

(No Model.)

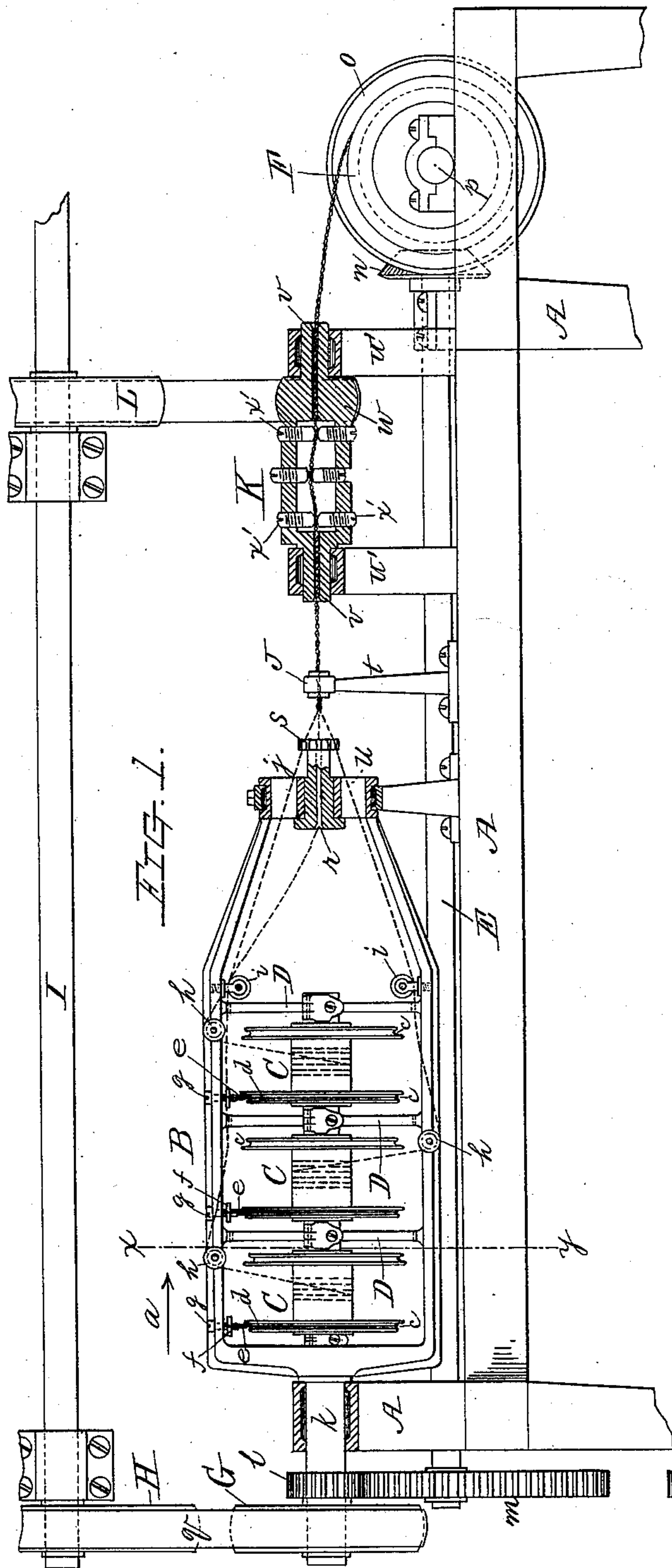
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J. B. STONE.

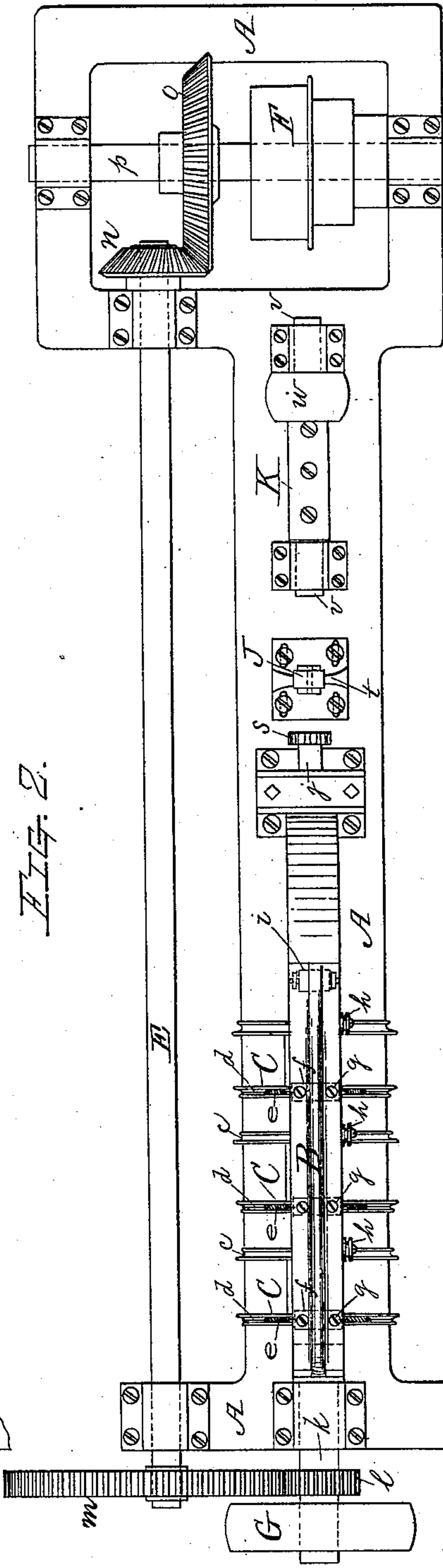
ART OF MANUFACTURING WIRE ROPES.

No. 359,410.

Patented Mar. 15, 1887.



WITNESSES;
Albert A. Barker.
Walter B. Nourse.



Inventor;
James B. Stone.
By John C. Dewey, Atty.

(No Model.)

2 Sheets—Sheet 2.

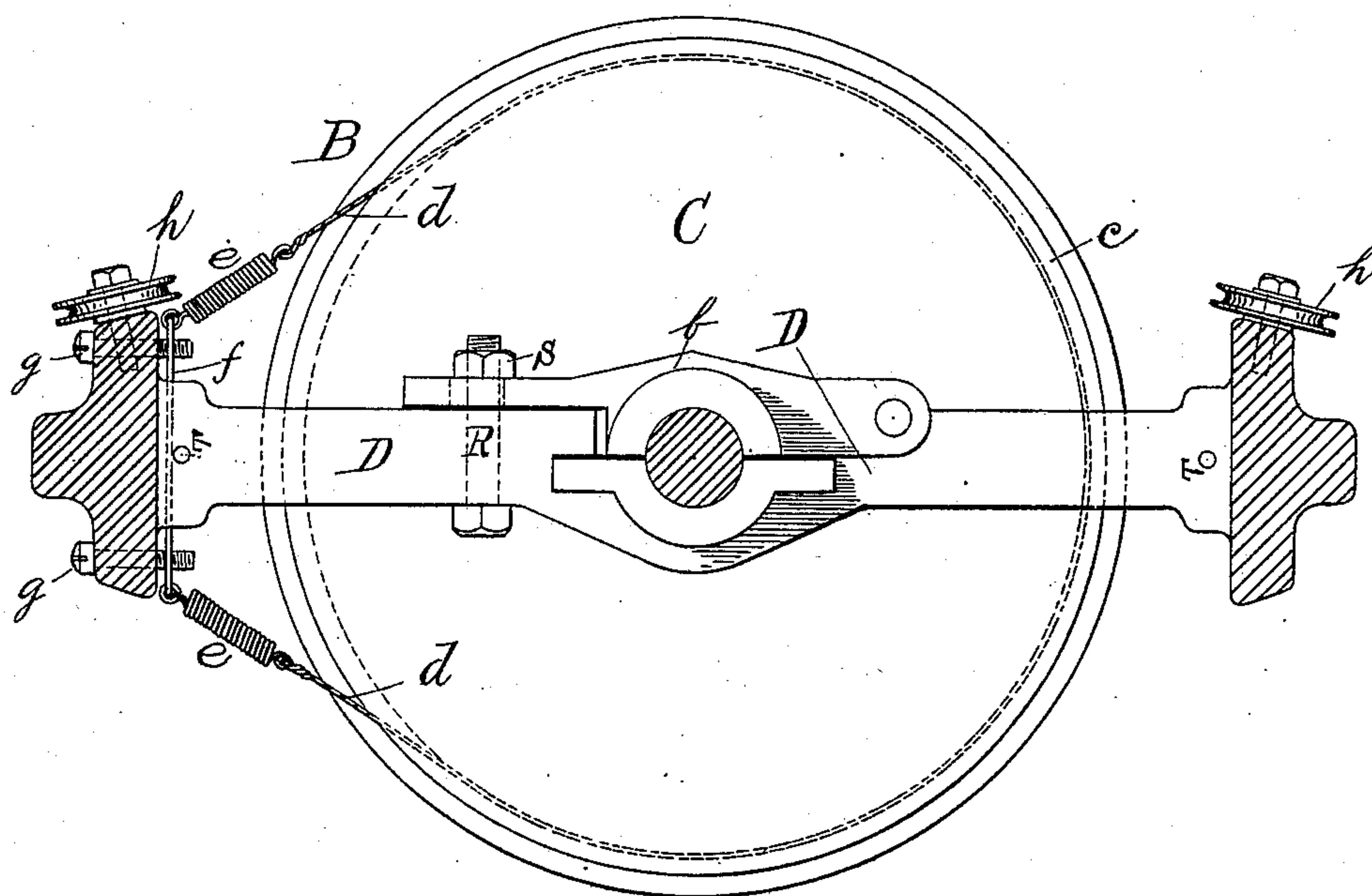
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FIG. 3.



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UNITED STATES PATENT OFFICE.

JAMES B. STONE, OF WORCESTER, MASSACHUSETTS.

ART OF MANUFACTURING WIRE ROPES.

SPECIFICATION forming part of Letters Patent No. 359,410, dated March 15, 1887.

Application filed October 11, 1884. Serial No. 145,217. (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 the Art of Manufacturing Wire Ropes and Cables; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to use the same.

My invention relates to the art of manufacturing wire rope, and has for its purpose to obtain a wire rope which will not kink or twist when unwound from the receiving-spool for use.

Heretofore in the manufacture of wire rope it has been customary, as one step of the process of the manufacture thereof, to remove torsion from each individual wire before the several wires were twisted together to form the rope. The mechanical means necessary to remove the torsion from each individual wire before the several wires were twisted together made the process of twisting the wires together a comparatively slow one. Still it was thought necessary to remove the torsion from each individual wire before the several wires were twisted together, for the reason that if a rope is made with torsion in the individual wires each wire has on that account inherent in it a tendency to kink and twist; so, also, will the completed rope formed of the several wires twisted together have a tendency to kink and twist.

By my invention I do away with the removing of torsion from each individual wire before the several wires are twisted together, and at the same time render the twisted rope free from any liability or tendency to kink or contort when removed from the receiving-spool. The great advantage of this will be readily appreciated by those skilled in the art, for by doing away with the mechanical means necessary for removing torsion from each individual wire before the several wires are twisted together greatly-increased speed is rendered possible in twisting together the wires, thus increasing the amount of production. I have discovered that by passing a rope made of two or more individual wires twisted together, without the torsion being removed from the

individual wires, through what is termed a "straightener" or "straightening device," properly adjusted, of any well-known form, construction, and operation, now in general use for straightening wire by giving alternate bends to the wire, all tendency of the rope to kink or contort is removed.

Briefly, my invention consists in twisting together two or more wires and then passing the twisted wires through a straightening device, giving alternate bends thereto, for the purpose of removing the tendency to kink and contort therefrom before the same are wound upon the receiving-spool, all in one continuous operation.

I have spoken of wires, meaning single individual wires; but it will be readily seen that my invention may also be employed when, instead of individual wires, wire strands made up of any number of wires are used to form a rope.

Any well-known means for carrying out my invention may be made use of, it requiring, first, means for twisting together two or more wires or wire strands; second, means for removing from the twisted wires or twisted strands after they are twisted together the tendency to kink or contort by giving alternate bends thereto; and, third, means for receiving and winding up the same, all in one continuous operation.

The following description, together with the drawings, describes and shows one form of a machine for practically carrying out my improvement, and the claims indicate the nature of such improvement.

Referring to the drawings, Figure 1 represents a side view of a machine adapted to carry out my invention, some of the parts thereof being shown in section to more clearly illustrate the same. Fig. 2 is a top or plan view of the machine shown in Fig. 1, the operating-shaft being left out in this figure; and Fig. 3 represents, on an enlarged scale, a cross-section on line *x y*, Fig. 1, looking in the direction of arrow *a*, same figure.

In the drawings, A is the frame of the machine, provided with suitable uprights and bearings for the several parts of the machine.

B is a large revolving flier for carrying a series of delivery-spools, C, upon which the individual wires of which the strand is formed,

or the strands of which the rope is formed, are wound. Said spools C revolve with the flier B as the same is revolved to twist together the wires to form the strand, and also revolve independently upon their own axes in the same direction in bearings formed upon the cross-bars D of the frame of the flier B as the wire is drawn off from said spools. The top parts or caps, *b*, of the bearings for the spools C on the cross-bars D are hinged or pivoted thereto, and held down when the spools are in place by means of a bolt, R, and nut S, as clearly shown in Fig. 3, the object of which is to allow of the spools or bobbins C being readily removed from the flier B for any purpose.

The ends or sides *c* of the spools C are grooved, as shown in the drawings, for the purpose of holding in place a cord, *d*, which passes around one end of each spool and acts, in connection with springs *e*, attached thereto, and which are secured to the flat piece *f*, held in place on the frame of the flier B by bolts *g*, passing through the same, (all as clearly shown in Fig. 3 of the drawings,) as a tension device for keeping the wire tight as the spools C revolve and the wire is drawn off therefrom and is operated by tightening or loosening the cord *d* by turning in or out the bolts *g*. On the frame of the flier B are secured, in any suitable manner, small guide-pulleys *h*, as shown, over which the wire passes as it is drawn from the spool C, a pulley, *h*, being provided for each spool. There are also two guide-pulleys, one on each side of the flier B, as shown in Fig. 1, over which the several wires pass before converging and passing through the perforated cylindrical head or end *j* of the flier B. There are also one or more holes, T, in each end of the cross-bars D of the flier B, through which the individual wires pass, as is customary, to prevent their being entangled and to guide them properly.

The flier B revolves in bearings on the frame A, the end *k* extending out beyond the bearing and having a small gear, *l*, secured thereto, for meshing with and turning a large gear, *m*, secured to a shaft, E, turning in bearings on the frame A to operate, by means of bevel-gears *n* and *o*, the drum F, by means of which the strand is drawn through the machine, and which is secured to a shaft, *p*, turning in bearings on frame A. (See Fig. 2.) A pulley, G, is also secured to the end *k* of flier B, which is connected by a belt, *q*, with a pulley, H, on the shaft I, which is operated by any suitable means.

The head or end *j* of the flier B is made sufficiently large, and is provided with a suitable number of openings or holes, U, through which the wires pass. There is a central opening or hole, *r*, through which the central or core wire passes, and also a grooved circular end or head, *s*, secured to the central part of the end *j* in any suitable manner, and having a hole through the center thereof for the purpose of keeping the wires separated and in their proper relative positions before they are twisted to-

gether at a point between said head *s* and the stationary adjustable dies J, which are constructed and operated in the usual manner, and secured in a suitable upright, *t*, on the frame A.

The part marked K in the drawings is a revolving wire-straightener of the usual and well-known construction and operation. It may be located at any point on the machine between the dies J, where the twisted strand is formed, and the draw-off drum F, upon which it is wound. By passing the twisted strand, which has been made without any reference to or means for removing the torsion put into the wires in twisting them together—such as are usually employed in wire-rope machines—through the straightener K, as shown in the drawings, before the completed strand or rope is wound upon the draw-off drum, any tendency or liability of the strand or rope to twist or kink (by reason of the torsion put into the individual wires in twisting them together) after the strand or rope is taken off of the draw-off drum, or the receiving-spool upon which it is wound after passing from the draw-off drum to said spool or spools, is overcome and removed.

The wire-straightener K (shown in the drawings) has hollow ends *v*, which turn in bearings formed in the uprights *u'* on the frame A, the central part of the straightener being larger than the ends, and a pulley, *w*, being formed at one end, connected by a belt with a pulley, L, on shaft I, by which belt-connection the wire-straightener K is revolved simultaneously with the flier B. Through holes or threaded openings in opposite sides of the straightener K extend adjustable screws *x'*, between the grooved ends of which the twisted strand or rope passes, the degree of curvature or deflection of the strand being varied as desired by adjusting the screws *x'*.

I prefer and intend in practice to locate the straightening device on the machine between the dies where the twisted strand is formed and the draw-off drum; but it may be located between the draw-off drum and the receiving spool or spools.

The machine shown in the drawings adapted to carry out my invention is designed to make a strand or rope composed of three individual wires; but the same result would be accomplished—namely, the removing of the tendency to kink and contort from the wires after they are twisted together—if, instead of single wires, wire strands, or strands made up of any number of wires, were used to form a rope or cable.

I do not seek to claim in this application any part of the machinery or mechanical devices shown and described, but only my improved process or method of making wire rope composed of two or more single wires twisted together, or of two or more strands made up of several wires twisted together.

Having thus described my invention, what I claim is—

1. The improvement in the art of manufac-

5 turing wire rope, which consists in first twist-
ing together two or more wires and then pass-
ing the twisted wires through a straightening
device for the purpose of removing the tend-
ency to kink and contort therefrom before
the same are wound upon the receiving spool,
all in one continuous operation, substantially
as set forth.

10 2. The improvement in the art of manufac-
turing wire rope, which consists in first twist-
ing together two or more wire strands made
up of any number of wires, and then passing
the twisted strands through a straightening
device, for the purpose of removing the tend-
15 ency to kink and contort therefrom before
the same are wound upon the receiving spool,
all in one continuous operation, substantially
as set forth, and for the purpose stated.

20 3. The improvement in the art of manufac-
turing wire rope, which consists in first twist-

ing together two or more wires and then giv-
ing alternate bends to the twisted wires for
the purpose of removing the tendency to kink
and contort therefrom before the same are
wound upon the receiving spool, all in one con- 25
tinuous operation, substantially as set forth.

4. The improvement in the art of manufac-
turing wire rope, which consists in first twist-
ing together two or more wire strands made
up of any number of wires, and then giving 30
alternate bends to the twisted strands for the
purpose of removing the tendency to kink and
contort therefrom before the same are wound
upon the receiving spool, all in one continuous
operation, substantially as set forth, and for 35
the purpose stated.

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