

(No Model.)

3 Sheets—Sheet 1.

J. B. STONE.
WIRE ROPE MACHINE.

No. 359,409.

Patented Mar. 15, 1887.

FIG. 2.

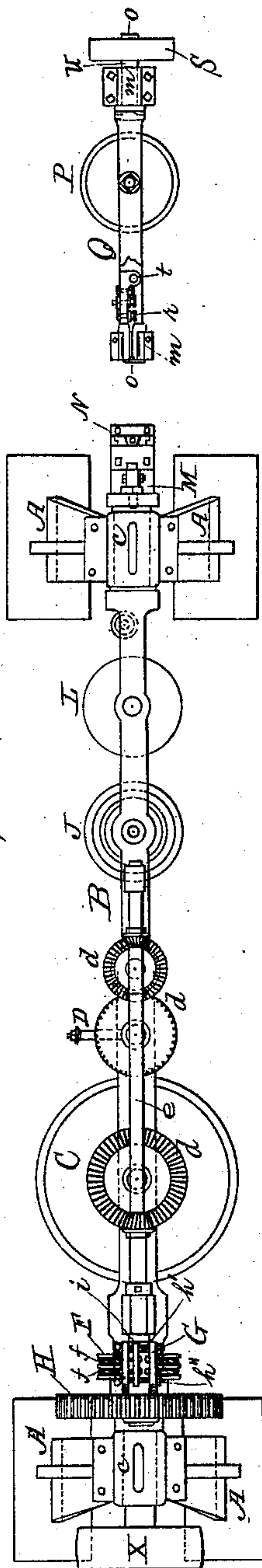
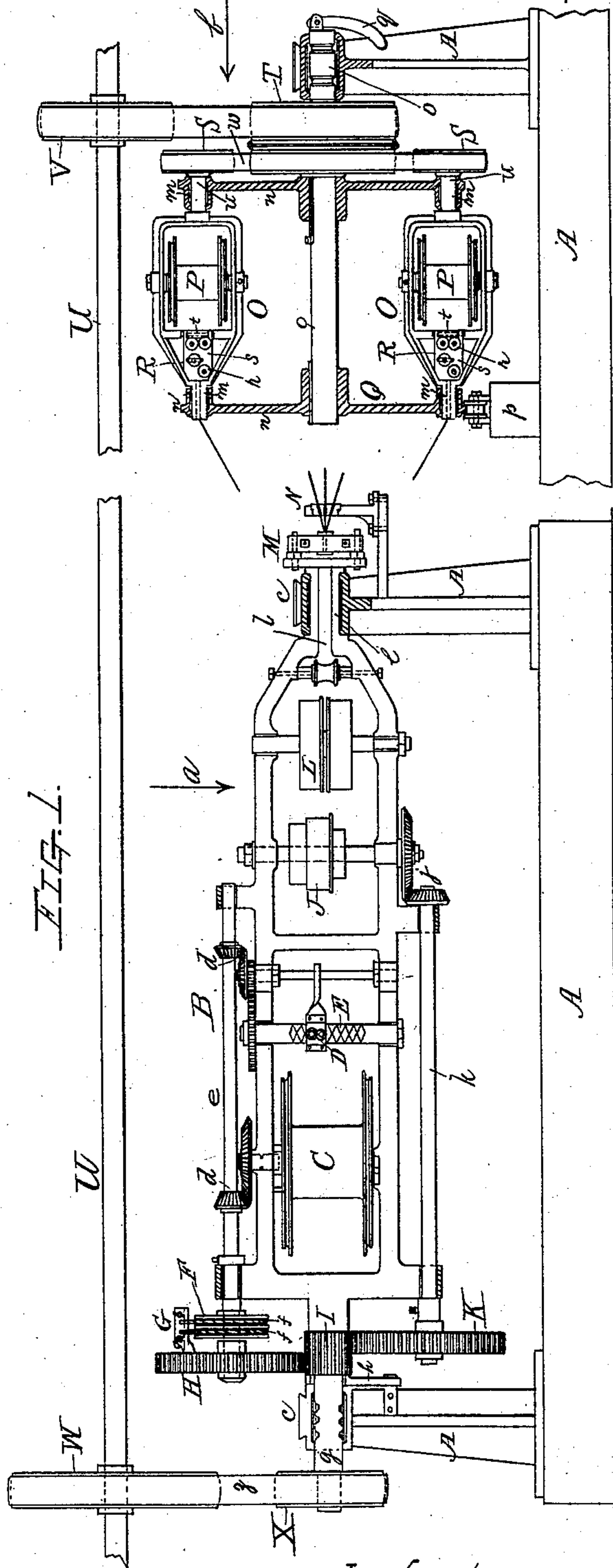


FIG. 1.



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Inventor;
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By his Attorney, John C. Dewey.

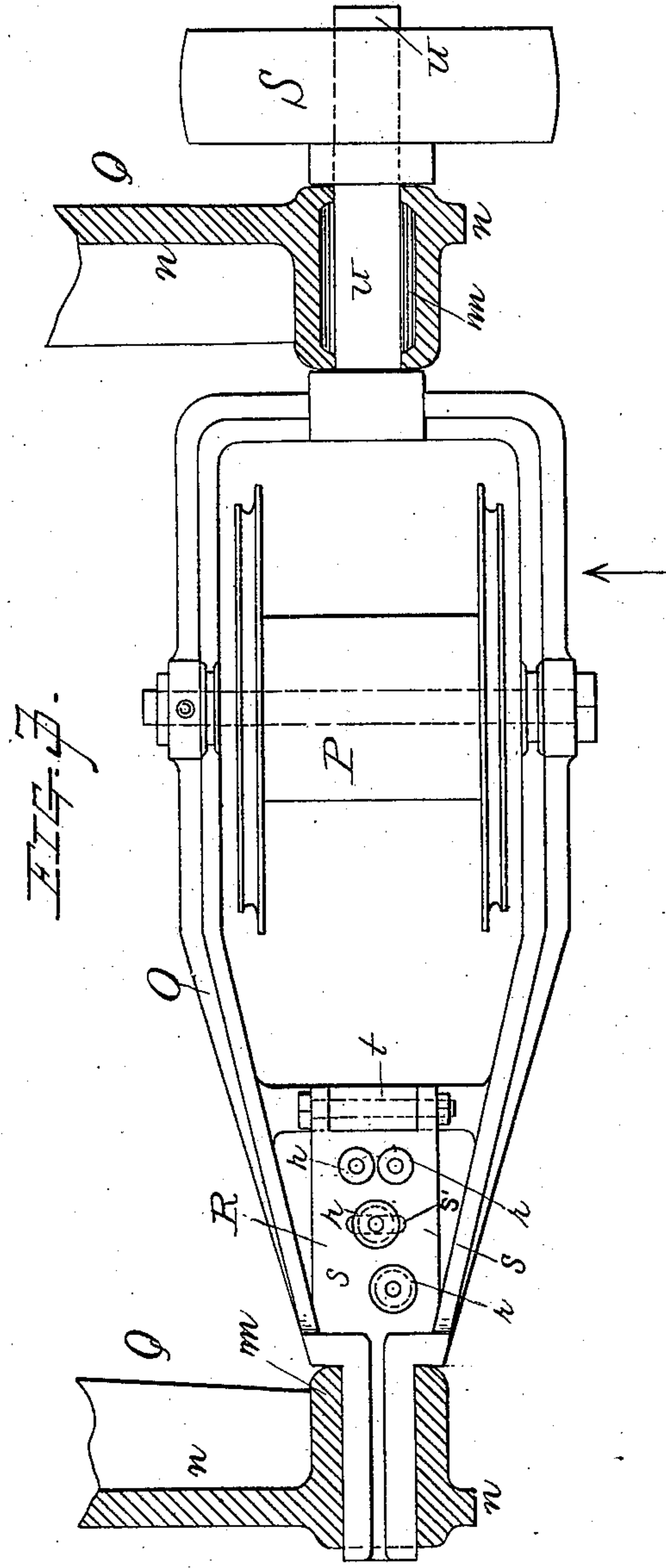
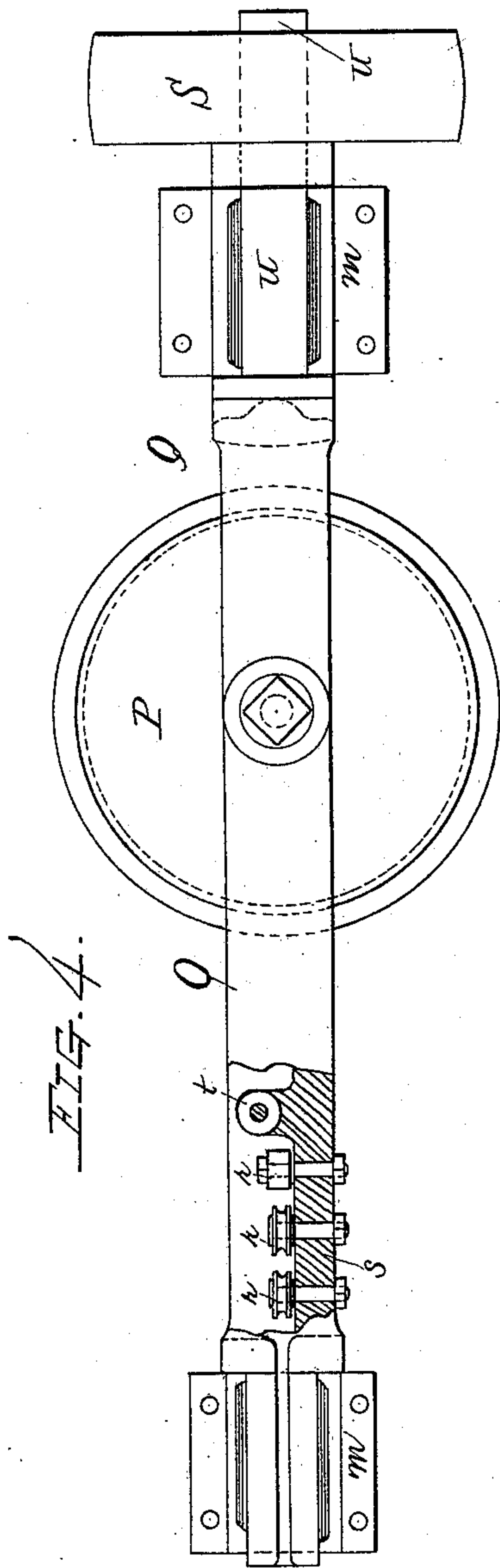
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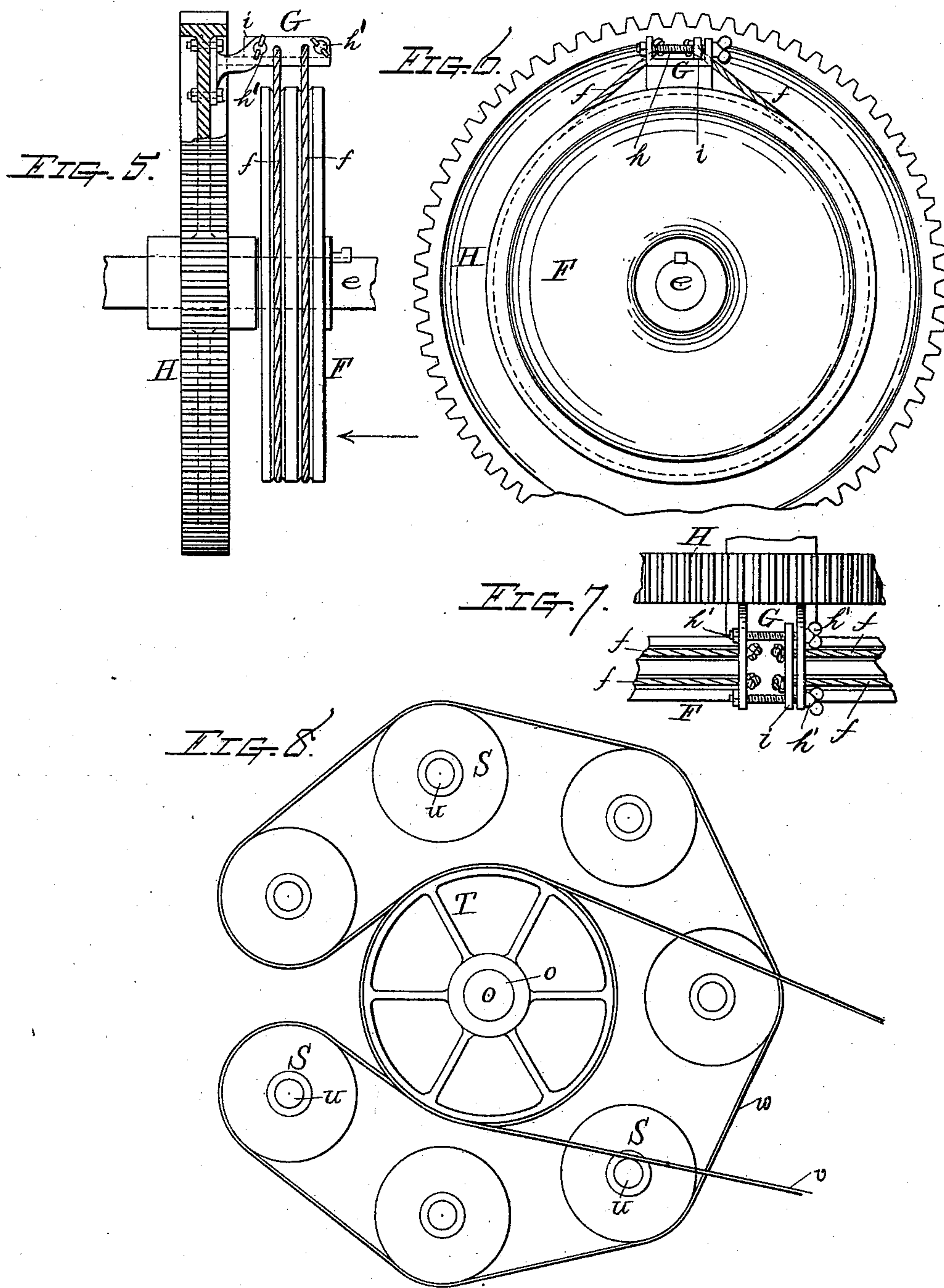
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UNITED STATES PATENT OFFICE.

JAMES B. STONE, OF WORCESTER, MASSACHUSETTS.

WIRE-ROPE MACHINE.

SPECIFICATION forming part of Letters Patent No. 359,409, dated March 15, 1887.

Application filed September 24, 1884. Serial No. 143,851. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. STONE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Wire-Rope Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side view of a machine, with parts thereof shown in section to better illustrate my improvements. Fig. 2 is a top or plan view of parts of the machine shown in Fig. 1, looking in the direction of arrow *a*, same figure. Fig. 3 is a side view, on an enlarged scale, of one of the revolving fliers, with its spool or bobbin, and showing the tension-regulating device for the wire strand placed upon the flier, as will be hereinafter fully described, the bearings of the flier being shown in section. Fig. 4 is a view of the part shown in Fig. 3, looking in the direction of the arrow, same figure, part of the frame being broken away to show the tension-regulating device more clearly. Fig. 5 is a front edge view, on an enlarged scale, with parts broken away, of the friction device for regulating the speed of the spool on the large flier, upon which the twisted strand is wound, as will be hereinafter fully described. Fig. 6 is a side view of the friction device shown in Fig. 5. Fig. 7 is a top or plan view, on an enlarged scale, of part of the friction device shown in Figs. 5 and 6, showing how the device is operated; and Fig. 8 is a side view, on an enlarged scale, of the driving-pulleys and belt-connection, looking at the end of the machine, as indicated by arrow *b*, Fig. 1, for revolving the smaller fliers, upon each of which is carried a spool of wire, as will be hereinafter fully described.

My invention relates to wire-rope machines, my improved machine being designed to make the strands of a wire rope, said strands being composed of any number of individual wires, as desired, and these strands being united in a second machine, of any well-known construction, to form the completed rope in the usual manner; and my invention consists in certain novel features of construction of a machine for making wire rope, as will be here-

inafter fully described, and the nature thereof indicated by the claims.

In the drawings, A represents the frame of the machine for supporting the different parts thereof.

B is the large flier for forming the twisted strand, which revolves or rotates in suitable bearings, *c c*, in the frame A, as shown in Fig. 1. Said flier B carries a revolving spool, C, upon which the twisted strand is wound, and a distributing device, D, moving back and forth upon the double-threaded revolving screw-shaft E. Said spool C and the distributing device D, for laying the strand evenly upon the spool, are all constructed in the usual and well-known manner, and operated by a system of gears, *d d*, on the flier B, in the usual manner, said gears being operated by the grooved friction wheel or pulley F, secured on the small shaft *e*, turning in suitable bearings on the flier B, and the cords *f f*, in connection with a device, G, attached to the toothed wheel H, which is loose upon the shaft *e*, and which meshes with the gear I, which is loose upon the spindle *g* of the flier B, but which is held stationary and supported so as not to turn by brackets or arms *h*, secured to frame A, or in any other suitable manner.

The object of the devices *f f G* is to regulate the speed at which the receiving-spool C revolves, for said spool must revolve slower as each successive layer of twisted wire is wound upon it, and to regulate the speed of said spool I in this instance employ the form of friction devices shown in the drawings, consisting of a grooved wheel, F, fast upon the shaft E, two cords, *f*, passing around said wheel and adjustably secured to the arm G, fastened to the toothed wheel H, loose upon the shaft *e*.

The operation of the friction devices shown in the drawings is as follows: The toothed wheel H is loose upon the shaft *e*, and has projecting out therefrom and secured thereto the arm G, as shown in the drawings. The grooved friction-pulley F is secured to the shaft *e* in any suitable manner, and one or more cords, *f f*, are passed around the wheel or pulley F and fastened to the arm G, as shown in Fig. 7. By means of the thumb-screws *h' h'* and the movable plate or piece *i*, in which the thumb-screws turn, I am able to tighten or loosen the

cords $f f$ and to adjust the friction by which the wheel H turns the shaft e by means of the friction of the cords $f f$ upon the grooved wheel F, and thus to wind the twisted strand tightly upon the receiving-spool C.

To accomplish the same purpose above described, it may sometimes be desirable that the arm G be fastened to the shaft e and revolve with it, and the grooved wheel F be loose upon the shaft e .

The drum or cylinder J, around which is wound once or twice the twisted strand, is rotated to draw the strand along by means of beveled gears j , in connection with the shaft k , turning in suitable bearings on the flier B, and the toothed wheel K, secured to said shaft k , and which meshes with the stationary gear L. A second drum or cylinder, L, for guiding the twisted strand to the drum J, is shown in the drawings; but this may be dispensed with, if desired.

The inner bearing spindle or end, l , of the flier B is made hollow, to permit of the twisted strand passing through it to the receiving-spool. To the extreme end of the part l are secured, in any well-known manner, dies M, of the usual construction. These dies revolve with the flier B, and are instrumental in forming the twisted strand in connection with the revolving flier B.

Upon the frame A of the machine is secured in any suitable manner the guide-plate N, of the ordinary construction, provided with holes or slots, through which the individual wires pass, leading from the series of small revolving fliers bearing the delivery-spools previous to their being twisted or cabled together to form the strand between said guide-plate N, which is stationary, and the dies M, which revolve with the large flier B.

The small revolving fliers O, bearing the delivery-spools P, are arranged to revolve in suitable bearings, m , formed in a frame part, Q, which in this instance is made in the shape of a double wheel having rims or sides n , and the hub o thereof extending out on one side, and having its support in the frame A, as shown in Fig. 1, the other side or end of the part Q being supported by the rim n , resting on a small grooved wheel secured in the part p , projecting up from the frame A. (See Fig. 1.)

The frame part Q is held stationary and prevented from turning in any suitable manner, in this instance by means of an arm, q , hinged or secured to the end of the hub o and projecting down against the frame part A, as shown in Fig. 1. I have shown the frame part Q, which holds the small revolving fliers O, and which is stationary when the machine is in operation, so constructed that it may be revolved or turned around, as a matter of convenience, in removing or replacing the spools P in the fliers O; but I do not wish to limit myself to this special form of the frame part Q, (shown in the drawings,) as any well-known form of a stationary frame adapted to

hold the revolving fliers O may be used, if preferred.

Upon each of the fliers O, carrying the delivery-spools P, is arranged a pin or button tension-regulating device, R, located on the flier O at a point between where the wire passes from the delivery-spool P and out from the flier.

The tension-regulating device R consists of a series of small wheels or buttons, r , placed out of line with each other and secured to the part s of the flier O, in this instance by means of bolts and nuts, as clearly shown in Fig. 4. One or more of the wheels r may be made adjustable upon its support, so that the curvature or angle of the wire passing between the wheels r may be varied as desired. In this instance I have shown the middle wheel, r , adjustable from side to side on the part s by means of a slot, s' , made in said part s , through which the bolt supporting said wheel r passes. Said slot allows the bolt to be moved back and forth therein, and it may be secured in place by a nut on the under side thereof. (See Figs. 3 and 4.)

I prefer to have the wheels r arranged to revolve upon their supporting pins or journals; but, if preferred, they may be made stationary. A roll or bar, t , may also be secured upon the inner end of the part s , as shown in Figs. 3 and 4, under which the wire passes as it is delivered from the delivery-spools P before it passes between the wheels or buttons r .

The object of the pin or button tension-regulating device R on the fliers O is for the purpose of subjecting each individual wire to a uniform and equal tension as the twisted strand is formed.

I am aware that the form of pin or button tension-regulating device R shown in the drawings is not new; but heretofore this form of tension-regulating device has been placed at some point between the point where the wire leaves the flier and the point where the rope is formed. The effect of thus placing the tension-regulating device is that, the wires being held from turning by said device, the revolving fliers carrying the delivery-spools put torsion in the wires. By my improved construction—that is, by placing the pin or button tension-regulating device upon the flier itself—said device is carried by and revolves with the flier and with the wire passing through the tension-regulating device, so that no torsion is put into the wires before they are twisted together.

As before stated, the buttons or pins between which the wire passes are made adjustable relatively to each other to produce the degree of contortion of the individual wires necessary to effect the requisite tension upon them.

The number of revolving fliers O, carrying the delivery-spools to be used, will depend upon the number of individual wires to be used in forming the twisted strand. In the

machine shown in the drawings it is intended to use seven. These fliers O are revolved in the frame part Q by means of a belt, *w*, passing around the pulleys S, secured upon the outer ends, *u*, of the fliers O, and over a loose double pulley, T, turning on the hub *o* of the frame part Q, said double pulley T being turned by a belt, *v*, connected with the pulley V on shaft U, said shaft having a second pulley, W, thereon, connected by a belt, *z*, with the pulley X on the end of the spindle *g* of the large flier B, for the purpose of revolving the large flier B simultaneously with the small fliers O, all as shown in Fig. 1 of the drawings. The shaft U is turned by any suitable mechanism.

In lieu of the shaft and belt connection therewith, (shown in the drawings,) a system of gears or any other suitable mechanism for operating the machine may be employed, if preferred.

The operation of my improved machine will be readily understood from the drawings, in connection with the previous description. The strand of rope, made of any number of individual wires, is formed by the revolution of the large flier B, torsion in the individual wires of which the strand is composed being obviated by the simultaneous revolutions of the small fliers O (carrying the delivery-spools) about their own axes, the frame in which said fliers O are placed being stationary.

In operating my improved machine the wire is first wound on the spools P, which are then placed in the small fliers O, so as to turn in delivering the wire. The ends of the wires are then passed under the bar *t*, and between the rolls or buttons of the tension-regulating device R, said buttons being adjusted as desired, and through the holes in the guide-plate N, between the dies M, and through the hollow spindle or end *l* of the flier B, and attached to a cord which passes around the drum J, through the distributor D, to the receiving-spool C. Power being applied to the shaft U, the large flier B and the series of small fliers O are si-

multaneously made to revolve. The drum J, rotating or turning in the manner described, draws the converging wires through the guide-plate N, where, by the combined motions of rotation of the flier B and the drum J, each about its own axis, the wires are laid in parallel helices at the mouth of the dies M, and the strand is formed.

Having described my improvements in wire-rope machines, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination, with flier O, carrying the delivery-spool, and means for operating the same, of the tension-regulating device R, consisting of three or more pins or wheels, *r*, placed out of line with each other, and located upon the flier O, to revolve with said flier, for the purpose stated, substantially as set forth.

2. The combination, with the flier-frame B, carrying a receiving-spool and distributing device, and shaft *e*, operating said spool and distributing device, of the grooved pulley F on said shaft, arm G, a carrier for said arm, cords *f*, means for adjusting the tension thereof, and means for revolving the flier upon its axis and rotating the carrier, substantially as described.

3. The combination, with flier-frame B, carrying a receiving-spool and distributing device, and shaft *e*, operating said spool and distributing device, grooved pulley F on said shaft, arm G, a carrier for said arm, cords *f*, means for adjusting the tension thereof, and means for revolving the flier upon its axis and rotating the carrier, of a series of fliers, O, carrying delivery-spools, and provided with a pin or button tension-regulating device, R, located on said fliers O and revolving with them, and means for revolving said fliers, substantially as set forth.

JAMES B. STONE.

Witnesses:

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