

No. 614,111.

Patented Nov. 15, 1898.

A. JOHNSTON.

MACHINE FOR ROLLING KNIFE BLANKS, &c.

(Application filed Mar. 19, 1898.)

(No Model.)

3 Sheets—Sheet 1.

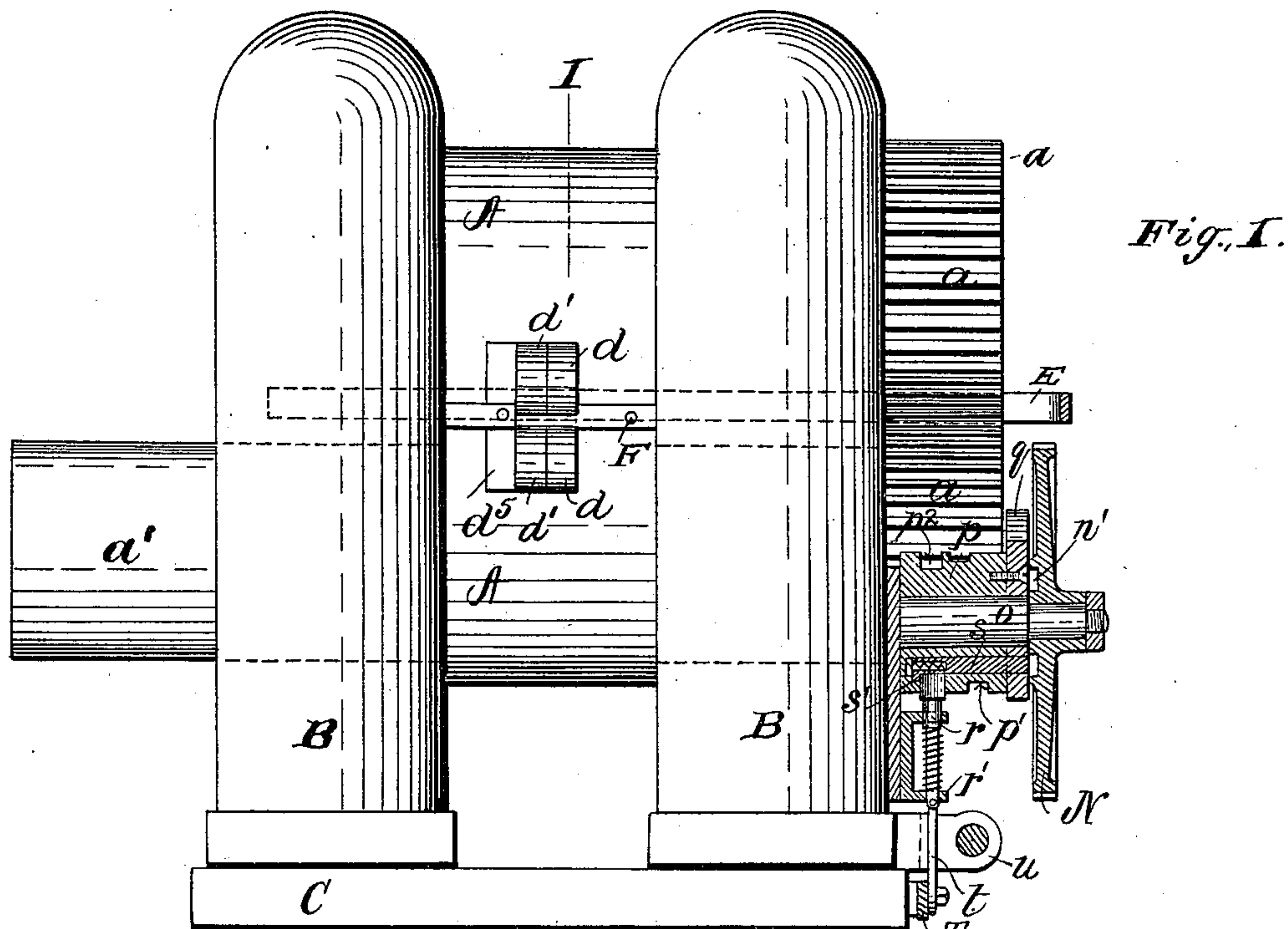


Fig. 1.

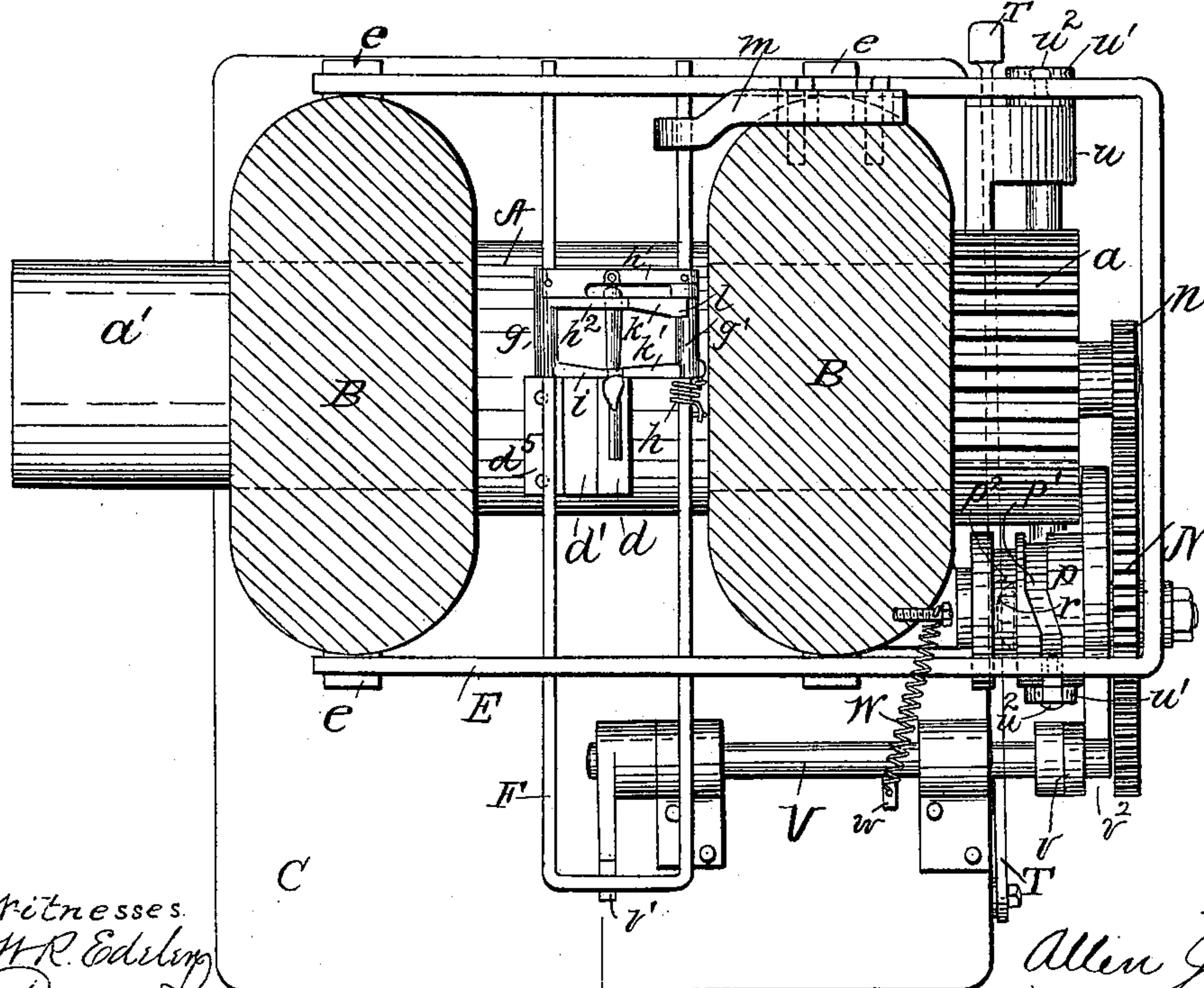


Fig. 2.

Witnesses.

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Fig. 4.

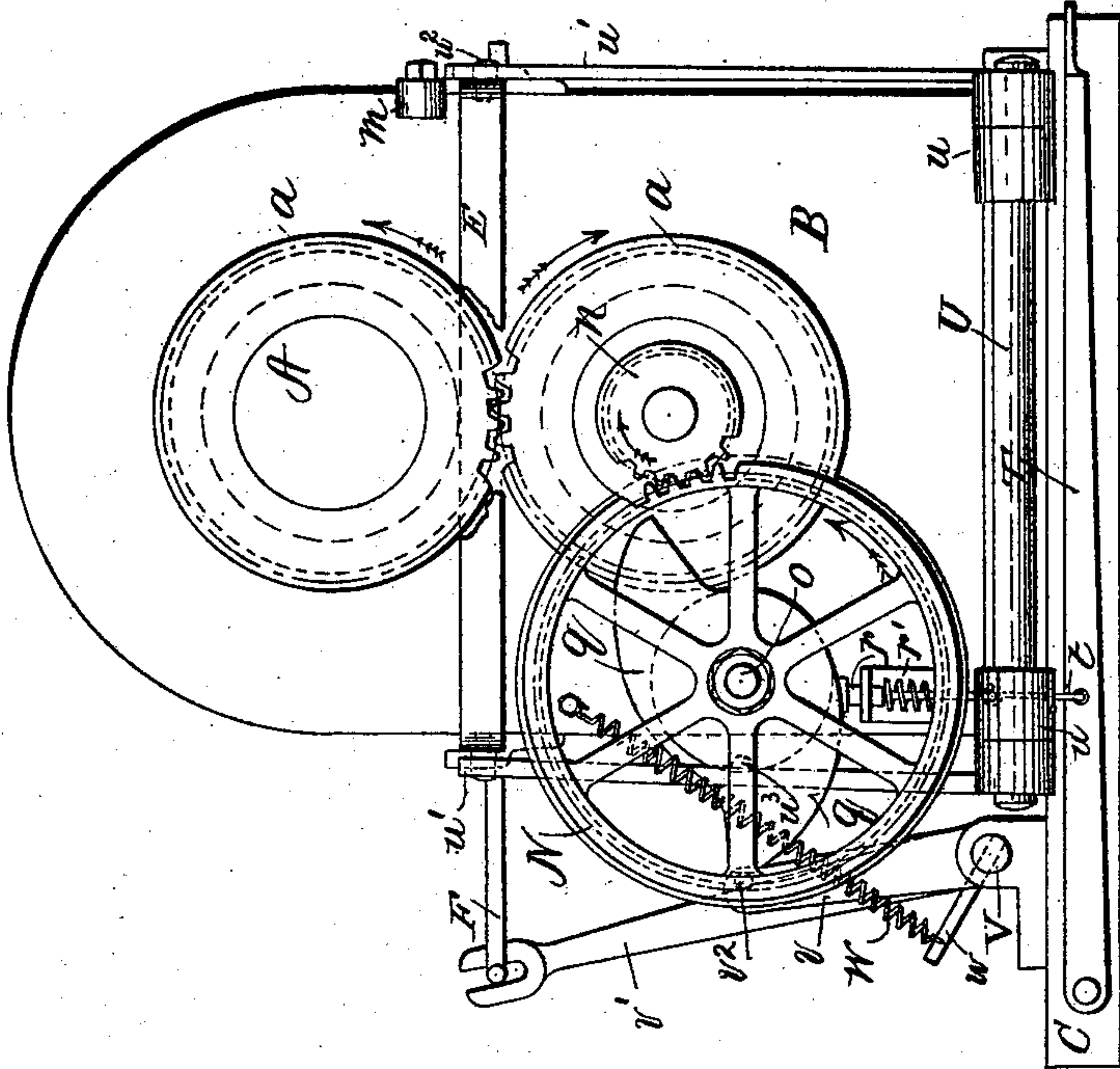
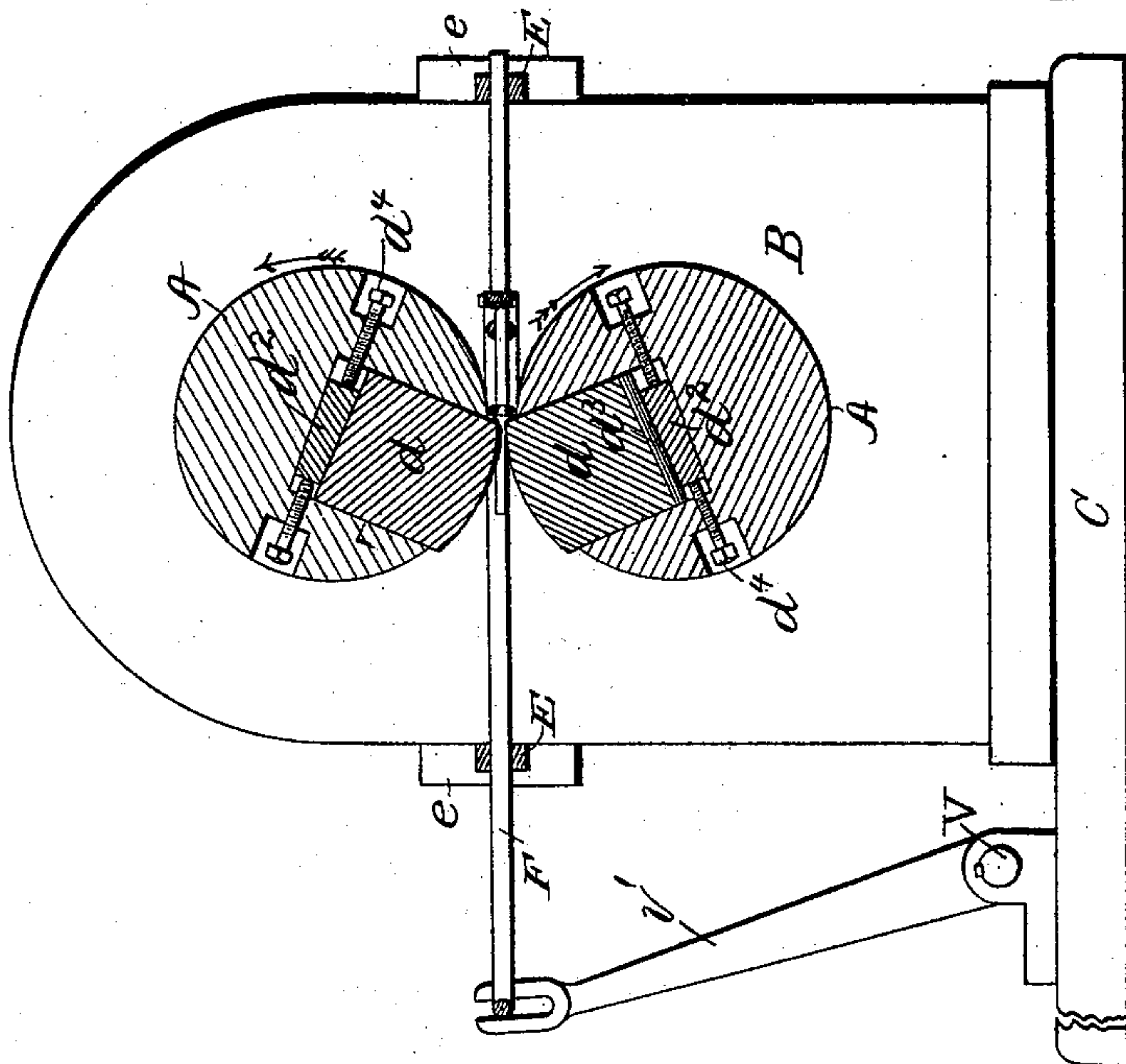


Fig. 3.



Witnesses.

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3 Sheets—Sheet 3.

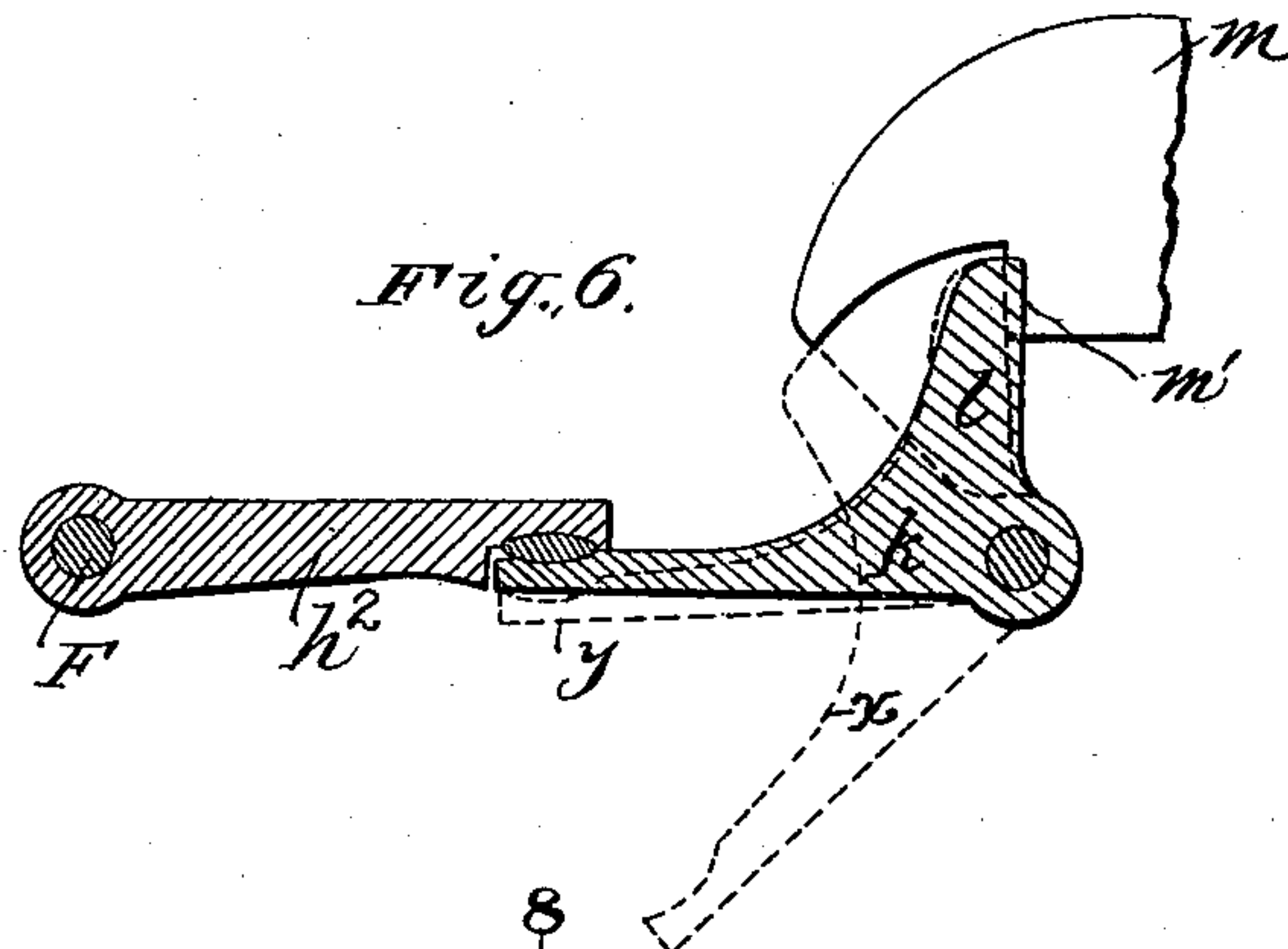


Fig. 8.

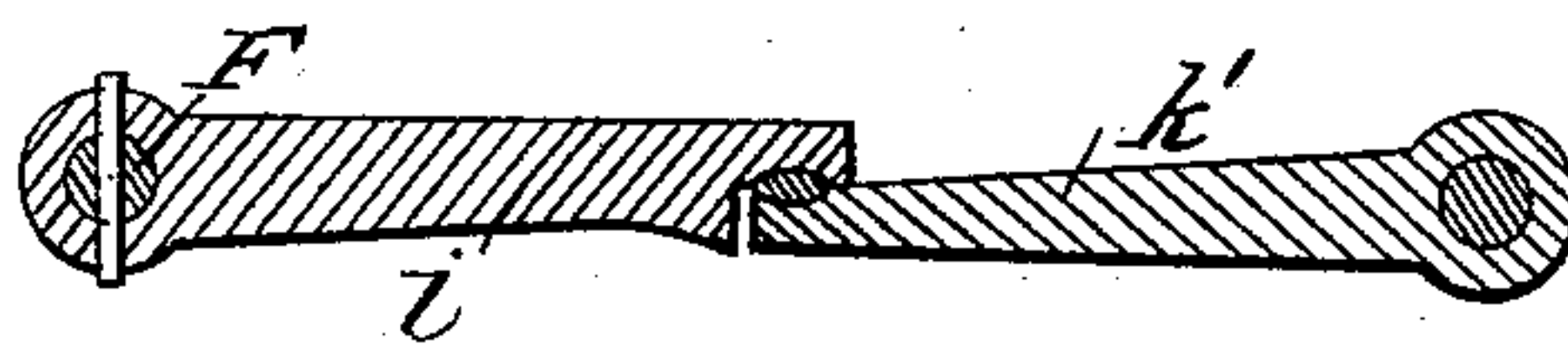
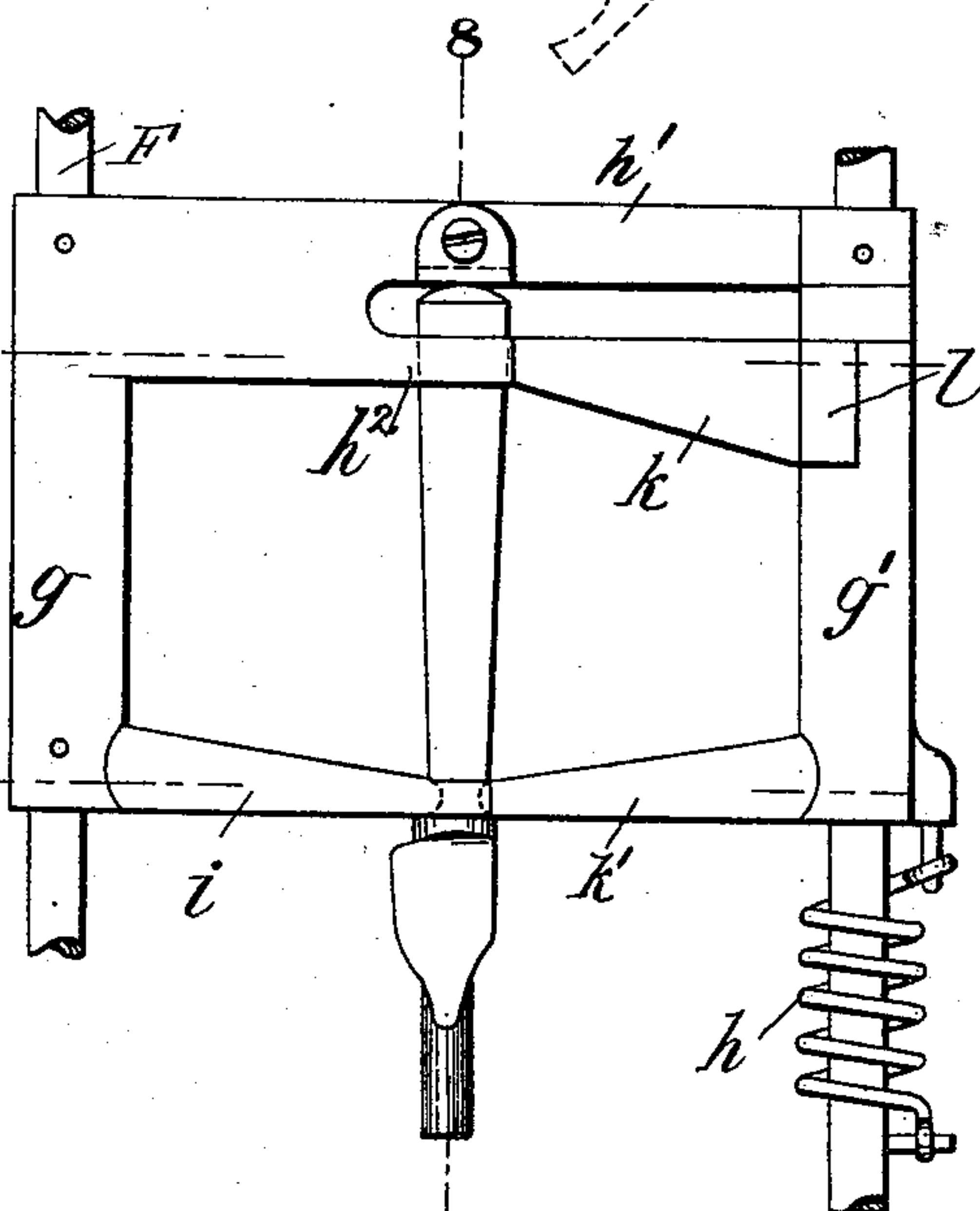
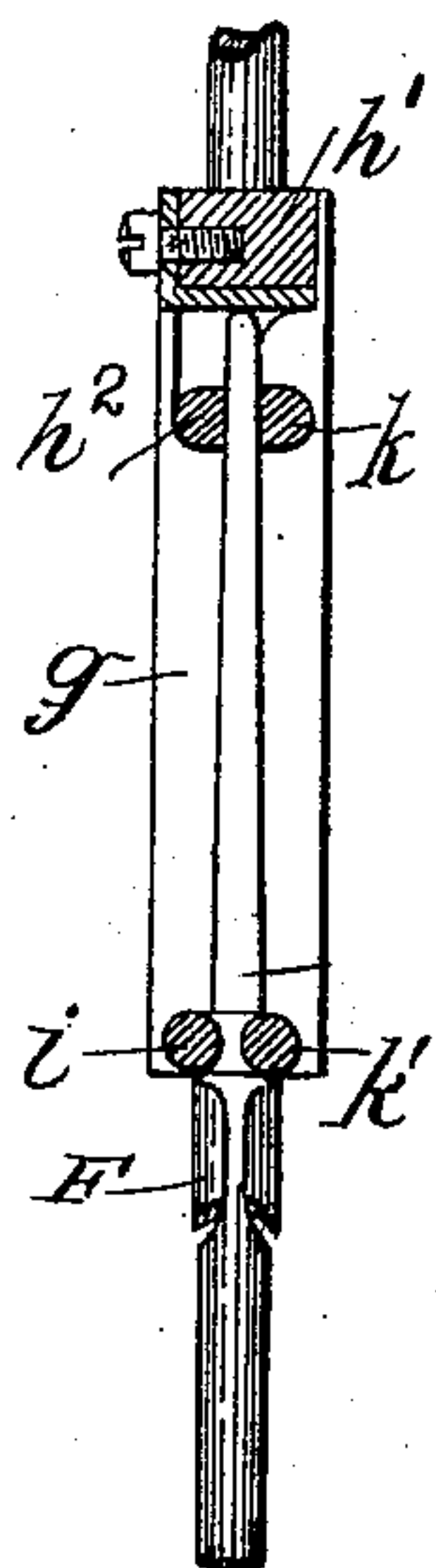


Fig. 7.

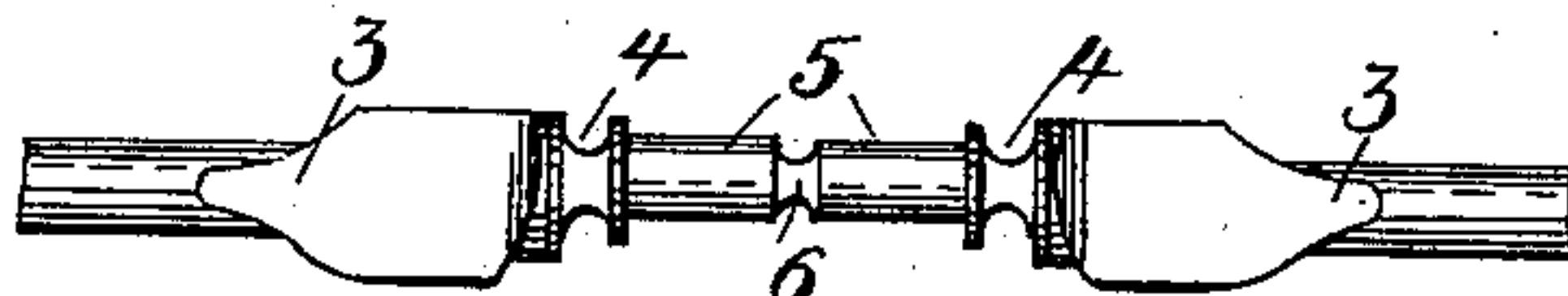


Fig. 9.

Witnesses

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UNITED STATES PATENT OFFICE.

ALLEN JOHNSTON, OF OTTUMWA, IOWA.

MACHINE FOR ROLLING KNIFE-BLANKS, &c.

SPECIFICATION forming part of Letters Patent No. 614,111, dated November 15, 1898.

Application filed March 19, 1898. Serial No. 674,510. (No model.)

To all whom it may concern:

Be it known that I, ALLEN JOHNSTON, of Ottumwa, Iowa, have invented a new and useful Improvement in Machines for Rolling Knife-Blanks and Similar Articles, which improvement is fully set forth in the following specification.

This invention relates to rolling-machines, and particularly to those adapted for rolling knife-blanks to form the blade thereof after the bolster has been previously formed in another machine or machines.

As stated in the specification of my Patent No. 541,618, dated June 25, 1895, (wherein is shown and described a machine for rolling an entire knife—handle, bolster, and blade—from suitable stock,) where knife and fork blanks are to be so shaped as to be suitable for grinding or finishing in automatic machines, such as those patented to me in recent years, (see, for example, Patents Nos. 534,394, 534,395, and 534,396, issued February 19, 1895,) it is quite desirable and in fact almost essential to the production of a high class of such articles to have the blanks as uniform and as near the ultimate finished form and contour of the article as it is possible to produce them. This is requisite mainly from the fact that in many instances the blank constitutes its own form, it being merely proportionately reduced in its dimensions during the finishing steps. It follows that the more accurately knife-blanks are rolled, and hence the less the grinding required in the finishing thereof, the less will be the labor and expense of finishing and the more uniform will be the article produced. Furthermore, the less the amount of metal required to be removed by grinding the more superior will be the product, for the reason that the metal of the blade is most refined (by the rolling or forging) at or near the surface, gradually deteriorating in quality toward the center. Hence the deeper into the metal it is necessary to grind to bring the blade to its final form the poorer will be the quality of metal left to constitute the same.

The object of my present invention is therefore to provide a machine for rolling knife-blades to proper form—that is to say, the back edge of the blade tapering from the thickest part at the handle to the point and

the cutting edge being of substantially uniform thickness throughout—whereby the objects above referred to may be more perfectly accomplished than in any machine now known to me.

In a machine constructed in accordance with this invention the blank is preferably passed successively between two or more sets of dies mounted on suitable rolls, the first set acting to effect a considerable flattening of the stock from which the blade is to be formed, while the second set or finishing-dies complete the rolling and impart to the blade its proper form as to thickness, concavity, &c. By thus employing a double instead of a single rolling the blade is more accurately formed, the metal thereof is left in a smoother and more refined condition, and little, if any, grinding is required in finishing the blade, the whitening or glazing operations in many instances effecting all the reduction necessary. Furthermore, by causing the first set of dies to effect the greatest flattening of the stock and leaving to the second and more accurately-ground dies the lighter work of shaping the blade not only is wear generally greatly reduced, but what wear there is is mostly imposed upon the dies that are most easily and cheaply ground.

Other important features of the machine are the holder and carrier for the knife and the mechanism for imparting the necessary movements thereto, whereby the blank is presented to the dies in such position that they close against the stock from which the blade is to be formed at a point adjacent to the bolster, and as the rolling proceeds the holder is advanced by the action of the dies or by suitable mechanism for that purpose, or by both. After the first set of dies have passed over and released the blank the holder is moved laterally far enough to bring the blank in line with the second set of dies and then forwardly to present the blank to said dies which act to complete the rolling of the blade. After the second set of dies have released the blade the holder is given a return movement, during which it is opened by a trip, allowing the blank to drop out, and finally coming to rest at its starting position with its jaws held partly open to receive another blank. Upon

the forward movement of the holder the jaws are automatically closed by the action of a suitable spring and the blank held tightly in the holder while being presented to the action of the dies. The mechanism for imparting the movements above referred to to the holder is automatically arrested after one revolution and remains at rest until again started by the attendant.

Other novel features of the construction, as well as those already referred to, will be more fully understood by reference to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a side elevation, partly in section. Fig. 2 is a horizontal section taken between the rolls. Fig. 3 is a vertical sectional view on line 1 2, Figs. 1 and 2. Fig. 4 is an elevation from the right of Fig. 2. Fig. 5 is a detail plan view of the holder for the knife-blank or stock, which is shown in place therein. Fig. 6 is a sectional view on line 6, Fig. 5, showing also a stop or projection which is fixed on the frame of the machine, as shown in other figures. Fig. 7 is a sectional view on line 7 of Fig. 5. Fig. 8 is a sectional view on line 8, Fig. 5, the knife-blank being shown in elevation; and Fig. 9 is a detail view of a double blank such as may be used in rolling blades for knives the handles of which are made separate from the blade.

Referring to the drawings, A A represent the rolls, bearing in standards B B, mounted on base C. Said rolls are geared together at one end by pinions a a , and power is communicated thereto from any suitable source to the extended end a' of the shaft of the lower roll.

d d' d' d' are two sets of dies set in pockets or recesses in rolls A A (see Fig. 3) and resting against wedge-shaped blocks d^2 in the bottom of said pockets. Blocks d^2 may be moved by screws d^4 to adjust the dies to take up wear or to the required thickness of the blade to be rolled. As another or secondary means for effecting adjustment of the dies a number of plates or liners d^3 may be interposed between the inner end of one of the dies d' d' and the wedge-block d^2 . For retaining the dies in proper position in the pockets I employ wedges d^5 d^5 , driven in tight or otherwise secured. Of the two sets of dies above referred to the acting surfaces of the first set are of such contour as to partially flatten the stock of which the blade is to be formed, while the acting surfaces of the second set are of such contour as to complete the rolling and shaping of the partially-flattened blade.

The devices for holding the knife and presenting the same to the action of the rolls will next be explained.

Referring particularly to Figs. 2 and 3, E is a U-shaped carrier adapted to slide in suitable ways e e on the sides of standards B B when reciprocated by means hereinafter de-

scribed. F is an auxiliary U-shaped carrier adapted to slide in suitable openings in the side bars of frame E when reciprocated by means hereinafter described. The knife-holder is mounted on the auxiliary carrier F, and consists of two sleeves g g' , sleeve g (carrying two stationary jaws, against which the blank is gripped) being secured to the auxiliary carrier, while sleeve g' (carrying two movable jaws for gripping the blank) is free to rotate on the side bar of auxiliary carrier F against the tension of a coiled spring h . Cross-bar h' , formed integral with sleeve g , rigidly connects the latter with the side bar on the opposite side of the auxiliary carrier. A projection h^2 at one side of cross-bar h' and an arm i on the opposite end of sleeve g from the cross-bar constitute the stationary or fixed jaws, against which the handle is gripped by the arms k k' , projecting from sleeve g' and constituting the movable jaws. A lug or projection l , extending upwardly and formed integral with sleeve g' and arm k , is adapted to make contact, (on the lateral return movement of the work-holder,) first, with the extreme point of a fixed projection m (see Fig. 6) on one of the standards B, (see Fig. 2,) and, secondly, with a shoulder or tooth m' on said projection, against which it rests to hold the movable jaws in a partially-open position when the carrier is at its starting position, as will be more fully hereinafter explained.

The desired movements are imparted to the carriers E and F from the axle of the lower roll A through a small gear n and a large gear N, turning loosely on a stud or shaft o , rigidly secured to one of the standards B. (See Fig. 1.) A drum p is also loosely mounted on shaft o and has secured to one end adjacent to gear N a double cam q . The peripheral surface of drum p is formed with a cam-groove p' and with a straight groove p^2 , in which engages a spring-actuated latch r , inclined at opposite edges (see dotted lines, Fig. 2) and sliding in a bracket r' . When the operative parts of the machine are in a state of rest, the latch r rests in front of a shoulder s' on a spring-actuated pin s , sliding in a suitable chamber in drum p , thereby holding said pin out of engagement with one of a series of recesses n' in the inner face of the rotating gear N. A treadle-lever T (see Fig. 4) is connected with the lower end of latch r by a link t , so that upon the depression of said lever the latch r releases the pin s , which drops into one of the recesses n' of gear N and causes the drum to be carried around with said gear until it has made a complete rotation, when the inclined edge of latch r engages behind shoulder s' on pin s , withdrawing the latter from engagement with gear N and bringing the drum to rest in the position shown in Fig. 1, in which position it is retained until treadle-lever T is again operated. The latch r being inclined on both edges acts to withdraw pin s in whichever direction the drum is rotated.

For reciprocating carrier E a rock-shaft U, bearing in suitable ears $u u$ on base C, carries at opposite ends two levers $u' u'$, pivoted to the side bars of frame E at $u^2 u^2$, and one of said levers having a roller u^3 thereon (see dotted lines, Fig. 4) projecting into cam-groove p' of drum p , whereby reciprocation in opposite directions is imparted to said frame upon each complete rotation of the drum.

For reciprocating carrier F rock-shaft V has levers $v v'$ at opposite ends, lever v' having a forked extension embracing frame F and lever v carrying a friction-roller v^2 , against which the cam q bears to rock lever v and reciprocate frame F in one direction, said frame being moved in the opposite direction by the action of the rolls drawing the knife therebetween and by the tension of a spring W, secured at one end to one of the standards B and at the other end connecting to a pin w on shaft V.

The operation of the machine is as follows: As shown in Figs. 3 and 4, the cam q , operating through lever v , shaft V, and lever v' , has forced the auxiliary carrier F to the limit of its rearward movement (assuming the front of the machine to be to the right in Figs. 3 and 4) and the bite of the dies $d d$ is closing against the partially-flattened part of the blank adjacent to the bolster. The further movement of the parts from the position shown causes one of the highest points of cam q to pass the roller v^2 on lever v , at which instant the dies close against and begin their action on the knife-blank and of course move the latter and auxiliary carrier F forward. After the blank is released from the bite of the rolls the spring W acts to continue the advance of the carrier until roller v^2 again comes into contact with cam q . One of the inclined parts of the cam-groove p' now comes into action to move carrier E to the left, Figs. 1 and 2, so as to bring the partially-rolled blank into line with the second set of dies $d' d'$. The cam q again comes into action and advances the auxiliary carrier F to the limit of its rearward movement, at which instant the dies $d' d'$ close against and complete the rolling and shaping of the blade. After the blade is released from the bite of the second set of dies the spring W again comes into action to advance carrier F to the limit of its forward movement, when the second incline in cam-groove p' acts to return carrier E to its starting position by shifting it to the right, Figs. 1 and 2, during which latter movement lug l on sleeve g' of the holder strikes the extreme point of the fixed projection m , (see particularly Fig. 6,) with which it is now in line, lowering the movable jaws $k k'$ against the tension of spring h to the position shown by dotted lines x in Fig. 6 and automatically discharging the blank from the holder. As the carrier E moves still farther the lug l slips off of the extreme point of projection m and

by the action of spring h is brought into contact with shoulder m' of projection m , partially closing the movable jaws to the position shown by dotted lines y , Fig. 6, the stationary and movable jaws being in this position far enough apart to permit of the introduction of a new blank therebetween. When the parts have arrived at the position last referred to, the pin s is withdrawn from engagement with gear N by the action of the inclined edge of latch r , as already described, (the drum p and cam q having made a complete rotation,) and the operation of the feeding mechanism is arrested. A new blank is now introduced into the holder and the lever T again actuated to start the operation of the work-holder. As the auxiliary carrier moves rearwardly, projection l slips off of shoulder m' , Fig. 6, and the jaws $k k'$ close tightly against the blank, as shown in full lines in Fig. 6. The operation already described is now repeated.

From the foregoing description it will be understood that the entire operation of the machine after the insertion of the blank and the manipulation of the starting-lever T is automatic and requires the attention of an operator of but ordinary skill and experience.

In rolling blades for knives whereof the handle is made separate from the blade a double blank, such as that shown in Fig. 9, may be employed, whereof 3 3 are the parts to be rolled into blades, 4 4 are bolsters connected by the parts 5 5, which latter are adapted to be severed at 6 and suitably formed for attachment of handles to the blades. In rolling such a blank one end offers a suitable part to be gripped by the holder while the part 3 at the other end is being rolled. After one blade is rolled the blank may be reversed in the holder to roll the other blade.

Modifications of and departures from the precise construction herein described and illustrated may of course be made without departing from the principle of my invention.

It will also be apparent that any desired number of sets of dies may be employed—as, for example, in rolling small knife-blades one rolling is sometimes sufficient, in which case only one set of dies would be necessary, whereas in other instances it may be expedient and desirable to employ three or even more sets of dies.

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

1. In a machine for rolling the blades of knife-blanks, the combination with rolls and dies therefor, of a holder consisting of a fixed and a movable jaw adapted to grip that part of the blank not to be acted upon by the dies and to retain said grip during the rolling operation, and means for automatically advancing the holder to such position that the bite of the dies will close against the blank at a point adjacent to the bolster and for then releasing the holder whereby it is free to travel

with the movement of the dies in forming the blade, substantially as described.

2. In a machine for rolling knife-blades, the combination with rolls and two sets of dies mounted thereon, of a holder for the knife-blank on which the blade is to be rolled consisting of fixed and movable jaws adapted to grip the blank and to retain said grip during the rolling operation, and means for automatically reciprocating the holder to such position that the two sets of dies will successively close against the blank at a point adjacent to the bolster and for releasing said holder during the periods that the dies are acting on the blank, whereby the holder is free to travel with the movements of the dies during said periods, substantially as described.

3. In a machine for rolling knife-blades, the combination with the rolls and two sets of dies carried thereby, of a work-holder adapted to grip the work and to retain said grip during the action of the rolls on the work, means for automatically reciprocating the work-holder in a longitudinal direction to present the work to the action of the dies, and means for automatically reciprocating the work-holder in a lateral direction, after the action of the first set of dies, to bring the work in line with the second set of dies, substantially as described.

4. In an automatically-operating machine for rolling knife-blades, the combination with the rolls and two sets of dies mounted thereon in different circumferential alinement, of a work-holder adapted to grip that part of the blank not to be acted upon by the dies and to retain said grip during the rolling operation, means for imparting longitudinal reciprocating movements to said work-holder, and means for reciprocating the work-holder laterally in opposite directions to bring the work in line with the sets of dies and to return the work-holder to its starting position, and means acting on said return movement to open the work-holder for discharging the work, substantially as described.

5. In an automatically-operating machine for rolling knife-blades, the combination with the rolls and two sets of dies mounted thereon in different circumferential alinement, of a work-holder adapted to grip that part of the blank not to be acted upon by the dies and to retain said grip during the rolling operation, means for imparting longitudinal reciprocating movements to said work-holder, and means for reciprocating the work-holder laterally in opposite directions to bring the work in line with the sets of dies and to return the work-holder to its starting position, and means acting on said return movement to open the work-holder for discharging the work and for holding said work-holder open while in its starting position to permit the insertion of the work, substantially as described.

6. In an automatically-operating machine

for rolling knife-blades, the combination with the rolls and two sets of dies mounted thereon in different circumferential alinement, of a work-holder adapted to grip that part of the blank not to be acted upon by the dies and to retain said grip during the rolling operation, means for imparting longitudinal reciprocating movements to said work-holder, and means for reciprocating the work-holder laterally in opposite directions to bring the work in line with the sets of dies and to return the work-holder to its starting position, and means acting on said return movement to open the work-holder for discharging the work and for holding said work-holder open while in its starting position to permit the insertion of the work, means acting to arrest the movement of the work-holder when it arrives at its starting-point, and means under the control of the operator for again throwing the work-holder into operation, substantially as described.

7. In a machine for rolling knife-blanks, the combination with the rolls and two sets of dies mounted thereon, of a main carrier, and an auxiliary carrier mounted on the main carrier, a work-holder mounted on the auxiliary carrier and adapted to grip that part of the knife-blank not to be acted upon by the dies and to retain said grip during said operation, and devices—such as cams—for reciprocating both carriers in opposite directions, substantially as described.

8. In a rolling-machine, the combination with the rolls and two sets of dies mounted thereon, of a main carrier, an auxiliary carrier mounted to slide laterally on the main carrier, a work-holder consisting of fixed and movable jaws mounted on the auxiliary carrier, a lug on the movable jaws, and a fixed projection on the frame of the machine with which said lug is adapted to make contact to open the movable jaws on the return movement of the main carrier to its starting position, substantially as described.

9. In a rolling-machine, the combination with the rolls and two sets of dies therefor, of a main carrier mounted to slide on the machine-frame, an auxiliary carrier movable laterally on said main carrier, a work-holder consisting of fixed and rigid jaws mounted on the auxiliary frame, a drum on a suitable axle on the machine-frame, a cam-groove in the periphery of said drum operating through suitable connections to reciprocate the main carrier, and a double cam rotating with the drum and operating through suitable connections to reciprocate the auxiliary carrier, gearing for driving said drum and cam, a clutch device for throwing the gearing into and out of engagement with the drum and cam, a lever whereby the operator may throw said clutch into action, and means for automatically throwing the clutch out of engagement with the drum and cam upon a complete rotation thereof, and a projection on the machine-frame adapted to engage the movable jaws of

the work-holder on the return movement of
the latter to its starting position, whereby
said jaws are fully opened to discharge the
work and retained in a partially open position
5 until the parts are again set into operation,
substantially as described.

In testimony whereof I have signed this

specification in the presence of two subscri-
ing witnesses.

ALLEN JOHNSTON.

Witnesses:

REEVE LEWIS,
S. T. CAMERON.