No. 724,571. PATENTED APR. 7, 1903.

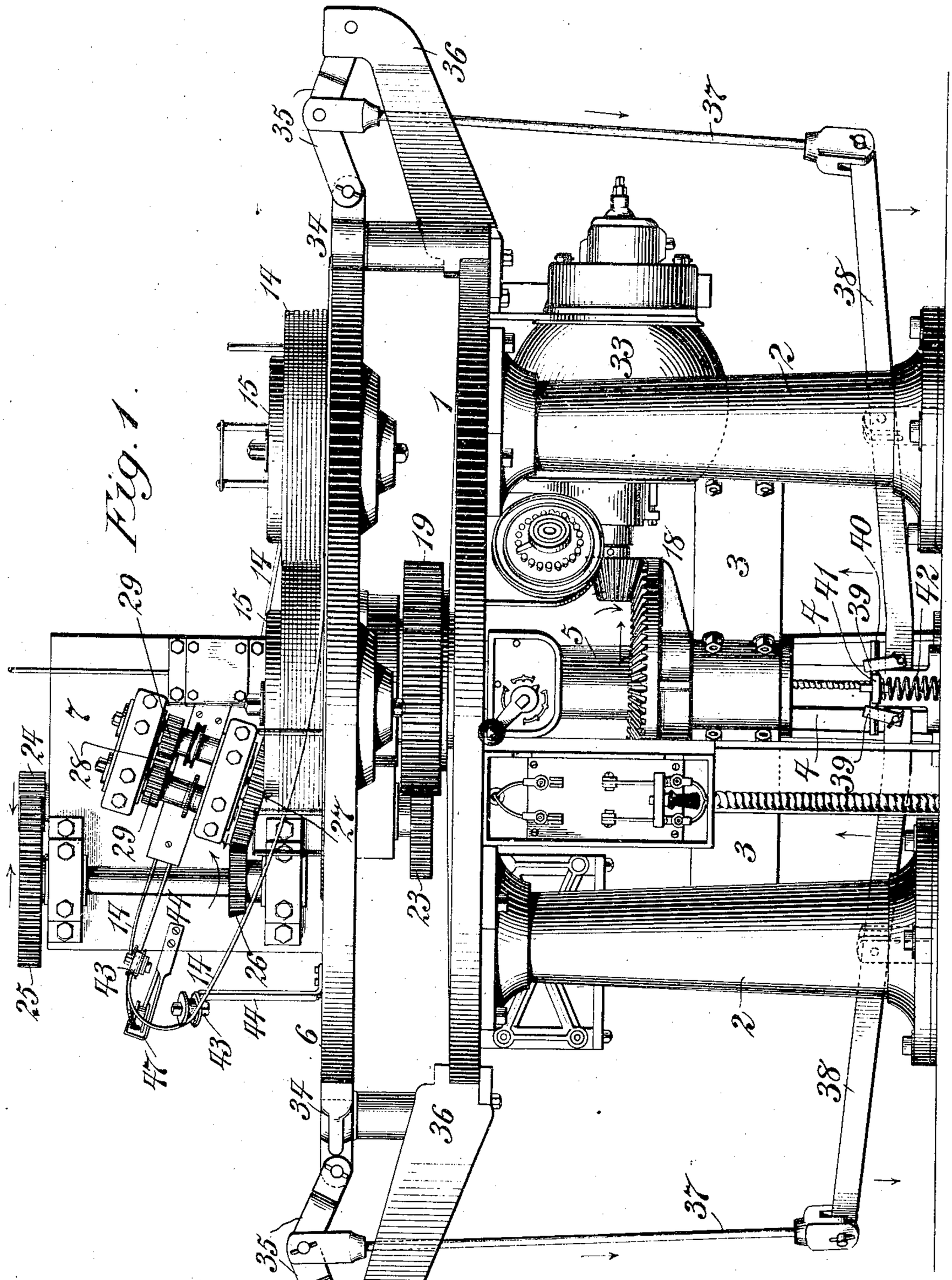
E. T. GREENFIELD.

MACHINE FOR MAKING ARMORED ELECTRIC CABLES.

APPLICATION FILED JULY 31, 1902.

NO MODEL. 6 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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NO MODEL. 5 SHEETS—SHEET 2.

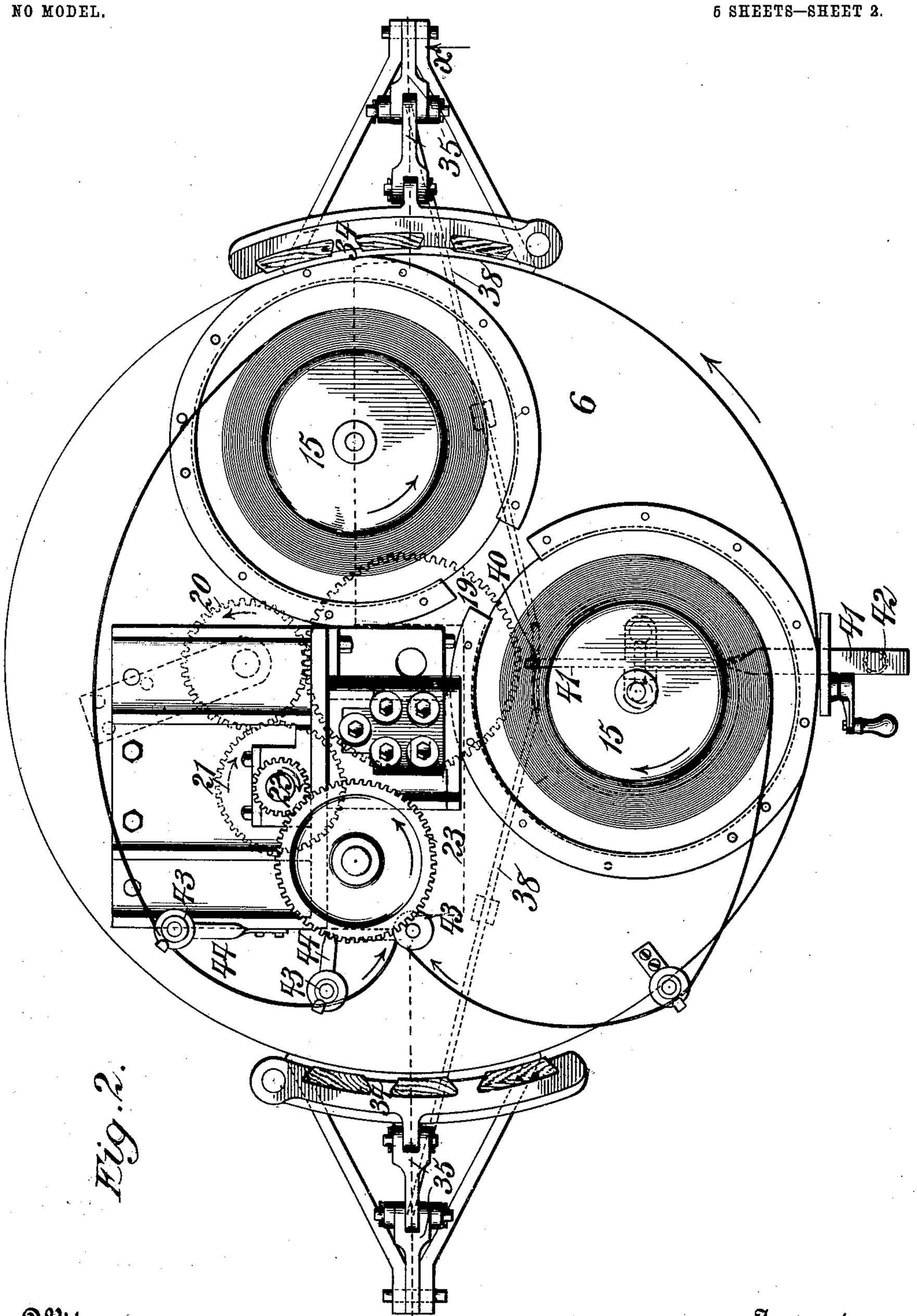

Fig. 2.

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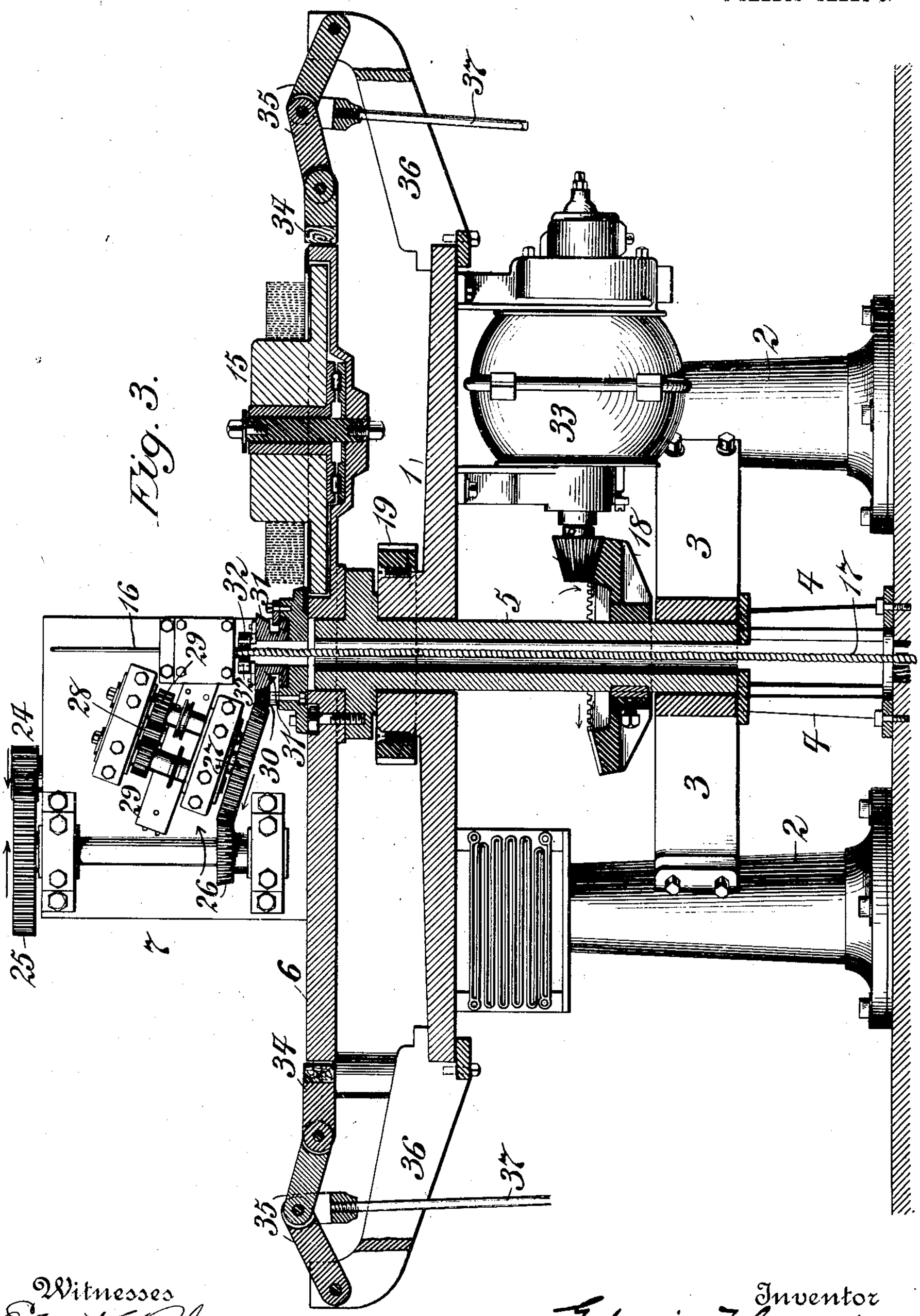
NO MODEL. 5 SHEETS—SHEET 3.

Fig. 3.



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NO MODEL. 5 SHEETS—SHEET 4.

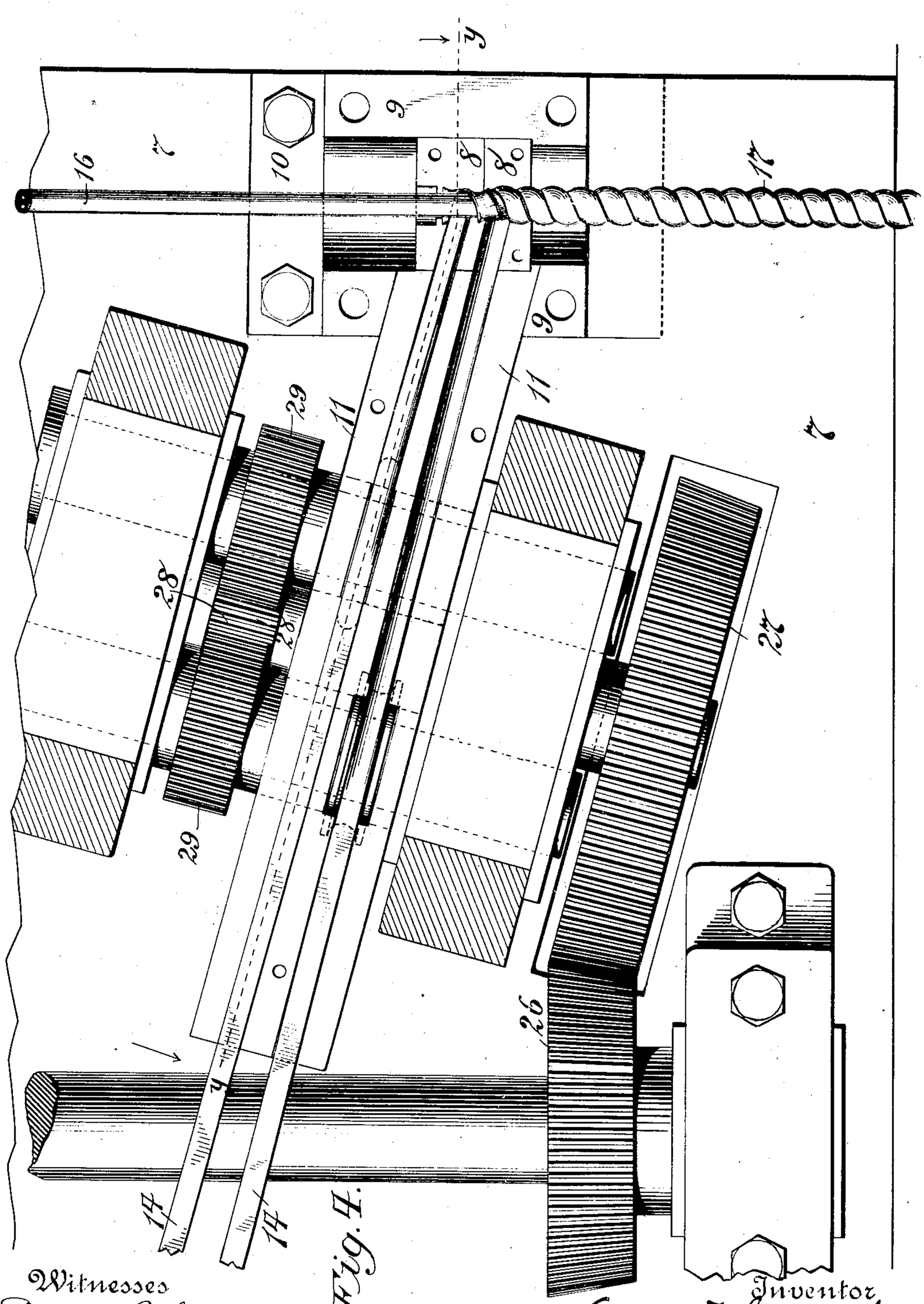

Fig. 4.

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No. 724,571. PATENTED APR. 7, 1903.

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APPLICATION FILED JULY 31, 1902.

NO MODEL. 5 SHEETS—SHEET 5.

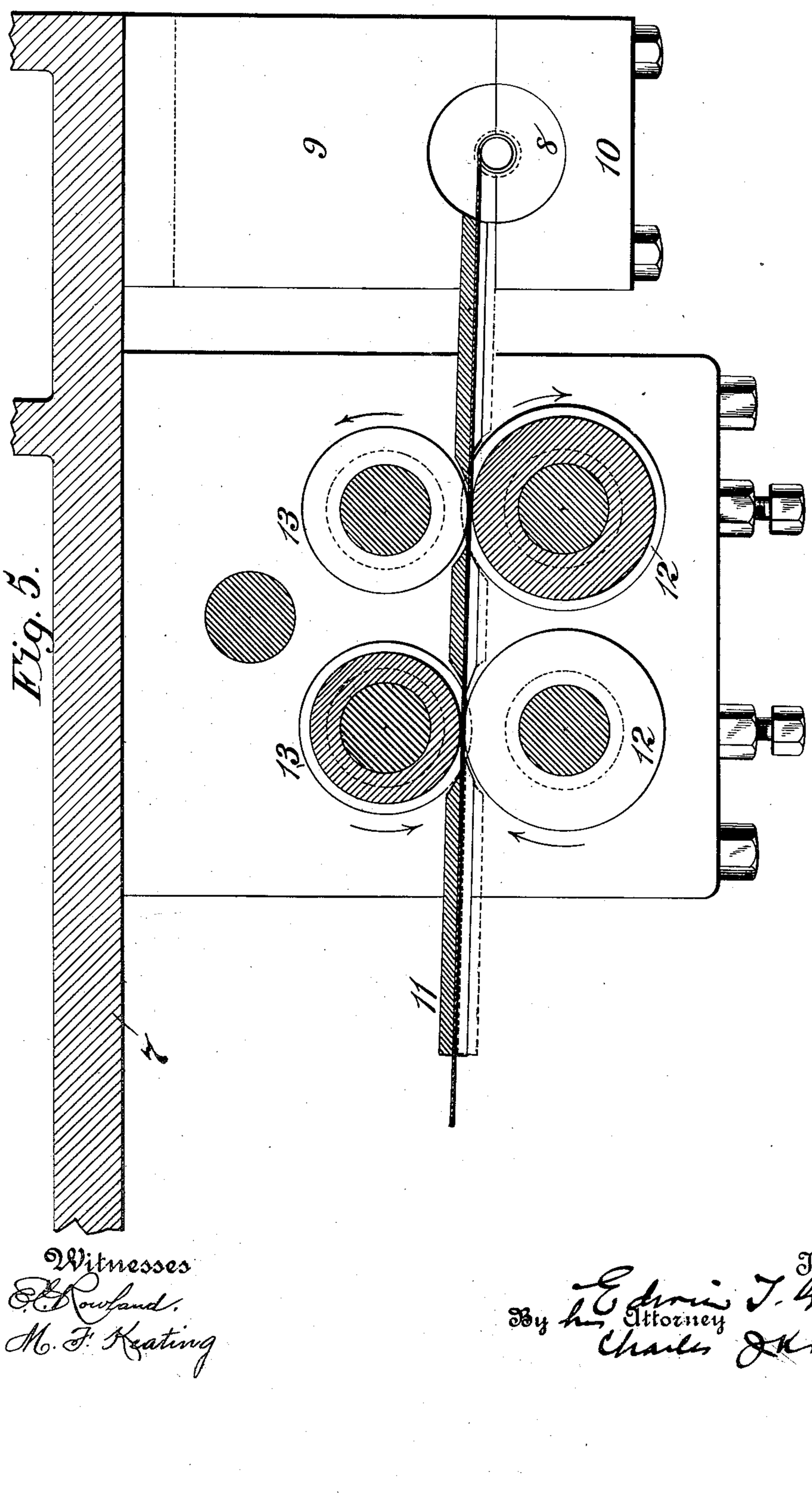

Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWIN T. GREENFIELD, OF MONTICELLO, NEW YORK.

MACHINE FOR MAKING ARMORED ELECTRIC CABLES.

SPECIFICATION forming part of Letters Patent No. 724,571, dated April 7, 1903.

Application filed July 31, 1902. Serial No. 117,810. (No model.)

To all whom it may concern:

Be it known that I, EDWIN T. GREENFIELD, a citizen of the United States, residing at Monticello, county of Sullivan, and State of New York, have made a new and useful Invention in Machines for Manufacturing Armored Electric Cables, of which the following is a specification.

My invention is directed particularly to improvements upon the cable-armoring or tube-forming mechanism disclosed in United States Patents Nos. 630,502 and 630,503, granted to me on the 8th day of August, 1899; and it has for its object the manufacture of armored electric cables of great lengths—such, for instance, as are used in ocean telegraphy or in various conductor systems of electricity.

With the mechanism disclosed in my before-mentioned United States Patent No. 630,502 only a limited amount of cable may be armored, owing to the fact that with such mechanism the cable is rotated as it is armored and is wound upon a reel, which also rotates with it. It is obvious, therefore, that a cable of great length cannot be thus armored, owing to the immense mass or weight thereof, as it is wound upon the reel.

The essential feature of my present invention is therefore to permit of the manufacture of this type of cable in such lengths as can conveniently be transported from place to place, the weight of the same when completed constituting the only limit as to the length of cable thus armored.

In using the improved mechanism hereinafter described and claimed the armoring mechanism and armoring material rotate around the cable and the latter does not rotate, but is fed continuously forward by the armoring action, so that it is possible to armor a cable of indefinite length.

For a full and clear understanding of the invention, such as will enable others skilled in the art to construct and use the same, reference is had to the accompanying drawings, in which—

Figure 1 is a side elevational view of the entire machine. Fig. 2 is a plan view thereof as seen looking at Fig. 1 from the top toward the bottom of the drawing, some of the driving gear-wheels and the brake-controlling levers being shown in dotted lines. Fig. 3 is a sectional view taken on the broken line *x x*, Fig. 2, and as seen looking thereat from the bottom toward the top of the drawing in the direction of the arrows. Fig. 4 is an enlarged plan view of that part of the mechanism which controls the movements of the armoring-strips, the interior of the dies being also illustrated in this view with the top die removed and an insulated electric cable shown in position in the act of being armored. Fig. 5 is a sectional view taken through the feeding-rolls, one of the metallic armoring-strips, the trough in which is located the guideways for said strips, and that portion of the frame which supports all of said parts, the dies being shown in this figure in end elevational view.

Referring now to the drawings in detail and first to Figs. 1 to 3, inclusive, 2 2 represent the legs or standards of the machine, preferably four in number, secured directly to the floor by bolts, and 1 the base or frame thereof, secured in turn in a similar manner directly to the upper ends of said legs or standards.

6 represents a rotary table, made, preferably, of iron and secured directly by bolts to the upper end of a hollow rotatable shaft 5, journaled at its upper end in the frame 1 and at its lower end in a spider having radial arms 3 3, secured directly to the legs 2 2, the lower end of said shaft resting directly upon a metal bearing which is supported in turn by a number of metal standards 4 4, rigidly secured directly to the floor, as clearly illustrated in Figs. 1 and 3. The rotary table 6 carries upon its upper surface all of the mechanism and material for effecting the armoring of the cable, and said mechanism and material are rotated therewith as the insulated cable 16 passes downward into the armoring-dies and out of the latter as a completed armored cable 17 through an opening in the floor beneath the machine, as will be more particularly described in connection with the description of the mode of operation of the entire machine.

15 15 are reels for carrying the thin metallic armoring-strips 14 14, said reels being of cylindrical form, with their lower faces resting upon roller-bearings in grooves in cylindrical depressions in the upper face of the rotary table 6, the reels being held in position by adjustable screws, as clearly illustrated in Fig. 3.

43 43 43 are guide-rolls secured directly to

the rotary table 6 and standard 7 by rigid arms 44 44 44, their function being to guide the armoring-strips to the guideways before they enter the armoring-dies.

33 is an electric motor or equivalent source of power secured beneath the frame 1 of the machine and having on one end of its armature-shaft a beveled pinion adapted to drive a bevel gear-wheel 18, secured directly to the hollow shaft 5.

19 is a gear-wheel journaled directly to an upward extension of the frame 1, said gear-wheel meshing with a gear-wheel 20, which in turn is adapted to drive a gear-wheel 21 and a pinion 22, carried upon the same shaft and meshing with an additional gear-wheel 23, carried by another shaft having upon its upper end a pinion 24, meshing with a gear-wheel 25 upon a shaft carrying a beveled pinion 26, which meshes with a bevel gear-wheel 27 upon a shaft carrying at its other end a pinion 28, meshing with pairs of gear-wheels 29 29, adapted to drive two pairs of feeding-rolls 12 12 13 13 in such manner as to feed the metal armoring-strips 14 14 through the guideways in the trough 11 to the dies 8 8, said trough, dies, and supports 9 and 10 for the dies, together with the immediately-connected gearing and pinions 20 to 29, inclusive, being supported and carried by the rotary table 6, so that the gear-wheel 20 as it rotates around the gear-wheel 19 will impart motion to all of the interconnected gearing. The dies 8 8, trough 11, feeding-rolls 12 12 13 13, and guideways in the trough are substantially like the same parts disclosed in the before-mentioned patents and need no further description here, the invention in the present instance consisting, as hereinbefore indicated, in mechanism for adapting these parts disclosed in my before-mentioned patents to armor a cable or a tube or to manufacture a flexible tube of metal strips and of indefinite length. 30 is a bevel-pinion meshing with the bevel gear-wheel 27 and also with an additional hollow bevel gear-wheel 31, which is journaled in the upper end of a hollow support carried directly by the table 6.

32 32 are friction-rollers, three or more, adjustably secured to the upper face of the hollow bevel gear-wheel 31 and in such manner that they may be brought into frictional relation with the completed cable 17 as it passes downward.

I have described so far sufficient mechanism for effecting the result sought. It is found, however, that with such a mechanism there is necessarily much momentum, owing to the weight of the table 6 and the mechanism and armoring material carried thereby, and that serious damage may be imparted to the cable upon varying or stopping the application of power to the driving gear-wheel 18. For the purpose of overcoming the evil effects of this momentum I have provided braking mechanism in the nature of two curved brake-shoes 34 34, having movement to and from the outer cylindrical face of the table 6, said brake-shoes being connected by toggle-levers 35 35 to rigid arms 36 36, supported at their inner ends directly by the frame 1.

37 37 are links connected at their upper ends to the toggle-levers 35 35 and at their lower ends to brake-controlling levers 38 38, fulcrumed, as shown, and connected in turn by links 39 39 and a cross bar or pin 40 to a treadle 41 42, being a strong spiral spring for normally maintaining the outer end of the treadle in its upper position and the brake-shoes 34 out of mechanical contact with the cylindrical face of the rotary table 6.

The operation is as follows: The insulated cable 16, as shown in Fig. 4 of the drawings, is passed downward from a supply-reel (not shown) located in a room and on a floor above the machine and in such quantity as may be desired. The armoring-strips 14 14 are wound upon the reels 15 15 and secured in position in the manner shown in Figs. 1 and 3 of the drawings. The free ends thereof are then passed around the guide-rolls 43 43 43 43 and into the guideways in the trough 11 and between the feeding-rolls 12 12 and 13 13 to the dies 8 8, after which the machine is set in motion by applying power in the proper direction in any preferred manner to the bevel gear-wheel 18, thereby rotating the hollow shaft 5, and hence the rotary table 6, in the direction shown by the arrow in Fig. 2 of the drawings. Consequently the gear-wheel 19 imparts motion to the several gear-wheels 20, 21, 23, 24, 25, 26, and 27 in the directions indicated by the arrows, thereby imparting to the two pairs of feeding-rolls 12 12 and 13 13 motion in the proper directions to feed said strips forward to the dies in the same manner as disclosed in my before-mentioned patents. Hence as the table rotates around the cable 16 it is armored and drawn forward by the armoring action of the mechanism, passing downward through the hollow shaft 5 and opening in the floor as a completed article 17. At the same time motion is imparted by the gear-wheel 27 to the bevel-pinion 30 and from it to the bevel gear-wheel 31, thus causing the friction-rollers to prevent the cable from being unnecessarily twisted or strained by the armoring action already described. In other words, the friction-rollers act as a brake upon the forward or twisting action due to the pressure of the armoring action upon the suspended insulated cable 16, so that as the cable is thus armored it passes out and is received and stored in a room below in such quantity as may be desired. Should there be any tendency for the rotary table and its supported mechanism and armoring material to run "wild" by reason of its momentum, the attendant simply applies the brake by placing his foot upon the treadle 42, thereby causing the brake-shoes to come into mechanical contact with the lateral face of the rotary table through the agency of the connecting mechanism described and shown.

When the supply of armoring-strips becomes exhausted, it is only necessary to supplant the reels shown in the drawings with an additional pair of reels having a further supply of armoring-strips and to splice the outer or free ends of said strips by brazing or in any other well-known manner to the ends of the strips already used, after which the process of armoring is continued as before. In a similar manner when it becomes necessary to add further cable it is only required to splice and insulate the adjoining end of an additional cable to the end of the one already being armored in a manner well understood by those skilled in the art. In this way armored cables may be constructed of any desired length.

I do not limit my invention to the specific details of construction illustrated in the accompanying drawings and hereinbefore described. I believe it is broadly new with me to armor a cable of indefinite length by forcing one or more armoring-strips through dies around the cable in the manner disclosed in my before-mentioned patents and to carry the mechanism which thus effects the armoring and the supply of material for such apparatus continuously around the cable to be armored, and in this generic feature lies the essence of this invention; nor do I limit my invention to the armoring of electric cables, as it may obviously be utilized in the manufacture of flexible tubes of indefinite length composed of one or more metal strips forced through dies in a manner hereinbefore described, and my claims are designed to be of such scope as to include the manufacture of such tubes.

I make no claim in the present application to the method of operation practiced by the mechanism herein disclosed for armoring electric cables of indefinite length, as such a method constitutes the subject-matter of a separate application filed by me in the United States Patent Office on the 31st day of July, 1902, bearing Serial No. 117,809.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. Mechanism for armoring insulated electric cables of indefinite lengths, consisting of a rotary table and an armoring die or dies, and means for supporting the armoring material, all carried by said table; in combination with means for imparting rotary motion to the table and forward motion to the armoring material through the dies, substantially as described.

2. Mechanism for armoring insulated electric cables of indefinite lengths, consisting of a rotary table and means for rotating it continuously in one direction; in combination with an armoring die or dies and one or more reels for supporting an armoring strip or strips, said die or dies and reels being supported by the table and adapted to rotate therewith, substantially as described.

3. Mechanism for armoring insulated electric cables of indefinite lengths, consisting of a rotary table and means for rotating it continuously in one direction; in combination with an armoring die or dies and means for supporting the armoring material, all carried by the table; together with braking mechanism for braking the forward motion of said table, substantially as described.

4. Mechanism for armoring insulated electric cables of indefinite lengths, consisting of a rotary table supported by a hollow shaft geared to a source of power; in combination with an armoring die or dies and means for supporting a supply of armoring material, all of said parts being carried by the table, substantially as described.

5. Mechanism for armoring insulated electric cables of indefinite lengths, consisting of a rotary table, armoring mechanism of die-like construction, means for supporting a supply of armoring material, and means for forcing said armoring material through the die-forming mechanism and around the cable; in combination with means carried also by the table and acting frictionally upon the completed armored cable in such direction as to prevent the same from being unduly twisted as it is fed forward, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN T. GREENFIELD.

Witnesses:
WILLIAM T. RUETE,
CHARLES J. KINTNER.