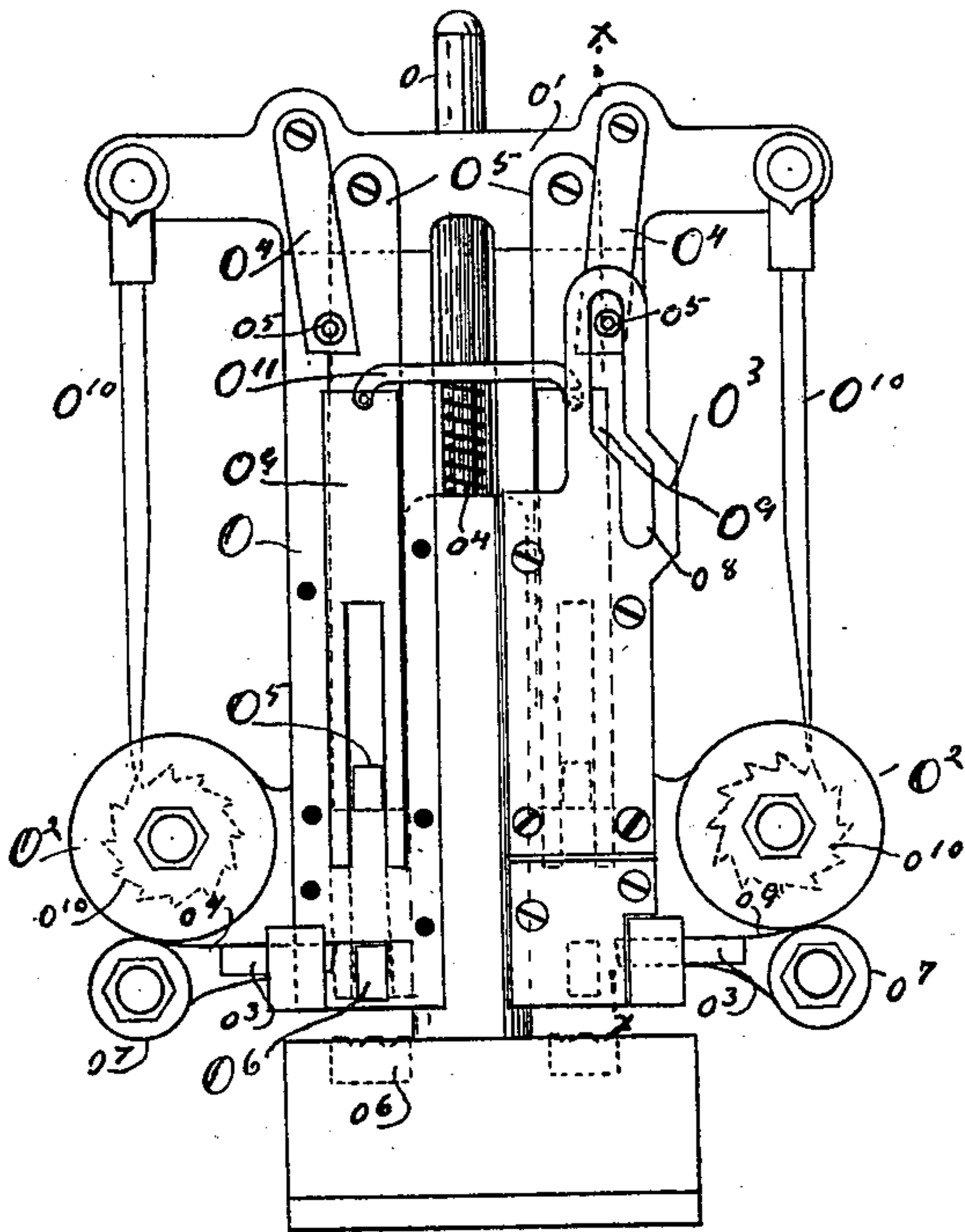


Fig. 9.

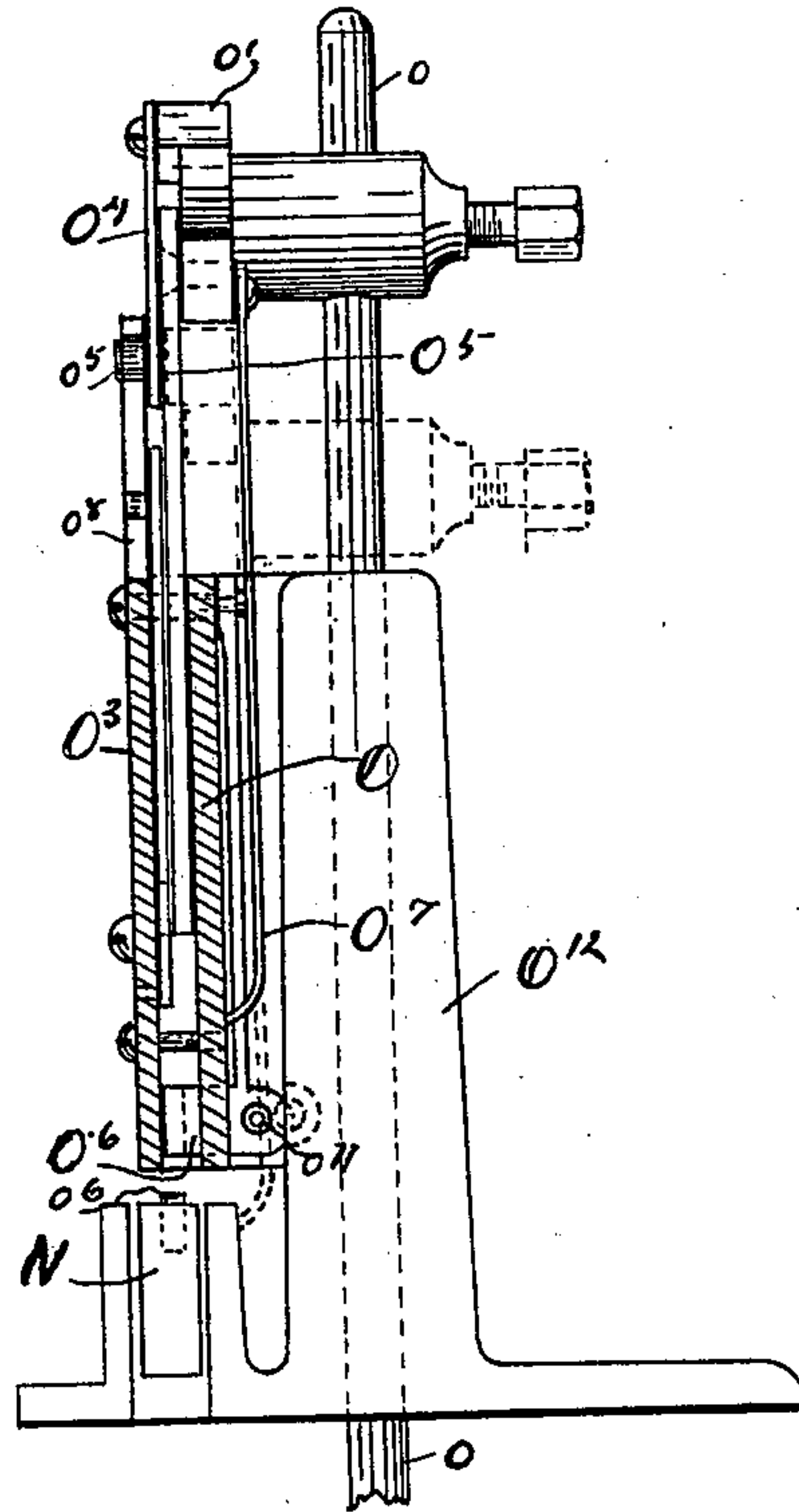


Fig. 10.

Witnesses.

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UNITED STATES PATENT OFFICE.

BENONA A. BLAKENEY, OF GRAND HAVEN, MICHIGAN.

BOX-MACHINE.

SPECIFICATION forming part of Letters Patent No. 592,687, dated October 26, 1897.

Application filed October 2, 1896. Serial No. 607,699. (No model.)

To all whom it may concern:

Be it known that I, BENONA A. BLAKENEY, a citizen of the United States, residing at Grand Haven, in the county of Ottawa and State of Michigan, have invented certain new and useful Improvements in Box-Making Machines, of which the following is a specification.

My invention relates to improvements in machines for automatically manufacturing paper boxes, as the outer box for telescoping match-boxes, &c., and its object is to enable me to place the roll of paper or pasteboard on the machine and automatically score, print, form, secure the folded box, and cut it off ready for use without further manipulation. I attain this result by the mechanism illustrated in accompanying drawings, in which—

Figure 1 is a plan of my machine with portions removed to show the construction of its several parts. Fig. 2 is a side elevation of the same with the driving-pulley removed to show the action of the main driving-gears, also showing the cardboard in place in the several positions necessary for forming and making the boxes. Fig. 3 is an elevation of the opposite side of the machine. Fig. 4 is an elevation of the back end of the machine, showing the feeding mechanism and the cutting arrangement. Fig. 5 is an elevation of the printing-roll and its companion feed-rolls. Fig. 6 is a like view of the score and cutter roll, and Fig. 7 is a plan of the forming tube and anvil. Fig. 8 is a perspective of the box after it is cut from the stock. Fig. 9 is a front elevation of the stapling-machine with the face-plate removed from one side to show the relative position of the several parts, and Fig. 10 is a sectional view of the same on the line xx of Fig. 9.

Similar letters refer to similar parts throughout the several views.

In constructing my machine I provide a frame A, on one end of which I mount a spool B, on which I place the material Z from which the boxes are to be made. A short distance from this end I place a pair of feed-rolls D D', the lower of which is designed as a printing-roll, as indicated in Fig. 5, and is arranged to place the desired printed matter on the box, being differently arranged to correspond with the necessities of each particular case. A

short distance from these rolls I place two more feed-rolls E E', the lower of which is provided with means, as indicated at e^2 in Fig. 6, for cutting or scoring the paper on the several lines upon which it is to be folded to form the corners of the box.

When the paper has passed through between the rolls D D' and been properly printed, thence through between the rolls E E' and been properly scored or fitted for folding, it is allowed to drop through and form a loop, as Z², at the floor, whence it is brought back over the roller E' and around C, which is simply an idler from which the paper is passed to the forming-tube P. This tube is so formed that the paper in entering is nearly flat, and is gradually brought to shape as it approaches the anvil N, when it is in form to be thrown snugly around this anvil. The anvil is secured to the frame N' in position to receive the paper and form it into the box, and is placed directly under an ordinary stapling-machine O, so that at the proper times the stapler may be made to descend and secure the edges to form the box.

As the stapling-machine is old, having storage-spools O' for the wire o^2 , feed spools or rolls O², and slides O³, operated by the connecting-rod o , which is connected to the slides O³ by means of the connecting-bar o' , and is driven from the shaft R', as hereinafter stated, and forms no part of my invention, but is simply used thereon in the usual manner, I do not deem it necessary to go into a detailed description of its construction at this time.

After having passed from under the stapling-machine the paper boxes, now in the form of an oblong tube, as shown in Fig. 8, are passed between the feed-rolls M at the foot of the machine, when the end Z' is cut off to the proper length by means of the knife L.

The machine is driven by means of the pulleys F'' on the shaft F', on which is secured a gear-wheel F, which is fitted to mesh with the gear-wheel G, which latter is mounted on the shaft H⁶. I form a crank-pin g on the gear-wheel G, to which I secure the connecting-rods H, the other ends of which are secured to the arms H', which in turn are secured at the other ends to the bearings h^2 and

h^3 , that support the ratchet-wheels H^2 and H^3 and the gear-wheels E^3 and E^4 . The arms H' are provided with pawls h and h' , that are arranged to engage with the ratchet-wheels H^2 and H^3 , so that each revolution of the wheel G will give to the gear-wheels E^3 and E^4 , alternately, a partial revolution. It makes no difference which way the gear-wheel G revolves, as the feed-rolls can be made to revolve but one way; but supposing it to revolve in the direction of the arrow in Fig. 2 the change of motion takes place about at the points indicated at x , y , and z . Thus the pawl h takes effect to drive the wheel H^2 while the crank-pin is traveling from z to x , and the pawl h' acts while the pin is traveling from x to y , and when traveling from y to z both pawls are disengaged. The motion of the wheel E^3 is transmitted to the shafts e and e' through the medium of the gear-wheels E'' and E^2 to drive the rolls E and E' , and through the medium of the idler e^2 and the gear-wheel D^2 to the shaft d and the printing-roll D and its companion D' . The printing-roll is inked by means of a series of ink-rolls D^3 in the usual manner.

To the opposite end of the shaft H^6 , I attach a crank H^4 , to which I attach one end of the connecting-rod H^5 , the opposite end of which is attached to the arm b' . The opposite end of this arm is pivotally attached to the shaft q , upon which is mounted the ratchet-wheel b^2 , which is engaged by the pawl b^3 to drive the shaft q simultaneously with the rolls D and E . The shaft q is provided with bevel-gears, as Q , which are arranged to mesh with corresponding bevel-gears M' , by means of which the feed-rolls M are made to revolve simultaneously with the other feed-rolls—that is, the printing and score rolls—so that there is no difficulty in drawing the boxes off of the anvil or danger of kinking the stock in its passage through the machine.

Returning now to the gear-wheel E^4 , its motion, alternating with the motion of the mechanism above described, is transmitted through the medium of the idlers r and R to the shaft R' , by means of which the stapler is operated, as by means of the connecting-rod o or other suitable device, in the usual manner.

On the opposite end of the shaft I , to which the gear-wheel r is attached, I secure a bevel-gear I^2 , that meshes with a corresponding bevel-gear on the shaft K to drive said shaft. On the opposite end of this shaft I place a crank K' , which is connected with the lower end of the knife L by the connecting-rod K^2 , (the upper end of said knife being pivoted to the upper portion of the frame M^2 at l ,) so that the revolving of the shaft will cause the lower end of the knife to be drawn over the opening m in the frame, as indicated by the dotted lines, in such a manner that the boxes will be cut from the stock with each revolution of the shaft. The object of the alternating motion of the two sets of gear-wheels is now appar-

ent, it being that the boxes may be stapled and cut from the stock when the stock is at rest, and that the stapler and the knife may be out of the way when the stock is passing through the machine.

Y simply illustrates the position of the shifter-lever, and X represents a weight, which consists of a properly-shaped roller mounted on pivoted arms, as shown, to hold the stock to place and assist to shape it into the tube P .

The tube P may be bent over at the back end, as indicated at p in Fig. 7, to throw the lapping edges of the stock together over the anvil for stapling, and I also place auxiliary supports N^2 to hold the stock snugly to the sides of the anvil when stapling the boxes.

I do not desire to restrict myself to securing my boxes by the use of staples, but mention them as more convenient than other means.

The inking of the printing-roll may be accomplished by means of the ordinary train of ink-rolls D^3 or in any other suitable manner.

In Figs. 9 and 10 I have shown a more complete drawing of a stapling-machine such as I have applied to my machine. In these views O represents the standard or support of the machine. O^2 is the wire reel and, with o^7 , forms the feed-rolls to feed the wire o^9 to the anvil O^6 . These wheels are actuated by the pawls O^{10} acting on the ratchets o^{10} with the downstroke of the slide o' . O^3 is a face-plate that covers the face of the machine. O^4 represents catches that engage the staple-former O^9 to force it down upon the anvil and cut and form the wire as the slides o' are brought down by the actuating-rod o , as hereinbefore specified. These catches are held to place by the antifriction-rollers o^5 in the slot o^8 , and release the staple-former at the proper time by means of the incline shown in Fig. 9, when the formers are carried up to place by the spring o^4 acting on the yoke O^{11} . O^5 represents staple-drivers, which are actuated by the slide o' to drive the staples after they have been formed and the anvil O^6 removed from under them, which is done by the arm O^7 passing back of the antifriction-roller o^{11} , as in Fig. 10. o^3 o^3 are the wire-cutting anvils that act in conjunction with the lower end of the staple-former O^9 to cut the wire before forming the staples, and o^6 o^6 are the clamping-anvils for securing the staples into the boxes by the downstroke of the drivers O^5 .

In Fig. 9 I have substituted the reels O^2 for the reels O' in Fig. 2.

My stapling machine is secured to the box-machine frame and supported by the standard O^{12} , and is driven from the shaft R' through the medium of the connecting-rod o , as hereinbefore stated.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a paper-box machine, a supporting-

frame, a carrying-roll, a feed and printing roll, a second feed and score roll, an idler for guiding the stock to the forming-anvil, a tube to form the stock upon the anvil, an
 5 anvil depending from the frame in position to receive the stock and form the box and a stapling-machine for securing the edges of the box, substantially as and for the purpose set forth.

10 2. In a paper-box machine, a supporting-frame, a carrying-spool, a feed and printing roll, a second feed and score roll, an idler to support the bend of the stock, a forming-weight, a forming-tube, an oblong forming-
 15 anvil, a stapling-machine above said anvil, feed-rolls back of said anvil, and a shearing-knife for cutting the finished box from the formed stock, substantially as and for the purpose set forth.

20 3. In a paper-box machine, a supporting-frame, a carrying-spool, a set of feed-rolls fitted to print the stock, a set of feed-rolls fitted to score the stock, a set of gear-wheels for driving said feed-rolls, a ratchet and pawl
 25 for running said gear-wheels, a connecting-rod and crank-pin for operating said pawl, a second rod connected with said crank-pin, a pawl and ratchet operated by said rod and operating a train of gears, a stapling-machine
 30 and a knife driven by said gears alternately with the feed-rolls, and a forming-tube and

an anvil for forming and constructing the boxes, substantially as and for the purpose set forth.

4. In a paper-box machine, a supporting- 35
 frame, a carrying-spool, a set of feed-rolls fitted to print the stock, a set of feed-rolls fitted to score the stock, gear-wheels for driving said rolls, a pawl, ratchet-wheel and crank for driving said gear, a driving-gear G, 40
 a crank on the opposite end of the shaft that carries said gear-wheel, a connecting-rod connected at one end to said crank and at the other end to the arm b^3 , a pawl and ratchet connected with said arm to actuate shaft q 45
 and through it the feed-rolls M simultaneously with the feed-rolls on the opposite end of the machine, a forming-anvil, a forming-tube arranged to fold the stock around said anvil, means for securing the edges of the 50
 stock over the anvil, a shearing-knife for cutting the boxes from the formed stock, and a train of gears and ratchet for operating the knife and the securing device alternately with the feed-rolls, substantially as and for 55
 the purpose set forth.

Signed at Grand Haven, Michigan, September 22, 1896.

BENONA A. BLAKENEY.

In presence of—

DAN F. PAGELSON,
 WALTER I. LILLIE.