(No Model.)

G. M. CRUICKSHANK.

MACHINE FOR MAKING AND TRIMMING COMPOUND WIRE CABLES.

No. 346,645. Patented Aug. 3, 1886.

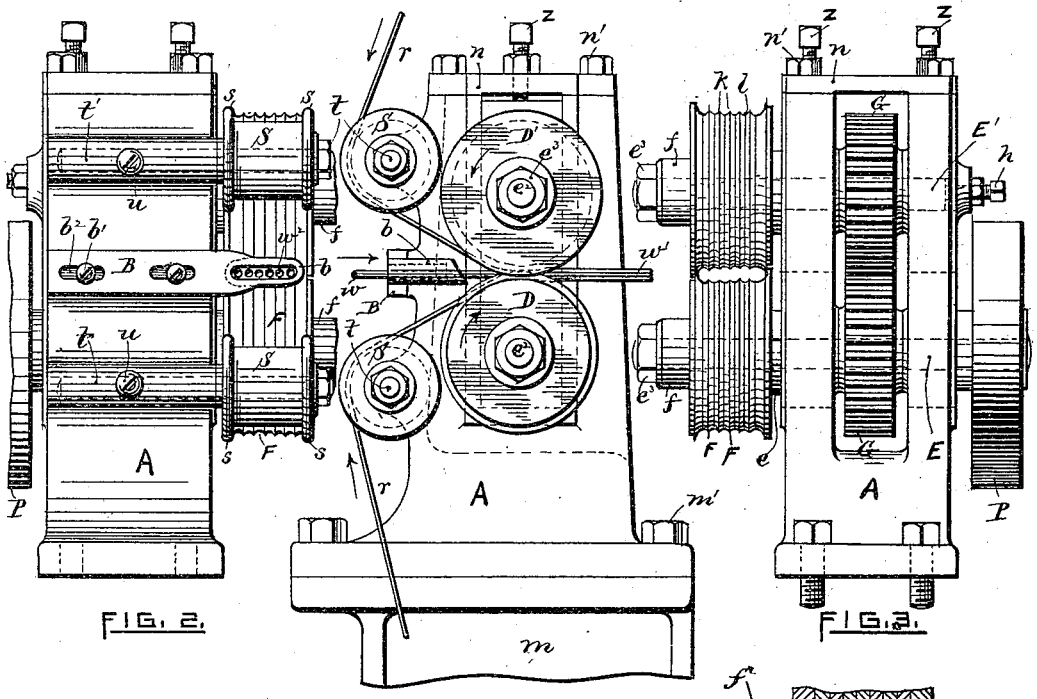

FIG. 2.

FIG. 1.

FIG. 3.

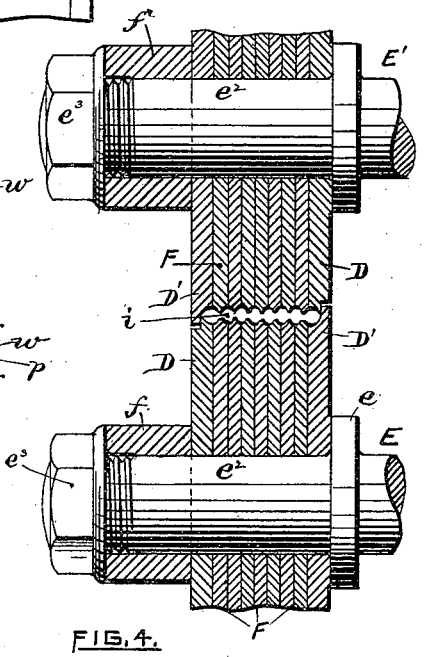

FIG. 4.

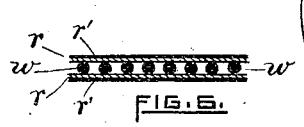

FIG. 6.

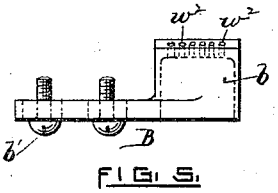

FIG. 5.

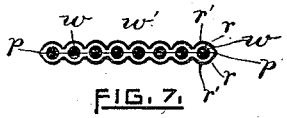

FIG. 7.

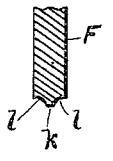

FIG. 9.

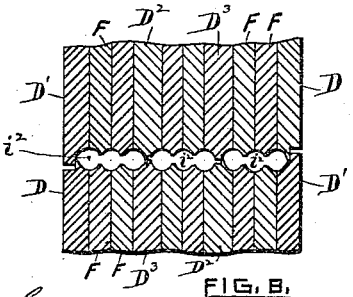

FIG. 8.

WITNESSES.

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UNITED STATES PATENT OFFICE.

GEORGE M. CRUICKSHANK, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO WILLIAM W. DOUGLAS, TRUSTEE, OF SAME PLACE.

MACHINE FOR MAKING AND TRIMMING COMPOUND WIRE CABLES.

SPECIFICATION forming part of Letters Patent No. 346,645, dated August 3, 1886.

Application filed March 24, 1885. Serial No. 159,941. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. CRUICKSHANK, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Machines for Making and Trimming Compound Wire Cables; 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.

The present invention relates to mechanism for producing compound band-cables or conductors composed of a series of wires laid flatwise, but not touching each other, and covered with suitable insulating material—as, for example, india-rubber or any of its compounds—said cable, when finished, presenting longitudinally-corrugated top and bottom surfaces.

The invention consists of a machine embodying a frame or housing within which is mounted two geared arbors, each carrying one or more series of disk-like formers and cutters, adapted to respectively corrugate and trim the band-cable continuously, in combination with suitable guide-rolls and a wire-guide mounted on the front side of the frame, all as will be more fully hereinafter set forth and claimed.

The invention has for its object the rapid and continuous coating of a series of wires, to form a flat corrugated band or cable adapted to be used for telegraphic or telephonic purposes, said coating serving also as an insulator for the wires, the same preferably being flat and continuous bands of rubber backed with cloth, which passes between the formers or corrugated rolls of the two arbors, (both above and below the wires,) the cutters at the same time serving to trim the two longitudinal edges of the cable.

The invention also consists in the novel arrangement of the disk-like formers and cutters, whereby two or more narrower cables may be formed at once from a single cable of greater width. By means of this device I am enabled to increase the production of the machine twofold or more, as desired.

My invention is fully illustrated in the accompanying sheet of drawings, in which Figure 1 represents a front end view of the machine, showing the flat compound cable in process of manufacture. Fig. 2 is a front side view of the same, showing the adjustable band guides or spools and the adjustable wire-guide, the rubber webs or coatings and wires, however, not shown. Fig. 3 is a rear side view of the same, showing more clearly the disk-like formers and cutters, together with the driving mechanism. Fig. 4 is a partial central sectional view, through the said formers and cutters, of the upper and lower arbors enlarged. Fig. 5 is a detached view of the wire-guide. Fig. 6 is a cross-sectional view through the wires and covering just prior to their passage between the formers and cutters. Fig. 7 is a cross-sectional view of the same after passing said formers and cutters, showing the cable corrugated and trimmed and ready for use. Fig. 8 is a partial sectional view showing the arrangement of the formers and cutters for the purpose of making (in this case) three three-wire cables at one operation; and Fig. 9 is a partial transverse sectional view of one of the formers or shapers enlarged.

The following is a detailed description of the invention and the manner of its operation.

A, again referring to the drawings, designates the head or frame carrying the operating mechanism, the same adapted to be secured to standards *m*, or other suitable base, by means of bolts *m'*. Within said head are journaled in boxes the bottom arbor or spindle, E, and the top arbor, E', said arbors being adapted to receive simultaneous movement by means of the gear-wheels G, power being transmitted to the machine by means of a belt upon the pulley P, the latter secured to the lower arbor. I contemplate, however, the employment of a counter-shaft and compound gearing, the pulleys in this case being secured on the countershaft. The front end, e^2, of each of said arbors is provided with a screw-thread and nut, e^3.

F designates the metallic circular or disk-like former or shaper, adapted to be mounted and secured upon said end portions, e^2, of the arbors, the peripheral edges *l* of the disks be-

ing slightly concave and terminating in the central raised portion, *k*, said disks in thickness corresponding to the "pitch" or distance between the centers of two adjacent wires of the cable. I prefer to use an individual disk for each wire, substantially as shown, and for reasons hereinafter set forth.

D and D′ designate a pair of disks adapted to serve both as formers and edge cutters or trimmers for the cable, said cutters being mounted on the arbors E E′, substantially as shown in Fig. 4, thereby coacting to form revolving shears.

f f are filling-in collars, adapted to bear against the cutters by means of the binding-nuts e^3.

In Fig. 8, at D^2 and D^3, I have represented a modification of the cutters, wherein they are used for stripping the cable longitudinally and without waste into two or more narrower cables.

S S represent spools or guides loosely mounted upon spindles *t*, adjustably secured by means of screws *u* to the front side of the frame A, both above and below the center thereof. These spools serve to properly guide the insulating material or coating *r* to the cutters and formers.

B designates the guide for the several wires *w*, said guide being adjustably secured to the front and center of the frame A, substantially as shown. The guide portion *b* proper extends rearward nearly to the cutters, a hole being formed therein for the reception of each wire, the latter thereby being retained in their proper relation to the formers F, and also serving to straighten the wires, particularly when copper or annealed wire is used.

r r, Fig. 1, represent the two webs of insulating material or covering, each consisting, preferably, of a rubber face and a cloth back, *r′*, Figs. 6 and 7. The latter surface bears against the spools S, while the face or rubber portion is adapted to engage directly with the wires, (both top and bottom,) the issuing product *w′* being the flat cable having longitudinal grooves or corrugations extending throughout its length. An adjustable support and guide for the cable may be secured to the rear of the machine and beneath the cable, if desired.

The operation may be described substantially as follows: Desiring, now, to produce an eight-wire cable, (see Figs. 4, 6, and 7,) the rubber webs or strips *r*, of proper width, are first wound each upon a center or drum, thus forming two large coils. These latter are then suitably mounted one above and one below the frame A, the ends being passed over the spools S. (See arrow direction, Fig. 1.) The cutters or trimmers D′ D are then placed upon their respective arbors E E′, after which seven disks, F, (proportioned to the size of the wire and thickness of coating *r* to be used,) are placed upon each arbor at e^2, followed by the outer cutters, D D′, the whole being clamped in position by means of the nuts e^3 and washers, thus forming the indented elongated space *i*, Fig. 4, between the top and bottom series of disks and cutters, said space being the mold or counterpart of the complete cable. (Shown in Fig. 7 enlarged.) Now eight wires, *w*, are passed through a correspondingly-apertured head, *b*, of the guide B and between the disks, after which the ends of the webs *r r* are also introduced between the disks and into the said space *i*, when, finally, by causing the arbors to revolve in the arrow direction, both the webs and wires are thereby fed along, the issuing product *w′* being the completely-formed cable. During this latter part of the operation the two rubber-faced webs are completely united together, the same being molded and compacted around the wires by means of the projections *k* and grooves *l* of the disks and cutters, each of the inclosed wires thereby being uniformly covered and insulated. The cable is now adapted to be rapidly and continuously vulcanized or baked by suitable vulcanizing apparatus, if desired, an example of this class of mechanism being shown and claimed in Albert C. Eddy's United States patents of May 8, 1883, and numbered 277,018 and 277,019.

It is obvious that the spools S between their flanges *s* should necessarily correspond to the width of the bands or webs *r*. A means for effecting this would be to have one or both flanges adjustably secured upon the barrel portion of the spool; or a series of spools can be used for the same purpose.

In order to effect an accurate adjustment of the cutters D′ D, the rear end of the top arbor, E′, is made to bear against an adjusting-screw, *h*, Fig. 3, while a vertical adjustment of the upper arbor and its attached cutters and disks is effected by means of the adjusting-screws *z*, mounted within the cap or tie *n*, said screws being adapted to bear against the boxes of the arbor E′, as fully shown in Fig. 1.

The disks F are made from steel, such stock being more uniformly hardened in the thin form shown than would be practicable in disks having a greater thickness adapted to embrace several wires. The former construction also enables the operator to readily enlarge or diminish the width of the cable, and by the addition of intermediate cutters, D^2 D^3, two or more narrower cables are formed at one operation, or a wide and a narrow one, or any other combination of widths within the limits of the machine.

I am aware that compound flat insulated cables have been made prior to my present invention. Therefore I do not broadly claim mechanism adapted to produce such cables. The construction of the disk-like formers and cutters, together with the adjustably-mounted wire-guide, as well as the general arrangement of the machine, I believe to be new; in view of which,

I claim and desire to secure by Letters Patent of the United States—

1. The combination, substantially as before set forth, of the frame or head, a set of two arbors mounted in said head, one or more se-

ries of disk-shaped corrugating-formers and edge-trimmers secured to the arbors exteriorly of the head, the wire-guide, substantially as shown, adjustably secured to the front of the frame, spools mounted both above and below said guide, and the mechanism, substantially as described, for revolving said arbors.

2. The disk-like former F, having the narrow projecting tongue *k* extending around its circumference and terminating on each side thereof in the concave edge *l*, and, further, having a central opening whereby it is adapted to be mounted upon the arbor or spindle, substantially as shown, and for the purpose described.

3. The machine for making compound cables or conductors herein described, consisting of the head or frame A, top and bottom geared arbors, E' E, mounted within said head, one or more series of corrugating-formers, F, and edge-cutters D D', secured upon each arbor, a wire-guide, B, and top and bottom spools, S, said guide and spools being adjustably mounted at the front of the frame A, the whole combined, arranged, and adapted for use substantially as shown and set forth, whereby a row or series of wires, *w*, and suitable upper and lower webs, *r*, for covering the same are all passed between said cutters and formers, to produce the continuously-corrugated insulated cable or cables *w'*, having trimmed or sheared edges.

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

GEORGE M. CRUICKSHANK.

Witnesses:

THOMAS JACKSON,

GEO. H. REMINGTON.