

C. D. ROGERS.
MACHINE FOR DRAWING WIRE.

No. 187,732.

Patented Feb. 27, 1877.

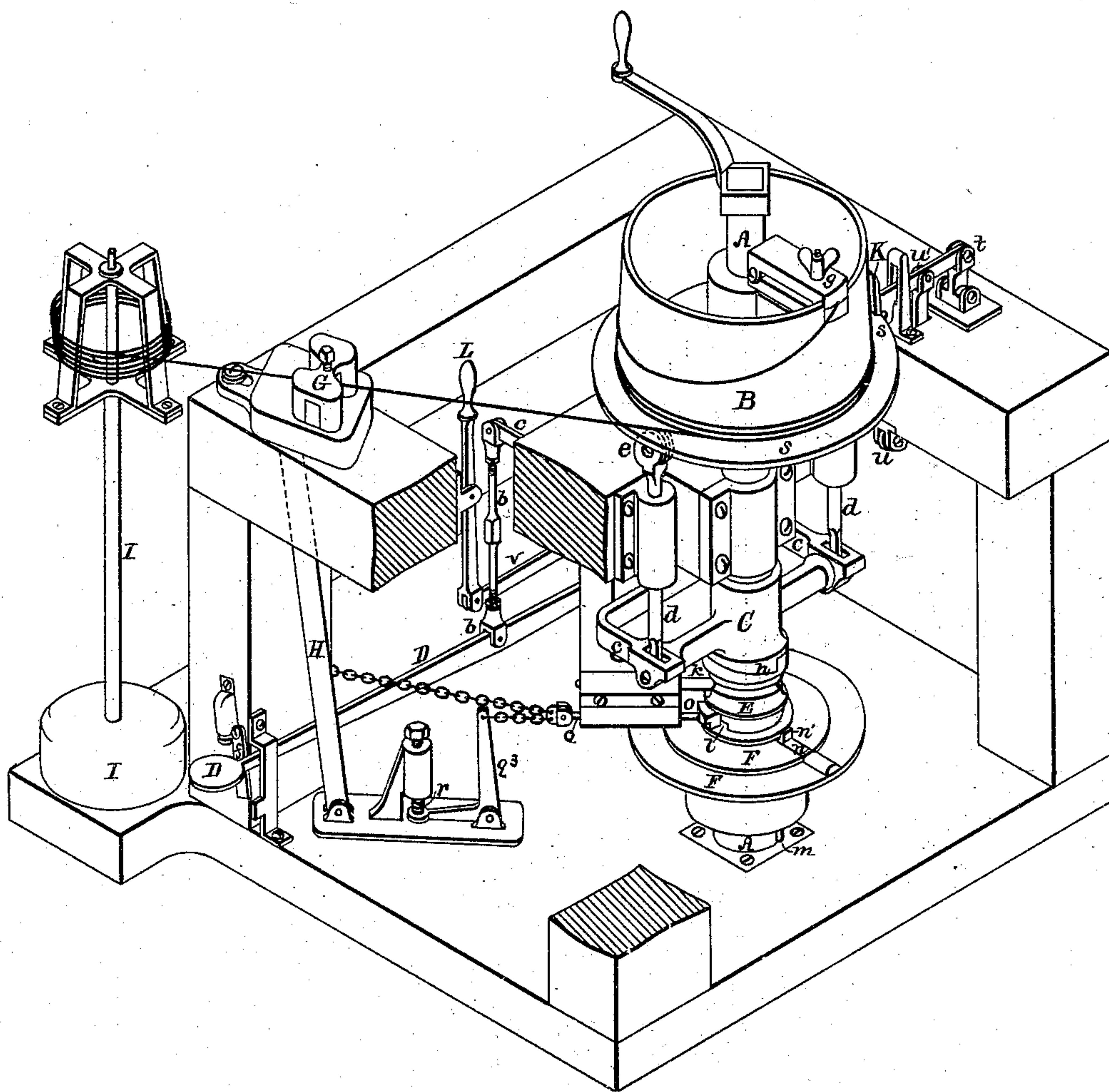


FIG. 1.

WITNESSES.

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George Fisher

INVENTOR.

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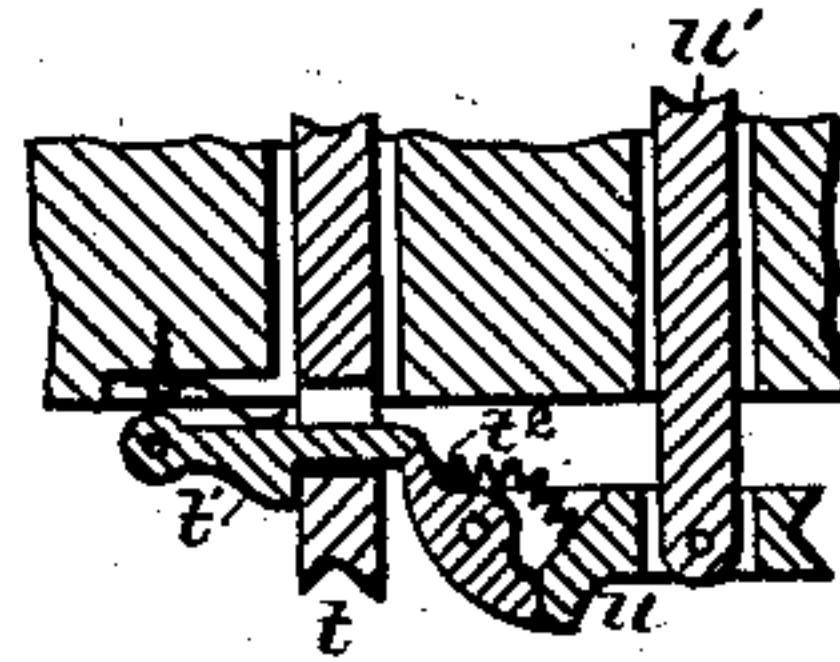
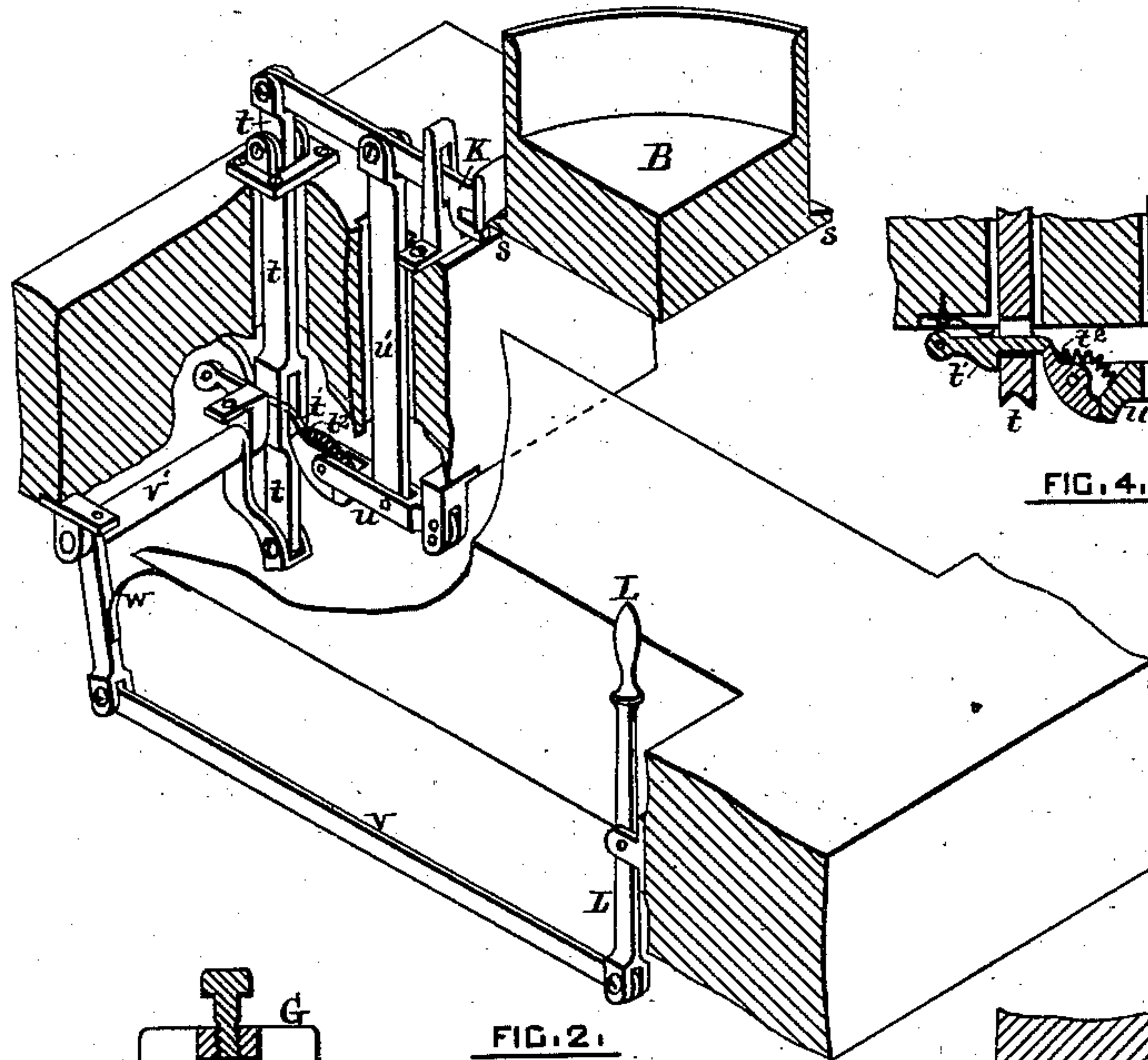


FIG. 4.

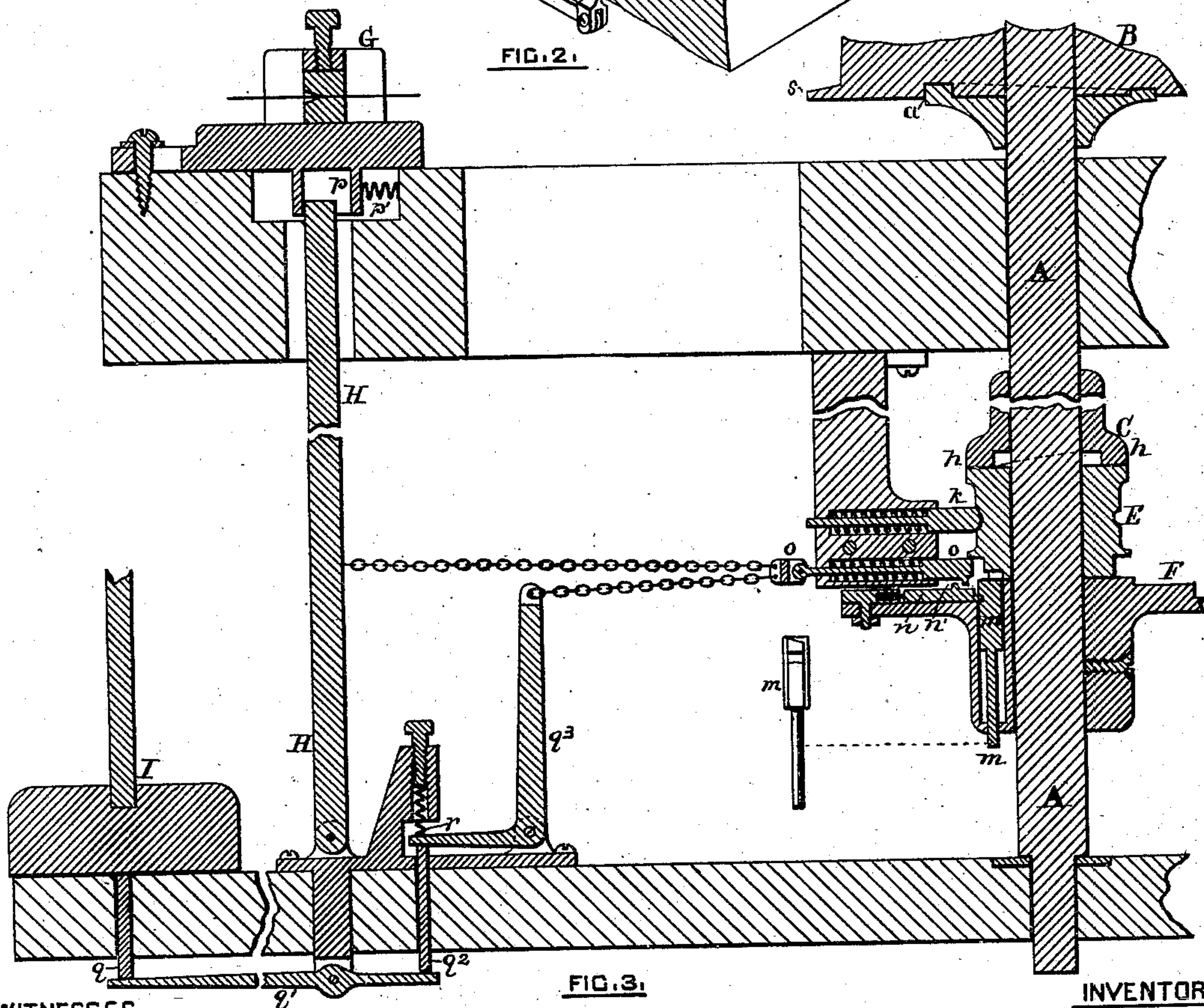


FIG. 3.

WITNESSES

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CHARLES D. ROGERS, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO
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IMPROVEMENT IN MACHINES FOR DRAWING WIRE.

Specification forming part of Letters Patent No. **187,732**, dated February 27, 1877; application filed
December 23, 1876.

To all whom it may concern:

Be it known that I, CHARLES D. ROGERS, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Machine for Drawing Wire; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description thereof.

My said improvements are applicable to that class of machines which embody a draw-plate and a coiling or drawing drum.

Machines of this class, as heretofore constructed, require, in each instance, the close supervision of an attendant. The breakage of the wire is of comparatively frequent occurrence; and this is followed by the sudden uncoiling of the wire and a sweeping stroke of the broken end, attended with danger to the attendant, unless he has been so vigilant as to promptly apply the usual foot-lever stop-motion, and has with his hand maintained control of the wire prior to and after breakage. The expansive uncoiling of wire from the drum incurs much labor and loss of time of the attendant and the machine. The wire is delivered to the draw-plate from a reel loosely mounted upon a movable reel-standard. While in operation this standard, from various causes, is liable to be displaced or overthrown. If unduly displaced, it will not occupy a desirable position with relation to the draw-plate, and if overthrown while the machine is in operation the running wire trundles thereabout, detaches the wire therefrom, and entangles it, necessitating much loss of time and labor before the drawing operation can be resumed.

My improvements have for their object the obviation of these several difficulties; and to these ends my invention mainly consists in the combination, with the drum and draw-plate, of stopping mechanism, controlled by that portion of the wire which extends from the draw-plate to the drum, whereby when the wire breaks, or the end of the wire has left the plate, the drum will be promptly stopped automatically.

My invention further consists in the combination, with the drum, of a "presser," which

is forced against the wire coiled upon the drum, and prevents it from uncoiling, either after the breakage of the wire, or after the wire has left the draw-plate.

Another feature of my invention consists in the combination, with the drum and reel-standard, of stopping mechanism, which is prevented from operating as such so long as the standard occupies its proper position with relation to the draw-plate, but which permits it to operate in stopping the drum whenever the standard is overthrown, or otherwise unduly moved out of its proper position.

I do not limit the main features of my invention to stopping mechanism of any particular construction which may profitably be employed in the several combinations before set forth; but I have embodied these features in a machine which contains certain novel devices and combinations of mechanism, which are herein shown and described, and portions thereof constitute subordinate features of my invention, as will be hereinafter specified.

To more particularly describe my invention, I will refer to the accompanying two sheets of drawings, in which—

Figure 1, Sheet 1, represents, in perspective, a machine embodying the several features of my invention, with a portion of its frame broken away. Fig. 2, Sheet 2, represents in perspective the presser, its operative mechanism, portions of the frame of the machine, and a portion of the drum in vertical section. Fig. 3, Sheet 2, represents the machine in vertical section, substantially on a line with the axis of the drum, the center of the draw-plate, and the center of the reel-standard. Fig. 4 represents in section the latch mechanism which controls the presser.

The frame of the machine is necessarily so constructed as to afford a firm support for the mechanism, and it should be strong and heavy. A denotes the vertical shaft on which the coiling-drum B is mounted. Power is communicated to this shaft by gearing not shown. The drum is so mounted on the shaft that it can be moved vertically thereon, but it is rotatively connected therewith by a clutch, as is shown in the main sectional view, Fig. 3,

at *a*, and the disengagement between drum and shaft is effected by the lifting of the drum. A cross-head, as at *C*, slides loosely on the vertical shaft when pressure is applied to the foot-lever *D*, which operates through the vertical rod *b* and the horizontal lever *c*, which is connected with the cross-head. The lever *c*, at its junction with the cross-head, has two arms, each of which supports a vertical sliding rod, as at *d*, and each of these at the upper end is provided with a friction-roller, *e*, which is in contact with the under surface of the drum. With this construction it will be seen that if the foot-lever be depressed the drum will be lifted and thereby disconnected from the driving-shaft, permitting the latter to continue its movement while the drum remains stationary. A spring-catch, as at *f*, near the treadle of the foot-lever, engages with the upper surface of the lever when it is depressed and the drum elevated, holding them in those positions until the catch is specially manipulated to effect a release of the lever. The drum is provided with the usual clamp, as at *g*, for engaging with the end of the length of wire to be drawn and coiled on the drum. As before stated, machines for drawing wire have heretofore been so constructed that the drum can be disconnected from the shaft by means of a foot-lever. The lower end of the cross-head neck, surrounding the shaft *A*, is provided with two inclined planes, as at *h*, which are reversed counterparts of two inclined planes on the upper end of the sleeve *E*, which also surrounds the shaft, and under some circumstances moves with said shaft, but is normally stationary. These inclined planes are in form like a simple clutch, but instead of rotatively connecting or disconnecting two parts, as in a clutch, they separate the two parts, when the lower part or sleeve is rotated, in that the cross-head and drum are thereby elevated in like manner as if the treadle had been depressed. The sleeve *E* is provided on one side with a concave recess, with which the convex end of a lateral spring-plunger, as at *k*, engages for affording a frictional stop for the sleeve, and preventing its rotation with the shaft, except when it is rotatively connected therewith, during which time the plunger simply clicks at every revolution. At the lower end of the sleeve, at its periphery, is a square-shouldered recess, as at *l*, adjacent to but below the concave recess before referred to. Keyed to the shaft is a disk, as at *F*, the upper surface of which supports the sleeve *E*. This disk has a hub, which contains a vertical spring-latch, as at *m*, so located that it can enter the recess *l* in the sleeve, as shown in Fig. 3. The head or top of the spring-latch has a flat face for engaging with the end of the recess *l*, but it has also an offset portion, the upper part of which is inclined like an ordinary latch-face, as is fully shown in the detached view of the spring-latch *m*, in Fig. 3. The disk has also a radial

spring-bolt, as at *n*, which is normally at its front end so engaged with a hole in the shank of the latch *m* as to keep the latter in a depressed position and out of engagement with the recess *l* of the sleeve. This bolt has also a vertically-projecting stud, as at *n'*.

In the same downhanger in which the spring-plunger *K* is mounted, and below it, is a spring-slide, as at *o*. In its normal position this slide is well advanced toward the sleeve, and when in that position, while the disk is revolving, a cam-surface on the slide withdraws the radial spring-bolt *n* from the vertical latch-bolt; but this latter is prevented from engaging with the sleeve *E*, at the recess *l*, by means of the overlapping engagement of the spring-slide with the head of the latch-bolt, which depresses it, and forces it to pass beneath the sleeve, leaving the latter unmoved. This spring-slide is withdrawn not only when the wire breaks, but also when the reel-stand is thrown over from any cause whatever.

G denotes the draw-plate. It is secured to the top of the frame, so that it is capable of slight movement in the direction in which the wire is drawn. It is provided with a recess at its under side, as at *p*, Fig. 3, which is loosely occupied by the upper end of a vertical lever at *H*, which is pivoted at its lower end to the floor or bed of the machine. A spring, as at *p'*, is so set that it is compressed by the draw-plate when the latter is held in its advanced position by the wire and drum. The lever *H* is connected by a chain or other flexible device with the spring-slide *o* in such a manner that said slide occupies its normal position while the draw-plate is held in its advanced position by the wire and drum; but when the latter is allowed to be thrown back by its spring the lever moves with it and withdraws the spring-latch, which, as before stated, effects the withdrawal of the radial spring-bolt *n*, but fails to depress the vertical spring-latch *m*, and, therefore, this latter engages with the sleeve, rotates it, elevates the cross-head and the drum, thus stopping the latter by disengaging it from the clutch *a* on the driving-shaft. *I* denotes the reel-standard. As usual, it is so constructed that a wire-loaded reel can readily be mounted thereon and an empty one removed. The base of the standard is usually broad and heavy. When in working position the reel is so set that the wire is delivered smoothly from it to the draw-plate. In the bed-plate of the machine is a vertical sliding pin, as at *q*, Fig. 3, so located that it is covered by the base of the reel-standard when in position for service. Beneath the bed of the machine is a lever, *q*¹, with one end of which the pin *q* engages. With its opposite end there engages another vertical sliding pin, *q*², which passes upward through the bed of the machine, and is in contact with the under side of the horizontal arm of a bell-crank lever, *q*³. The vertical arm of lever *q*³ is connected directly with the spring-slide *o* by a chain or wire. A spiral spring, as at *r*,

rendered adjustable by means of a thumb-screw, is so set that it bears on the upper surface of the short longitudinal arm of lever q^3 .

It will be obvious that when the vertical standard-base is on the pin q the bell-crank lever q^3 and its spring r are not permitted to withdraw the spring-slide o ; but that, if the standard should be thrown over, said slide would be promptly withdrawn, the sleeve E rotated, and the drum elevated and stopped precisely in the same manner as has already been described in connection with the draw-plate, its spring, and the lever H .

It will be seen that these stopping devices are wholly independent of each other, although each can separately operate as a "stop-motion" by withdrawing the same spring-slide, and that, in case the tipping of a reel-standard and the breakage of the wire between draw-plate and drum should simultaneously occur, both devices would co-operate harmoniously.

The wire is prevented from uncoiling after the completion of a "draw" or a breakage by means of the presser at K . This presser may be variously constructed, and one of the simplest forms thereof consists of a sliding spring-rod, so set that it will be forced toward the drum, and carrying a compressing-roller, on a vertical axis, which will always press on the drum or the intervening wire, and be capable of revolving therewith, and of receding as the layers of wire increase on the drum. While such a device, in combination with the drum and draw-plate, would embody my invention, I have, by preference, illustrated this feature by means of a system of levers, which automatically operate the presser whenever the drum is elevated.

The presser-face is at the end of a lever, which is slotted below the face, so as to receive the flange s of the drum, as shown in Fig. 2. The lever at its rear end is pivoted to a vertical lever, t , which is so actuated by a spring that the presser is forced toward the drum, unless otherwise prevented. The presser is withdrawn from the drum normally, and is so held by a spring-latch, as at t^1 , as shown in Fig. 4. This latch is made to release the lever t and the presser by means of a spring-catch, t^2 , on the end of the lever u beneath the top of the frame. This lever u is connected, by a link, w' , with the presser-lever, so that when this lever is raised by the drum, the latch t^1 releases the lever t , and the presser is promptly thrown forward against the coiled wire on the drum, and securely holds it. When the drum is next lowered to its working position, the presser does not retire automatically, but maintains its pressure until the hand-lever L is thrown back. This lever is connected with the vertical lever t by a rod, v , and rock-shaft v' , which has an arm at each end, one for connection into rod v , and the other with lever t . The spring for actuating the presser is shown at w , and it operates through the rock-shaft by contact with one of

its arms. When the presser is moved backward the latch t^1 engages with the lever t , and holds it until the drum is again elevated.

The presser and its operative mechanism are fully shown in Fig. 2.

The operation of the several combinations of mechanism has been fully explained in each instance in connection with the detailed description.

Although I have shown the stopping mechanism so applied that it permits the vertical driving-shaft to revolve while the drum is stationary, it is to be distinctly understood that my invention is not limited to this particular mode of operation, because the stopping-levers, as I am well aware, can be readily connected with an ordinary clutch on a horizontal driving-shaft, from which power would be derived for driving the vertical shaft, in which case the vertical shaft and drum would be positively connected, instead of being connected by a clutch, as shown, and both the shaft and drum would, therefore, be stationary after the operation of the stopping mechanism.

For illustrating my invention I have selected wire-drawing mechanism, which is generally considered preferable to all others, and persons skilled in the art will be readily able to apply my improvements to other wire-drawing machines, which involve a drum and draw-plate, by the employment of a great variety of equivalent mechanism, without departing from the true spirit of my invention.

The draw-plate is herein shown to perform a service, in connection with the stopping mechanism, which requires that it be capable of a backward movement on the breakage of the wire; but I am well aware that the die-block may be rigidly mounted, and yet perform, in one sense, a controlling function, in connection with stopping mechanism. As, for instance, the lever which elevates the drum, or in any manner disconnects the drum or its shaft from its driver, may be weighted sufficiently to effect the disconnection desired, and said weighted lever may be counterpoised by means of a hook or loop, which is supported by the wire at any point between the draw-plate and drum, so that the breakage of the wire and its fall will drop the weight and stop the drum.

With such mechanism the draw-plate, instead of being an active medium in the combination, will be simply passive, in that it will secure the requisite tension on the wire for enabling it to support the weighted lever. If, however, the hook of the lever be applied to the wire adjacent to a surface with which the wire is always in bearing contact the mere presence of the wire will prevent the stop motion from operating, in which case the draw-plate will perform no service in connection with the stopping mechanism.

However constructed and applied, the stopping mechanism will be controlled by that portion of the wire which is between the

draw-plate and drum; and it is immaterial, so far as mere stopping is concerned, whether the stopping mechanism is prevented from operating as such by the tensile strain on the wire, as in the case of the movable draw-plate, or by the mere presence of the wire, as in the case of the fixed plate, although it is obvious that promptness in operation is of consequence, and that this is attained by the movable plate, as herein shown.

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

1. In a machine for drawing wire, the combination, substantially as described, with the drum and the draw-plate, of stopping mechanism, whereby, when the wire breaks between the draw-plate and drum, the latter will be prevented from revolving, substantially as set forth.

2. In a machine for drawing wire, the combination, with the drum and its driving-shaft, of stopping mechanism, controlled by a reel-standard, substantially as described, whereby, when the reel-standard is unduly

displaced from its proper position, the drum will be stopped, as set forth.

3. The combination, with the drum of a wire drawing machine, of a presser for preventing the wire from uncoiling, substantially as described.

4. In combination, with a drum in a wire-drawing machine and stopping mechanism, of a presser, substantially as described, whereby, when the drum is stopped, the presser is caused to engage with the wire coiled on the drum, as set forth.

5. The combination, with the driving-shaft, the drum, and its connecting-clutch, of the disk on the shaft, its latch, a spring-slide, controlled either by a die-plate or a reel-standard, or both, a sleeve provided with inclined planes loosely mounted on the shaft, and a cross-head for lifting the drum, substantially as described.

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