(No Model.)

4 Sheets—Sheet 1.

J. KRUESI.

MACHINE FOR INSULATING ELECTRICAL CONDUCTORS.

No. 288,454. Patented Nov. 13, 1883

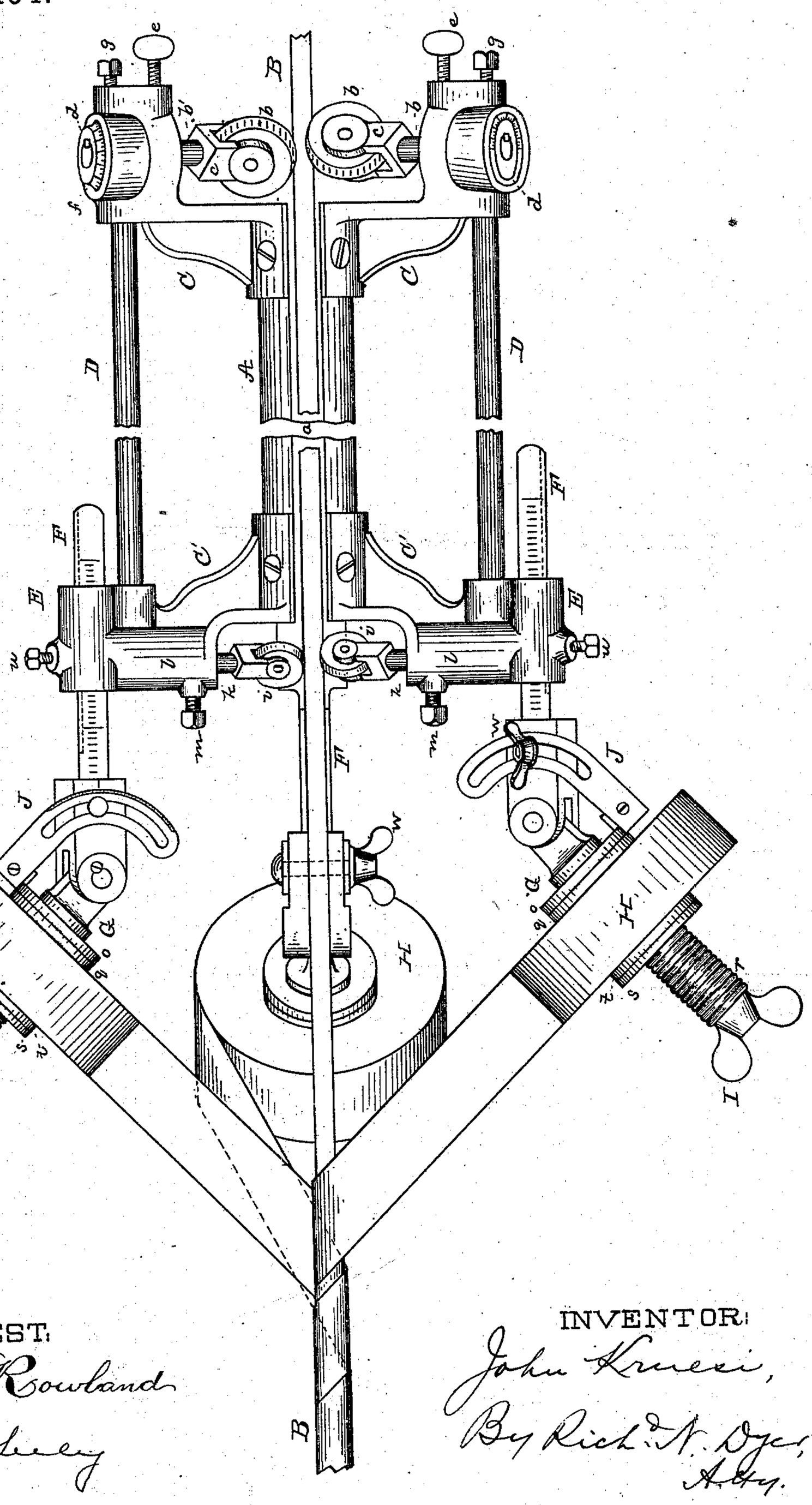

Fig. 1.

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W. C. Dewey

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Fig. 2.

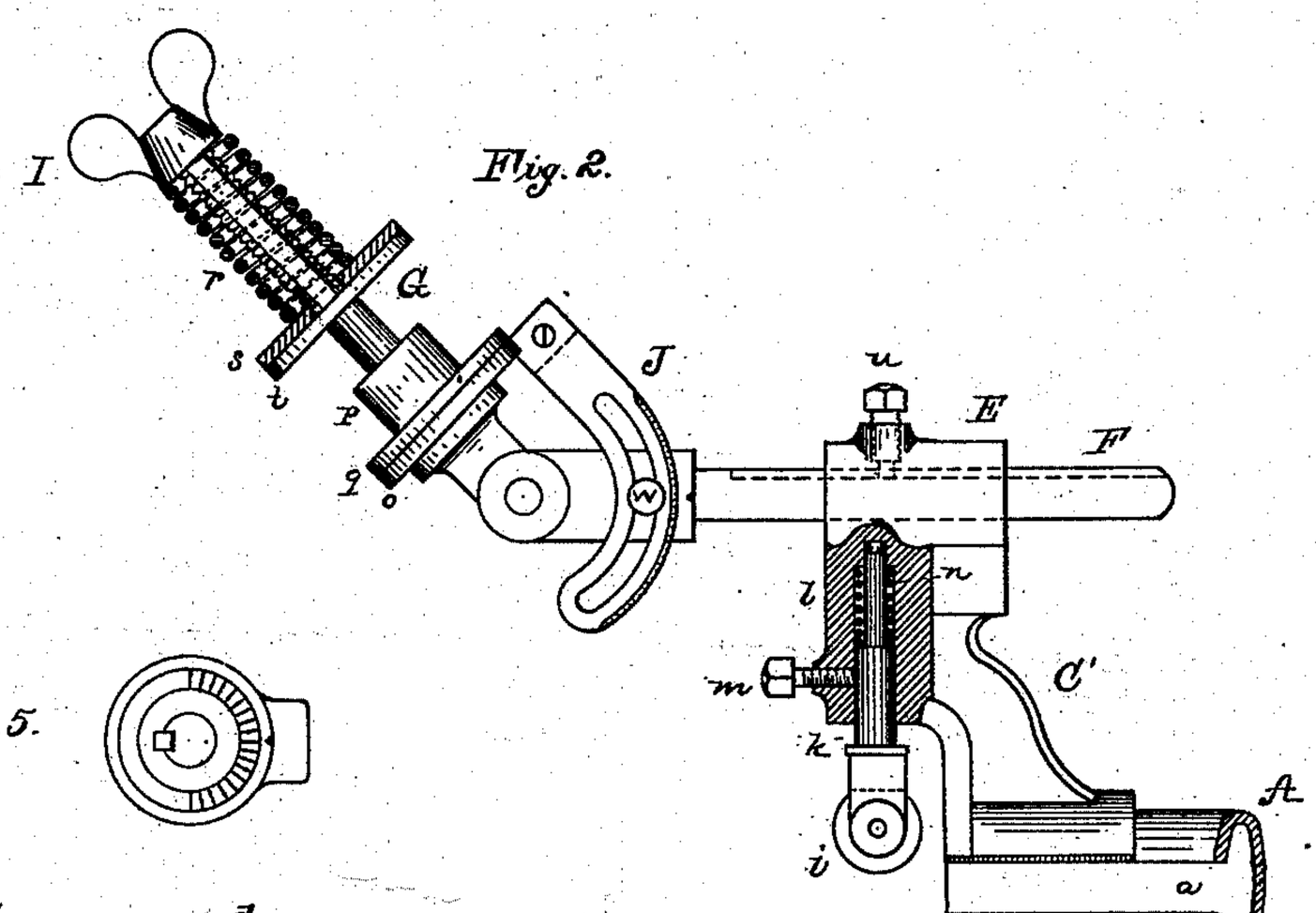


Fig. 5.

Fig. 4.

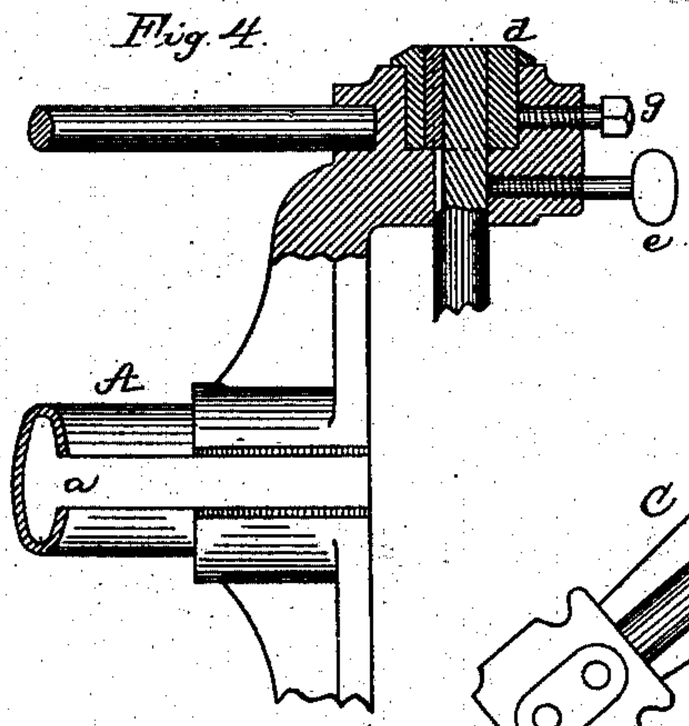
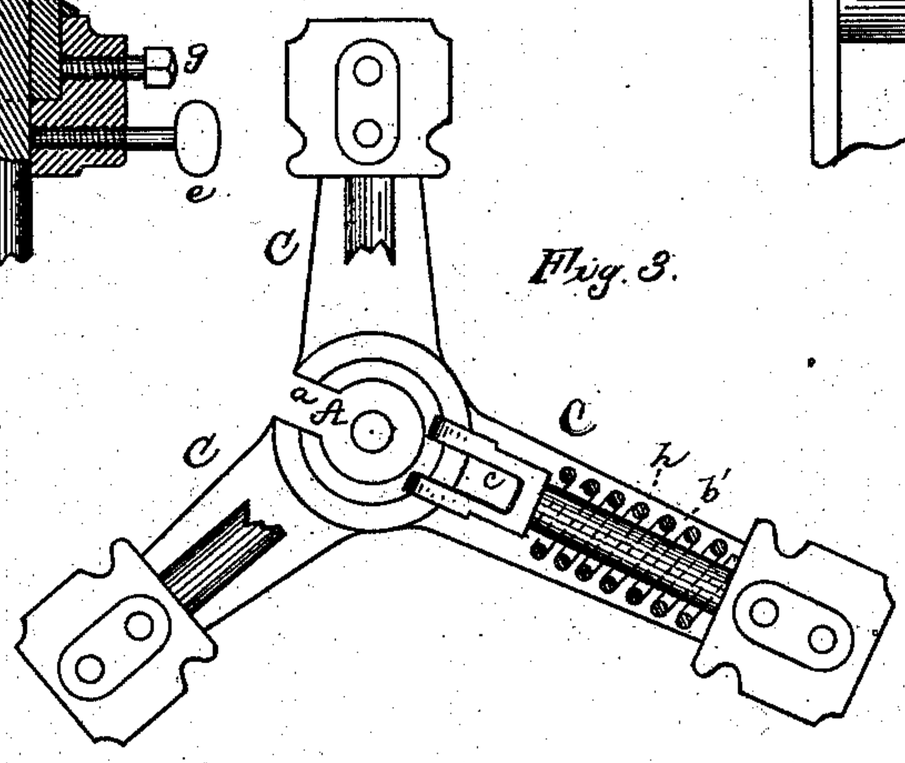


Fig. 3.



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MACHINE FOR INSULATING ELECTRICAL CONDUCTORS.

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Fig. 6.

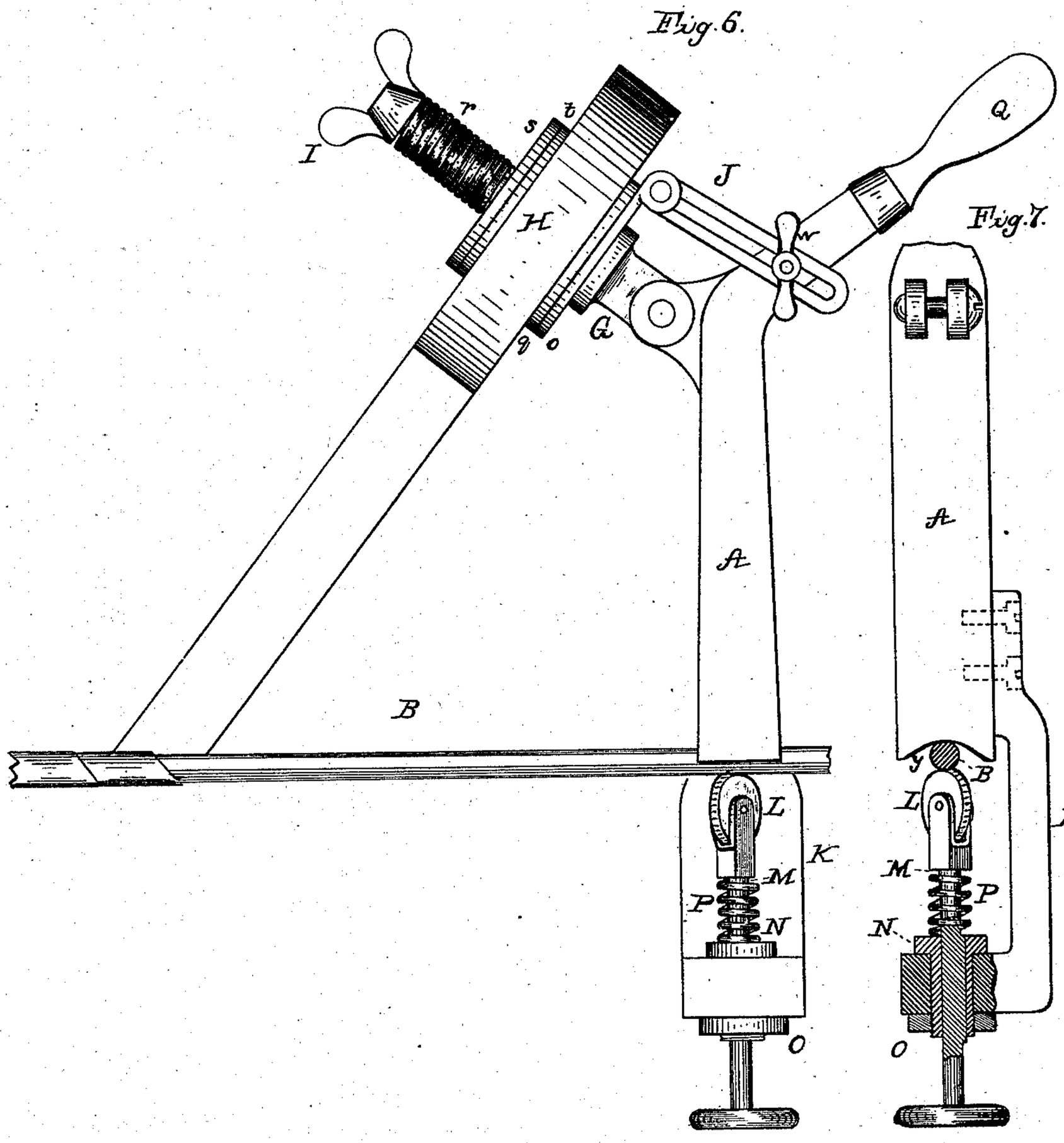

Fig. 7.

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MACHINE FOR INSULATING ELECTRICAL CONDUCTORS.

No. 288,454. Patented Nov. 13, 1883.

Fig. 8.

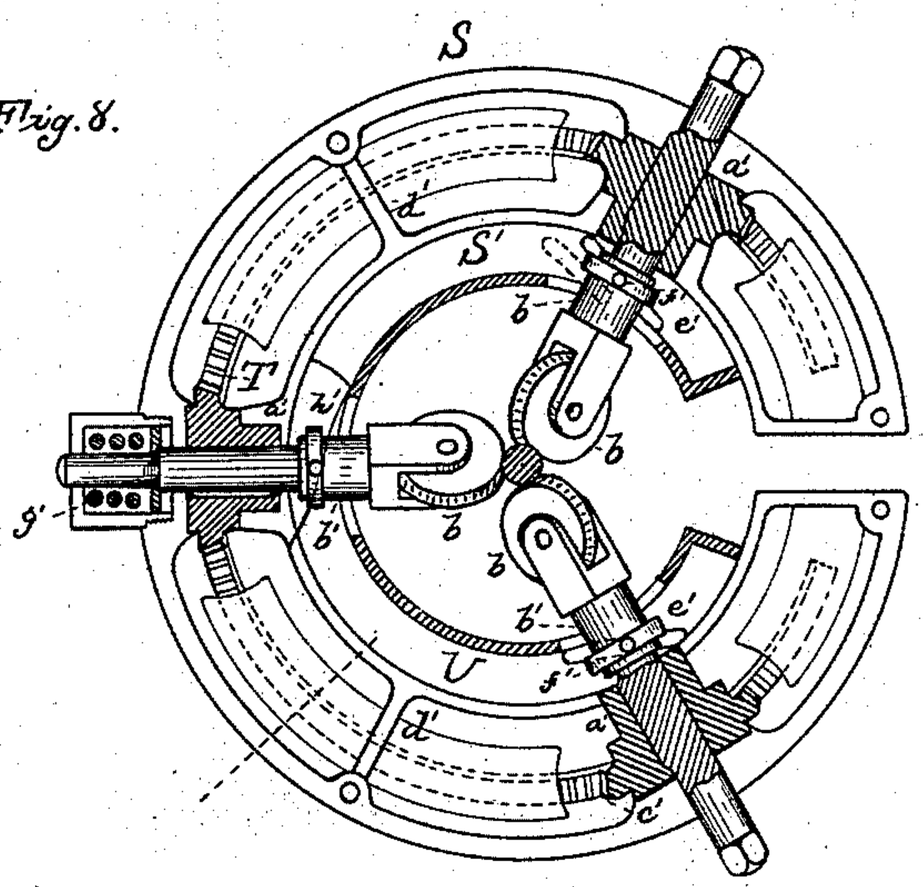

Fig. 9.

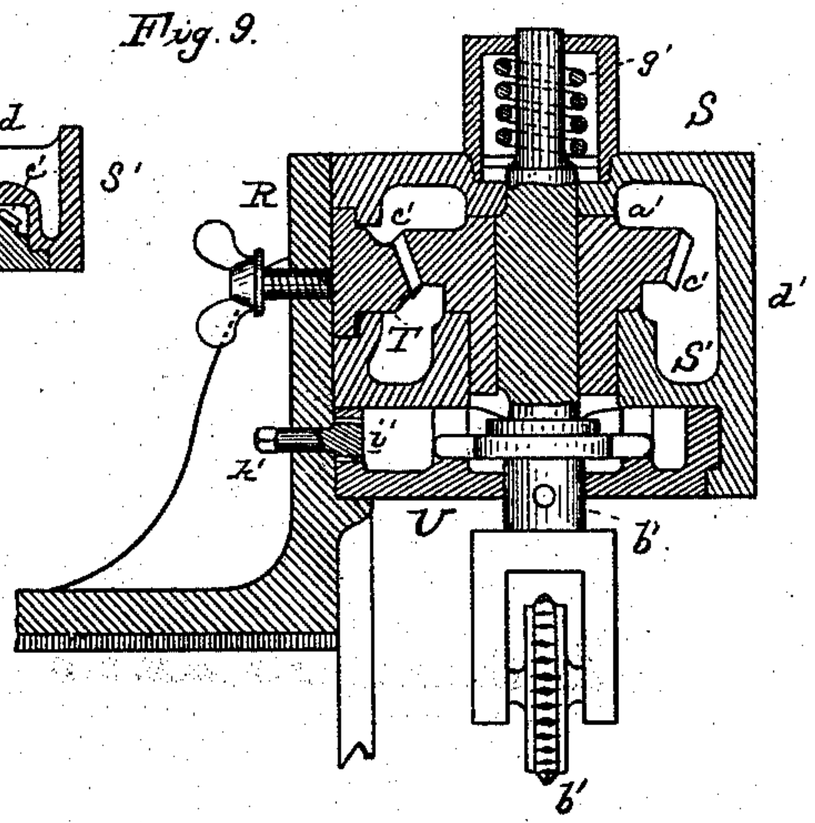

Fig. 10.

ATTEST:

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UNITED STATES PATENT OFFICE.

JOHN KRUESI, OF BROOKLYN, ASSIGNOR TO THE ELECTRIC TUBE COMPANY, OF NEW YORK, N. Y.

MACHINE FOR INSULATING ELECTRICAL CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 288,454, dated November 13, 1883.

Application filed April 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN KRUESI, of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Machines for Insulating Electrical Conductors, of which the following is a specification.

The object I have in view is to provide an apparatus by means of which electrical conducting-wires which have already been placed in position upon poles may be wrapped with an insulating-covering, or with strengthening-wires, without severing or detaching the wire at any point.

Generally speaking, the machine which I prefer to use consists of an open or hinged body which can be placed over or upon the wire. Such body is provided with propelling or feed rollers which rest obliquely upon the wire, so that when the body is revolved upon the wire it feeds itself along, and also with guide-rollers which assist in centering the body upon the wire. The body also carries a suitable number of tape-holders for holding the coils of insulating-tape, which is the preferable insulating substance, and which unwinds from the holders and wraps itself around the wire as the machine feeds forward. The angle of obliquity of the feed-rollers is adjustable to vary the rapidity of the feed, and such rollers are also adjustable perpendicularly to the wire, to allow the machine to be used for wires or cables of different sizes. One or more of the feed-rollers should be held against the wire by a spiral spring, so that if any bend, enlargement, or irregularity in the wire occurs the roller will give and pass over it, instead of stopping the machine. The guide-rollers are also perpendicularly and angularly adjustable, and should be provided with one or more spiral springs, for the purpose just mentioned. The tape-holders are independently adjustable in different directions, so that the tape can be wound tightly or loosely or in any spiral, or any pitch can be given to the winding. The feed-rollers may be independently adjustable, or may be connected so as to be adjusted simultaneously. I prefer to employ three feed-rollers, three guide-rollers, and three tape-holders, though I do not confine myself to these numbers. It is evident that one or more of the tape-holders may be disconnected, if desired. I have also devised a smaller machine, which may be used when it is desired to wind only one strand of insulation upon the wire. In this the body of the machine is placed perpendicularly upon the wire, having a groove or slot in its end in which the wire travels. An arm attached to the body passes around the wire and carries a single adjustable roller, which bears upon the wire opposite the end of the body. A single adjustable tape-holder is also carried by the body, and a handle is provided for turning the whole upon the wire, feeding the machine along and winding the tape spirally upon it.

It is evident that my invention can be applied to the winding of other insulating-coverings than tape upon wires or to the winding of one wire upon another for strengthening it.

The invention is illustrated in the annexed drawings, in which Figure 1 is a view in elevation of the preferred apparatus; Fig. 2, a partial section and partial elevation, showing a guide-roller and a tape-holder with their adjusting devices; Fig. 3, an end view and partial section, showing the arrangement of the feed-rollers; Fig. 4, a section illustrating the adjusting devices of a feed-roller; Fig. 5, a top view of the same; Fig. 6, a side elevation of the small machine with one tape-holder; Fig. 7, an end view and partial section of the same without the tape-holder and handle; Fig. 8, an end view of the machine provided with means for simultaneously adjusting the feed-rollers; Fig. 9, a sectional view of a part of the same, and Fig. 10 a detail view of part of this adjusting apparatus.

Referring at present to the first five figures, A is the body of the machine, consisting of a hollow metal tube having a longitudinal slot, *a*, extending along its entire length. By means of this slot the tube A can be placed upon the wire B, as shown. Near one end of the tube the three arms C extend from said tube. These arms support the propelling or feed rollers *b*

b. Each feed-roller is carried by a rod, *b'*, extending from the arm C, and revolves between the sides of the forked portions *c*. The rod *b'* is keyed within the sleeve *d*, and moves up and down therein, being held at the desired height by the set-screw *e*. The feed-rollers are thus adjustable vertically, and can be placed at different distances apart to accommodate different sizes of wire.

The sleeves *d* turn within the arms C to change the angle of the feed-rollers upon the wire, and so vary the rapidity of the feed. A scale, *f*, is provided to indicate the degree of adjustment, and the set-screw *g* is used to hold the sleeve when it is adjusted to the proper point.

One of the rods *b'* is provided, as seen in Fig. 3, with a spiral spring, *h*, bearing against the arm C, so that if any kink or irregularity occurs in the wire the rollers will be free to pass over it. From the other end of the body A extend the three arms C'. These support the guide-rollers *i i*. Each guide-roller is carried by a rod, *k*, which enters an aperture in the part *l* of the arm C'. The rod *k* turns within the part *l*, being held at the proper angle of the roller by the set-screw *m*. The springs *n* allow the movement of the rollers away from the wire, so that they adapt themselves to different-sized wires; and when the machine is to be removed from the wire one of the rollers can be pressed back against its spring and secured by its set-screw *m* to release the wire.

Both the feed and guide rollers preferably have roughened or corrugated peripheries, as shown, to give a secure hold upon the wire.

The arms C and C' are connected together by rods D, which form handles for turning the machine and serve to give strength to the structure. Parts of the rods D and body A are broken away in the drawings to reduce the size of the figure. The arms C' carry also the tape-holders. Through the tubular portions E of such arms pass the rods F.

Pivoted at the end of each rod F is an arm, G. Upon each arm G is placed a stationary flange or ring, *o*, and above this a sleeve, *p*, having a flange, *q*, is placed. The upper portion of the rod G, upon which the spiral spring *r* is coiled, is not round, but has a flat side, and the flange or ring *s* has an opening of similar shape, so that it can move longitudinally upon the rod, but cannot turn upon it. The flange *t* and sleeve *p*, however, are free to turn upon the rod. When it is desired to place a roll of tape, H, upon the rod, the thumb-screw I, spring *r*, and flanges *s* and *t* are removed and the roll placed upon the sleeve *p*, against the flange *q*. The parts are then replaced and the flanges *s t* are pressed down tightly against the roll by turning the thumb-screw. The flange *t* and sleeve *p* turn with the roll, while the other parts are stationary. By adjusting the thumb-screw the rod can be arranged for tapes of different widths, or narrow tape could be placed directly upon the rod G, between the flange *t* and sleeve *p*. By forcing the flanges *s* and *t* more or less tightly against the tape the winding can be retarded to a greater or less extent, and consequently the tape can be wound tightly or loosely upon the wire.

The rods F are adjustable through the tubular portions E of the arms C, being held at the desired point by set-screws *u*, and a scale is provided upon each rod F to mark the extent of adjustment. By thus moving the tape-holders back or forward the pitch of the winding is changed, so that the tape can be wound at any spiral. Each rod G is also adjustable angularly at its pivoted point, and is held at the proper angle by screwing the thumb-screw *w* down upon the segment J, which is provided with a scale at *x* for indicating the adjustment. By this angular adjustment the position of the tape-holder is varied for wires of different diameters and for different widths of tape.

The winding is accomplished by turning the whole machine round and round upon the wire, when the feed-rollers cause it to travel forward and the tape unwinds from the rollers, the ends having been first wrapped around the wire.

As all the tape-holders are independently adjustable, it is evident that by arranging them to different pitch the winding may be made heavy or lighter, as desired, as the layers may overlap each other, or the spirals be placed between one another.

In the machine illustrated in Figs. 6 and 7 the body A is placed vertically upon the wire B, the wire passing through the groove *y*. From the body A an arm, K, passes around the wire, which arm carries the roller L. Such roller is held in bearings at the end of rod M. Rod M is keyed to a sleeve, N, which turns in an aperture in the arm K. The rod M is longitudinally adjustable in the sleeve N, and said sleeve turns in the arm K, and is held at the proper point by screwing down the nut O. This accomplishes the angular adjustment of the roller. A spiral spring, P, is also provided, for the purpose before explained.

The body A is provided with a handle, Q, for rotating it upon the wire, and the tape-holder, constructed and arranged substantially like those previously described, is pivoted upon said body. By rotating the machine a single strand of tape is wound upon the wire B. This form of machine may be a desirable one in some cases.

Figs. 8, 9, and 10 illustrate an arrangement for adjusting the feed-rollers simultaneously. A circular back piece, R, is supported from the body of the machine, and to this back piece is attached a circular frame which carries the rollers and the adjusting mechanism. This frame consists of two rings, S S', united by ribs *d'*. The rollers *b* are supported by rods *b'*, to which are keyed sleeves *a'*, formed into bevel-gears at *c'*. These sleeves are held between the rings S and S', so that they have no

longitudinal movement, but can turn in either direction, carrying the rods *b'* and the rollers. Between the bevel-gears *c'* and the back piece, R, a ring, T, is supported between the rings S S', but in such manner that it can revolve. The inner edge of this ring is formed into a bevel-gear which engages with the bevel-gears *c'*. It is evident that when either of the rods *b'* is turned to adjust the angle of its roller the ring T will turn, and engaging with all the other rods *b'* the same adjustment of all the rollers will be performed simultaneously. This provides for the angular adjustment of the feed-rollers. For vertically adjusting them I provide another ring, U, supported by the frame and provided with two oblique slots, *e' e'*. Pins *f' f'* on the rods *b' b'* enter these slots, so that when the ring is turned the rods are forced in one or the other direction. One of the rods *b'* is, however, provided with the spring *g'*, for forcing it toward the wire. Therefore, instead of providing a slot, a part of the ring is removed at *h'*, and the pin presses upon the oblique edge thus formed, so that when the ring is turned the roller is forced away from the wire.

The ring U may be turned by means of the pinion *i'*, whose shaft *k'* extends out from the ring and may be grasped by a wrench; or it may be turned in any other suitable manner.

It is evident that most of the special devices described can be used with a stationary machine through which the wire is fed either by the feed-rollers or by other suitable automatic and variable feed mechanisms. The machine would be supported in a suitable frame-work and turned by power and the wire fed through it.

What I claim is—

1. A machine for winding wire with insulation, having an open body adapted to be supported directly upon the wire, and to travel thereon, substantially as set forth.

2. In a machine for winding wire with insulation, the combination of a longitudinally-slotted body carrying the insulating material, and means for moving said body along the wire, substantially as set forth.

3. In a machine for winding wire with insulation, the combination, with the longitudinally-slotted body adapted to be placed directly upon the wire and turned thereon, of means for propelling said body forward, and one or more tape-holders carried by said body, substantially as set forth.

4. In a machine for winding wire with insulation, the combination, with a body adapted to be placed upon a wire, of one or more propelling or feed rollers attached to said body and resting upon the wire, and one or more tape-holders carried by said body, substantially as set forth.

5. In a machine for winding wire with insulation, the combination, with the longitudinally-slotted tubular body, of propelling or feed rollers attached to said body and resting upon the wire, and one or more tape-holders carried by said body, substantially as set forth.

6. In a machine for winding wire with insulation, the combination, with a body adapted to travel upon the wire, of guide-rollers and propelling or feed rollers attached to said body and resting upon the wire, and one or more tape-holders carried by said body, substantially as set forth.

7. In a machine for winding wire with insulation, the combination, with the body adapted to travel upon the wire, of the perpendicularly-adjustable propelling or feed rollers attached to said body and resting upon the wire, substantially as set forth.

8. The combination, with the body, of the angularly-adjustable propelling or feed rollers, substantially as set forth.

9. The combination, with the body, of the angularly and perpendicularly adjustable propelling or feed rollers, substantially as set forth.

10. The combination, with the body and two or more propelling or feed rollers attached thereto, of means for adjusting both or all said rollers simultaneously, substantially as set forth.

11. The combination, with the angularly-adjustable feed-rollers, of a scale for determining the extent of adjustment of each, substantially as set forth.

12. In a machine for winding wire with insulation, the combination, with a body adapted to travel upon the wire, of perpendicularly and angularly adjustable guide-rollers and feed-rollers attached to said body and resting upon the wire, substantially as set forth.

13. In a machine for winding wire with insulation, having a body adapted to travel upon the wire, the combination, with a propelling-roller or guide-roller resting upon the wire, of a spring forcing such roller toward the wire, substantially as set forth.

14. In a machine for winding wire with insulation, the combination, with a supporting-body, of one or more tape-holders each adjustable longitudinally for varying the relative longitudinal positions of successive spiral layers of the winding, substantially as set forth.

15. In a machine for winding wire with insulation, the combination, with a supporting-body, of tape-holders carried by said body, each adjustable angularly to accommodate wires of different sizes, substantially as set forth.

16. In a machine for winding wire with insulation, the combination, with a rod for holding a tape-reel, of a stationary flange and an adjustable flange upon said rod, between which said reel is placed, whereby the tension of the winding is made adjustable, substantially as set forth.

17. In a machine for winding wire with insulation, the angularly and longitudinally adjustable tape-holders, substantially as set forth.

18. The combination, with the adjustable

tape-holders, of scales for indicating the extent of their adjustment, substantially as set forth.

19. In a machine for winding wire with insulation, the combination, with a supporting-body, of one or more arms extending therefrom, adjustable rods carried by each of such arms, and a roller carried by each of said rods, substantially as set forth.

This specification signed and witnessed this 6th day of April, 1883.

JOHN KRUESI.

Witnesses:
H. W. SEELY,
E. H. PYATT.