

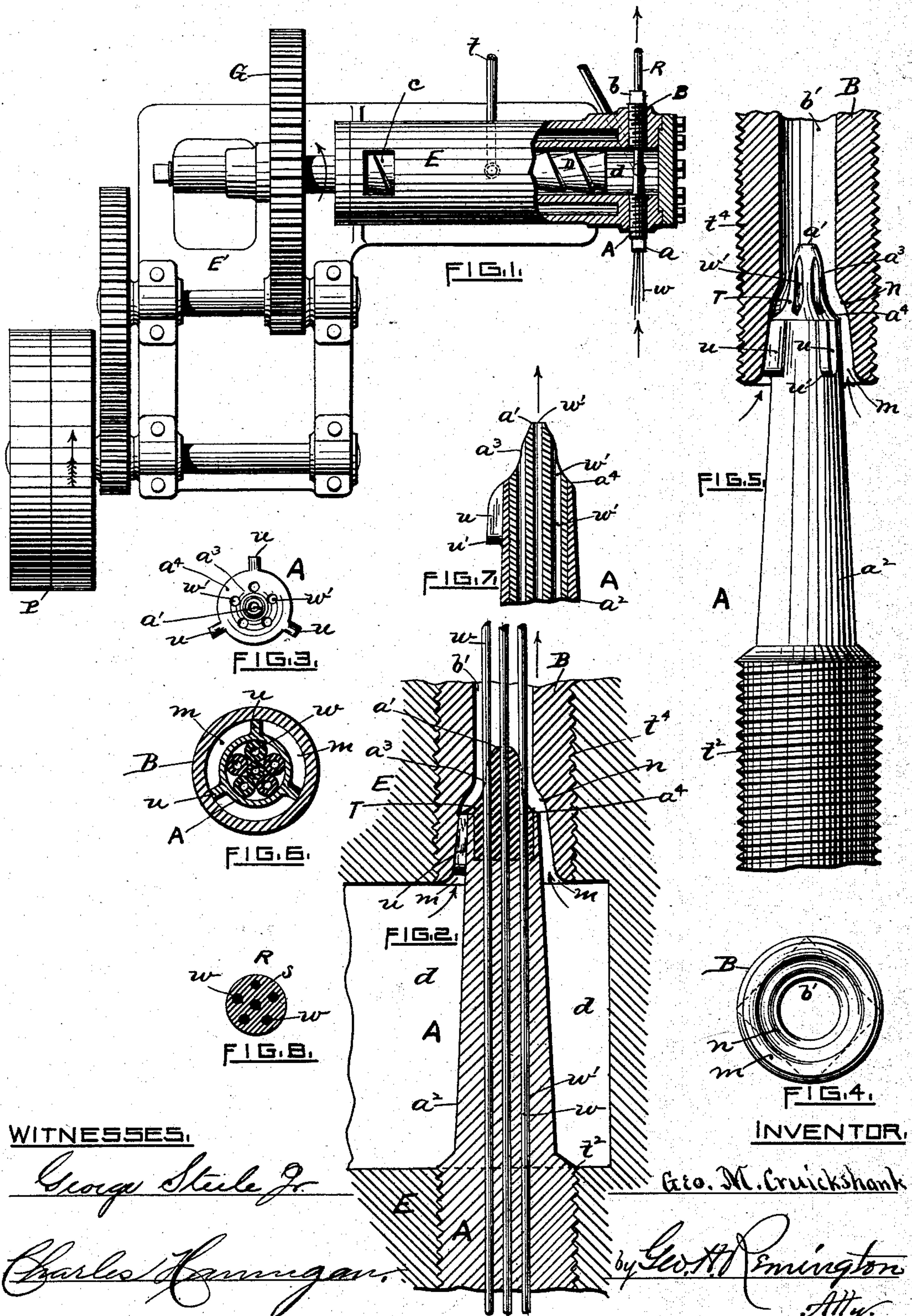
(No Model.)

G. M. CRUICKSHANK.

DIE FOR COVERING WIRE WITH INSULATING MATERIAL.

No. 326,021.

Patented Sept. 8, 1885.



WITNESSES.

George Steele Jr.

Charles Harrigan.

INVENTOR.

Geo. M. Cruickshank

by Geo. H. Remington
Att'y.

UNITED STATES PATENT OFFICE.

GEORGE M. CRUICKSHANK, OF PROVIDENCE, RHODE ISLAND.

DIE FOR COVERING WIRE WITH INSULATING MATERIAL.

SPECIFICATION forming part of Letters Patent No. 326,021, dated September 8, 1885.

Application filed September 13, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEO. M. CRUICKSHANK, a subject of the Queen of Great Britain, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Dies for Covering Wire with Insulating Material; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to machines adapted for the covering of one or more wires with an insulating material, and as an illustration of this class of machines I would refer to United States Patent No. 37,112, issued to Thomas Sault, December 9, 1862, and to United States Reissue Patent No. 9,988, granted to Henry A. Clark, December 27, 1881.

The object of this invention is to provide the machine with improved dies, whereby the wires of the compound cable issuing therefrom are uniformly covered and surrounded by the insulating material, said wires at the same time retaining their relative and exact position or arrangement with each other and to the axis of the cable which they first had in entering the dies.

Heretofore, as far as I am informed, compound cables thus constructed, upon being cut transversely, show the wires displaced, in some instances the wires being almost or quite in contact with each other, thus obviously neutralizing the insulation. Further, also, the wires in the completed cable almost invariably present an eccentric or non-central and irregular arrangement with reference to the peripheral surface of the cable. These defects are partially caused by means of the free end of the wire-guiding die being forced or sprung to one side during the process of pressing the insulating material around the wires. Heretofore, also, the end of the die from which the wires issue has been practically square with the axis of the die, thereby forcing the coating material to impinge against all the wires at once, which in practice is found to be detrimental

in that it produces increased friction upon the machine.

To obviate the foregoing disadvantages this invention is made to consist of a metallic die having holes extending longitudinally through the same, corresponding to the number and size of the wires composing the cable, the inner end of the die, from which the wires issue, being gradually elongated to approximate a > shape, thereby adapting the center wire to be first completely coated, followed in turn by the remaining and surrounding wires of the series.

The invention further consists in providing a portion of the exterior of said die with guide-wings, in combination with the annular or shaping die, whereby the insulating material in its passage through said shaping-die is prevented from forcing or crowding laterally the wire guiding die.

In the accompanying sheet of drawings, Figure 1 represents in reduced scale a plan view of a machine, in partial section, embodying my invention, as adapted to cover wire with insulated material. Fig. 2 is an enlarged sectional view of a portion of the rear end of the machine, showing the improved dies in position as in use. Fig. 3 is an end view of the wire-guiding die. Fig. 4 is an end view of the shaping or annular die. Fig. 5 is a view showing the two dies in position with the wires removed, the shaping-die being in section. Fig. 6 is a cross-sectional view of the dies, showing a modified construction of the wire guiding die. Fig. 7 is a horizontal sectional view of the same, the outer die being removed; and Fig. 8 represents a cross-section of the compound cable, showing in this and in all the other views a series of six wires.

Again referring to the drawings, A designates the wire-guiding die, having holes w therein, which extend throughout its length, said holes being adapted to receive the wires w , the inner or tip end, T, of the die terminating in the annular point a' , which latter receives the center wire of the series. The tip T is preferably made of hardened steel, adapted to be connected with the barrel a^2 of said die. The tip approximates a cylindrical form at a^3 , from which it extends into the beveled or con-

cave surface a^4 , and joining with the end of the barrel portion a^2 . The said cylindrical portion a^3 is turned off, as shown, thereby partially exposing the lower side of the circular row of holes w' , (see Figs. 2, 5, and 7,) which forms an under support or rest, against which the wires are pressed during the process of coating. The other portion of the die A is provided with means for securing it within the machine, the holes w' being adapted to coincide with those of the tip before described.

B designates the hollow shaping-die, adapted to be secured within the machine. The inner end of the die is made flaring internally at m and connects with the central die-opening, b' , the latter being in its cross-section of the size and form of the compound cable to be produced—in other words, it serves as the shaping-die for the cable.

The die A is provided exteriorly, near the end of its barrel portion a^2 , with guide-wings u , which are turned off to fit within the end m of the die B. These wings or guides serve to center the wires w within the die-opening b' , (see Fig. 2,) and at the same time preserve a uniform opening, m , Fig. 6, through which the insulating material is forced. Said wings being narrow and rounded at u' , offer very little resistance to the entrance of the material.

The operation of the invention may be described as follows: A cylinder, E, which may be steam-jacketed, is secured to a frame, E', as common. Within the cylinder is mounted a conveyer-screw, D, which is driven by compound gearing, also as common. At or near the rear end of said cylinder (see Fig. 1) are secured the wire-guiding die A and the shaping-die B. Now, the wires w are passed through the dies longitudinally, when, by feeding the insulating compound into the opening c of the cylinder, the compound is forced along by means of the screw D to the rear end thereof, from whence it enters the die B through the apertures m , the guide-wings u preventing the material from crowding the end of the die A with its wires from its true axial center. The material now first encounters the outer row of wires and completely surrounds the exposed surface thereof, the lower surface at the same time resting in the grooves of the die at a^3 , thereby preventing said wires from being pressed or compacted out of position. A further movement of the screw forces the material and outer row of wires along until the end a' is passed, at which point the center wire, as well as all the others, become completely covered and insulated, the issuing cable R being represented full size in Fig. 8. The cable is now perfectly adapted to be vulcanized (when requisite) by means of the process shown and described in United States Patent No. 277,019, issued to Albert C. Eddy May 8, 1883.

It is obvious that my improved dies may be adapted to cover a single wire or any practical cable number of wires, even if arranged in two or more circular rows, without departing from the spirit of the invention. The dies also may be arranged to produce compound cables having a rectangular cross-section. Such cables may be coated continuously for a great length, and adapted to be used for telegraphic, telephonic, and other analogous purposes.

As hereinbefore stated, I do not claim the machine as a whole adapted to produce insulated-wire cables; neither do I claim the compound insulated-wire cable as my invention, as such machines and cables have been made heretofore. Such cables, however, have been imperfectly produced prior to my invention, more especially when insulated with very rich or pure rubber, the latter class of material requiring greatly increased pressures within the dies in forming the cable compared with poorer and less expensive compounds.

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

1. In a wire-guiding die, the elongated end or tip T herein described, the outer end thereof having a central hole around which are arranged one or more rows of holes, the under surface of the latter being exposed, substantially as shown, and for the purpose set forth.

2. In a wire-guiding die having the grooved and apertured elongated tip T herein described, the guide-wings u , arranged and secured to the exterior of the barrel of said die and near the end thereof, substantially as and for the purpose set forth.

3. In a machine adapted for making insulated wire cables, the combination of the shaping-die B with the wire-guiding die, the latter being provided with the elongated tip T, having grooves and holes w' therein, said dies being arranged in relation to each other and adapted for use substantially as shown, and for the purpose set forth.

4. In a machine adapted for making insulated-wire cables, the combination of the shaping-die B with the wire-guiding die A, the latter having the elongated tip T, provided with grooves and apertures w' , the die A being further provided with guide-wings u , the whole combined, arranged, and adapted for use substantially as shown and set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEO. M. CRUICKSHANK.

Witnesses:

GEO. H. REMINGTON,
CHARLES HANNIGAN.