(No Model.) 3 Sheets—Sheet 1.

J. W. GRISWOLD.

MACHINE FOR STRAIGHTENING AND CUTTING WIRE.

No. 420,509. Patented Feb. 4, 1890

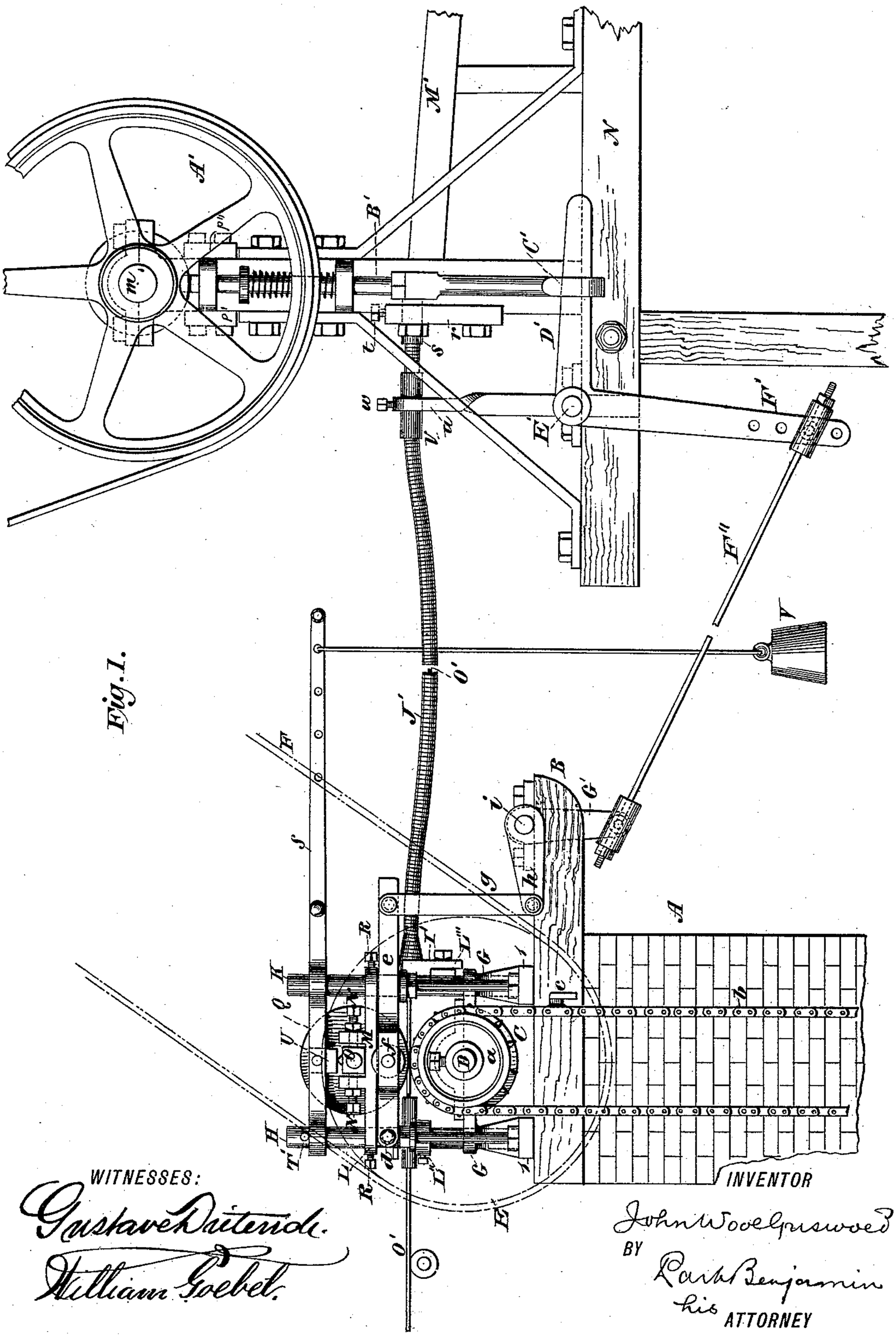

Fig. 1.

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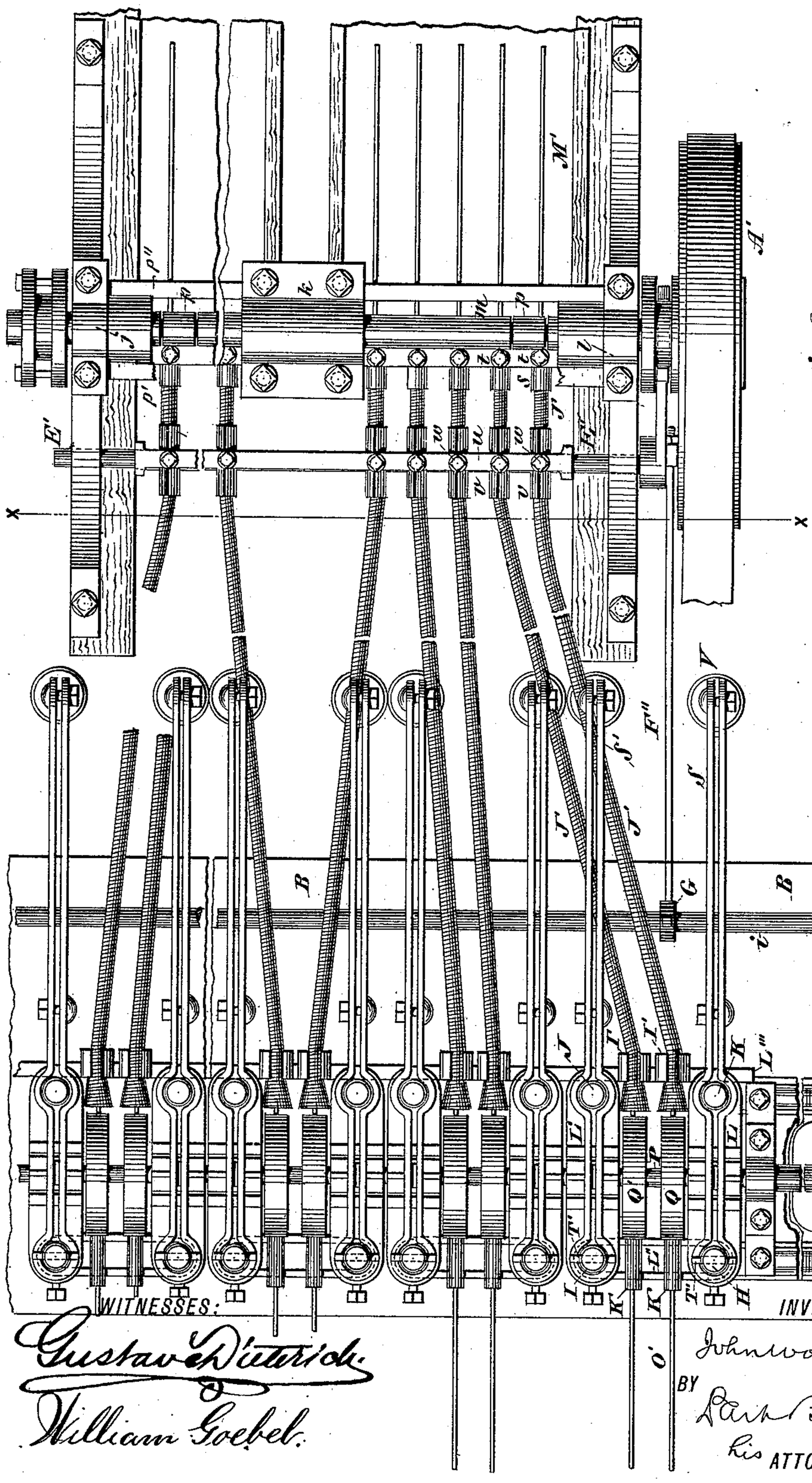

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 3

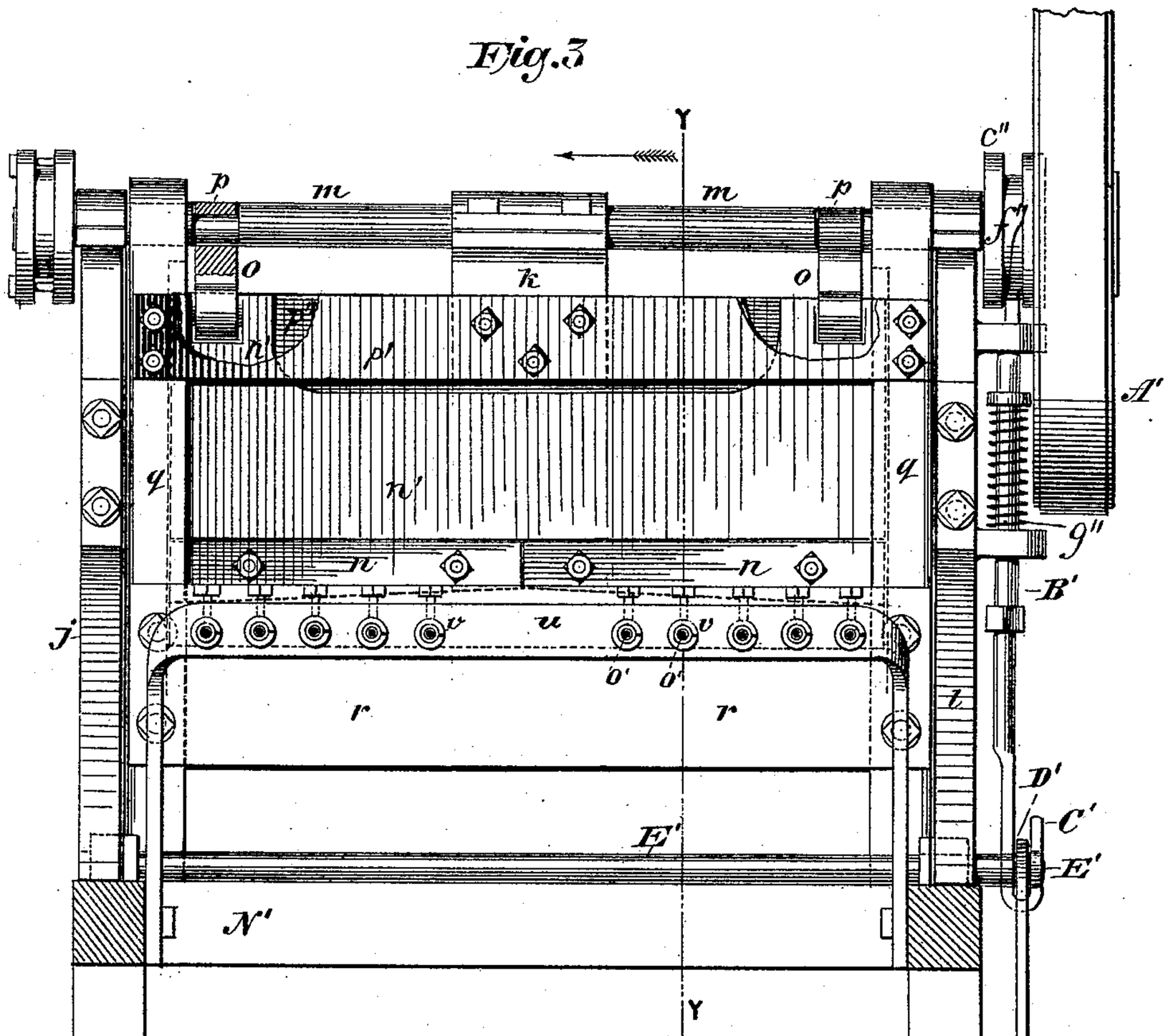


Fig. 4.

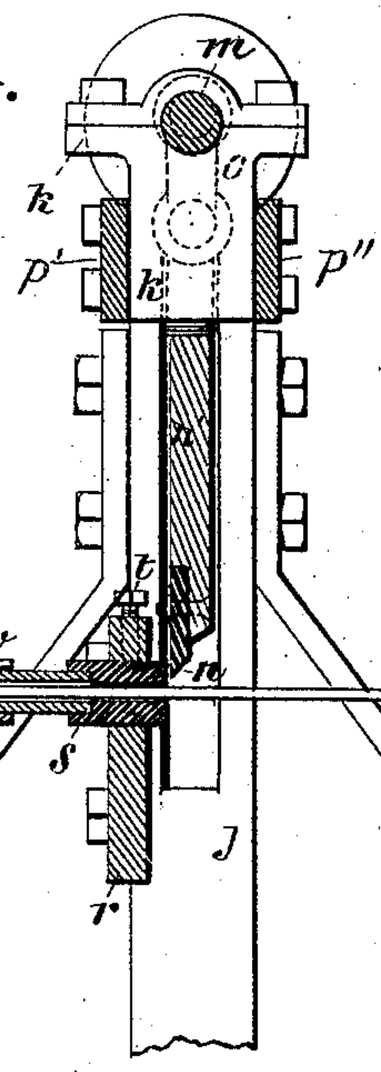


Fig. 5.

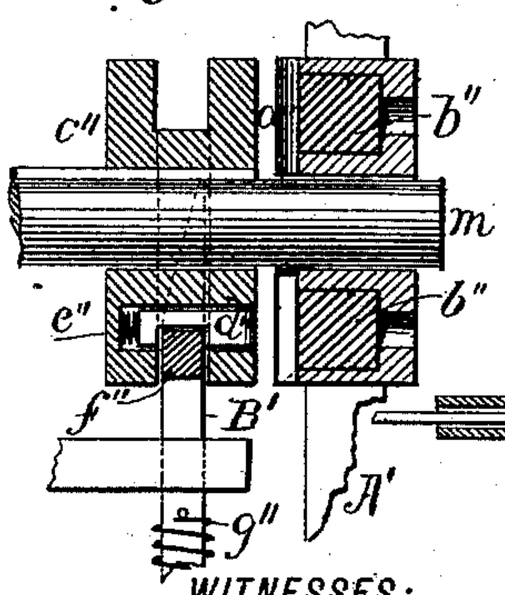
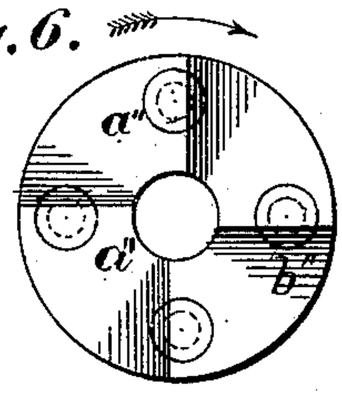


Fig. 6.



WITNESSES:

Gustave Dittenöe.

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UNITED STATES PATENT OFFICE.

JOHN WOOL GRISWOLD, OF TROY, NEW YORK.

MACHINE FOR STRAIGHTENING AND CUTTING WIRE.

SPECIFICATION forming part of Letters Patent No. 420,509, dated February 4, 1890.

Application filed July 26, 1889. Serial No. 318,758. (No model.)

To all whom it may concern:

Be it known that I, JOHN WOOL GRISWOLD, of Troy, Rensselaer county, New York, have invented a new and useful Improvement in Machines for Cutting and Straightening Wire, of which the following is a specification.

The object of the invention is to provide a machine which operates to straighten wire subsequent to annealing, and then to cut said wire into measured lengths.

The invention consists in the construction of the machine described, and more particularly in the mechanism for automatically operating the cutting devices, and the tubes of spiral coiled wire, which serve as conduits for the wire being acted upon during the passage of said wire between the straightening-wheels and the cutting apparatus, all as more particularly hereinafter set forth.

In the accompanying drawings, Figure 1 is a side elevation of the apparatus. Fig. 2 is a plan view. Fig. 3 is a transverse section on the line X X of Fig. 2, and Fig. 4 is a section on the line Y Y of Fig. 3. Fig. 5 is a sectional view of the clutch mechanism, and Fig. 6 a face view of the notched clutch-disk.

Similar letters of reference indicate like parts.

A is a pier, of masonry or other solid support, to which is secured the table B. The table B supports the feeding and straightening rolls, by means of which the wire is continuously moved toward the cutting device. The lower set of feeding and straightening rolls (not shown) are all fast upon the transverse shaft D, and are placed directly beneath the upper feeding-rolls Q. Said shaft D carries a pulley E, (dotted lines,) to which motion is communicated by the belt F. The shaft D is journaled upon the supports G, and from parallel frame-bars 1 1 rise vertical standards in sets of four, as H I J K, Fig. 2. Between the standards H K and I J extend bars L L′ and longitudinal brace-bars L″ L‴, Fig. 1. Upon bars L L′ are formed upward projections M, and between said projections M are secured, by set-screws N, bearing-blocks O for a short shaft P, which supports the upper feeding-rolls Q and Q′. It will be understood that beneath this pair of upper feeding-rolls there is a corresponding pair of lower feeding-rolls. It will also be understood that this arrangement of pairs of feeding-rolls and the supports for the same is repeated a number of times longitudinally of the table B, as shown in Fig. 2. The bars L L′ slide freely on the standards H K or I J and are secured in place thereon by set-screws R.

S is a double lever having two eyes, which surround, respectively, the bars H and K. S′ is a similar lever having eyes which surround the standards I and J. On the standards I and H or brace above the levers S S′ are transverse pins T′. Pivoted to said levers and between the standards H K are blocks U, which bear upon projections or studs on the wheel-bearings O. At the end of each lever S S′ is suspended a weight, as V. At one extremity of the shaft D is a sprocket-wheel *a*, around which passes the endless sprocket-chain *b*. This chain is simply suspended from the pulley *a*. Upon said chain is fastened a stud *c*. Pivoted at *d* above the pulley *a* is a lever *e*, which carries a roller *f*, which rests near the sprocket-wheel *a*. The free end of the lever *e* is connected by a link *g* to an arm *h* of the shaft *i*, which is journaled upon the table B.

Referring now to the cutting apparatus: From the frame N′ rise two standards *j l*, in which is journaled the transverse shaft *m*. Said shaft also passes through a bearing *k*, which is supported on the bars *p′ p″*, which extend between the standards *j l*. *n′* is a knife-bar, which is supported upon the shaft *m* by the connecting-rods *o*. At the point where the shaft *m* is encircled by the connecting-rods *o* said shaft is reduced in diameter, and is eccentric, as shown in section at *p*, Fig. 3. Consequently when the shaft *m* is rotated the knife-bar *n′* is given a vertical or up-and-down motion. The edges of the knife-bar *n* are received in fixed ways or guides *q* on each side of the machine. Secured to the lower edge of the knife-bar *n* is the knife-blade *n′*. Said blade is made in two parts, as shown, for convenience in handling. Bolted on the front sides of the guides *q* is a guide-bar or brace *r*, through which pass a number of cutting-dies *s*, secured in place by set-screws *t*, as shown in Fig. 4. Secured to the frame N′ in front of the guide-bar *r* is another guide-bar *u*, in which are secured a number of

split tube-sections *v*, which are placed in line with the cutting-dies *s* on the guide-bar *r*. The sections *v* are secured in place in the guide-bar *u* by set-screws *w*. Upon the shaft *m* is a driving-pulley A′, which is loose upon said shaft, but may be caused to transmit motion thereto by means of the clutch mechanism hereinafter described. Said clutch is operated by means of the vertical rod B′, which at its lower end has a hook C′, Fig. 3, and into this hook enters the horizontal arm D′ of the bell-crank lever, which is supported upon the shaft E′, which is journaled transversely to the frame N′. The other arm F′ of the bell-crank lever is connected to an arm G′ on the transverse shaft *i* by means of a link F″.

Just in rear of each pair of feeding-wheels and upon the bar L‴ are bolted slotted eyes or collars I′, which receive the large end of tubes J′. These tubes are preferably made of coiled-spring wire. They extend through the split tubes *v*, and are finally secured in the dies *s*. In front of each pair of feeding-rolls and upon their supporting-frames, and adjustable horizontally thereon, are secured short tube-sections K′ K′.

As a number of lengths of wire are operated upon at the same time, the following description of the way in which one length passes through the machine and is operated upon is true of all: Let O′ represent one strand of wire to be cut. This strand is first passed through one of the short tube-sections K′, thence under an upper feeding-roll Q and between that roll and its corresponding lower feeding-roll, thence through a coiled-wire tube J′ to the short tube-section *v* in the guide-bar *u*, and thence through die *s* in the guide-bar *r;* then under the knife-blade *n*, with its end resting upon the inclined table M′, which is supported above the frame N′, as shown in Fig. 1. The wheels Q, being pressed down by the weighted lever S, acting upon bearings O, forces the wire O′ into close contact with the lower feeding-wheel, and the shaft D of said lower feeding-wheel being rotated the wire is drawn between said wheels and so moved rearwardly under the knife *n*. This rearward motion of the wire continues until the projection *c* on the endless chain *b* meets the roller *f* of the lever *e*, and thus raises said lever *e*. The effect of raising the lever *e* is to vibrate the shaft *i* through the links *g* and arms *h*, and through the arm G′, link F″, and bell-crank lever F′ D′ to draw down the rod B′ and throw into operation the clutch, which causes the pulley A′ to rotate the shaft *m*. The effect of rotating the shaft *m* is to cause the knife *n* to descend upon the wire, cutting it, and then immediately to rise again. By this time the projection *c* will have passed from under the lever *e*, and the clutch-fork *f*″, by the action of its spring, have returned to its normal position for withdrawal of the key. Thus the shaft *m* will be no longer rotated, and the knife *n* will remain in its uppermost or normal position. The operation of the machine is therefore continuous, the wire being uninterruptedly drawn through the feeding-wheels and the knife being brought down at predetermined intervals to cut said wire into lengths. These lengths are determined and regulated by the length of the sprocket-chain *b*, as it will be obvious that only when the entire length of said chain has passed over the sprocket-wheel the stud *c* acts upon the lever *e* to throw the knife *n* into operation. It is necessary, therefore, simply to modify the length of the chain *b* to correspond to the lengths into which it is desired to cut the wire. At the point where it is cut by the knife *n* the wire is supported in the dies *s*.

The clutch mechanism as here shown is as follows: The inner face of the hub of pulley A′ is notched, as shown at *a*″, Fig. 6. The bottoms of the notches are formed in removable steel pins *b*″, so that wear may be provided for. Arranged transversely of the pulley *c*″ on shaft *m* is a sliding key or pin *d*″, which is normally pushed outwardly by a spring *e*″, Fig. 5. The pin, when it projects from the pulley *c*″, enters and engages with one of the notches *a*″. *f*″ is a yoke on the end of rod B′, which enters the groove or channel in the periphery of pulley *c*″ and is received in a notch in the sliding key or pin *d*″. The effect of pulling down the rod B′ against the action of spring *g*″ is to allow the pin *d*″ to be pushed out by its spring *e*″ to engage with the driving-pulley A′.

The arrangement of the sprocket-wheel *a*, carrying the hanging endless belt *b* on the shaft *d*, serves as a very convenient means of measuring the wire passing through the rolls Q into definite lengths. It will be obvious that during the time that the stop *c* travels from a point—for example, just above the shaft D back to the same point—the length of wire which in that period will have been drawn through the rolls Q will be exactly equal to the length of the endless chain or belt *b*. Consequently the chain *b* forms a measuring apparatus which may be used even when the wire is not to be cut in definite lengths, but which will show just when a definite length of wire has passed through the machine by the return of the stop *c* to some fixed position. In such case the stop *c* might be simply regarded as an indicator; but in the present machine I have caused the stop *c* to lift the lever *e*, and thus, as already explained, to control the movement of the intermittently-acting knife. Of course it will be obvious that I may connect the lever *e* to any kind of indicating mechanism—as to an ordinary counter—so that the number of lengths of wire passing between rolls might be thus recorded. I have shown the belt *b* here made as a chain. It will be understood that I may lengthen or shorten said chain, as desired, by adding or removing links, and thus

I may regulate the individual lengths into which the wire will be cut.

I claim—

1. The combination, in a wire straightening and cutting machine, of a pair of rotary straightening and feeding rolls and intermittently-operating knife, a cutting-die, and a continuous flexible support for the wire extending between said rolls and said knife, the wire operated upon being led between said rolls over said support and between said knife and said cutting-block, substantially as described.

2. The combination, in a wire straightening and cutting machine, of a pair of rotary straightening and feeding rolls and an intermittently-operating knife, a cutting-die, and a flexible tubular support for the wire extending between said rolls and said knife, the wire operated upon being led between said rolls through said tubular support and between said knife and said cutting-block, substantially as described.

3. The combination, in a wire straightening and cutting machine, of a pair of rotary straightening and feeding rolls and an intermittently-operating knife, a cutting-die, and a flexible tubular support of spiral coiled wire extending between said rolls and said knife, the wire operated upon being led between said rolls through said tubular support and between said knife and said cutting-die, substantially as described.

4. The combination of a pair of wire-receiving rolls, a pulley on one of the shafts of said rolls, an endless belt on said pulley, a stop on said belt, an independently-supported movable arm or lever above said pulley, a cutting-blade, a cutting-die, and transmitting mechanism between said lever and said blade, the said lever being displaced when said stop is carried between said pulley and said lever and through said transmitting mechanism to control the operation of said blade, substantially as described.

5. The combination of the rotary shaft D and roll thereon, the independently-supported roll Q in contact with said first-named roll, pulley *a* on shaft D, belt *b*, having stop *c*, pivoted lever *e* above said pulley *a*, a knife, a cutting die or block, mechanism for vertically reciprocating said knife, and transmitting mechanism between said lever *e* and said reciprocating mechanism, the aforesaid parts operating and arranged so that when the lever *e* is lifted by said stop *c* said reciprocating mechanism shall be set in operation and said knife shall move downwardly to cut a strand of wire passing between said rolls and then between said knife and said cutting-block, substantially as described.

6. The combination of the rotary shaft D and roll thereon, the independently-supported roll Q in contact with said first-named roll, pulley *a* on shaft D, belt *b*, having stop *c*, pivoted lever *e* above said pulley *a*, a knife *n n'*, a cutting die or block *s*, eccentric shaft *m*, connecting-rods *o* between said shaft and said knife, loose driving-pulley A', a clutch mechanism between said pulley A' and shaft *m*, and connecting mechanism between said lever *e* and said clutch, the aforesaid parts operating and arranged so that when the lever *e* is lifted by said stop *c* said clutch will be operated to connect said pulley A' and shaft *m*, and thereby cause a downward movement of said knife to cut a strand of wire passing between said rolls and then between said knife and said cutting die or block, substantially as described.

7. The combination of the rotary feeding and straightening rolls Q, the intermittently-operating knife *n n'*, the support *r*, cutting-die *s* in said support, tube J', split tube *v* and support *u* therefor, and slotted eye I', the said tube J' extending through said split tube *v* and received at its extremities in said die *s* and eye I', substantially as described.

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Witnesses:

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