

A. J. BATES.
WIRE BARBING MACHINE.
APPLICATION FILED DEC. 12, 1903.

5 SHEETS—SHEET 1.

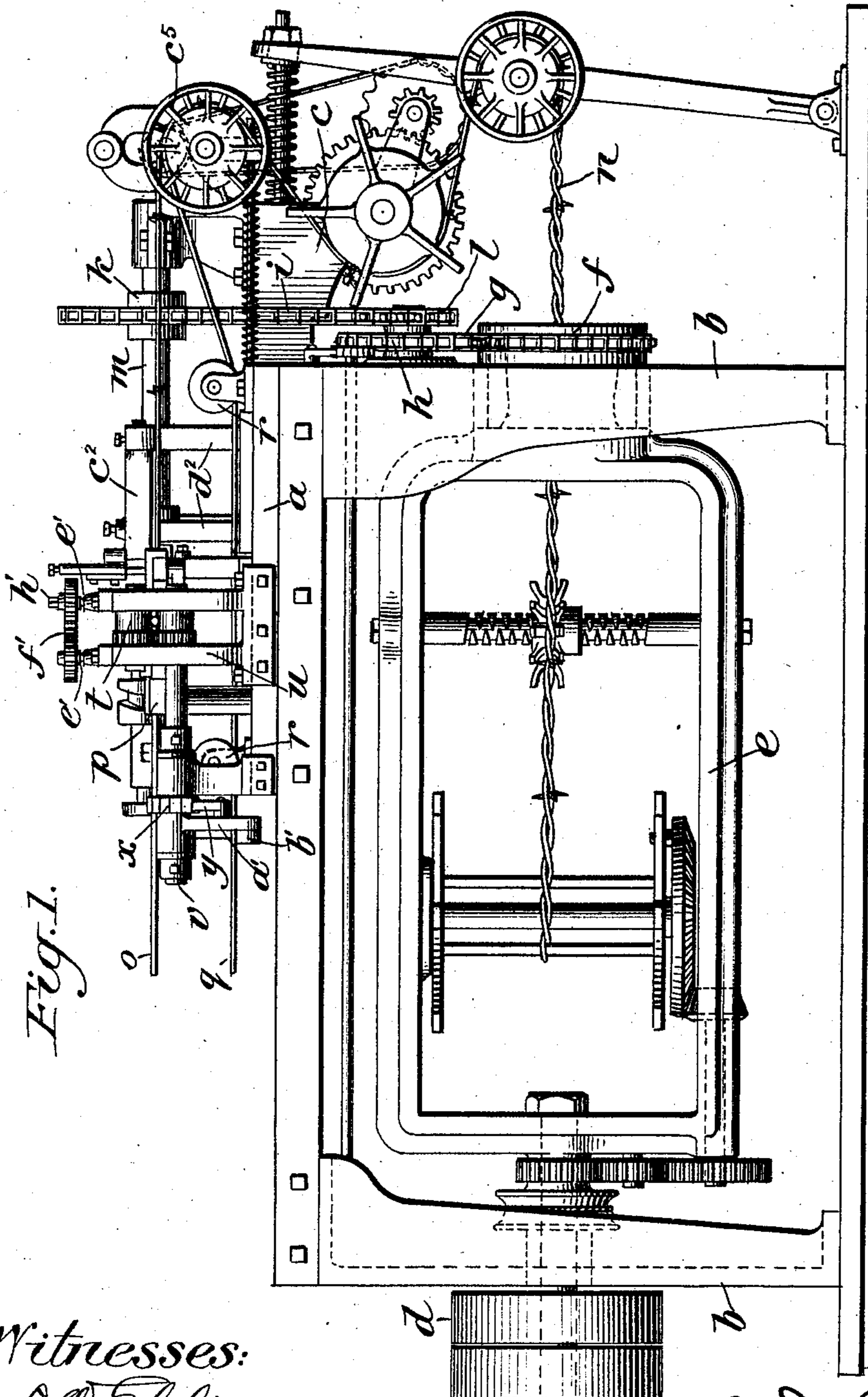


Fig. 1.

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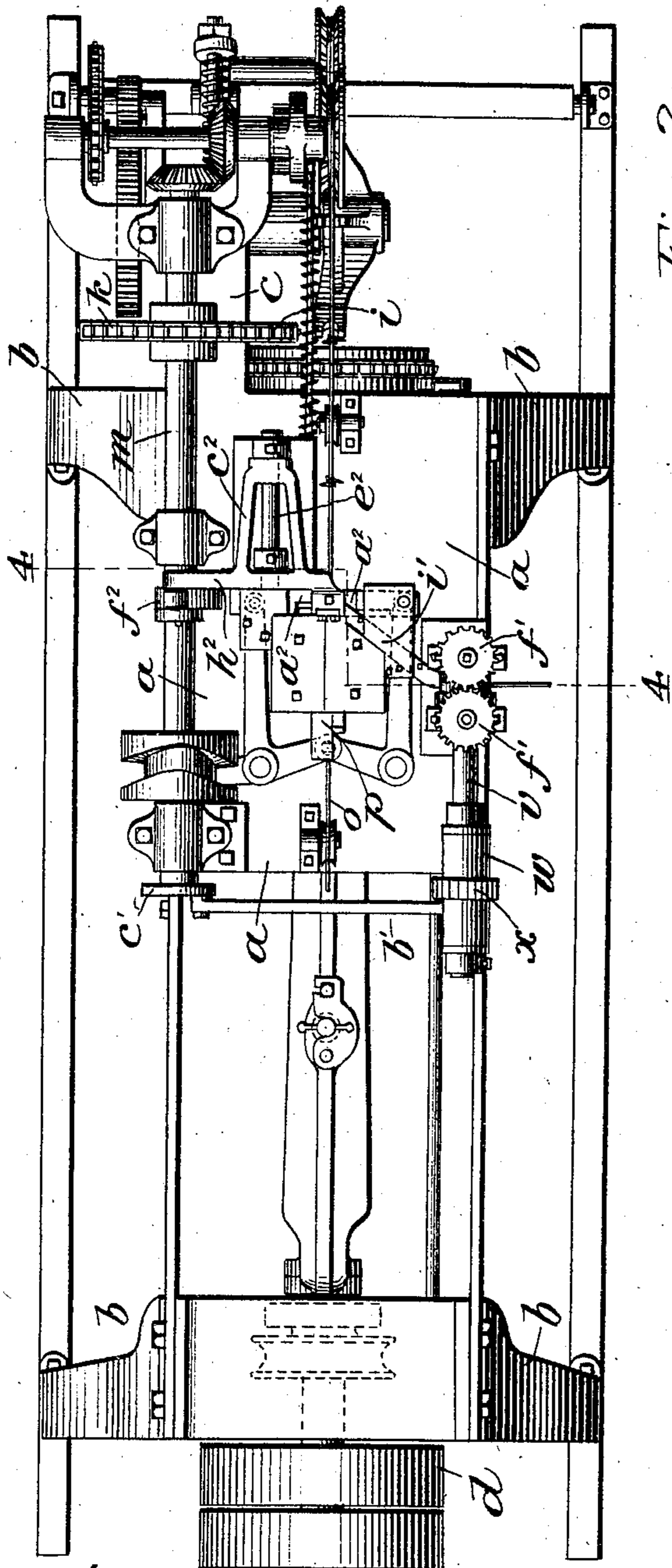


Fig. 2.

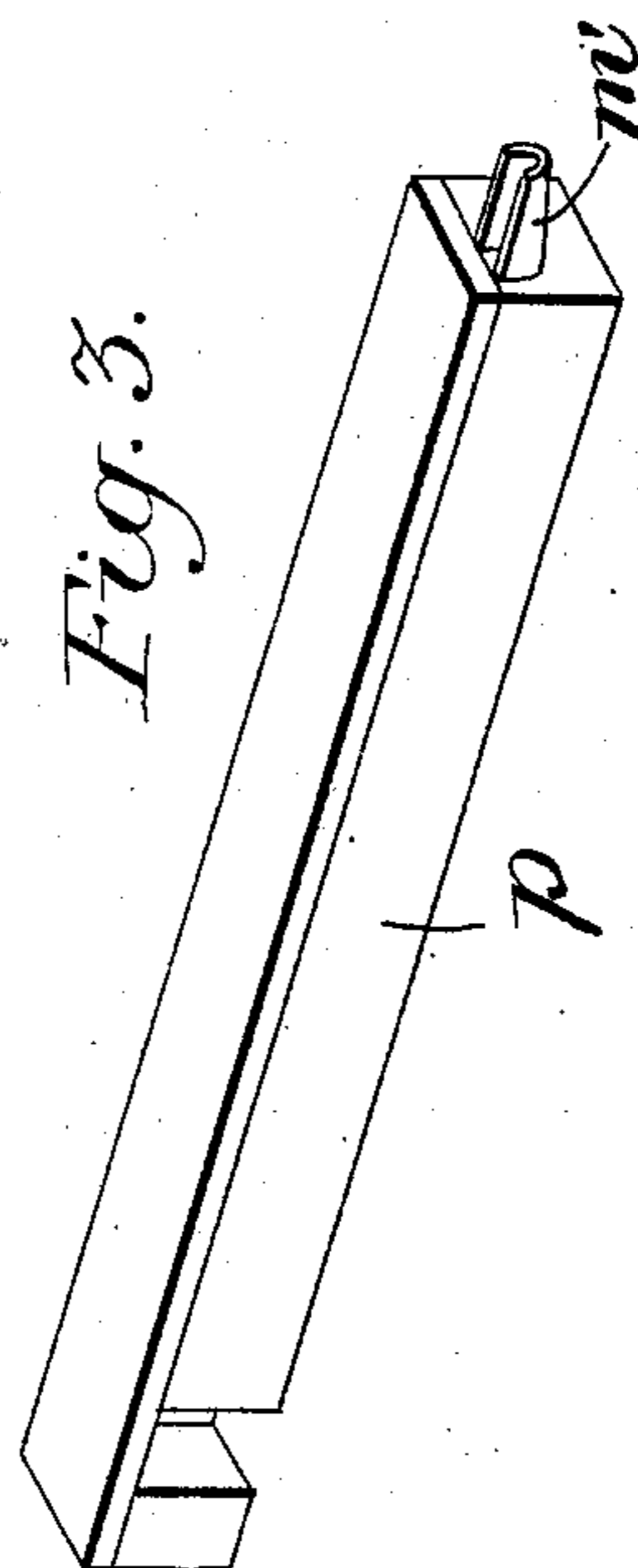


Fig. 3.

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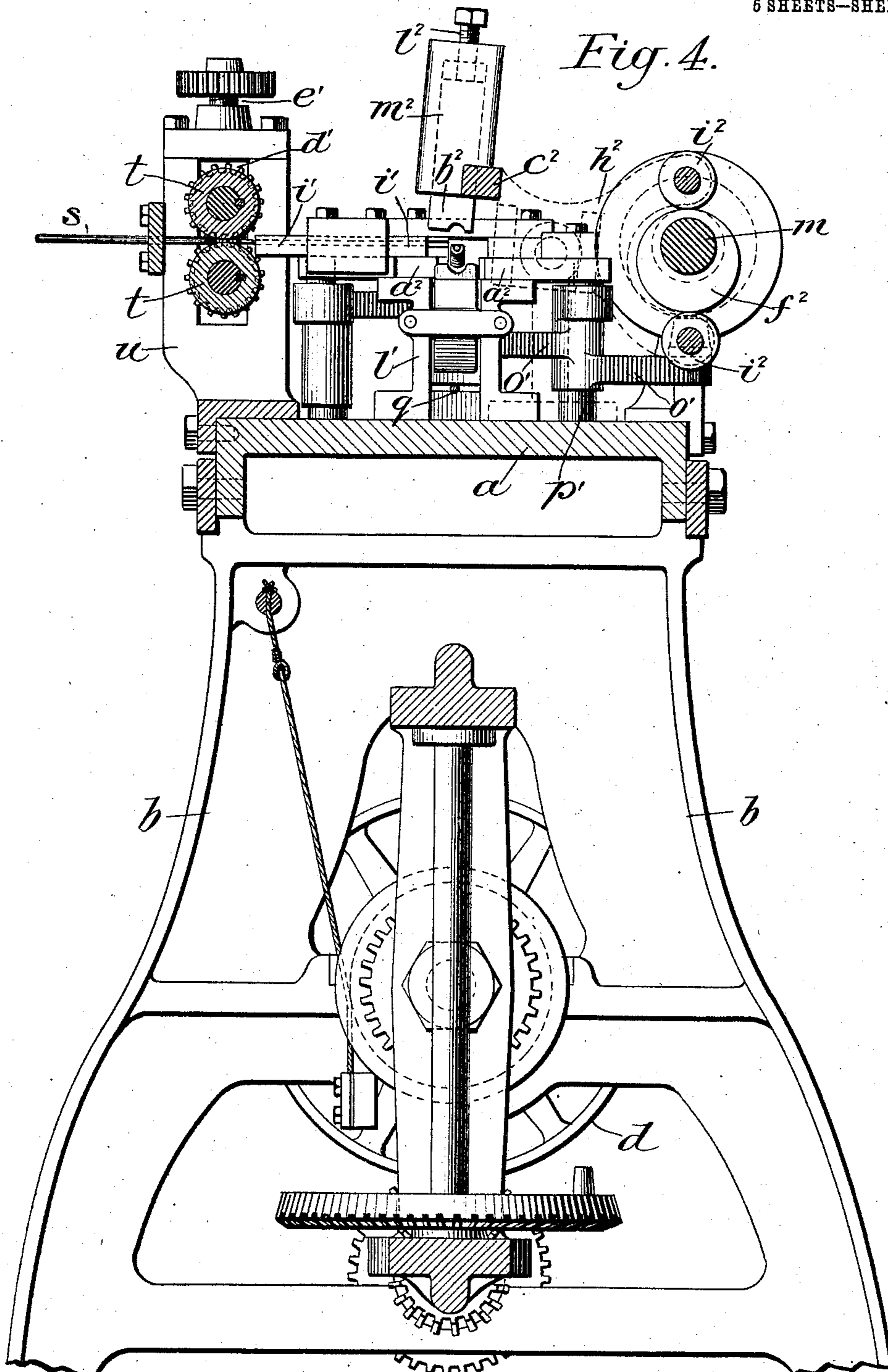
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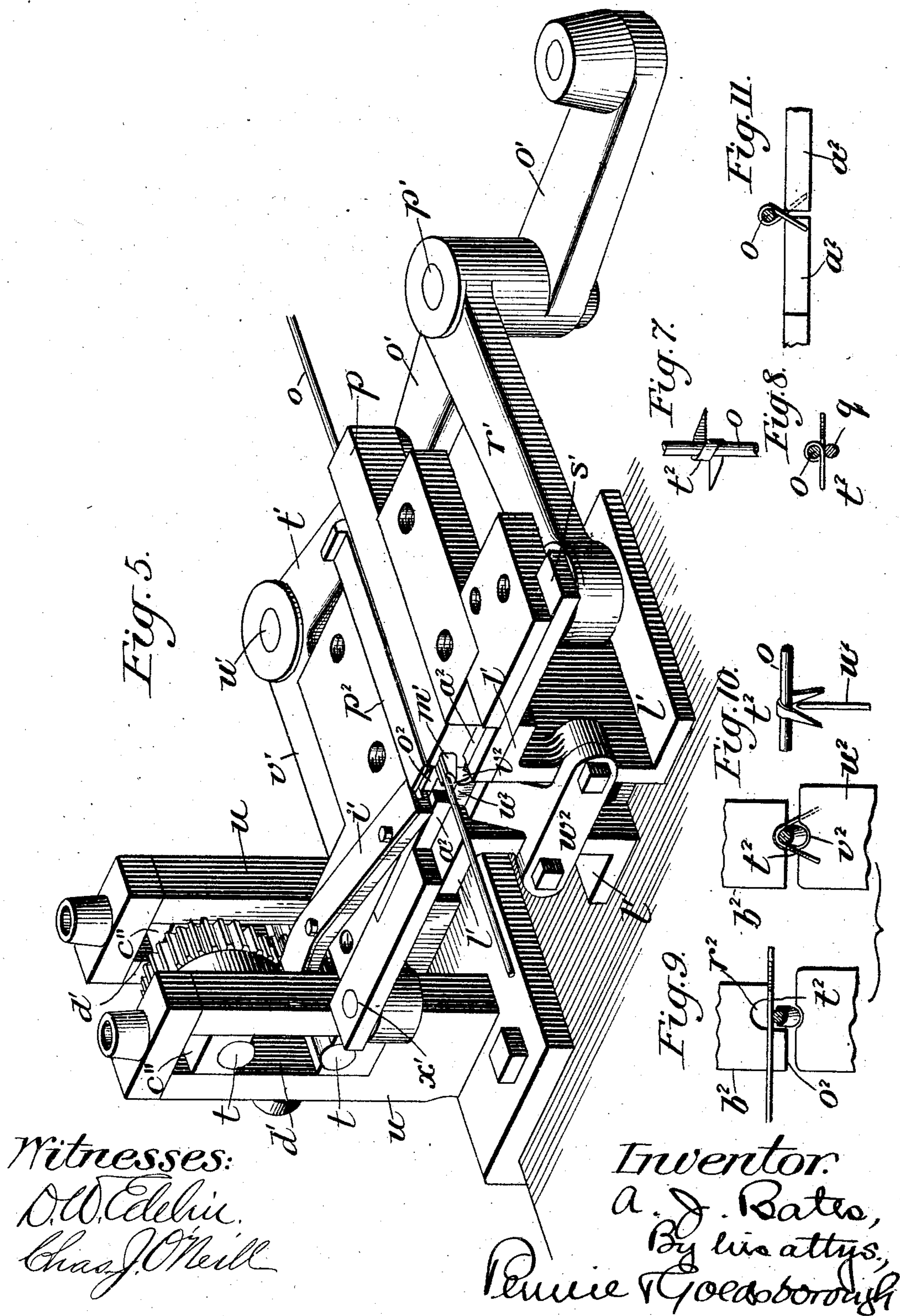


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5 SHEETS—SHEET 4.

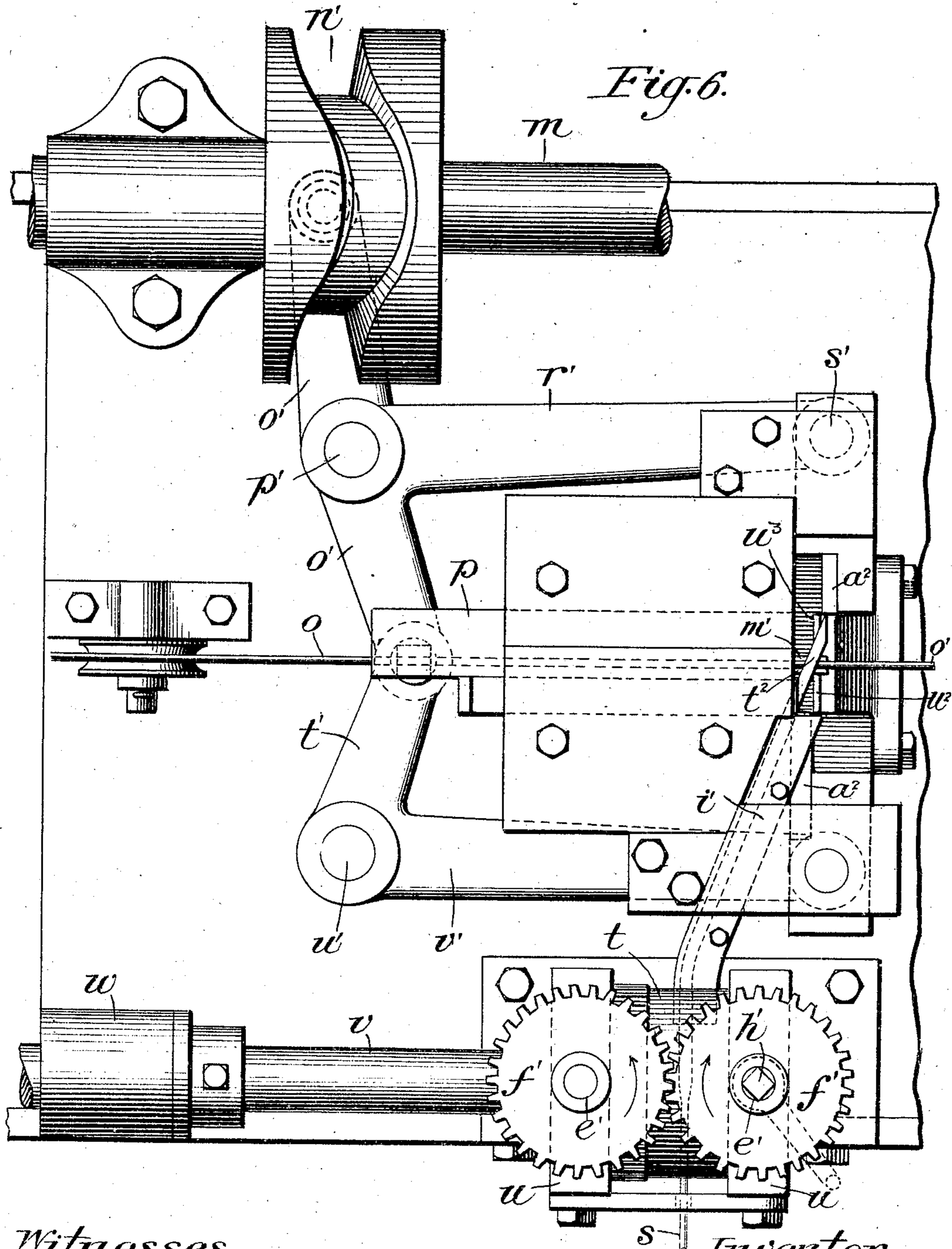


No. 785,652.

PATENTED MAR. 21, 1905.

A. J. BATES.
WIRE BARBING MACHINE.
APPLICATION FILED DEC. 12, 1903.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

ALBERT J. BATES, OF JOLIET, ILLINOIS, ASSIGNOR TO AMERICAN STEEL & WIRE COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

WIRE-BARBING MACHINE.

SPECIFICATION forming part of Letters Patent No. 785,652, dated March 21, 1905.

Application filed December 12, 1903. Serial No. 184,941.

To all whom it may concern:

Be it known that I, ALBERT J. BATES, a citizen of the United States, residing at Joliet, county of Will, State of Illinois, have invented certain new and useful Improvements in Machines for Barbing Wire; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to machines for barbing fence-wire, and has for its object to provide improved means for forming the barbs and applying them to the wire.

In the patent granted to me on the 28th day of June, 1887, No. 365,723, there is illustrated, described, and claimed a machine for the same general purpose wherein the mechanism for drawing the fence-wires through the barbing devices and controlling the spacing of the barbs on the wires and the mechanism for twisting the two fence-wires together and winding the twisted wire upon the reel or spool are all the same as in the machine illustrated and described herein.

The present improvements relate solely to the mechanism for feeding the barbing-wire and forming the barbs therefrom and applying them to the fence-wire. The other parts of the machine will therefore only be described in a general way, and reference may be had to the above-mentioned patent for an explanation of the details of these other parts.

The present improvements are illustrated in the accompanying drawings, wherein—

Figure 1 illustrates the entire machine in side elevation. Fig. 2 is a top plan view of the entire machine. Fig. 3 is a perspective view of the guide and support for holding up the fence-wire in the early stage of applying the barbs thereto. Fig. 4 is a vertical transverse section of the machine on the line 4 4, Fig. 2. Fig. 5 is an enlarged perspective view of the devices for feeding the barbing-wire and bending the barbs around the fence-wire after they have been severed. Fig. 6 is an enlarged plan of the parts shown in Fig. 5. Figs. 7 and 8 are details illustrating in plan and cross-section, respectively, a fragment of the fence-wire with a barb applied. Fig. 9 contains two views of the device for severing the barbs from the barbing-wire and making the preliminary application thereof to the fence-wire. Fig. 10 is a detail showing a fragment of the fence-wire with a barb bent partly around it, the particular object of this view being to illustrate the action of the guide for keeping the ends of the barbs apart in the final bending operation. Fig. 11 is a detail illustrating the action of the dies in the final barbing operation.

The frame of the machine is of substantially the form of the original machine illustrated and described in the above-mentioned patent. It may, however, be of any preferred form and construction. As here shown, it consists generally of a bed or table *a*, supported in elevated position upon uprights or standards *b b*. The mechanism for drawing the fence-wires through the machine with the appropriate intermittent action to properly space the barbs thereon is mounted on a bracket *c*, projecting from one end of the frame, and the devices for twisting and spooling the wires are located under the table and driven by power applied to belt-wheels *d* in the manner described in the patent.

The end of the twister-reel *e* opposite to the belt-wheels *d* is provided with a sprocket-wheel *f*, and a chain belt *g* is thrown around this and an idler sprocket-wheel *h*, journaled on a stud projecting from one of the standards *b*. Another chain belt, *i*, is carried by a sprocket-wheel *l* outside of and integral with or fixed to the idler sprocket-wheel *h*, and the chain belt *i* extends up and is thrown around a sprocket-wheel *k* on the shaft *m*, mounted in bearings above the table *a* and which constitutes the main shaft, from which all the devices to which the present invention relates derive their motion.

The completed fence-wire is indicated at *n*, Fig. 1, and, as in the patent above referred to, consists of two wires twisted together, with barbs wrapped around one of the wires and spaced at suitable intervals apart. Both

the wires are drawn through the machine by mechanism which is in all respects like that of the above patent, and which, moreover, being now well understood in the art, requires no particular description herein. The main wire *o*—that is to say, the wire around which the barbs are wrapped—passes through a grooved guide *p*, which is mounted in elevated position above the table *a*, and the complementary wire *q* is guided by rollers *r r*, parallel with but some distance under the main wire to a point beyond the barb-applying devices, where it is permitted to join the main wire just before it reaches the butterfly-wheel *c*⁵ of the mechanism for drawing the wire through the machine.

The barbing-wire *s* is fed transversely into the machine through a pair of rolls *t t*, journaled in standards *u u*, rising from one side of the table *a*. These rolls are intergeared, as best shown in Figs. 1 and 4, so that each is positively driven, and they are driven by a short shaft *v*, forming an extension of the shaft of the lower roll and mounted at its outer end in a bearing *w* near one end of the table *a*, at which end the shaft is provided with a ratchet-wheel *x*, with which engages a pawl *y*, that is carried on a crank *a'*, which is sleeved on the end of the shaft *v*, so as to oscillate thereon. The crank *a'* is oscillated from the main shaft *m* by means of a connecting-rod *b'*, which connects it (the crank) with a wrist-pin on a disk *c'* at the end of the shaft *m*, so that the constant rotation of the main shaft produces an intermittent rotation of the rolls *t t* in a manner well understood in the art and which is also fully described in the above patent.

As will be understood on reference to the patent, the barbs contemplated by the original machine were of round wire. The present improvements, however, contemplate the employment of flat barbs, and for this purpose the rolls *t t*, which feed the barbing-wire, are made adjustable one toward and from the other, so that although a round barbing-wire is fed into the machine it is flattened before it reaches the barb-applying devices. To this end the bearings *c'* for the shaft of the upper roll *t* slide in slots *d'* in the standards *u u* and are controlled by screws *e' e'*, which are right and left threaded, respectively, and which are connected together by spur-gears *f' f'*, so that when one screw is turned both will be operated and the two bearings of the roll-shaft will be adjusted equally. One of the screws *e'* is preferably extended above the gear *f'* and provided with a square end *h'* to receive a wrench, by means of which the upper roll *t* may be easily and quickly adjusted toward or from the lower roll *t*, so as to obtain any degree of flattening the barbing-wire which may be desired.

The rolls for feeding the barbing-wire are

for convenience of driving placed parallel with the main shaft *m*; but as it is preferable to feed the barbs obliquely to the fence-wire there is a covered guide *i'*, leading from the rolls *t t* obliquely forward to a point in proximity to the end of the guide *p*, whence the fence-wire issues. The level of this guide is slightly above the level of the fence-wire *o*, so that the flattened end of the barbing-wire will be fed above and across the fence-wire. The relation of the guides for the fence and barbing wires and the manner of feeding the barbing-wire to the fence-wire are best shown in Figs. 5 and 6, respectively, to which reference will now more particularly be made.

As before stated, the guide *p* for the fence-wire is elevated above the table *a*. It slides in ways carried by brackets *l' l'*, which also support all the other parts of the barb-applying mechanism. At its front end the guide *p* is provided with a support for the fence-wire in the form of a short nipple-like trough *m'*, which is open on its upper side, so as to expose the wire, and which when projected stands across the path of the barbs issuing from the guide *i'*. The object of this support is to hold up the fence-wire during the preliminary bending of the barbs around it, as will be more fully explained later on, and the guide *p* is operated to withdraw the support, so as to permit the complete wrapping of the barbs around the wire, by means of a grooved cam *n'* on the main shaft *m*, through the instrumentality of a lever *o'*, which is pivoted on a stud *p'* and carries at one end a roller working in the groove of the cam *n'* and at its other end has a pin-and-slot connection with the under side of the wire-guide. While the fence-wire is being fed forward and also while the barbing-wire is feeding across the fence-wire, the wire-guide *p* is in its forward position and the support *m'* underlies that part of the fence-wire which is covered by the flattened end of the barbing-wire. The feeding of both wires is then interrupted for the purpose of permitting the barb to be severed and applied to the fence-wire, all as is now familiar practice in the art of wire-barbing. At this juncture a cutter to be hereinafter described comes into operation and severs a barb from the projecting end of the flattened wire *s* and at the same time bends the severed barb down and partly around the fence-wire and the projecting support *m'*, as clearly illustrated in the two views of Fig. 9. Immediately after this the wire-guide *p* and support *m'* are withdrawn by the grooved cam *n'*, so that certain lateral moving dies that are presently to be described may come into action and complete the wrapping of the partially-bent barb around the wire. These dies are indicated at *a² a²* in Figs. 5 and 6. They are supported by the brackets *l' l'* and slide in ways transversely across the line of the fence-wire at a level slightly below the wire, as best

indicated in Fig. 11. The dies are not located in the same vertical plane, but, as indicated in Figs. 6 and 7, are arranged to slide past each other, so that the barbs may be more completely wrapped around the wire. They are operated simultaneously from the grooved cam n' , which works the wire-guide p , the lever o' being provided for this purpose with an arm r' , having a pivotal connection at s' with one of the guides, and the end of the arm o' being pivotally connected to the short arm t' of a bell-crank lever which is pivoted on a stud u' and has an arm v' similar to and parallel with the arm r' and which is connected at x' with the other die a^2 .

The cutter b^2 for severing the barbs is best shown in Figs. 2 and 4. It is a combined cutter and die and is carried at the front end of a frame c^2 , journaled at the upper end of standards d^2 on a pin e^2 and oscillated so as to raise and lower the cutter by means of a cam f^2 , carried by main shaft m , the rear end of the cutter-carrying frame having a fork h^2 inclosing the cam and provided with rollers i^2 , working on opposite sides of the cam. By this means the cutter-carrying frame is oscillated, so as to raise and lower the cutter positively, and the cutter is preferably adjustable in its bearing m^2 on the frame by means of a screw l^2 , so that its throw may be accurately regulated.

As best shown in Figs. 4 and 9, the cutter is a rectangular blade having a cutting edge, which coöperates with the edge of a stationary cutter o^2 , located at the mouth of the guide v' , whence issues the flattened end of the barbing-wire. At a point rearward from the cutting edge and immediately over the support m' for the fence-wire the cutter-blade b^2 is provided with a curved recess r^2 , so that the ends of the cutter on opposite sides of the recess may act as a die to depress the ends of the barb t^2 , as indicated in Figs. 9 and 10, by the continued downward movement of the cutter after severing the barb from its wire.

The flattened end of the barbing-wire is preferably fed obliquely across the fence-wire, as has already been described, and the object of feeding the wire in this manner is to permit the barbs to be wrapped around the wire, so that their ends will pass each other when the dies $a^2 a^2$ come together, leaving the barb wrapped spirally and close upon the wire, as shown in Fig. 7. In order to insure the passage of the ends of the barbs past each other on the under side of the fence-wire when the dies $a^2 a^2$ come together, there is provided underneath the wire-support m' an upstanding guide u^2 in the form of a blade arranged perpendicular to the line of the fence-wire, and therefore oblique to the barb-wire on the opposite side of the fence-wire, as best shown in Figs. 5 and 6, and the dies $a^2 a^2$ are located so as to work on opposite sides of this guide. The action of the guide is clearly illustrated

in Figs. 9 and 10, where, in connection with Fig. 6, it will be seen that when the barbs are severed and pressed down upon the fence-wire one end passes upon one side of the guide u^2 and the other end upon the opposite side, this position of the barb with respect to the guide being due to the oblique location of the barb above the fence-wire. Were it not for the guide u^2 the dies $a^2 a^2$ might possibly deflect the ends of the barbs, so as to interfere with each other and prevent the snug wrapping indicated in Fig. 7; but when the guide u^2 is employed it is impossible for the ends of the barbs to interfere with each other, and the dies $a^2 a^2$ are enabled to wrap the barbs tightly around the fence-wire while keeping the cutter-blade b^2 depressed during the entire inward travel of the dies $a^2 a^2$.

It will be understood from the drawings that the guide u^2 is stationary. It is preferably cut away, as shown at v^2 , Figs. 5 and 9, so as to fit up close against the fence-wire support m' . It is held in position between the brackets $l' l'$ by means of a clamp w^2 , which is bolted to the brackets, as indicated in Fig. 5.

The construction and arrangement of the several parts of the improved barbing devices being as thus described, the operation is briefly as follows: The main and complementary fence-wires being fed forward with a step-by-step movement, as fully explained in my former patent, and the barbing-wire being also fed transversely by a similar movement that is properly timed with respect to the movement of the fence-wires, the cutter descends and severs that portion of the flattened projecting end of the barbing-wire which extends across the fence-wire and at the same time bends the severed end (now constituting a barb with sharpened prongs) down upon and partially around the fence-wire o , the fence-wire being at this time held up by the projecting nipple-like support m , so that the preliminary bending of the barb is made around the wire and its support. At this juncture the dies $a^2 a^2$ approach each other, one on one side of the guide u^2 and the other on the opposite side, and these dies engage the downwardly-extending ends of the partially-bent barb and completely wrap it around the fence-wire, as indicated in Fig. 7. As soon as the dies engage the ends of the barbs the wire-support m' is withdrawn and the cutter rises, while the dies recede. The fence-wire, which of course has been stationary during the bending and wrapping of the barb, moves on, and the barbing-wire is also again fed forward, and the above-described operation is repeated.

Having thus described my invention, what I claim, and desire to secure, is—

1. In a machine for barbing fence-wire, the combination of means for feeding the fence-wire, means for feeding a barbing-wire across the fence-wire, a combined cutter and die for

severing the barbs, and bending them over the fence-wire, and a guide located obliquely to the barbs on the opposite side of the fence-wire to keep the ends of the barbs apart.

5 2. In a machine for barbing fence-wire, the combination of means for feeding the fence-wire, means for feeding a barbing-wire over and across the fence-wire, a combined cutter and die for severing the barbs, and bending
10 them down over the fence-wire, a guide located obliquely to the barbs and perpendicular to and under the fence-wire, and dies moving toward each other from opposite sides of the fence-wire to wrap the bent barbs around
15 the wire, said dies working on opposite sides of the guide.

3. In a machine for barbing fence-wire, the combination of means for feeding the fence-wire, means for feeding a barbing-wire trans-
20 versely across and above the fence-wire, a combined cutter and die for severing the barbs, and bending them down upon the fence-wire, and a support for holding up the fence-wire while the barb is being pressed down upon it.

25 4. In a machine for barbing fence-wire, the combination of means for feeding the fence-wire, means for feeding a barbing-wire transversely across and above the fence-wire, a combined cutter and die for severing the barbs,
30 and bending them down upon the fence-wire, a support to hold up the fence-wire while the barb is being pressed down upon it, dies moving toward each other from opposite sides of the fence-wire to wrap the bent barbs around
35 the wire, and means for withdrawing the wire-support out of the way of the dies.

5. In a machine for barbing fence-wire, the combination of means for feeding the fence-wire, a pair of rolls for feeding and flattening
40 the barbing-wire, and means for adjusting the rolls comprising right and left screws $e' e'$, intermeshed gears $f' f'$ connecting the screws, and means for operating one of the screws whereby the operation of one screw adjusts
45 both bearings of the upper roll.

6. In a machine for barbing fence-wire, the combination of a combined cutter and die for severing the barbs and bending them over the fence-wire, dies moving toward each other
50 from opposite sides of the fence-wire, and a pair of bell-crank levers for operating the dies, said levers being connected together and operated by a single cam.

7. In a machine for barbing fence-wire, the
55 combination of a combined cutter and die for severing the barbs and bending them over the

fence-wire, dies moving toward each other from opposite sides of the fence-wire, bell-crank levers connected to the dies by their arms r', v' , a cam n' , an arm o' projecting from
60 one of the levers to the cam, and the levers being connected together by arms o', t' .

8. In a machine for barbing fence-wire, the combination of a support for the fence-wire, a combined cutter and die for severing the barbs
65 and bending them over the fence-wire, dies for wrapping the bent barbs around the fence-wire, a pair of connected bell-crank levers one arm of which operates the dies, the other arms of the levers being connected to the wire-sup-
70 port to move it out of the way of the dies.

9. In a machine for barbing fence-wire, the combination of a grooved covered guide p for the fence-wire sliding in ways in the brackets, a nipple-like wire-support m' projecting from
75 the end of the guide, a combined cutter and die to sever the barbs and bend them down over the fence-wire and around the support m' , and means to withdraw the support when the barb has been applied.
80

10. In a machine for barbing fence-wire, the combination of a grooved, covered guide for the fence-wire, a pair of rolls parallel with the fence-wire for flattening a barb-wire and bend-
85 ing it across the fence-wire, and a covered guide inclined forward from the rolls in the direction of the moving fence-wire for delivering the barb-wire obliquely thereto.

11. In a machine for barbing fence-wire, the combination of brackets l', l' uprising from
90 the machine-bed, a guide p and support m' for the fence-wire sliding in ways in the brackets, a combined cutter and die for severing the barb-wire and bending it around the fence-wire, a guide w^2 located under and transverse
95 to the support m' , and a clamp w^2 secured to the brackets to hold the guide in place.

12. In a machine for barbing wire fence, the combination of a guide for the fence-wire, a fixed cutting edge adjacent the end thereof, a
100 reciprocating cutter cooperating with the fixed edge, a pivoted frame c^2 in which the reciprocating cutter is mounted, and a rotary cam f^2 , the frame having a fork h^2 the arms of which are located on both sides of the cam.
105

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT J. BATES.

Witnesses:

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EUGENE E. WOODS.