

No. 762,735.

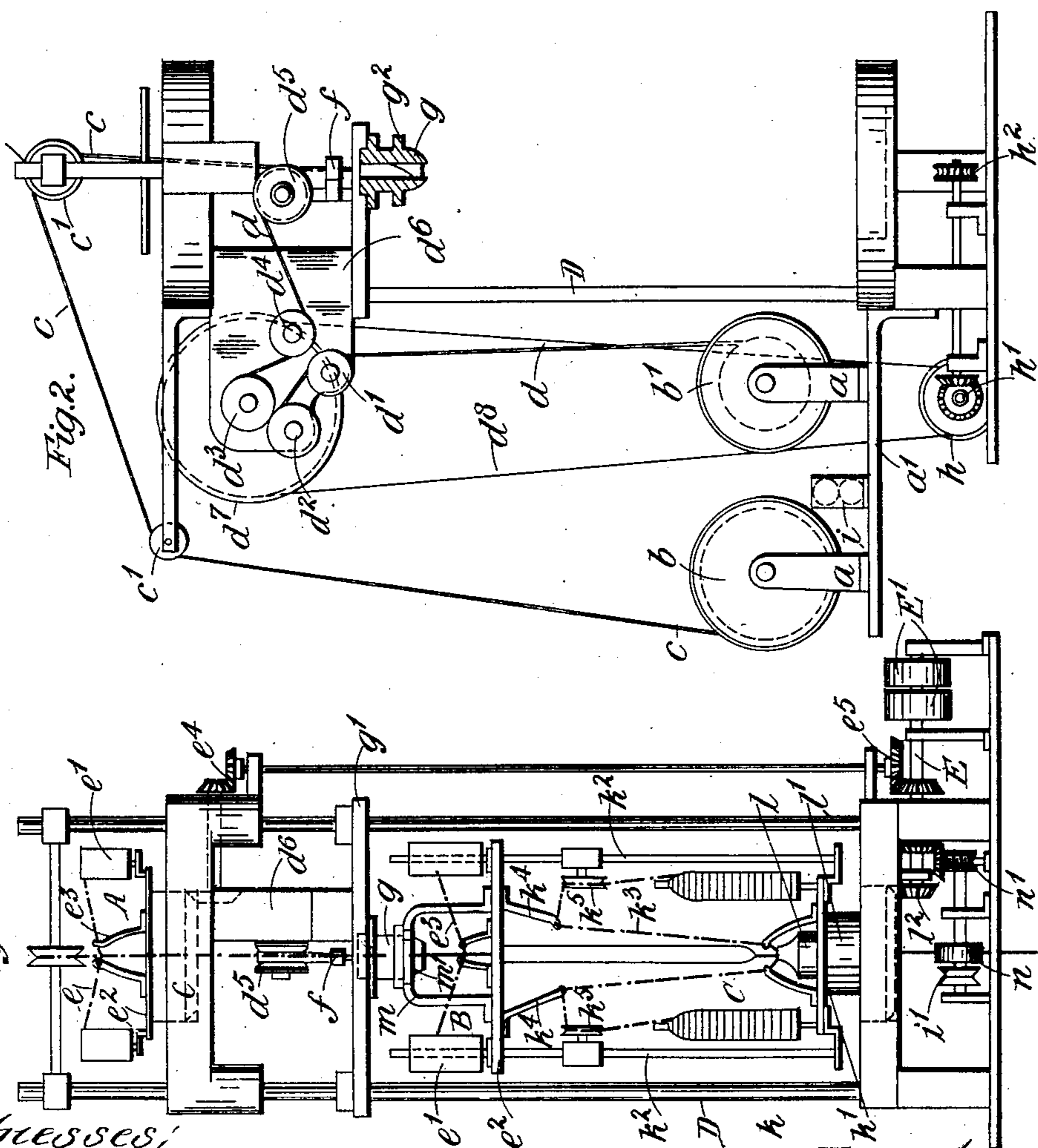
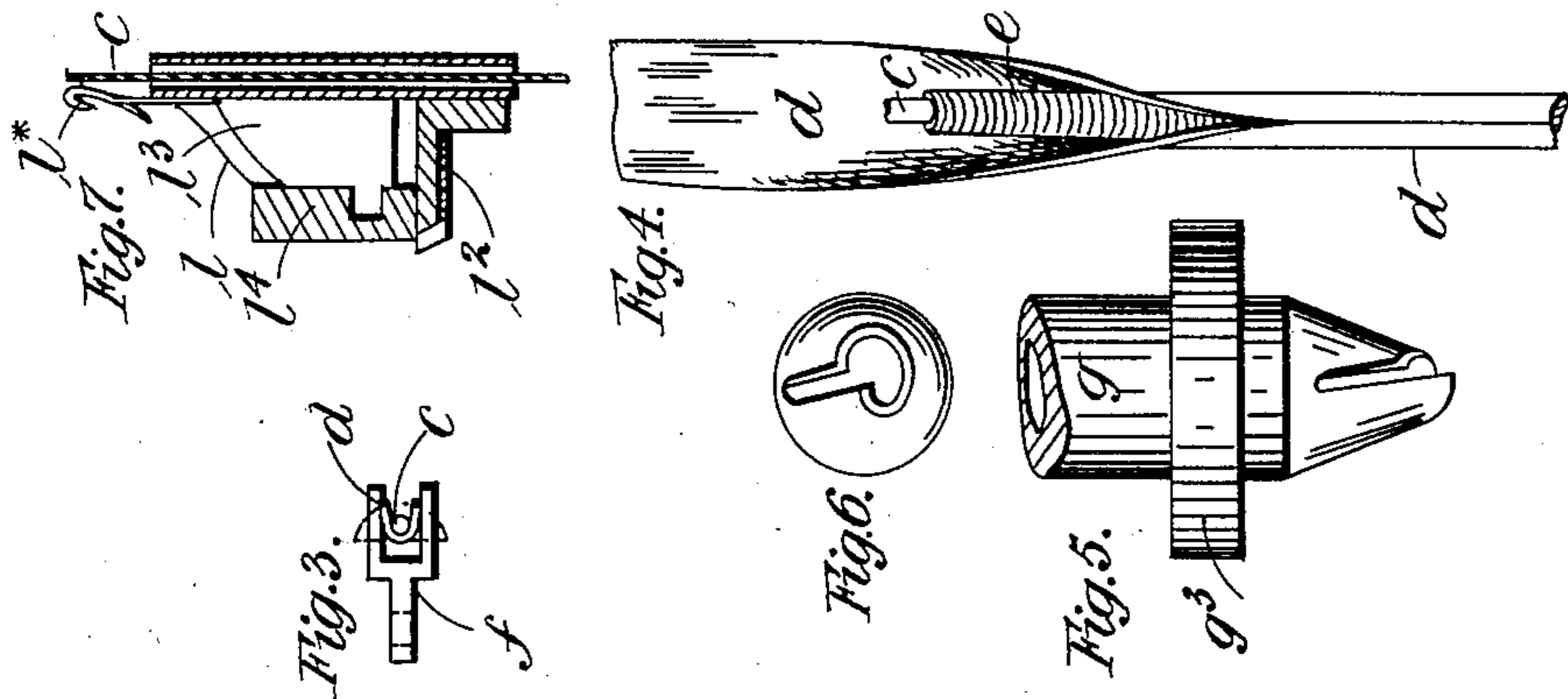
PATENTED JUNE 14, 1904.

C. MARTIN.

MANUFACTURE OF INSULATED OR COVERED WIRES AND MACHINE THEREFOR.

APPLICATION FILED MAY 18, 1903.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES MARTIN, OF NOTTINGHAM, ENGLAND.

MANUFACTURE OF INSULATED OR COVERED WIRES AND MACHINE THEREFOR.

SPECIFICATION forming part of Letters Patent No. 762,735, dated June 14, 1904.

Application filed May 18, 1903. Serial No. 157,735. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MARTIN, manufacturer, a subject of the King of Great Britain, residing at 44 Parliament street, Nottingham, in the county of Nottingham, England, have invented certain new and useful Improvements in the Manufacture of Insulated or Covered Wires and Machines Therefor, of which the following is a specification.

This invention relates to the manufacture of insulated or covered wires and the like and to machines therefor, and has reference more particularly to a special arrangement for combining in the covering one or more lapped layers and one or more knitted layers, the outer layer being, for example, of the latter kind and so serving to keep the other layers in place.

A feature of the invention consists in providing a layer of rubber insulation consisting of a strip which is folded over or around the wire and is applied in a stretched condition, being drawn away by the wire core faster than it is paid out by the devices for delivering it, so that its natural thickness is reduced when it is on the wire.

A convenient construction of machine for carrying out the invention is illustrated in the accompanying drawings.

Figure 1 is a side elevation showing the general arrangement. Fig. 2 is an elevation at right angles to Fig. 1, but with certain parts omitted for the sake of clearness. Figs. 3 to 7 are detail views hereinafter referred to.

In suitable supports *a* on an arm *a'* are mounted the reels *b b'*, Fig. 2, for delivering the wire *c* to be covered and the rubber strip *d* for sheathing or insulating the same. The wire is led up to the top of the machine over guide-pulleys *e'* and descends in a vertical line, Fig. 1, through three tiers A B C of covering devices, the top and middle tier comprising lapping devices consisting of bobbins *e'*, mounted on a revolving plate or table *e''*, from which the yarns *e* pass through guides *e'''* and are wound onto the wire as the bobbins revolve. These devices apply plain lapped coverings of yarn to the wire. The lowest tier *c* comprises the knitting mechanism hereinafter detailed, which may be substantially

of the kind employed for producing small knitted cords, laces, and the like, and such, for example, as described in United States Patent No. 648,347, issued on or about the 24th of April, 1900. After receiving the first lapping at the top tier A and while passing downward to the intermediate tier or second lapping position B the wire receives the strip of rubber insulation *d* aforesaid. This rubber is led up to it over a series of suitable guide and feeding rollers *d' d'' d''' d'''' d'''''*, mounted on a bracket *d''''''*. The last roller *d'''''* is practically in contact with the wire. The strip *d* on leaving this last roller travels down in the flat state alongside the wire for a short distance and then both pass between the prongs of a small device *f*, termed a "hammer" and shown to a larger scale in plan in Fig. 3. This gives a preliminary bend to the flat strip, (see dotted lines, Fig. 3,) so that it assumes a channel form and partly incloses the wire, as indicated. The two then pass into a folding-nozzle *g*, which completes the folding of the strip and causes the two edges to meet around the wire, so that the previously flat strip now forms a tube or sheath inclosing the wire, the process being clearly illustrated in Fig. 5. The nozzle *g* has its interior provided with a spiral or snail surface to act on the rubber and so cause the folding. The said nozzle is shown enlarged in side view in Fig. 5 and in under side view in Fig. 6. It is mounted in a cross-bar or bridge *g'* between the side uprights D. When the covered wire emerges from this nozzle, the lapping devices of the intermediate tier B immediately apply the second lapping over the rubber and so bind the latter tightly onto the wire. The wire then continues its downward movement till it reaches the knitting mechanism C, which applies the knit outer covering thereto, and from thence it passes to any suitable take-up arrangement. It will be noticed that a relatively considerable space is left between the three tiers or covering positions A B C, so that any accidental flaws can more readily be detected by the attendant, and the knitting position *c* is well separated from the second lapping position B, just as this is also separated from the first lapping position A. The lappings being effected by revolving bobbins,

the bobbin-plate e^2 of the top tier is driven by gearing $e^4 e^5$ from the main shaft E of the knitting mechanism. The corresponding plate e^2 of the intermediate tier B is mounted directly on top of the revolving part or cage of said knitting mechanism. The bobbins may be ordinary single-wound or they may be "warped" or multiple-wound, as convenient, and any suitable guides and tension devices are provided to conduct the yarns to the wire in the proper manner. The rubber strip is fed at a less rate than the wire—say at one-third of the speed—so that it is considerably stretched as it is applied to the said wire. The feed-rollers may for this purpose be geared up in the desired ratio to render this stretching action positive. Thus, for instance, in the example shown the roller d^3 , which draws up the strip d , is mounted on the shaft of a pulley d^7 , geared by a belt d^8 with a pulley h at the bottom of the machine. The pulley h is in turn driven through gearing $h' h^2$ at the desired rate. As the rubber strip is usually supplied in commerce with a paper band laid between its folds to prevent them from sticking together, a special set of rollers i , driven by a pulley i' , is provided near the drum b' to receive this paper and conduct it out of the way.

As regards the knitting mechanism above referred to, this may be briefly described as follows: It comprises a set of bobbins k , mounted on a revolving table k' . The needle-cylinder l of the machine is stationary, and the cam-cylinder l' , carrying the table k' , revolves around it, being driven by a gear l^2 on the main shaft E, carrying fast and loose driving-pulleys E' . At the sides are uprights K^2 , carrying the cross-bar e^2 and the upper parts of the mechanism. The knitting-yarns k^3 are carried round and round and so are knit in by the needles inside the cylinder l in the usual well-known manner. K^4 represents guides, and K^5 represents tension devices of the usual kind for the yarns. On the top of the knitting mechanism is a bracket m , having a central eye or ring m' , which fits on the tapered end of the nozzle g and forms a bearing for the upper part, with the lapping-bobbins, to revolve around. Fig. 7 shows a detail section throw the cylinder l , showing the needles l^x and the sliding plates l^3 , which engage the cam l' and so work the needles. At the bottom of the machine is an arrangement of grooved rollers n , driven by gearing n' , between which the work passes and which draw it down through the cylinder l at the desired rate.

Obviously the above machine may be modified in a variety of ways, or it may be arranged to repeat any or all of the aforesaid coverings by providing more tiers of covering devices.

The wire covered as above may be further treated by impregnating it with suitable in-

sulating-bodies—such as paraffin, shellac, &c.—the knit portion of the covering being from its open texture of a very absorbent nature and therefore specially adapted to take up the materials named.

Although the edges of the rubber covers, Fig. 4, are shown abutting against each other they may, if desired, be made to overlap, the nozzle g being correspondingly shaped to facilitate this.

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

1. In a machine for covering wires and the like, the combination of a lapping mechanism for applying a layer of yarn to said wire, means for folding a strip of rubber around said wire, another set of lapping mechanism for applying a layer of yarn over said rubber strip, and knitting mechanism for applying a knitted covering thereto, substantially as described.

2. In a wire-covering machine, the combination of means for applying a rubber strip to the wire, lapping mechanism for applying layers of yarn both under and over said strip, and a knitting mechanism for finally applying a knitted covering over the outer of said layers, substantially as described.

3. In a wire-covering machine, the combination of an upper and lower tier or set of lapping devices, and a knitting device beneath said lapping devices, such devices being arranged sufficiently far apart to expose the separate coverings as they are applied and so permit of easy inspection.

4. In a wire-covering machine, the combination of means for applying and folding a strip of rubber around the wire, means for stretching said rubber before applying the same, and means for also applying both lapped and knit coverings to the wire, substantially as described.

5. In a wire-covering machine, the combination of two tiers or series of revolving bobbins, revolving tables carrying the same, yarn-guides mounted on said tables, a knitting mechanism, and means for conducting the wire axially through said series of bobbins and said knitting mechanism, substantially as described.

6. In a wire-covering machine, the combination of an upper series of revolving lapping-bobbins, a delivery-roller for rubber strip arranged below said bobbins, a knitting mechanism at the lower part of the machine, and an intermediate series of lapping-bobbins carried by said knitting mechanism, substantially as described.

7. In a wire-covering machine, the combination of an upper series of revolving lapping-bobbins, a delivery-roller for rubber strip arranged below said bobbins, a hammer and nozzle for folding said strip around the wire, a knitting mechanism at the lower part of the

machine, and an intermediate series of lapping-bobbins carried by said knitting mechanism, substantially as described.

8. In a wire-covering machine, the combination of an upper series of revolving lapping-bobbins, a delivery-roller for rubber strip arranged below said bobbins, a knitting mechanism at the lower part of the machine, an intermediate series of lapping-bobbins, carried by
10 said knitting mechanism, and a slotted guide-

tube above said knitting mechanism to conduct the wire downward and at the same time permit easy inspection thereof.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 5th day of May, 1903. 15

CHARLES MARTIN.

Witnesses:

WM. H. FACON;
B. E. BINLEY.