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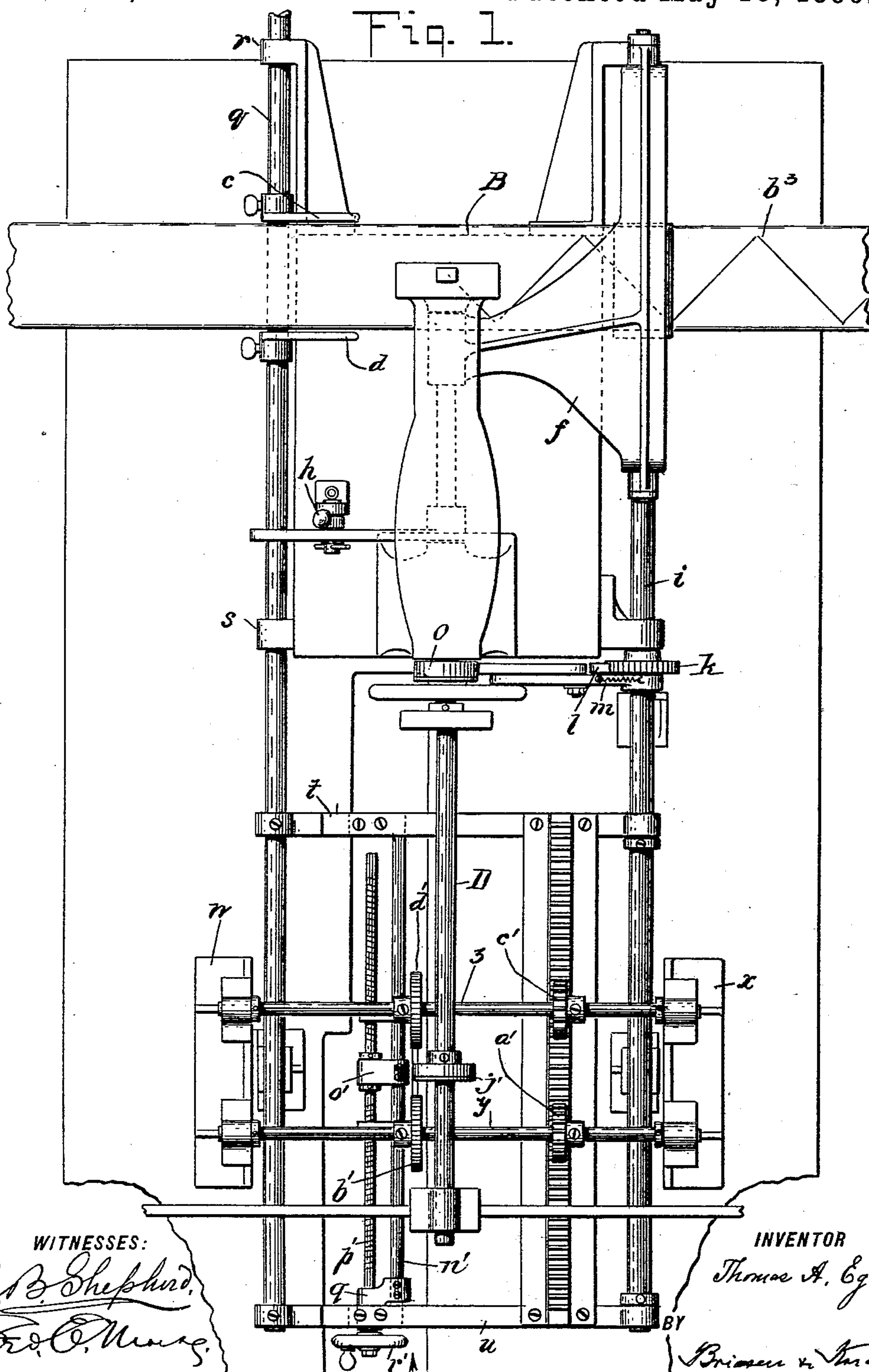
3 Sheets—Sheet 1.

T. A. EGAN.
BELT STITCHING MACHINE.

No. 560,201.

Patented May 19, 1896.

Fig. 1.



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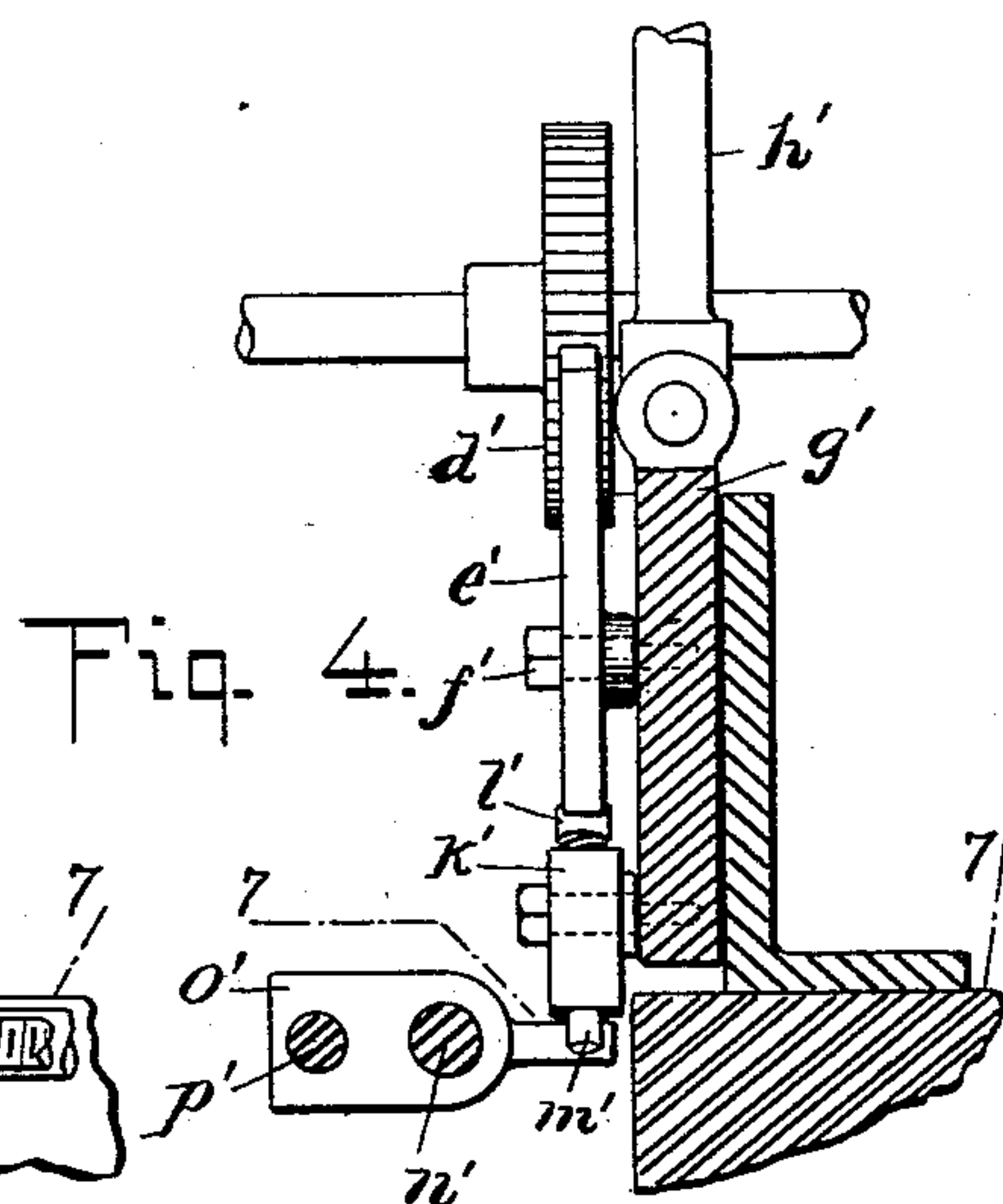
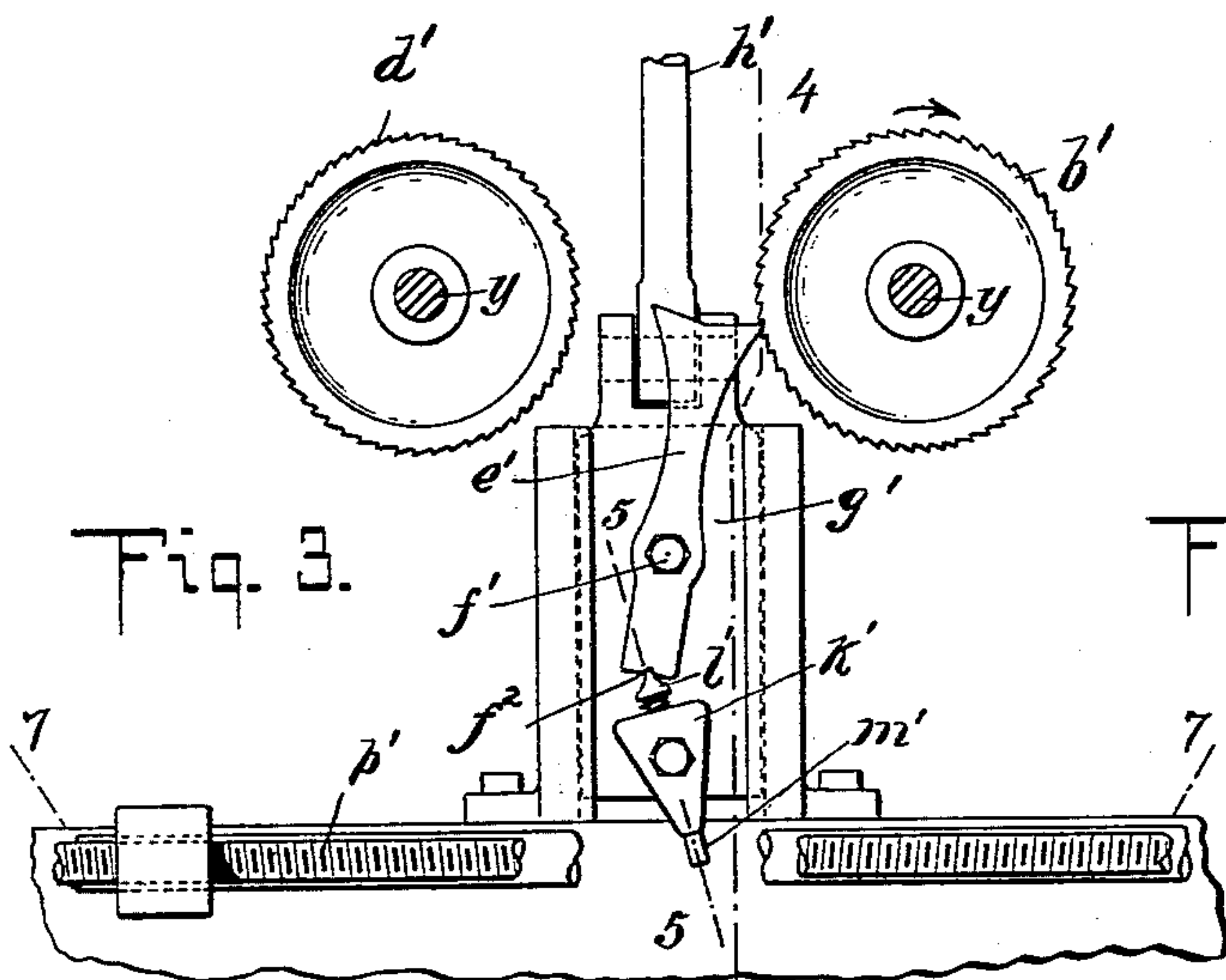
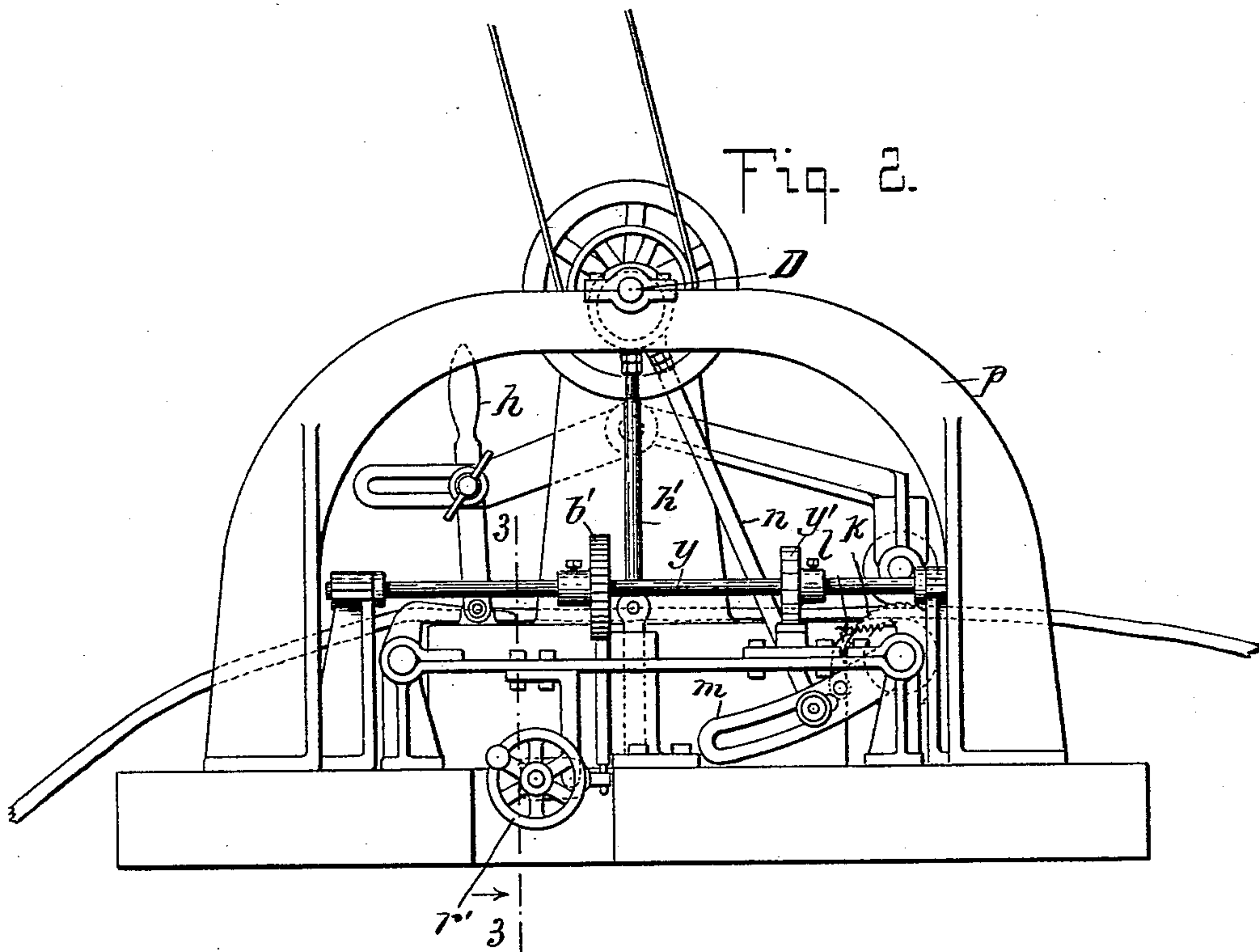
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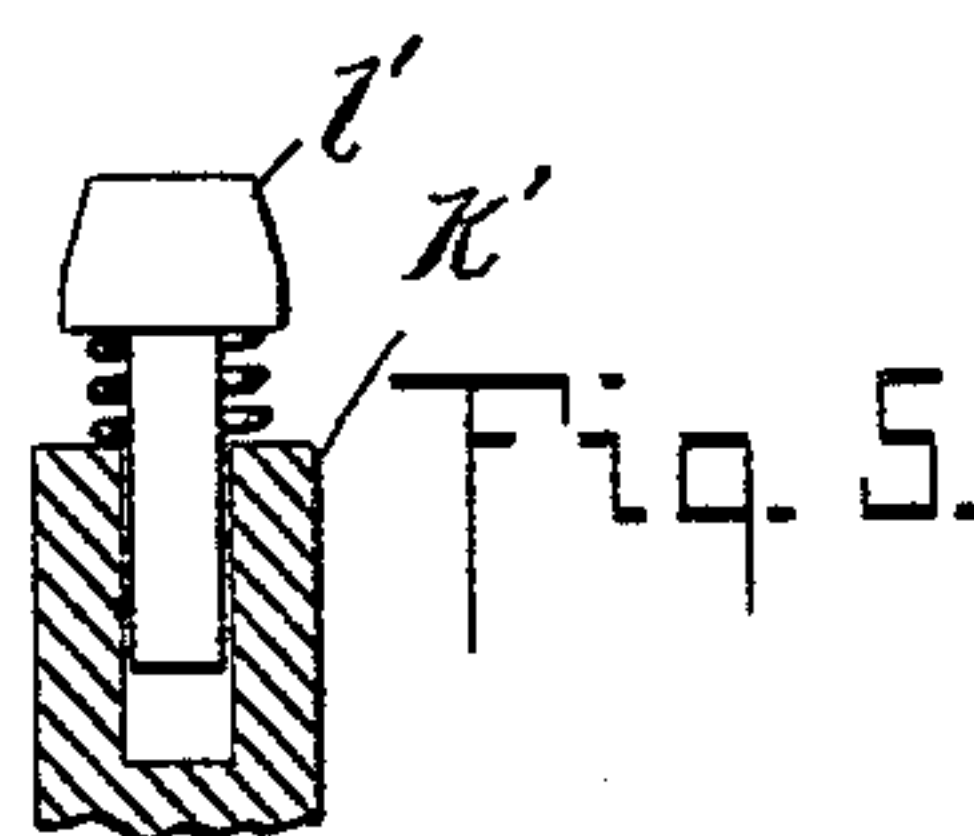
T. A. EGAN.
BELT STITCHING MACHINE.

No. 560,201

Patented May 19, 1896.



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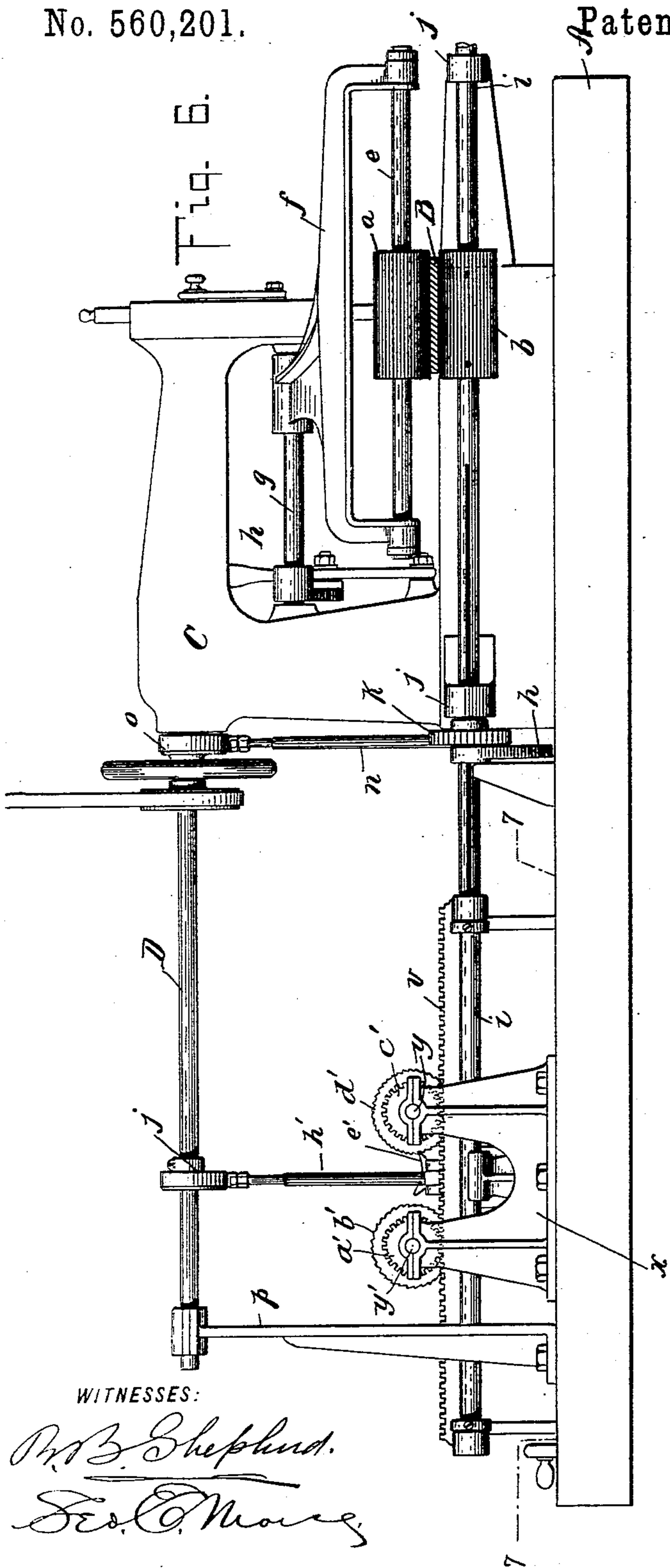
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T. A. EGAN.
BELT STITCHING MACHINE.

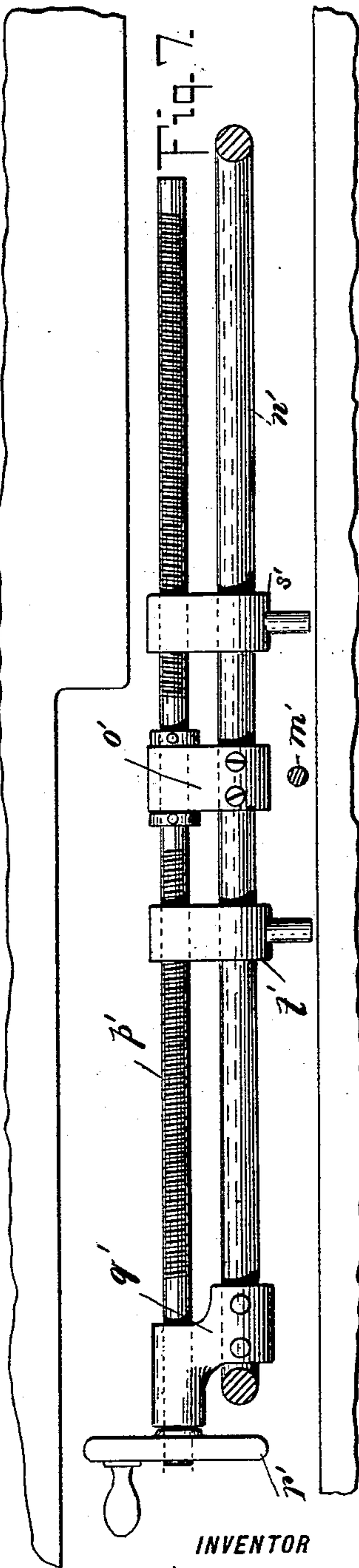
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UNITED STATES PATENT OFFICE.

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BELT-STITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 560,201, dated May 19, 1896.

Application filed September 7, 1895. Serial No. 561,746. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EGAN, a resident of Jersey City, Hudson county, State of New Jersey, have invented a new and useful Improvement in Belt-Stitching Machines, of which the following is a specification.

My invention relates to belt-stitching machines, and has for its object to produce a simple, cheap, and efficient machine which will stitch or sew a belt, meantime feeding the belt to the sewing mechanism from two different directions.

To this end my invention consists in the construction hereinafter set forth and claimed.

My invention will be understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is an end elevation looking in the direction of the arrow in Fig. 1. Fig. 3 is an enlarged broken-away detail view showing the pawl-and-ratchet feed mechanism for the feed-carriage and the shifter-bar thereof, the view being partly in section, the section being taken on line 3 3 of Fig. 2. Fig. 4 is a section of the pawl-and-ratchet feed mechanism on line 4 4 of Fig. 3. Fig. 5 is a section of the shifter-bar on line 5 5 of Fig. 3. Fig. 6 is a side elevation of the machine, looking from right to left across Fig. 1. Fig. 7 is an enlarged plan detail view, partly in section, showing the shifting mechanism for operating the shifter-bar of the pawl-and-ratchet feed mechanism. This view is taken on the line 7 7 of Fig. 6.

Stated in general terms the apparatus which I have shown, and which constitutes one form of my invention, consists of a sewing-machine proper and mechanism for feeding the belt longitudinally to the sewing-machine and mechanism for reciprocating the belt laterally at the same time that it is fed forward longitudinally, so that the line of stitches will run, not longitudinally of the belt, but in a zigzag direction on the belt. The mechanism for reciprocating the belt in a lateral direction consists of a feed-carriage fed forward and backward by well-defined step-by-step movements by means of a suitably-driven mechanism, the step-by-step feed bearing a definite fixed ratio to the movements of the sewing-needle.

The invention further consists in means hereinafter described and claimed for reversing the movement of the feed-carriage.

In the drawings, A is a suitable bed-plate upon which the sewing-machine C is mounted. This sewing-machine is adapted to sew or stitch the belt B, which is fed forward by the usual gripper feed-rolls *a b* and guided by the usual guides *c d*. The gripper feed-roll *a* is hung loosely upon the rod *e* and movable laterally thereupon. This rod *e* is carried in a stirrup or hanger *f*, mounted upon a rock-shaft *g*, which is provided with a rocking handle *h*, so that the shaft may be rocked to raise or lower the roller *a* in order to remove the belt from the rolls or to adjust the distance of the rolls apart. The gripper feed-roll *b* is mounted upon a shaft *i*, which is inserted in and movable longitudinally through a pair of brackets *j*. Splined upon this shaft *i* is a ratchet-wheel *k* with which coöperates a pawl *l*, carried upon a link *m*, (see Fig. 2,) which is swung by a connecting-rod *n*, worked by an eccentric *o* upon the main shaft D of the sewing-machine.

The main shaft D, which drives the sewing-machine is supported at its end in a bearing *p* and reciprocates the connecting-rod *n* in order to step the ratchet *k* around so as to rotate the shaft *i* and the gripper feed-roll *b*. The rotation of this gripper feed-roll *b* is transmitted to the loose gripper feed-roll *a*, and the movement of the two rolls serves to feed the belt B longitudinally through the machine. The guides *c d* are mounted upon a rod *q*, which passes through perforated lugs or brackets *r s*. The rod *q* and the shaft *i* are connected by cross bars or braces *t u*, which in turn are connected by a rack *v*, the whole constituting a feed-carriage for the gripper feed-rolls and the adjustable guides.

It will be obvious that a back-and-forth movement of the feed-carriage will cause the gripper feed-rolls and guides to be reciprocated across the line of longitudinal feed of the belt. This reciprocation may be effected by the following mechanism: Rising from the bed-plate of the machine are standards *w x*, in which are journaled shafts *y z*. The shaft *y* carries a ratchet-wheel *b'* and a pinion *a'*, which meshes with the rack *v*. The shaft

z carries a pinion c' and the ratchet-wheel d' . Located in the space between the ratchets b' d' is a double-faced pawl e' , which is pivoted at f' upon a slide g' , which is pivotally connected to an eccentric-rod h' , which is reciprocated by an eccentric j' on the main shaft D.

By referring to Fig. 3 it will be noted that the pawl e' is in engagement with the ratchet b' and that an upward movement of the connecting-rod h' and slide g' will step the ratchet-wheel b' around in the direction of the arrow. This will cause rotation of the shaft y and pinion y' and will cause the feed-carriage to be moved longitudinally in the direction of the arrow in Fig. 1. It will also be obvious that if the pawl e' be engaged with the ratchet d' the direction of the feed will be reversed. By properly reversing the feed of the feed-carriage in the manner above indicated the belt is fed laterally while it is being fed forward in the direction of its length by the gripper feed-rolls, so that the line of stitching on the belt will be zigzag or undulated, as shown at b^3 in Fig. 1. This reversing of the movement of the feed-carriage may be done in any suitable manner; but I prefer to reverse the movement by the following means: Pivoted upon the slide g' is a pivoted shifter-block k' , which is provided with a spring-pressed spur l' , which enters a notch f^2 in the tail of the pawl e' . This shifter-block is provided with a tail m' , which projects downward toward the bed of the machine. Carried by the feed-carriage is a guide-rod n' . (Seen clearly in Figs. 1, 4, and 7.) Mounted upon this guide-rod is a guide-supporting block o' , through which loosely passes a screw-shaft p' , which is also loosely supported in a bracket q' , mounted upon the shifter-rod. The screw-shaft p' may be provided with a hand-wheel r' or other suitable turning device. A pair of abutments $s' t'$ slide loosely upon the shifter-rod n' and are tapped with screw-threaded apertures, through which the screw-shaft passes. The screw-shaft is oppositely threaded in its separate sections, so that the turning of the hand-wheel will cause the abutments $s' t'$ to approach one another or to separate from one another, so that the extent of movement of the feed-carriage may be regulated by this means, as will be hereinafter set forth. The whole shifting mechanism just described—that is to say, the shifter-rod n' with its screw-shaft and abutments—moves with the feed-carriage, and the tail m' of the shifter-bar extends at all times into the path of movement of the abutments, so that the abutments $s' t'$ will strike this tail to swing the shifter-bar on its pivot to cause the pawl to be swung on its pivot so as to engage with one or the other of the ratchet-wheels $b' d'$.

The detailed operation of my device is as follows: When it is desired to sew a belt with zigzag stitches, the limits of the lateral feed of the belt are first fixed by adjusting the distance apart of the abutments $s' t'$. This, as before explained, is effected by turning the

screw-shaft p' by means of the hand-wheel r' . The belt is then fed to the gripper feed-rolls and guide d , the rotation of the main shaft D serving to step the shaft i around, so as to cause the gripper feed-rolls to rotate and feed the belt forward in the direction of its length, the eccentric j on the main cam-shaft at the same time serving to step one of the ratchet-wheels b' or d' around, so as to effect the lateral feed. When the limit of movement of the lateral feed has been reached—that is to say, when the stitching has approached as near the edge of the belt as is desired, which limit is fixed beforehand—the abutment s' or t' , as the case may be, contacts with the tail m' of the shifter-bar k' , and, swinging the same on its pivot, disengages the pawl from the ratchet with which it is in engagement and engages it with the opposite ratchet. The machine continuing to work, the belt is fed forward and the lateral feed is in a direction opposite to its former direction. When the limit of movement in this lateral direction has been reached, the other abutment comes in contact with the tail of the shifter-bar and again shifts the pawl into engagement with the ratchet with which it was first engaged.

It will be observed that the shaft i acts as a shaft to rotate the feed-roll of the machine and at the same time acts as a part of the feed-carriage to provide the lateral feed of the belt, tending also to guide and support other parts of the device. It is by these and other means that the simplicity of construction and efficiency of operation in my machine are attained.

Now while I have shown one form of my invention and have described the same in positive terms, I would have it understood that I do not mean to limit myself to the construction described and illustrated; but

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

1. The combination with a sewing-machine, of a feeding-carriage, a rack-bar carried by said feeding-carriage, two gear-wheels meshing with said rack-bar and adapted to move the carriage, two ratchet-wheels in the same line having the teeth thereof extending in opposite directions, one of said ratchet-wheels being fixed upon each of the shafts which carry the gear-wheels, a single double-faced pawl and means for automatically moving and engaging said pawl with either of the said ratchet-wheels, whereby the feeding-carriage will be fed backward and forward, substantially as described.

2. The combination with a sewing-machine, of a feeding-carriage, a rack-bar carried by said feeding-carriage, two gear-wheels meshing with said rack-bar and adapted to move the carriage, two ratchet-wheels in the same line having the teeth thereof extending in opposite directions, one of said ratchet-wheels being fixed upon each of the shafts which carry the gear-wheels, a single double-faced pawl, means for reciprocating the said pawl

to rotate a ratchet-wheel, adjustable stops carried upon said carriage and a pivoted shifter-block contacting with the tail of the pawl and adapted to be swung upon its pivot 5 by the stops upon the carriage to automatically throw the pawl into engagement with one of the ratchet-wheels to move the carriage in one direction and to throw the pawl into engagement with the other ratchet-wheel 10 to move the carriage in the opposite direction, substantially as described.

3. The combination with a sewing-machine, of a feeding-carriage, a rack-bar carried by said feeding-carriage, two gear-wheels meshing with said rack-bar and adapted to move 15 the carriage, two ratchet-wheels in the same line having the teeth thereof extending in opposite directions, one of said ratchet-wheels being fixed upon each of the shafts which 20 carry the gear-wheels, a single double-faced pawl, means for reciprocating the said pawl to rotate a ratchet-wheel, adjustable stops carried upon said carriage, a single right and left handed screw-threaded shaft for adjust- 25 ing said stops toward and away from each other and a pivoted shifter-block contacting with the tail of the pawl and adapted to be swung upon its pivot by the stops upon the carriage to automatically throw the pawl into 30 engagement with one of the ratchet-wheels to move the carriage in one direction and to throw the pawl into engagement with the other ratchet-wheel to move the carriage in the opposite direction, substantially as de- 35 scribed.

4. In a machine for stitching belts, the combination with a sewing-machine, of a feeding-carriage comprising in its structure a rotary longitudinally-movable shaft upon which is 40 mounted a roll which with means coöperating therewith feeds the belt in the direction of its length when such shaft is rotated and which carries the belt laterally with it when the shaft together with the carriage is moved, 45 means for rotating said shaft, a rack-bar carried by said feeding-carriage, two gear-wheels meshing with said rack-bar and adapted to

move the carriage, two ratchet-wheels in the same line having the teeth thereof extending in opposite directions, one of said ratchet- 50 wheels being fixed upon each of the shafts which carry the gear-wheels, a single double-faced pawl, means for automatically moving and engaging said pawl with either of said ratchet-wheels, whereby the feeding-carriage 55 will be fed backward and forward, substantially as described.

5. In a machine for stitching belts, the combination with a sewing-machine, of a feeding-carriage comprising in its structure a rotary 60 longitudinally-movable shaft upon which is mounted a roll which with means coöperating therewith feeds the belt in the direction of its length when such shaft is rotated and which carries the belt laterally with it when 65 the shaft together with the carriage is moved, a ratchet-wheel splined upon said shaft, means for intermittently rotating said ratchet-wheel, a rack-bar carried by said feeding-carriage, two gear-wheels meshing with said 70 rack-bar and adapted to move the carriage, two ratchet-wheels in the same line having the teeth thereof extending in opposite directions, one of the ratchet-wheels being fixed upon each of the shafts which carry the gear- 75 wheels, a double-faced pawl, means for reciprocating said pawl to rotate a ratchet-wheel, adjustable stops carried upon said carriage and a pivoted shifter-block contacting with the tail of the pawl and adapted to be swung 80 upon its pivot by the stops upon the carriage to automatically throw the pawl into engagement with one of the ratchet-wheels to move the carriage and its rotary and longitudinally-movable shaft in one direction and to throw 85 the pawl into engagement with the other ratchet-wheel to move the carriage and its shaft in the opposite direction, substantially as described.

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Witnesses:

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HARRY M. TURK.