

(No Model.)

2 Sheets—Sheet 1.

W. H. BROCK.
BOX NAILING MACHINE.

No. 285,729.

Patented Sept. 25, 1883.

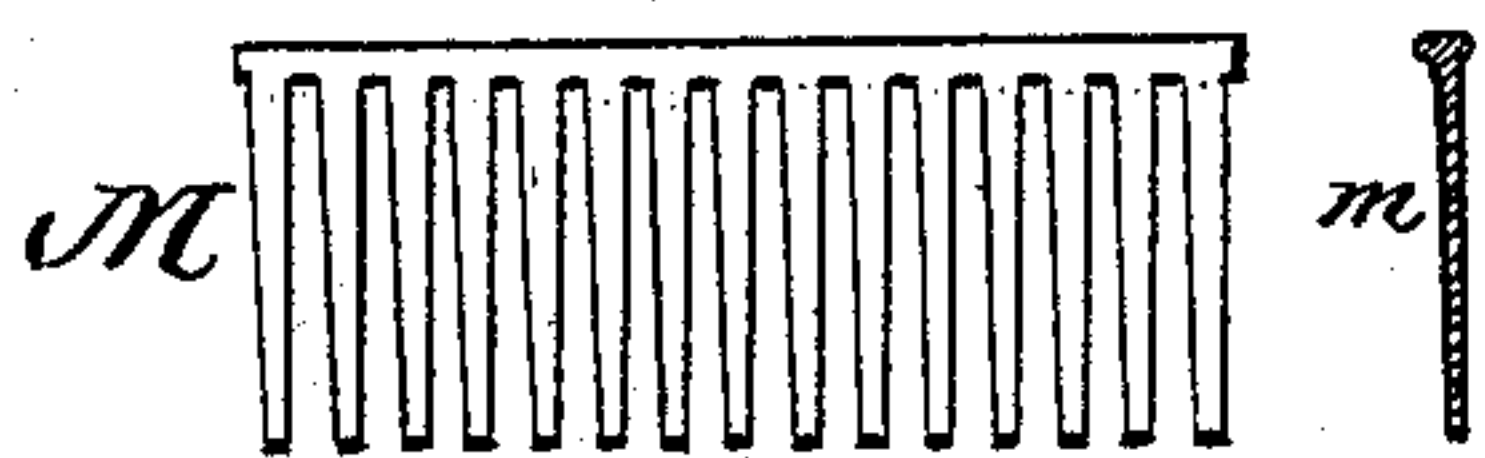
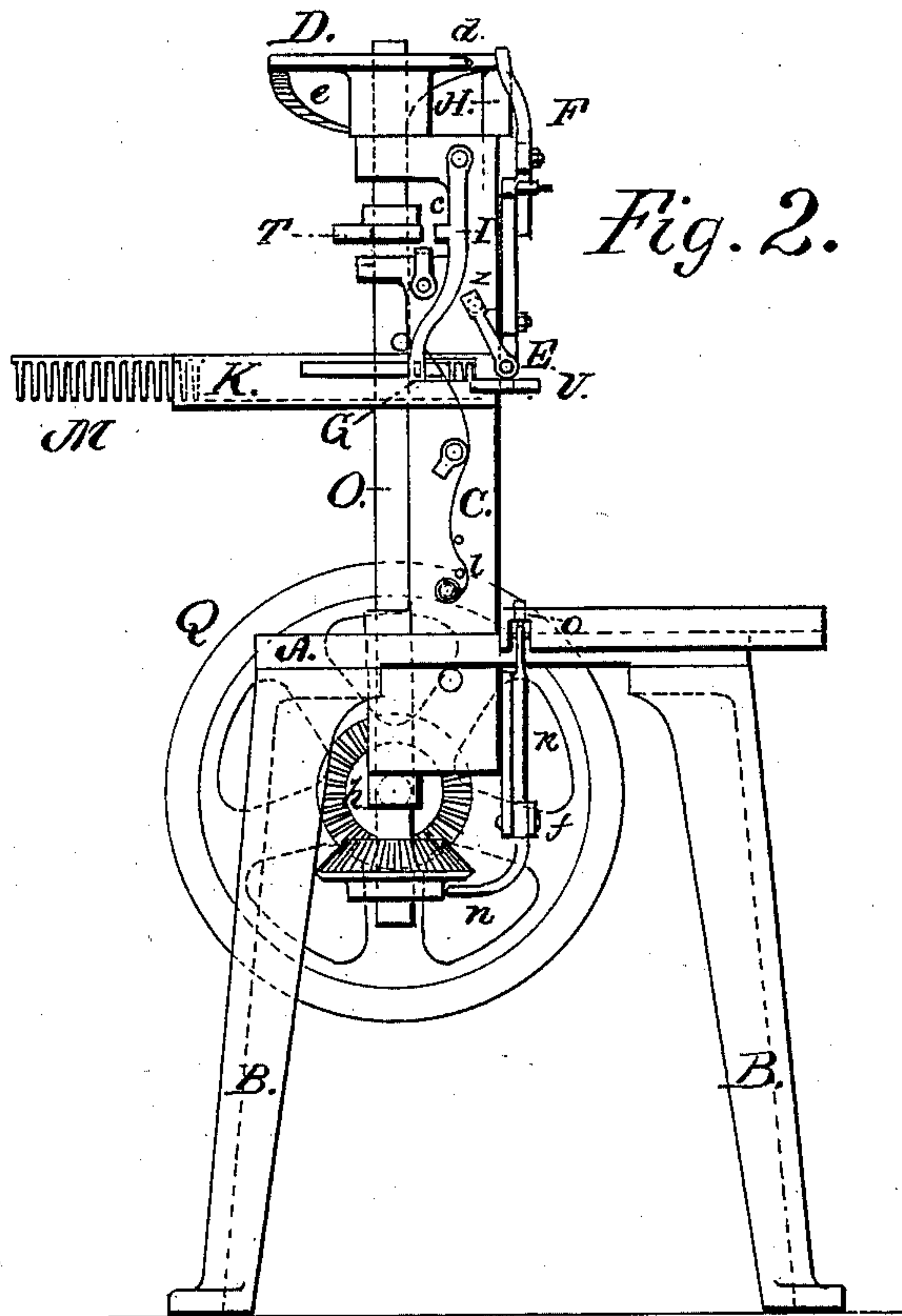
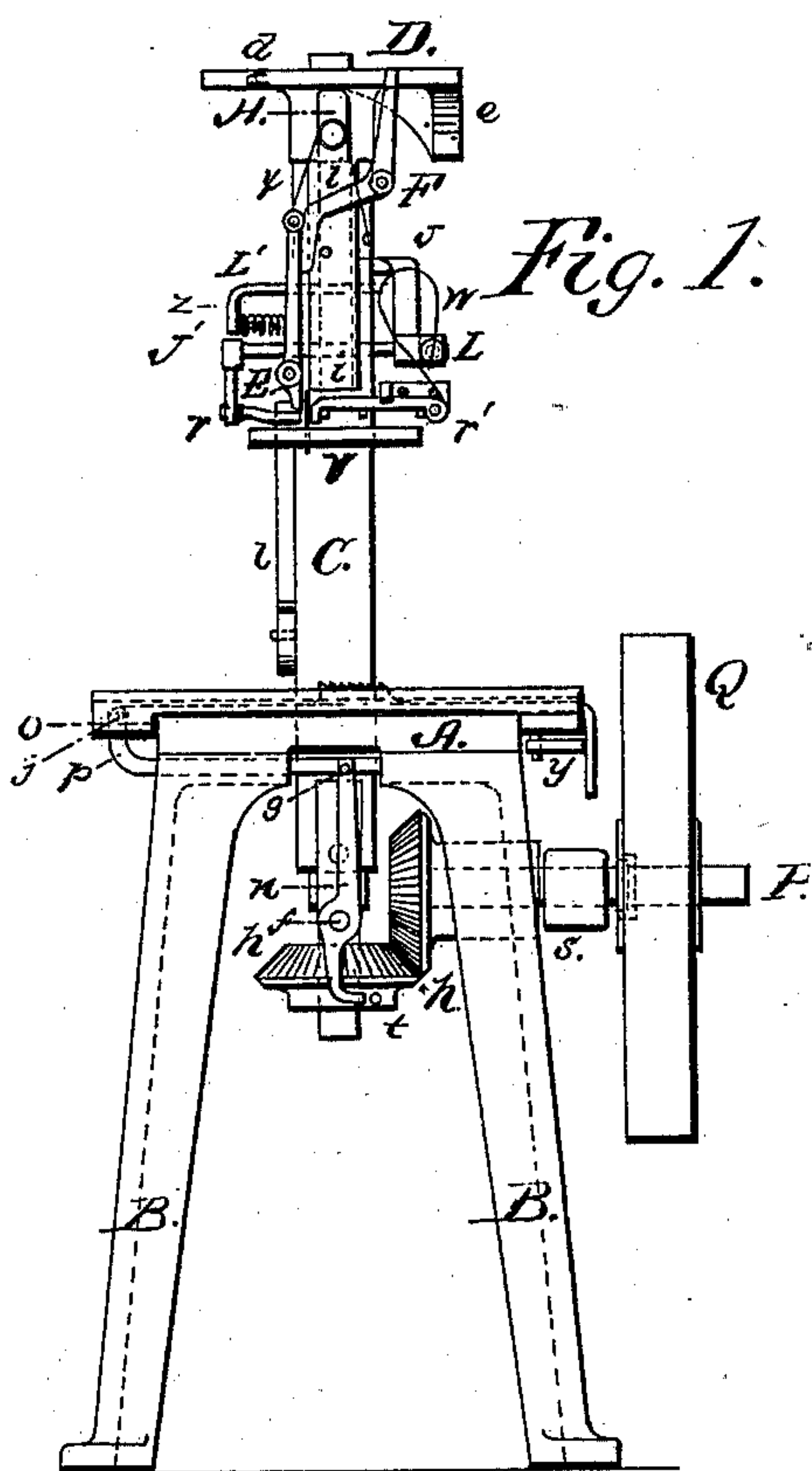
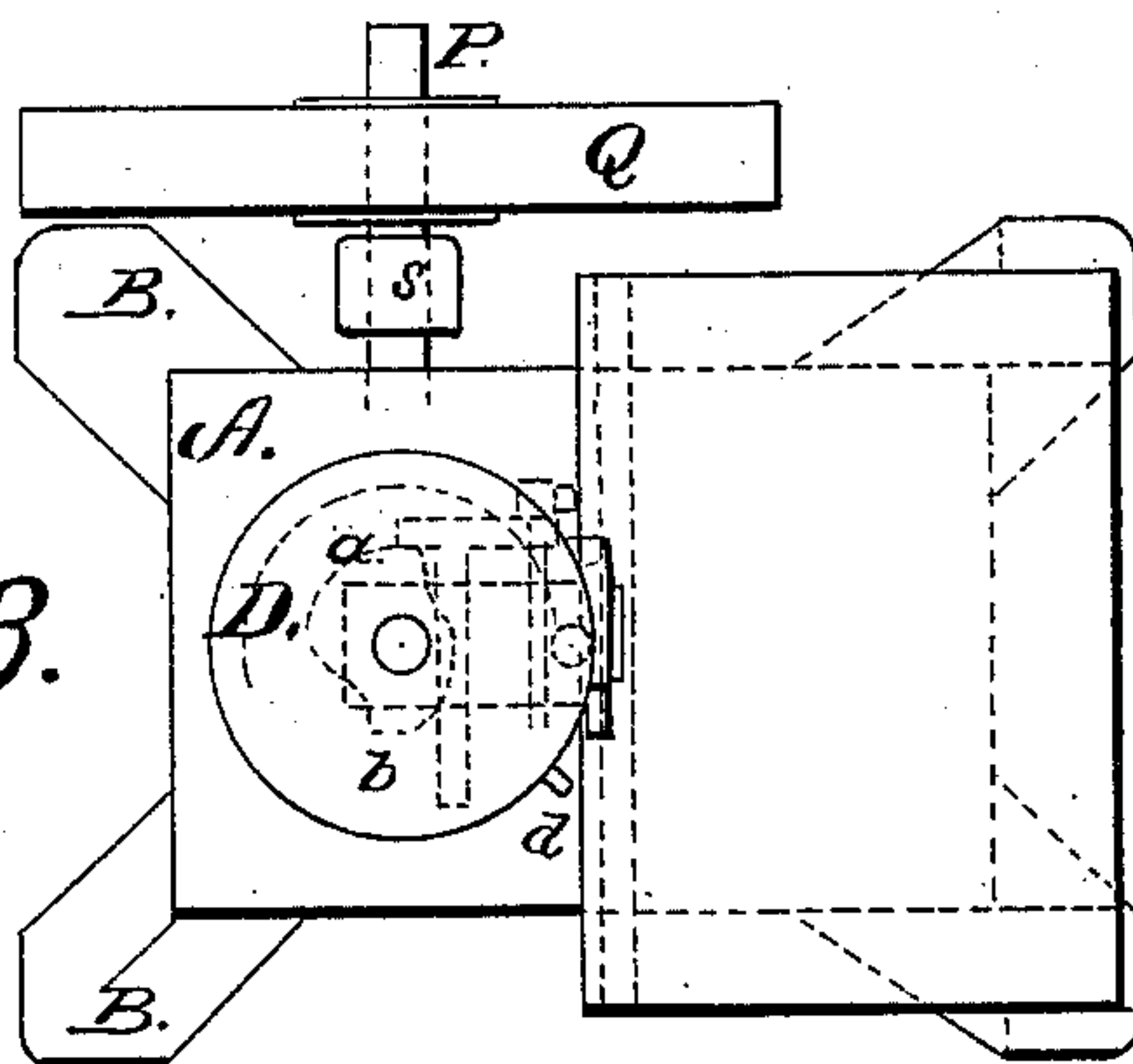


Fig. 4.

Fig. 3.



Witnesses:
William H. Deming.
Edwin M. Wright

Inventor.
William H. Brock.
per Alexander H. Wright
Atty.

(No Model.)

2 Sheets—Sheet 2.

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Fig 6.

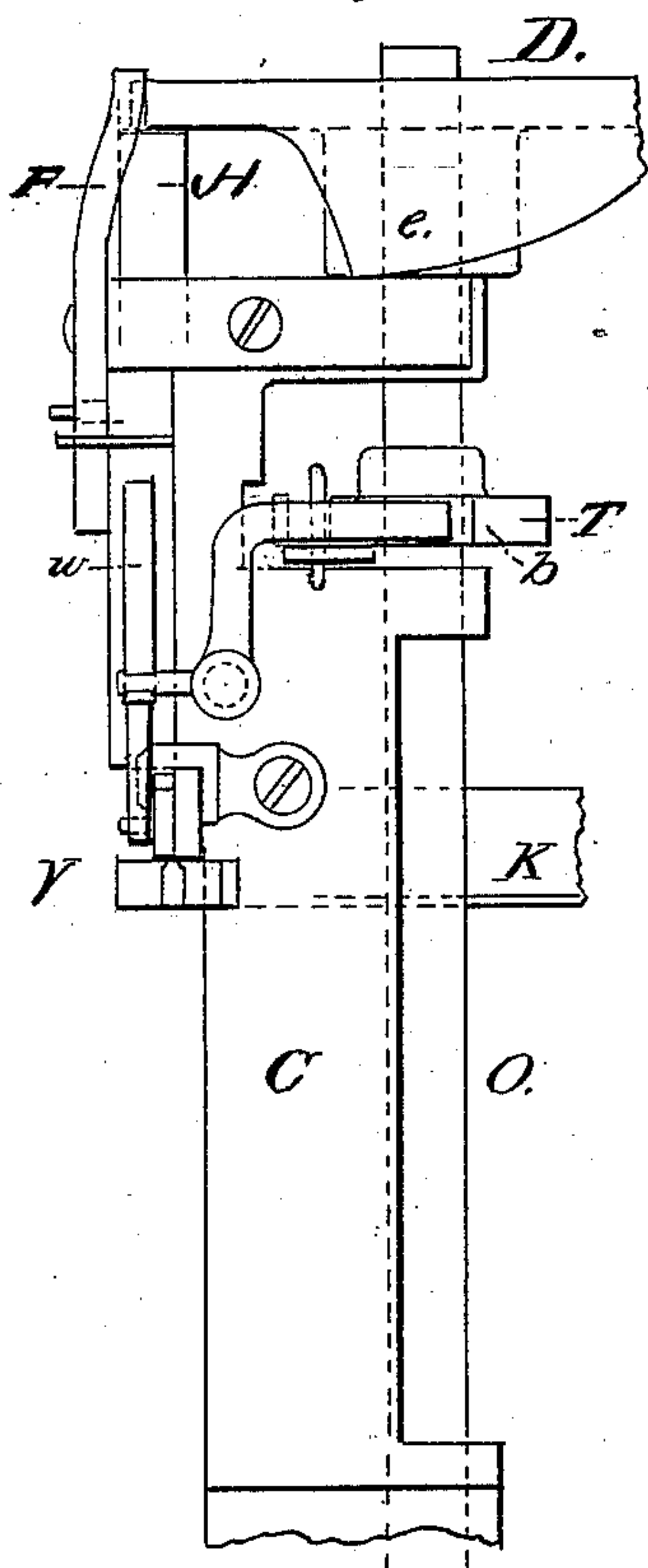


Fig 5.

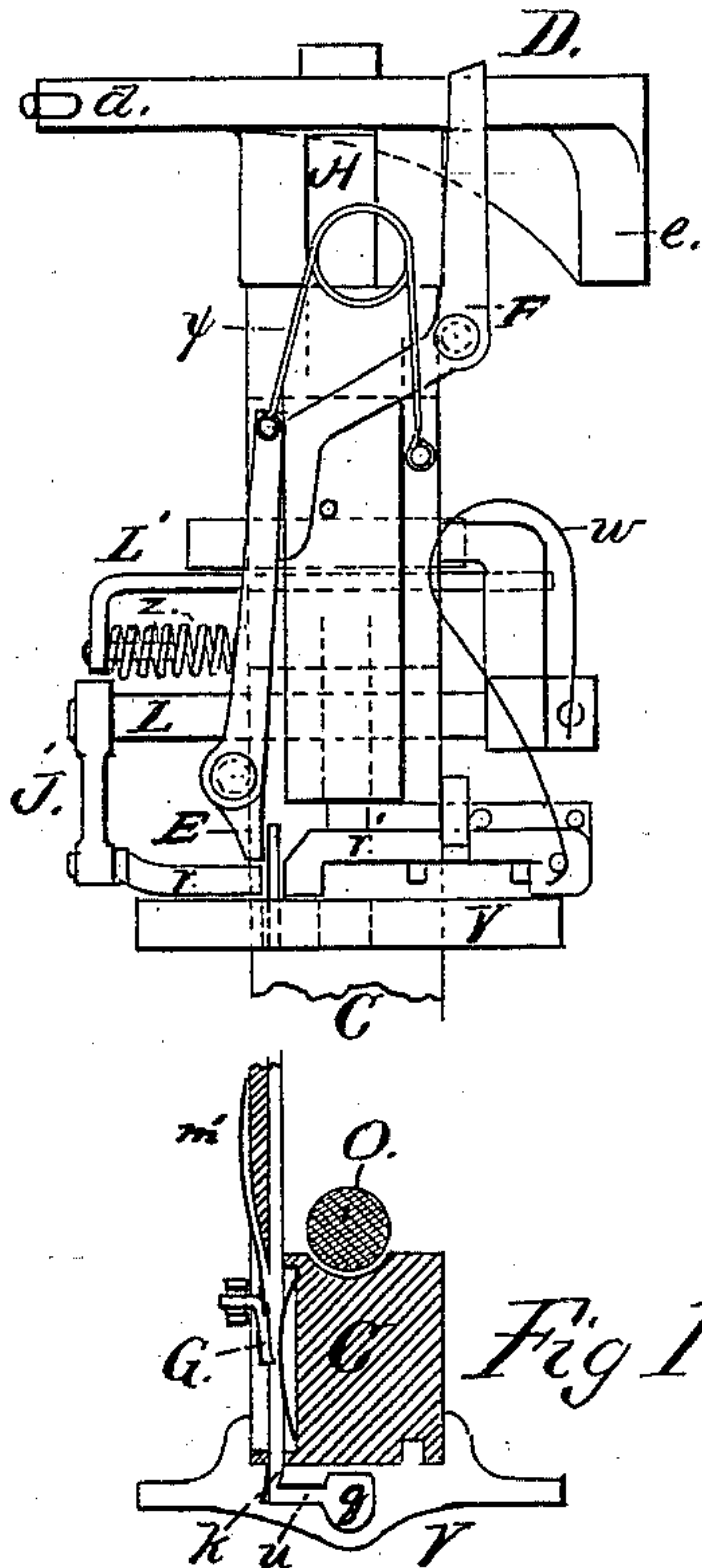


Fig 7.

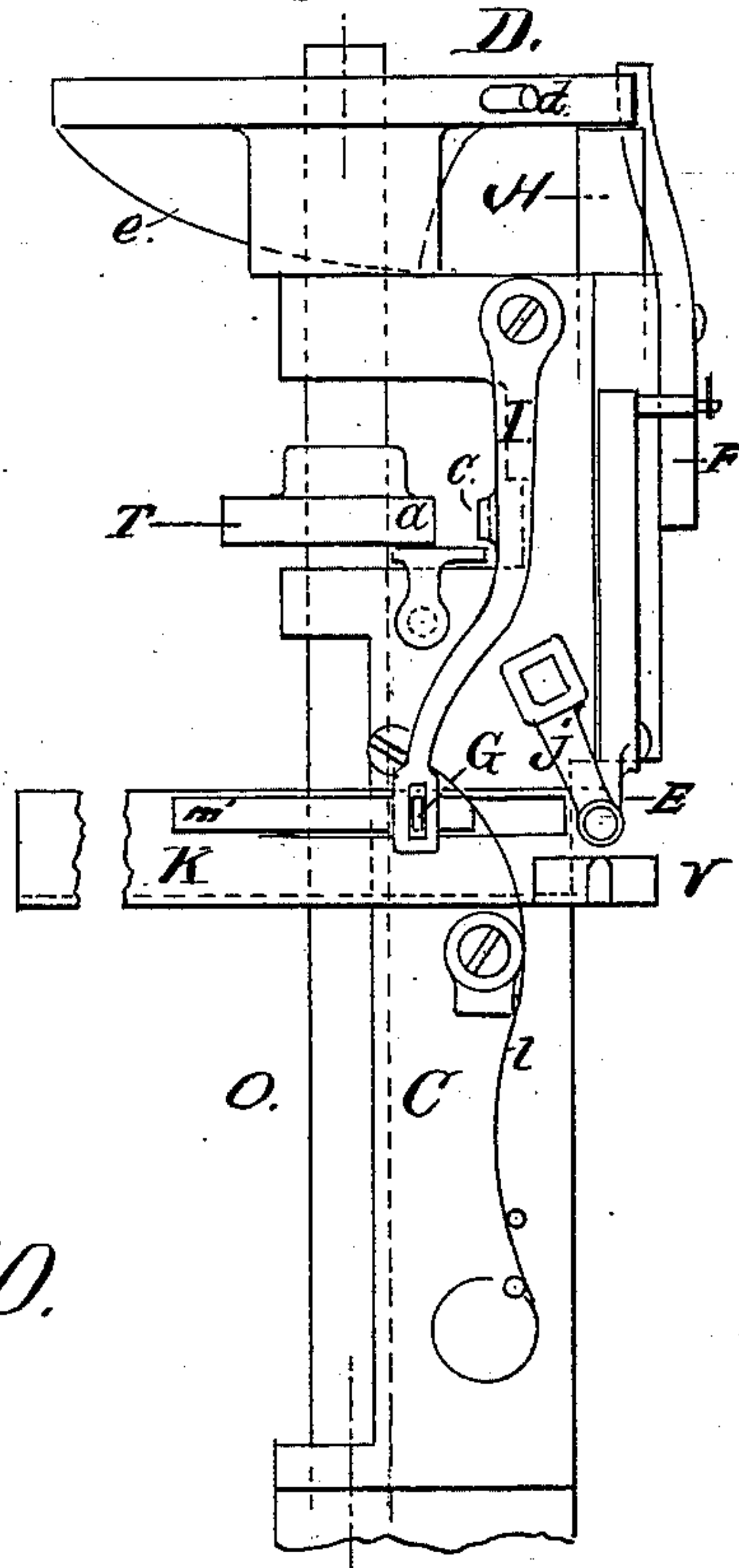


Fig 9.

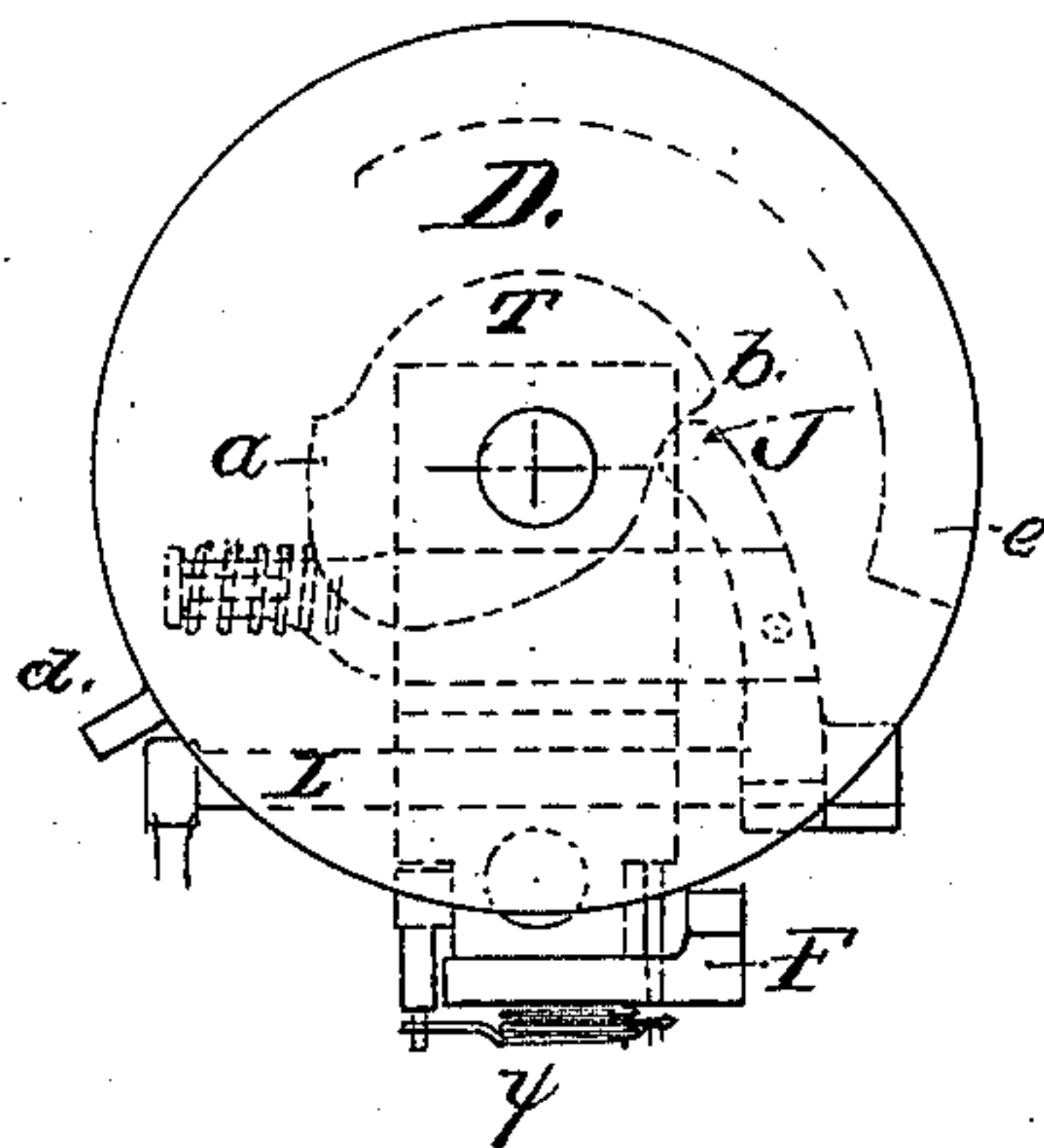
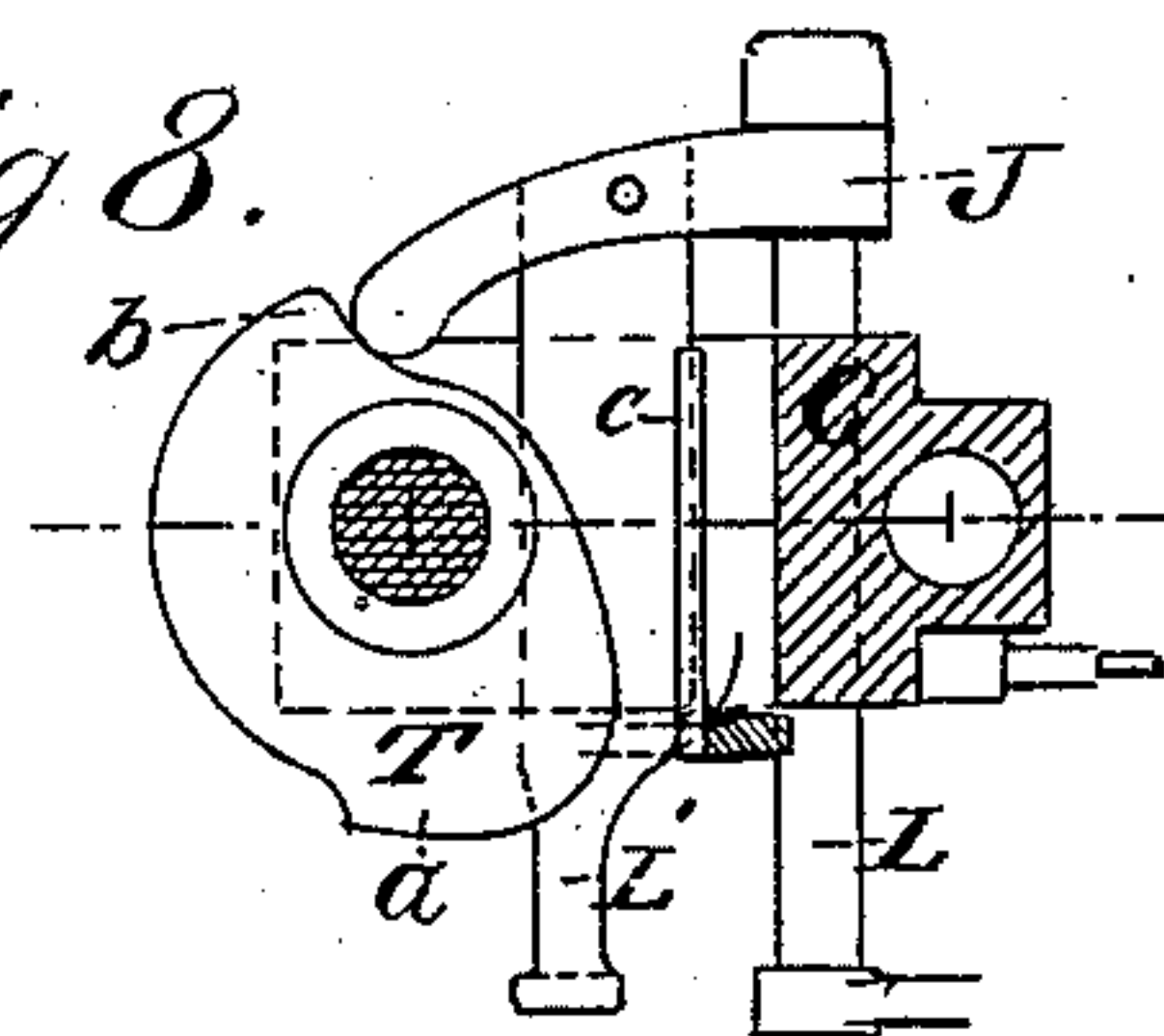


Fig 8.



Witnesses;

Wm. H. Deming.
Edwin M. Wright

Inventor.

William H. Brock.
per Alexander H. Wright.
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM H. BROCK, OF CORONA, ASSIGNOR OF FOUR-TENTHS TO JOHN W. ALEXANDER, OF NEW YORK, N. Y.

BOX-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 285,729, dated September 25, 1883.

Application filed June 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BROCK, a citizen of the United States, residing at Corona, in the town of Newtown, in the county of Queens, in the State of New York, have invented a new and useful Box-Nailing Machine, a description of which, with the method of its construction and use, as set forth in the within specification, is in terms so clear, concise, exact, and full as to enable any person properly skilled therein to make, construct, and use the same, reference likewise being had to the drawings annexed thereto.

The nature of this my invention relates not only to improvements in box-nailing machines hitherto devised or in use, but likewise to new functions and powers which are attained by novel and peculiar structure of the elementary parts and their arrangement in combination; and the objects thereby sought to be gained are, first, by a series of mechanical movements automatically to feed, cut off, carry forward into position, and lastly drive the nail; second, by a simple device to advance into position for nailing at the appropriate time the box; third, provision for implanting the nail in the edge of the box wherever the operator may desire; and, fourth, the avoidance of the usual waste by clogging and miscarriage of the nails, and of the delay consequent thereon. These objects I accomplish by means of the mechanism illustrated in the accompanying drawings, in which—

Figures 1 and 2 show, respectively, front and side elevations of the entire machine; Fig. 3, a plan view of the same, while Fig. 4 represents a strip of the nails used. The remaining figures, from 5 to 10, inclusive, are presented upon an enlarged scale to show in greater detail the structure of the individual parts, of which Fig. 5 is a front and Figs. 6 and 7 are side elevations of that portion of the machine which is above the table A. Fig. 8 is a top view, showing the actuating-cams *a* and *b* as they appear after removal of that part of the machine above the compound cam T. Fig. 9 is a plan view of the compound cam D, showing also cams *a*, *b*, *d*, and *e*, while Fig. 10 is a view of the machine in cross-section longitudinally through the center of the guide *v*, showing the structure and arrangement of the said guide.

Similar letters refer to similar parts throughout the several views.

The table or rest A, with its legs or supports B B and standard C, comprise the framework of the machine. Motion is communicated by beveled gearing *h h* to the upright shaft O from power-shaft P, furnished with clutch *s* and driving-wheel Q. The holder K, Fig. 2, for the nail-strip is securely held at one of its ends in a slot sunk into the side of the standard C to a depth commensurate with the holder's greatest thickness, and extends in a horizontal direction backward from the body of the machine to a distance requisite for supporting the nail-strip. It consists of a plain strip of metal sufficiently rigid for its purpose, and of uniform thickness, except at the bottom, where it is of somewhat greater width, and projects outward from the interior side, so as to form a flange or shelf upon which the nail-strip rests. As this flange-like projection extends along the entire length of the holder, there is thus formed above the flange, and between the inner side of the holder and standard C, the necessary space or passageway for the advance of the nail-strip to the cutter E. The holder K is further provided with a slot, as shown in Fig. 2, so as to permit contact of the pawl G with the teeth of the nail-strip. The pawl G is made to bear upon the teeth of the nail-strip by its attendant spring, *m'*, one end of which is made fast upon the pawl, while the other extremity rests in contact with the side of the holder K, Figs. 7 and 10. The nail-strip is made to retain its normal position for action upon it of the pawl G by a small counter-spring fastened within the slot of the body C, as shown in Fig. 10, so as barely to meet the inner side of the nail-strip. The function of the pawl G is to push forward the nail-strip into position for severing the first nail, and is put in motion by action upon it of the lever I. The novelty of the pawl in my invention, as herein described, consists in the peculiar and original combination with it of the lever, holder, and guide *v*, for conducting as well as feeding the nail in the nailing of boxes. The guide *v* is a strong flat bar of metal closely fitted to the standard C, upon the face of which it is securely held in a horizontal position by means of a pin, and by its clamp-like extension rearward upon the sides of the standard,

Fig. 10. It is perforated in the center, so as to permit passage through it to the box beneath of the punch H in driving the nail, and is adjusted to the standard at a certain height, so that not only the requisite space may be provided between it and the table A for the movement of the box in nailing, but that the surface of the under side of the guide-bar shall be exactly on a straight line with that of the holder K for the advance of the nail-strip in feeding. For affording passage to the nail-strip as it commences to feed, there is cut in the guide *v*, directly in the line of its advance, a slot or passage-way, *k*, Fig. 10, leading forward from the nail-strip to a point exactly opposite the end of the finger *r* when at rest in its normal position, Fig. 5. From this point the passage-way *u* extends in a direction at right angles to the passage-way *k* and terminates in the aperture *q* in the center of the guide-bar provided for the punch H. When the pawl G, actuated by the lever I, has moved onward the nail-strip along the passage-way described until its advance nail has reached the angle of the passage opposite the finger *r*, then the cutter E, operated by the lever F, severs it from the body of the strip. The instant it is detached the end of the approaching finger *r*, reaching it, presses it against the end of the opposite finger, *r'*, and the nail thus rigidly held between the fingers is moved along the passage-way *u* of the guide *v* until carried to the center of the aperture *q*, beneath the punch, into position to be driven. The guide as thus described, having the nail-strip passage *k*, for placing the nail to be cut off, the further passage *u*, through which the severed nails are moved into position for driving, the aperture *q* for passage of the punch, the combination with the feed mechanism for presenting the nail to the cutter, and with the finger for conducting the nail when severed, is, both in its individual structure and in combination with other parts of the machine, a new and useful device in the manipulation of the nail, having relation at the same time to feeding, cutting off, guiding into position, and driving the nail, all of which features I claim are novel and original with me. The shaft O is provided with two compound cams, D and T, the former of which comprises the individual cams *d* and *e*, Fig. 5, while the other consists of the individual cams *a* and *b*, Fig. 8. The action of the cam *a* is upon the lever I, Fig. 7, causing the feed movement of the nail-strip. As soon as the lever I is freed from the stress of its cam, it is returned to place by the spring *l*, which is made fast at its lower end to the base of the standard C, and extends upward, so that its upper extremity bears firmly against the lever. The movement of the cam *d*, Fig. 5, against the lever F actuates the cutter E and effects the cutting off of the nail. Upon passage of the cam *d* past the lever F both the cutter and lever are restored to their normal relations by the reaction directly upon the cutter of the spring *x*,

which is secured at one end to a supporting-pin set into the standard C, Fig. 1, while its other end is held by a like pin inserted into the side of the cutter E, near its upper extremity. The cam *b*, Figs. 8 and 9, initiates the movement whereby the nail, after being detached, is moved forward into position to be driven beneath the punch H. The immediate action of the cam is upon the arm J of the slide-bars L and L', which, thus being induced to slide from left to right, Fig. 5, carry forward the finger *r*, having in charge the severed nail. As soon as the slide-bars are free from the action of the cam *b*, they are again returned to place by reaction of the spring *z*, which has been compressed, during contact of cam with arm J, between the standard C and the curved end of the slide L', from the latter of which introprojects a pin, about which the spring is coiled and fastened. The function of the cam *e* by action upon the punch H, Fig. 7, is to drive the nail when placed in position by fingers *r* and *r'* for nailing. Excepting its head or top, the punch, when at rest, is hidden from view by its cover or casing *i*, Fig. 1. It is provided with a shoulder, (concealed by cover *i*,) against which presses a spring coiled about the body of the punch and properly secured at the bottom. By means of this spring within the cover *i* the punch is carried back to place after its descent upon the nail. The novelty of the nail-driving device herein described consists in the combination formed by the carriers *r* and *r'* with the punch for driving a nail of the form and proportion usual and practicable for box-nailing. The slides L and L', Fig. 5, consisting of bars of metal, of which the former is round and the latter flat in form, and each, respectively, of appropriate size for the purposes intended, are united by mortise-joints to the cam-impinging arm J, and thus made to slide backward and forward through the standard C, while to one end of the slide L is affixed the arm J', to which, at its lower extremity, is riveted the finger or nail-guide *r*. The finger *r*, which moves the severed nail into position to be driven, consists of a thin but rigid piece of metal projecting horizontally from the arm J', at first slightly forward, and then in the direction of the standard C. It is seen in its normal position at rest in Fig. 5. Opposite to and co-operating with the finger *r*, in the manipulation of the nail, is the finger *r'*, made of metal of like thickness, and having its end adjacent the nail beveled for proper contact with the punch H. The finger *r'* is held in place by clamp and guide-pegs, between which it is caused to slide laterally along the front of the standard C, when pushed backward by the finger *r*, or restored to its position of inactivity by the looped-shaped spring *w*, which has one of its ends resting in contact with a projecting peg from the finger *r'*, while it is made fast at its other extremity to the arm J of the slide-bar L. This device and peculiar movement of the carriers or

fingers r and r' , which take the nail directly from the cutter as soon as severed, carry forward and firmly hold it in position until reached by the punch, I claim has never before been used or known, but is wholly new with me. The pivotal lever I extends downward along the side of the standard C, Fig. 7, until it connects with the pawl G, and is provided with an arm c , which projects laterally, Fig. 8, at the rear of the standard, and on which the cam a impinges while producing the feed motion of the nail-strip. The cutter E and lever F are pivoted to the standard C, and have the structure and relation, one to the other, as shown in Fig. 5, and elsewhere herein more fully described.

Although different devices have heretofore been in use for separating a nail from the nail-strip, there are none, as known to me, having the individual structure, the certain arrangement in combination, and the unique shears-like movement of my cutter, by means of which I am enabled to sever from the body-strip a single nail having the bulk and strength of the ordinary size of nail used in box-nailing, for which purpose my cutter is expressly designed.

The table A is furnished with a feed-movement for propelling the box into position for nailing, Fig. 1, consisting of a line of teeth projecting from the feed-bar o upward through an opening or slit in the table sufficiently to catch the under side of the box, which at the same time is held down in place by its guide v above. The feed-bar o moves longitudinally in a slot sunk into the table from its under side, and is put into operation by the cam-like aggression of the pin t , projecting from the boss of the gear-wheel h of shaft O, upon the curved extremity of the lever n , Fig. 2. The lever n is pivoted at f to its support, and at its upper extremity, g , to the horizontal lever p , which in turn, by connection at its other extremity, j , with the feed-bar o , communicates to the latter the action of the cam t . As soon as the lever n is relieved from pressure of the cam, it is returned to place by spring y , which is fastened to the under side of the table A at one of its extremities, while its other end bears firmly against the curved extremity of the feed-bar.

The nails which I make use of in this machine, when first introduced to the holder K, are connected together by their heads, Fig. 4, so as to form an unbroken sheet or nail-strip of any desired length. They are previously manufactured in this form and for this special use by another machine of my device, (patent for which is about to be applied for,) in which a strip of metal, of the form known as "I-iron," is so treated as to obtain from the single strip two sheets of nails having their heads attached, and otherwise in form as shown in Fig. 4. The novel feature of this nail-strip, as employed in my invention, consists not alone in its peculiar combination with the guide v and other parts of the machine, but particularly

in its definite individual structure, whereby the single nail, as supplied therefrom, is exactly adapted to box-nailing, being similar in all respects to the hand-driven nail used for that purpose.

The several elementary parts, together with their respective functions, having thus been described, the operation of the machine and the sequence of movement of the several steps, from the feeding to the driving of the nail, may, perhaps, best be shown by viewing the mechanism when the different parts are in relative adjustment, as seen in Fig. 1.

In this machine I resort to the simplest and most natural method of putting a nail into the box by first placing in the holder K, Fig. 2, a strip of the nails fashioned as above described. When motion is communicated to the machine and the shaft O commences to revolve from left to right, the cam a is brought into contact with the projecting arm c , Figs. 7 and 8, of the lever I and presses it back. The lever I in turn acts upon the pawl G, which, being in contact with the nail-strip, thus becomes the immediate agency for carrying it forward along the passage-way of the guide v , Fig. 10, to the distance requisite for the detaching or cutting off of the first nail from the strip by the shears or cutter E, Fig. 5. The lever I is thereupon relieved from the pressure of the cam a and urged back into its normal position by the spring l . As soon as the nail is thus in position for cutting, the cam d , reaching the pivoted lever F, Fig. 5, pushes back its upper extremity, causing the lower end of the lever to move upward and outward against the upper end of the pivoted cutter E, whereby the lower or knife end of the cutter, responsive to the outward movement of the upper end, is suddenly forced inward upon the nail, which it instantly severs from the body of the strip. The cam d having now moved past the lever F, the spring x at once brings back into position the cutter E, whose contact with lever F likewise readjusts the latter, in readiness for a repetition of the movement. Simultaneously with the act of detaching the nail by the cutter E the cam b , Fig. 8, comes into contact with the arm J of the slide-bars L and L'. As the cam begins to act upon the arm J, and thus causes the bars to slide from left to right, the finger r , Fig. 5, which is riveted to the arm J' of the bar L, as hereinbefore described, immediately advances upon the freshly-severed nail and moves it up against the edge of the finger r' , which is thus pushed back from the normal position it was made to assume by the spring w , while the nail, firmly held in the grasp of the two fingers, is conducted forward through its guide-passage u in the guide v , Fig. 10, toward the center q , into position to be driven. Immediately at this point the cam e , Fig. 7, creeps upon the punch H, which, thereby emerging from its cover i , at first touches simultaneously the top or head of the nail and the beveled end of the finger r' , whereby the nail

is entered and the finger r' thrust still farther aside, while the punch, continuing its descent between the fingers and through the aperture of the guide v to the upper surface of the box, sends home the nail. At the moment the punch pushes back the finger r' the cam b , moving from the arm J , permits the spring z , Fig. 5, to return into position the slides L and L' , whereby the finger r also opportunely retreats into its place as the punch advances past it to the box. As soon as the punch reaches the box, it is relieved from pressure of the cam e , and immediately flies back, by action of its spring within, to its cover i , whereupon the finger r' , now freed from the obstruction of the punch, is likewise returned into position by coercion of spring w . Directly upon the driving of the nail and retirement of the punch, the cam t of the shaft O , Fig. 1, impinges the curved lower extremity of the lever n , whereby the feed-bar o , moving forward, brings its teeth into contact with the box, which is thus advanced into position beneath its guide v for the reception of the nail. Immediately upon passage of the cam t past the lever n the several parts, by reaction upon the feed-bar of the spring y , are returned to place, in readiness for a repetition of the same movements at the next revolution of the shaft O .

By this novel mechanism, thus fully described throughout its several successive steps, am I able to effect the identical objects had in view—viz., the feeding, cutting off, placing into position, and driving of the nail, and the location of the box for receiving the nail.

It is also readily apparent in the present invention, since the feed movement of the box does not commence until after the driving of the nail, that the box may be at any time so readjusted as to permit thereafter the nails to be driven at any such points along its edge, at regular intervals, as may be desired by the operator, who, in other devices, where all the nails are driven at the same time, is necessarily limited to certain distances only in the nailing.

In many box-nailing machines hitherto in use, with divers methods for nailing, the nails, owing to their natural inequalities and roughness, are liable, during their passage to the box, to become clogged, or to scatter and fall from the machine, causing both waste and delay, while in others, which permit the introduction of the nail by placing the proper end foremost only, an additional attendance and service is required for that express purpose, thus in-

volving extra expense. It is evident, however, that in the present construction, which does not employ the usual feed tubes or pockets, but provides a simple and appropriate mechanism which acts directly upon a single nail at each stage in its manipulation, the above-mentioned difficulties are successfully avoided.

What I claim herein as my invention, and seek to secure by Letters Patent, is—

1. In a box-nailing machine, the pawl G , in combination with the holder K , guide v , and pivoted lever I , actuated by cam a , and spring l , for feeding the nail to the cutter, substantially as shown and described.

2. In a box-nailing machine, the pivoted cutter or shears E , in combination with the spring x , and pivoted lever F , actuated by cam d , for cutting off the nail from the nail-strip, as shown and described.

3. In a box-nailing machine, the guide v , in combination with the carrier or finger r , actuated by cam b and spring z , and finger r' , having return-spring w , for conducting the severed nail into position to be driven, all as shown and described.

4. In a box-nailing machine, the fingers r and r' , in combination with the punch H , operated by cam e , and its return-spring for driving the nail into the box, substantially as herein described.

5. In a box-nailing machine, the feed-bar o , provided with teeth, and arranged as shown, in combination with the table or rest A , return-spring y , and pivoted levers p and n , actuated by cam t , for moving along the box into position to be nailed, substantially as described.

6. In a box-nailing machine, the guide v , in combination with the table A and feed-bar o , for holding the box in the same plane in proper contact with the teeth of the feed-bar as it moves forward during the process of nailing, as herein shown and described.

7. A machine for nailing boxes, provided with a holder, K , pawl G , cutter E , fingers r and r' , punch H , guide v , table A , and feed-bar o , substantially as shown, for feeding, cutting off, moving into position to be driven, and driving the nail into the box, and for moving forward and holding in place the box to be nailed.

WILLIAM HENRY BROCK.

Witnesses:

THOMAS H. BAROWSKY,
ROSWELL W. KEENE.