

# C. Marsh

## Grinding Needles.

No 97,664.

Patented Dec. 7. 1869.

Fig. 1.

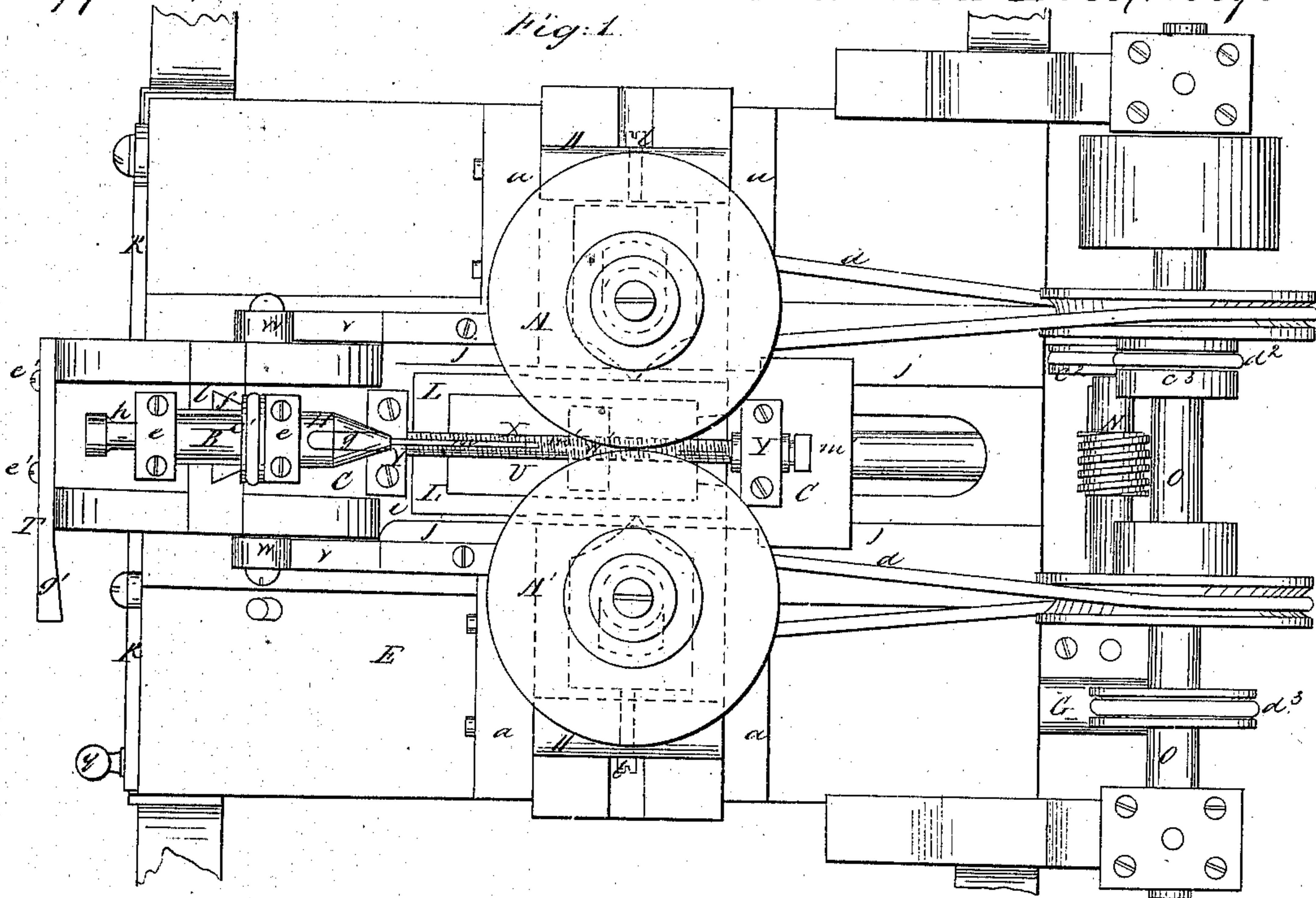
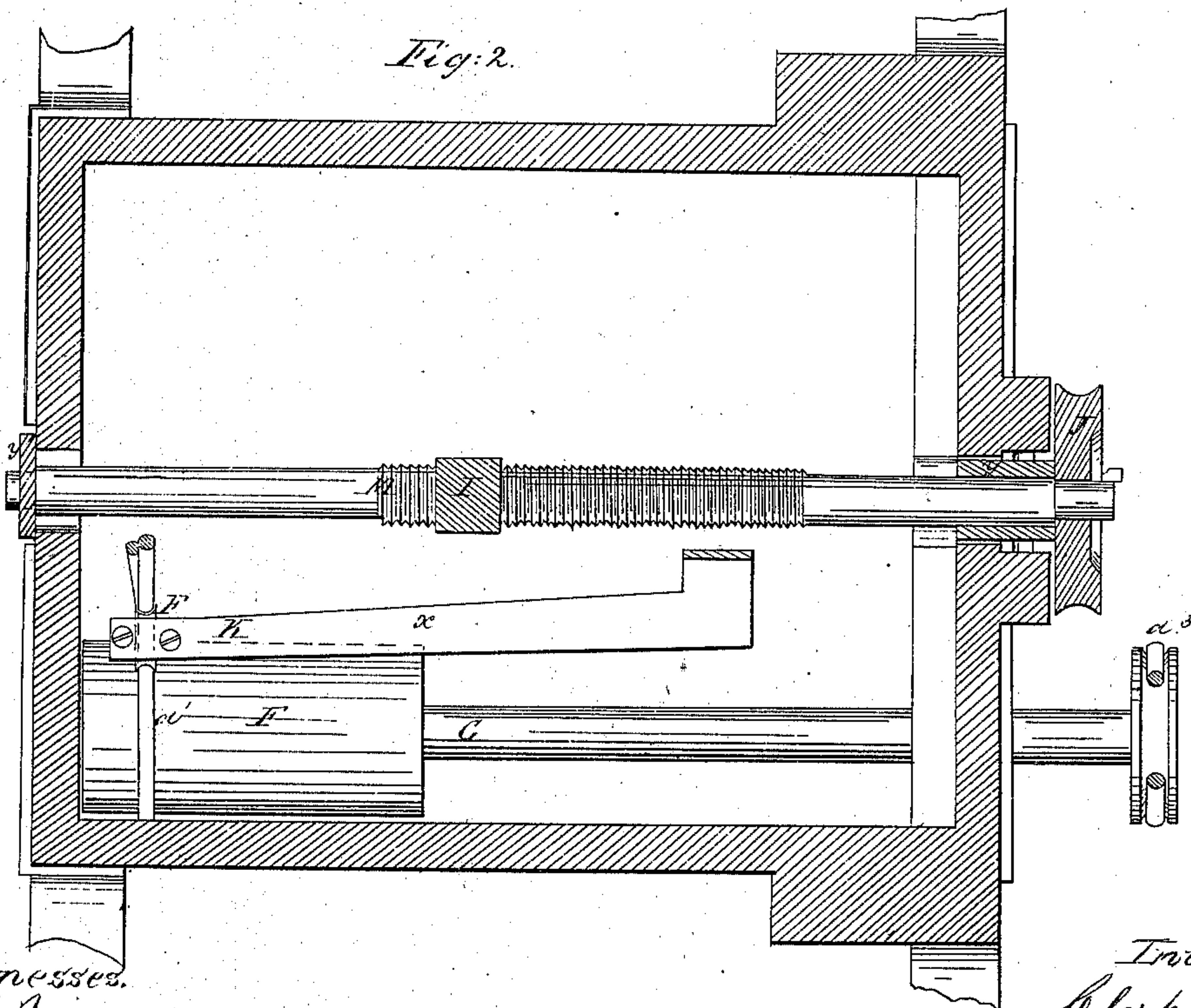


Fig. 2.



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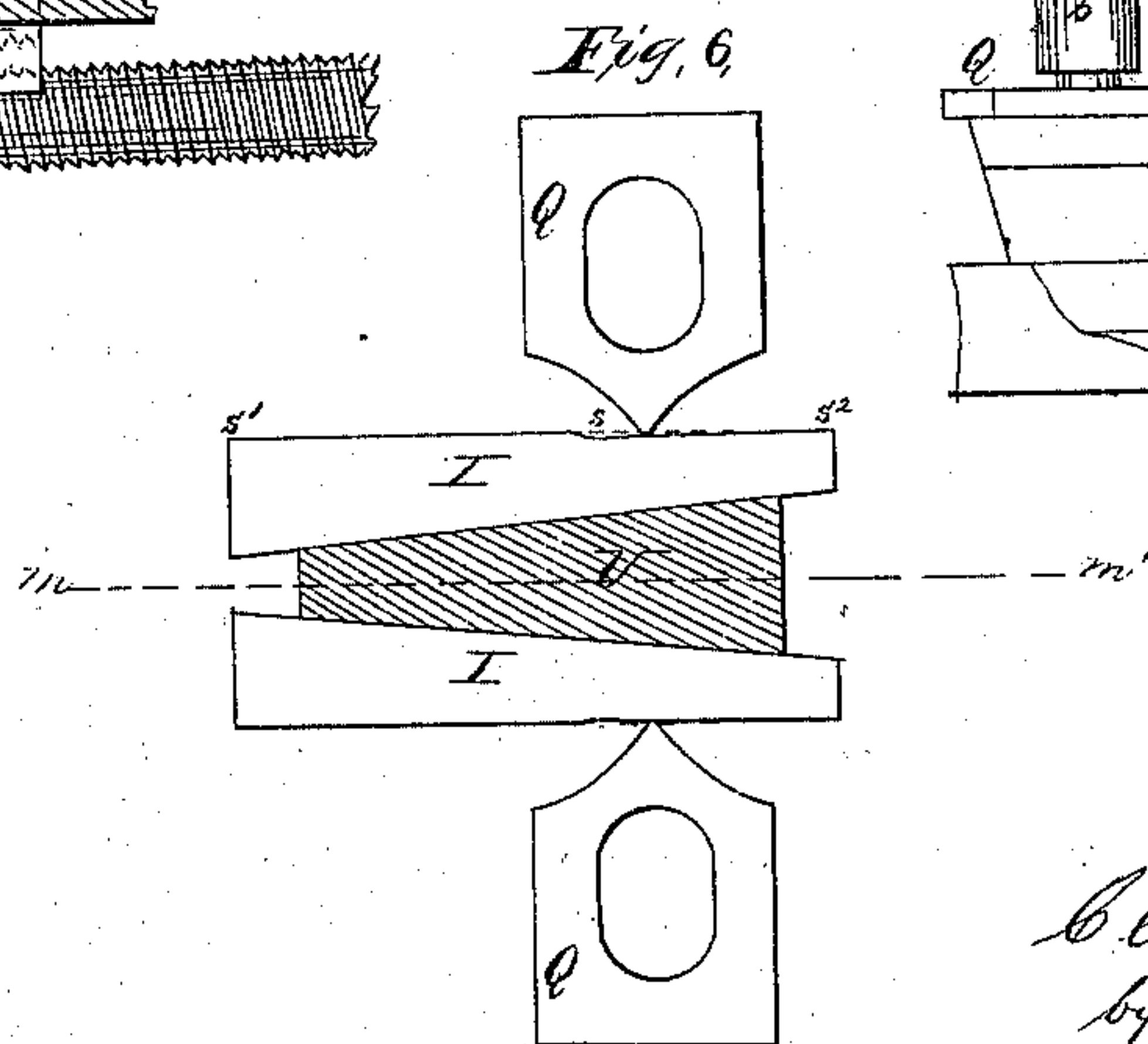
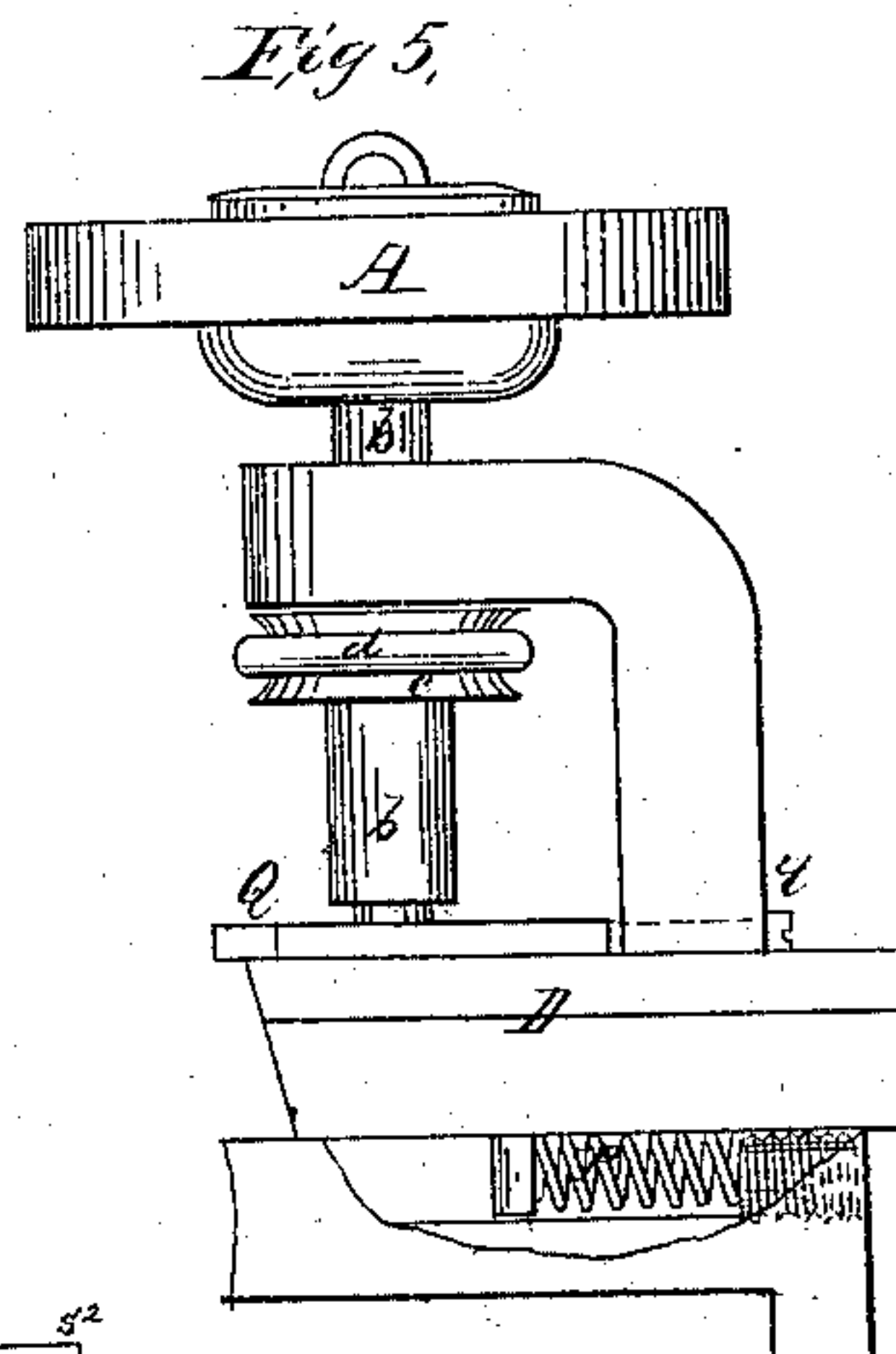
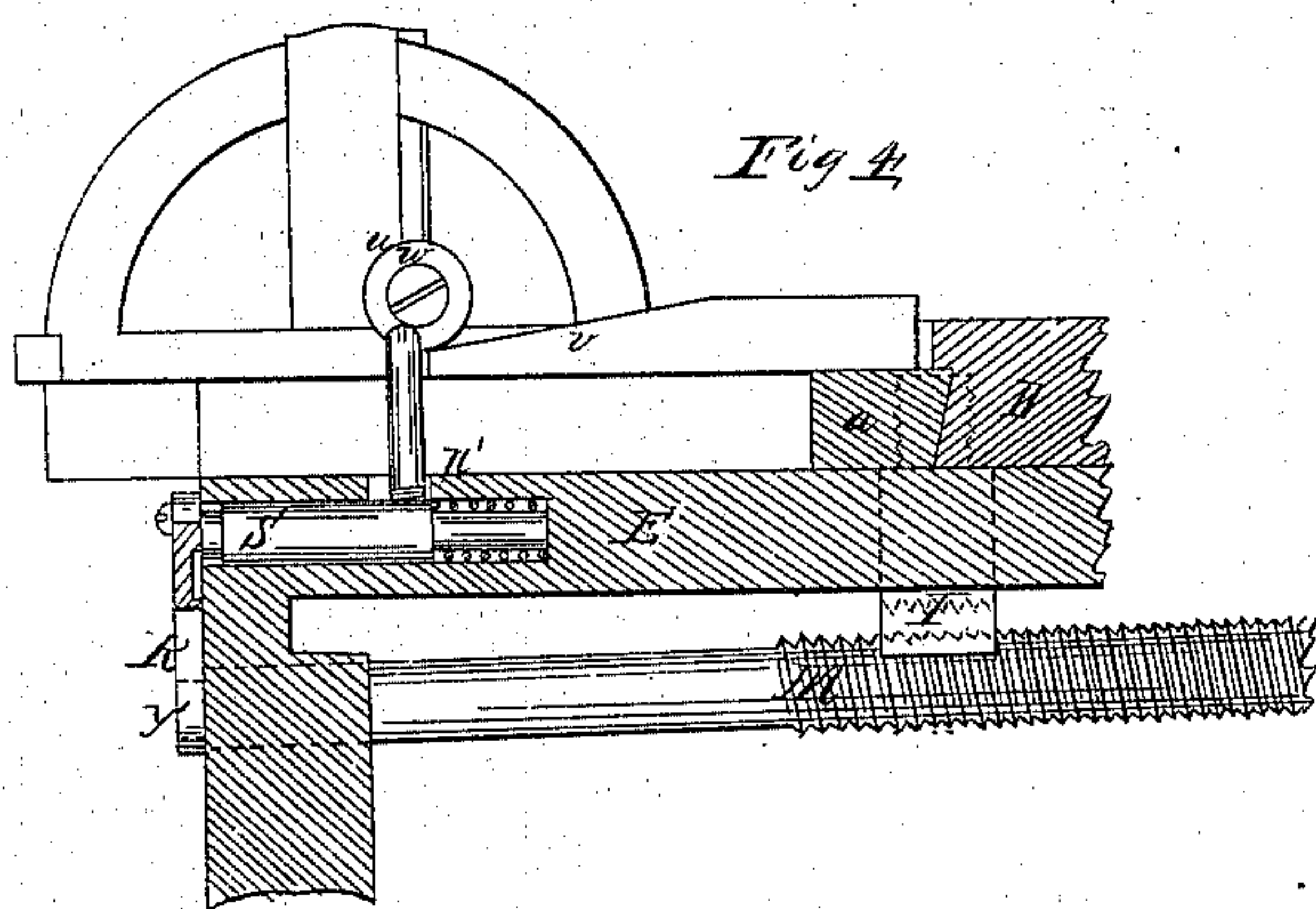
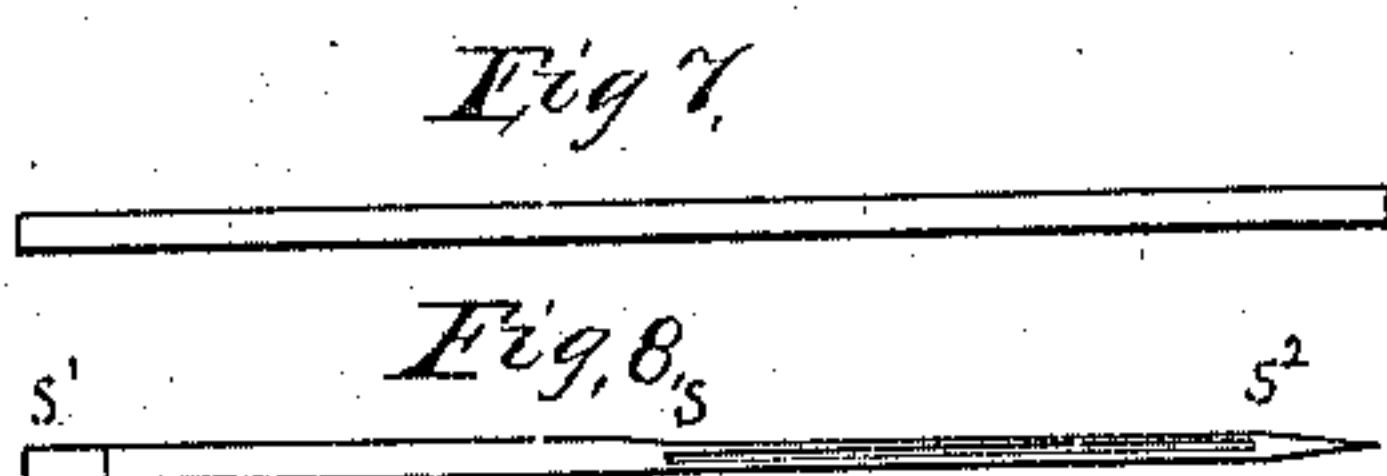
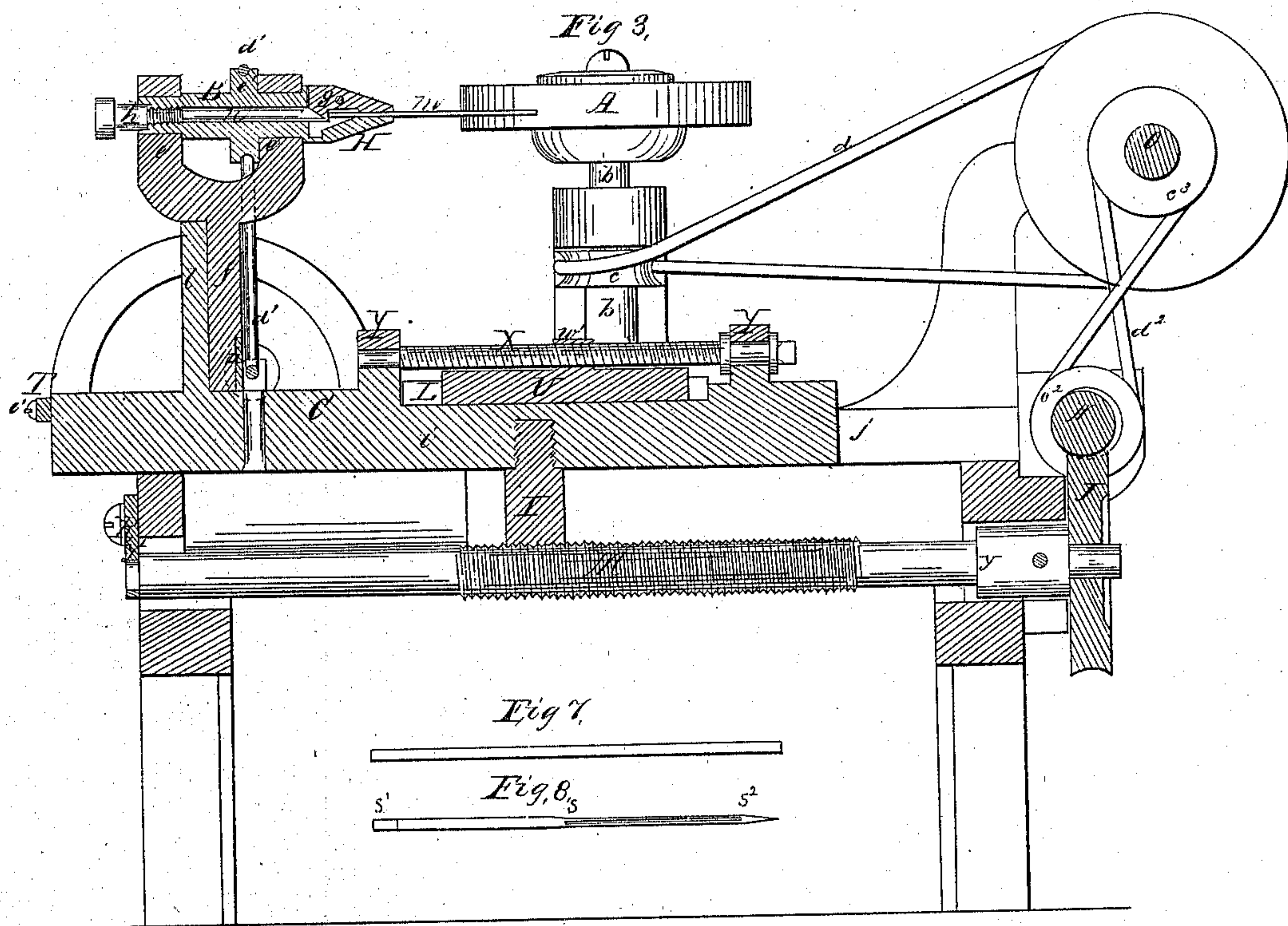


# C. Marsh

## Grinding Needles.

No 97,664.

Patented Dec. 7. 1869.



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# United States Patent Office.

CLARK MARSH, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

Letters Patent No. 97,664, dated December 7, 1869.

## IMPROVED MACHINE FOR GRINDING NEEDLES.

The Schedule referred to in these Letters Patent and making part of the same

### To all whom it may concern:

Be it known that I, CLARK MARSH, of Bridgeport, in the county of Fairfield, and State of Connecticut, have made an invention of certain new and useful Improvements in Machines for Grinding Needles, the same being applicable, also, to other purposes; and that the following is a full, clear, and exact description and specification of the same.

The object of my invention is to reduce sewing-machine needles and similar articles to a certain size and form, by a grinding-operation, effected automatically; and

My invention consists of certain combinations of mechanical instrumentalities, as particularly specified in the claims at the close of this specification.

The principal instrumentalities which are thus combined, are—

First, a rotating grinder, which is, by preference, a vulcanite emery-wheel.

Second, a reciprocating carriage for said grinder, constructed to move the same at right angles to its axis of rotation, or in the plane in which the grinder rotates.

Third, a turning-holder, to hold the article to be ground, and to turn it while in contact with the rotating grinder.

Fourth, a holder-carriage, constructed to move the turning-holder tangentially to the rotating grinder, so that said article, while turning on its axis, is caused to advance endwise against and in contact with the surface of the grinder, in the direction, or thereabout, of a tangent to the circular periphery of the grinder.

Fifth, a rest, acting antagonistically to the rotating grinder, so as to prevent the article from swerving (radially to the grinder) from the line of direction in which it is advanced. This rest, by preference, consists of a rotating vulcanite emery-wheel, mounted upon a reciprocating carriage, so that the article is ground at opposite sides of its axis simultaneously, and each grinder acts as a rest to prevent the swerving of the article from the opposite grinder.

Sixth, a controlling mechanism, (consisting, by preference, of a pattern-plate and one or more springs,) which determines the lateral distance of the grinder, or the rest, or of both, from the plane in which the article is advanced, and thereby determines the extent to which the article is reduced by the operation of the machine, and, consequently, the ultimate shape of the article.

Seventh, traversing-mechanism, by whose action the article, while turning on its axis and advanced endwise past the rotating grinder, is caused to traverse the breadth of said grinder, so that the wear of the latter is equalized, in part or in whole, and different belts of its periphery are caused to operate successively upon the article.

Eighth, stop-mechanism, by which the movement of the article past the grinder is stopped when the required reduction is completed.

The mode in which the instrumentalities are combined by me will appear fully from the following description of a machine which embodies my invention, and which is represented in the accompanying drawings—

Figure 1 representing a plan of said machine, and

Figure 2, a plan of the same, with the table and the parts above it removed.

Figure 3 represents a vertical section of the machine through the axis of the needle-holder;

Figures 4, 5, and 6, represent views of detached parts of the machine;

Figure 7 represents an enlarged view of a needle-blank; and

Figure 8 represents a similar view of a needle which has been reduced to the required form by the operation of the machine.

The said machine is constructed with two rotating grinders, A A', each of which acts as a rest, to prevent the needle-blank *m* from swerving radially from the other, the two grinders being so arranged, relatively to the needle-holder B and its carriage C, that the needle-blank *m* is advanced, in the direction of the dotted line *m' m'*, between the circular peripheries of the two grinders, and tangentially to said peripheries.

Each grinder is mounted upon an upright arbor or mandrel, *b*, which is fitted to turn in bearings formed upon the grinder-carriage D, the lower bearing being a step to hold the mandrel from moving endwise.

Each grinder-arbor is fitted with a whorl, *c*, to which the round belt *d* is applied, by which the grinder is caused to revolve rapidly—a speed of one thousand revolutions per minute, for a grinder of three inches in diameter, being found well suited to the production of the desired effect.

Each grinder-carriage D is fitted to move crosswise to the line *m'*, in which the needle is advanced in guides or ways *a a*, constructed upon the frame E of the machine, the ways and the base of the grinder-carriage being, by preference, of dovetail construction, so as to prevent the carriage from rocking.

The turning-holder B, by which the needle-blank *m* is held and caused to turn upon its axis, is constructed to revolve in bearings *e e*, formed at the upper end of the holder-carriage standard *f*, and is fitted with a whorl, *e'*, to which the round belt which imparts motion to the turning-holder is applied.

This belt receives its motion from a revolving drum, F, secured to a shaft, G, beneath the table of the frame of the machine.

At one end of the holder is a chuck, H, in the form of a conical head, for the purpose of holding the article to be ground.



The said head is slotted at one side, and a lever clamping-jaw, *g*, is pivoted in the slot. The inner side of the outer end of this jaw, and the adjacent inner side of the head, are the counterpart of the needle-blank, so as to centre it when it is clamped in the holder.

The inner end of the clamping-jaw is wedge-formed, and is operated upon by a sliding piston, *n*, whose front end is wedge-formed, to act upon the clamping-jaw, and whose rear end is operated upon by a screw, *h*, which, when turned, forces the piston forward in the holder, and compels the clamping-jaw *g* to gripe the blank firmly, so that it is compelled to turn with the holder.

The holder-carriage *C*, from which the standard *f* projects, is constructed to slide longitudinally in ways secured to the frame *E* of the machine, the bed *i* of the said carriage and the ways *j j* being constructed, by preference, of dovetailed form, so as to hold the carriage from rising as it is moved.

The ways *j j*, that guide this holder-carriage in its movement, extend parallel with the axial line of the holder *B* and of the blank contained therein, so that the holder is caused to move endwise, and the blank is moved longitudinally to and in contact with the peripheries of the grinders *A A'*, in the direction of their tangents.

The holder-carriage is caused to move in the required direction by means of a feed-screw, *M*, whose threads operate upon a segment of a nut, *I*, secured to the under side of said carriage.

This feed-screw is fitted to turn in suitable bearings, secured to the frame of the machine, and its head has a worm-wheel, *J*, secured to it, which is caused to turn by means of a worm or endless screw, *N*, the said worm being driven from the driving-shaft *O* by means of the belt *d<sup>2</sup>* and belt-pulleys *c<sup>2</sup> c<sup>3</sup>*.

As the holder-carriage causes the holder to move along, it is expedient that the belt *d<sup>1</sup>*, which drives the holder, should also be carried progressively along the drum *F*. To this end, it is engaged within the jaws of a traverser, *K*, which is connected with the holder-carriage, and is moved with it.

In order to reduce friction, the traverser is fitted with a grooved friction-wheel, *r*.

In order that the position of the two grinders, *A A'*, may be determined during the operation of the machine, so as to reduce the article to the required size and form, a pattern-plate, *L L*, is provided, and springs *P* are also provided, to force the grinder-carriages toward said pattern-plate with a yielding pressure.

The pattern-plate *L L* is secured to the bed of the holder-carriage *C*, so as to be moved by it between the grinder-carriages, and a bearing, *Q*, is secured to the adjacent bed of each grinder-carriage *D*, to bear against the adjacent edge of the pattern-plate, and the said bearing is constantly kept in contact with the edge of the pattern-plate by the operation of the spring *P* upon the grinder-carriage. Hence, a depression in the edge of the pattern-plate permits the spring to move the grinder-carriage and its grinder nearer to the axial line of the blank carried by the holder *B*, and a projection of the edge of the said plate, operating through the bearing *Q*, moves the grinder-carriage and grinder further from the axial line of said blank, the spring *P* permitting such movement by yielding to the pressure. In the former case, the surface of the blank is ground away to a greater extent, while in the latter it is less reduced, and consequently left of larger size.

The longitudinal form or the edges of the pattern-plate thus determines the resulting form and size of the article, and that part of the length of said edge which operates upon the bearing *Q* of the grinder-carriage, while the needle-blank is passing the periph-

ery of the grinder, or from *s* to *s<sup>1</sup>*, fig. 6, is made of the same profile as the longitudinal profile of the needle to be produced.

The part of said edge which passes by the bearing *Q* of the grinder-carriage, before the needle-point arrives opposite the centre of the grinder, or from *s* to *s<sup>2</sup>*, fig. 6, may be parallel with the line *m' m'*, in which the needle is advanced, but it is made by preference to diverge from that line, as represented at fig. 6, so that the grinders, or the grinder and rest, in case a non-grinding rest be used in place of one of the grinders, are kept apart until the needle-point is to be ground, thereby avoiding the risk of injuring each other, and facilitating the introduction and removal of the needle-blank.

The pattern-plate *L L* is made removable from the machine, so that in case articles of different longitudinal form are to be ground in the same machine, a pattern-plate of the proper form may be applied to it.

The bearings *Q* also are made adjustable upon their carriages, *D D*, and a screw, *t*, is applied to each, so as to adjust its position to suit the diameter of the grinder, which is secured to the mandrel. The bearing also may be moved back upon the grinder-carriage, as the diameter of the grinder is reduced by wear.

In order that the needle-blank, while turning on its longitudinal axis, and moved endwise past the grinders, may be caused to traverse their breadth, the standard *f* is not secured immovably to the holder carriage-bed *i*, but is constructed to slide vertically in a dovetail groove, formed in the upright stock *l*. Moreover, the lower end of the standard *f* is provided with an axle-tree, *u*, whose arms project laterally over inclined tracks *v v*, secured to the frame of the machine, and are fitted with wheels *w*, which traverse said tracks as the holder-carriage is moved forward. Hence, when the holder-carriage moves forward, the wheels *w w*, traversing said tracks, cause the revolving holder to rise and move the blank *m* across the face of the grinder *A*, thus applying it to successive belts thereof.

The driving-belt *d<sup>1</sup>*, which imparts motion to the revolving holder *B*, is permitted to accommodate itself to this change of position of the holder, by constructing the shank *x*, of the belt-traverser *K*, as a spring, which permits the friction-wheel *r* to act as a tightening-pulley, yielding as the revolving holder rises, and taking up the slack of the belt when the revolving holder descends, during the drawing back of the holder-carriage.

In order that the longitudinal movement of the article may be stopped as soon as it is reduced to the required extent of its length, the bearing *y*, which supports the head of the feed-screw *M*, is connected with the frame of the machine by pivots *z*, one at each side, upon which the bearing *y*, and the feed-screw within it, can vibrate longitudinally, while the other bearing, *y'*, is formed in a lever, *R*, which can be turned down to depress the feed-screw and disengage its threads from the nut-segment *I*. Moreover, a catch or bolt, *S*, is arranged to slide in a socket of the frame *E*, crosswise to the plane of movement of the bearing-lever *R*, so that when said lever is raised sufficiently to engage the feed-screw *M* with the nut-segment *I*, the end of the bolt *S* can be shot into a recess formed in the inner face of the lever, to maintain the engagement of the feed-screw.

When the machine is in operation, the feed-movement of the holder-carriage *C*, and of article carried upon it to the grinders, will continue so long as the bolt *S* maintains its engagement with the bearing-lever.

In order that the feed-movement may be stopped when the article has been advanced to the required extent, the bolt *S* is provided with a stud, *p*, that pro-



jects upward within the range of movement of an arm, T, which is secured to and moves with the holder-carriage, so that said arm, in its movement, may act upon the stud p, and disengage the bolt S from the bearing-lever, whereupon the weight of the feed-screw and lever causes the feed-screw to drop and disengage from the nut-segment, and the advancing movement of the article is stopped.

The holder-carriage may then be drawn back, either by hand or by means of a weight operating through a cord extended over a pulley. The reduced blank may be removed, and a new one clamped in its place in the rotating holder.

The bearing-lever R may then be raised, to throw the feed-screw into engagement with the nut, and the operations of the machine will be repeated.

In order that the bearing-lever may be readily raised, it is provided with a handle, q; and in order that the bolt S may engage automatically with the lever, as soon as the latter is raised, a spring, n', is provided, to push the bolt endwise toward the lever.

In order that the point at which the feed-movement of the carriage is to stop, may be adjusted with nicety, the stop-arm T is secured to the holder-carriage by means of screw-bolts e' e', whose stems pass through slots in the shank of the arm, and the head, g', of the arm, is constructed of a wedge-form; hence, when the said bolts e' e' are slacked, the arm may be slid crosswise to the carriage, so as to place a more or less protuberant part of the head opposite the stud of the bolt S, and thus disengage that bolt sooner or later from the bearing-lever.

The lateral adjustment of the pattern-plate L L also is provided for, so that it may be set to determine the reduction of articles of different diameters, or to compensate the wear of the grinders, as required. To this end it is constructed of two parts, L and L', whose inner edges are inclined, and are separated by a wedge, U, which can be moved longitudinally by means of a screw, X.

This wedge traverses a nut, w', projecting upward from the wedge U, and the ends of the screw are fitted to turn in suitable bearings, Y Y, secured to the carriage O.

The head of the screw is made square, so that it may be readily turned by means of a wrench.

The wedge U is made by preference thicker than the members of the pattern-plate, and the portions of its thickness above the said members are extended laterally, so as to overlap them, and hold them down to the bed of the holder-carriage.

The various belts, d d' d" d', which impart motion to the rotating members of the machine, receive their motion from the driving-shaft O, which is fitted with a pulley for each belt, and also with a driving-pulley, to receive the belt from the line-shafting of the manufactory in which the machine is used.

Having thus described a machine embodying my invention, in what I deem to be the best form known to me, I may state that my invention may be carried

into effect by modifying the construction of the machine.

Thus, for example, the holder-carriage may be dispensed with, so that the holder retains its longitudinal position upon the frame of the machine; and in place of the holder-carriage, the carriages of the grinder and rest may be mounted upon a second carriage, which will move them along the article toward the turning-holder. In this case, the grinder and rest will be advanced in the direction of a tangent to the periphery of the grinder, along the article, instead of the article being advanced, in the same way, along the grinder, and the operation of the combination upon the article will be substantially the same as in the machine represented.

Again, the grinder may be disconnected from its carriage, and in place of that carriage, the holder-carriage and rest may be mounted upon a carriage that will move them crosswise to the advancing movement of the article, toward the periphery of the grinder. The modified machine in this case will have the same number of instrumentalities operating in combination, substantially as the corresponding instrumentalities in the machine I have described, and represented in the drawings.

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

1. The combination and arrangement of the following instrumentalities, viz, the rotating grinder, the grinder-carriage, the turning-holder, the holder-carriage moving in the direction of a tangent of the circular periphery of the grinder, the rest, and controlling-mechanism, all constructed to operate substantially as before set forth.

2. The combination of the rotating grinder, the grinder-carriage, the turning-holder, the holder-carriage, moving in the direction of a tangent of the circular periphery of the grinder, the rest and stop-mechanism, the whole constructed to operate substantially as before set forth.

3. The combination of the rotating grinder, the grinder-carriage, the turning-holder, the holder-carriage moving in the direction of a tangent of the circular periphery of the grinder, the rest, and the traversing-mechanism, the whole constructed to operate substantially as before set forth.

4. The combination of the turning-holder and the holder-carriage, with a pattern-plate, constructed so as to be adjusted laterally, substantially as before set forth.

5. The combination of the rotating grinder and the grinder-carriage, with an adjustable bearing for the pattern-plate, substantially as set forth.

In testimony whereof, I have hereto set my hand, this 27th day of May, A. D. 1869.

CLARK MARSH.

Witnesses:

FRANCIS IVES,  
W. E. BARNETT.