

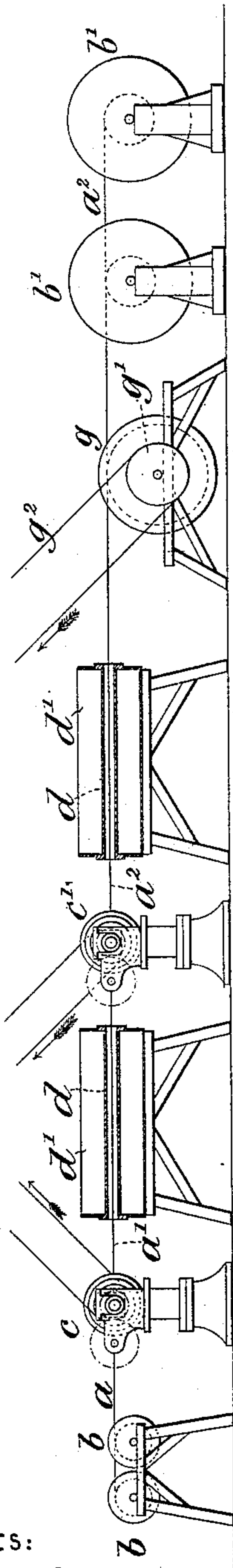
(No Model.)

T. GUILLEAUME.  
MANUFACTURE OF RUBBER COATED WIRE, &c.

No. 483,110.

Patented Sept. 20. 1892.

Fig. 1.



WITNESSES:

James W. Smallman,  
F. J. Rapson.

Fig. 2.

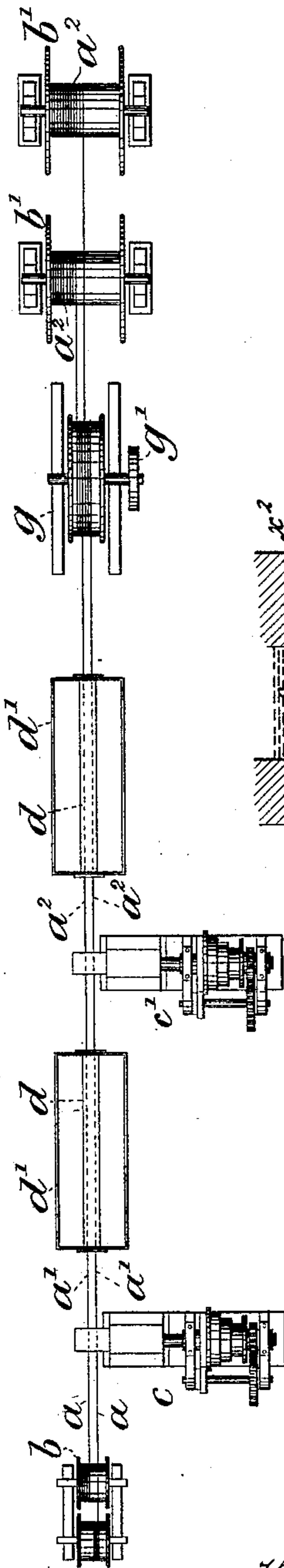
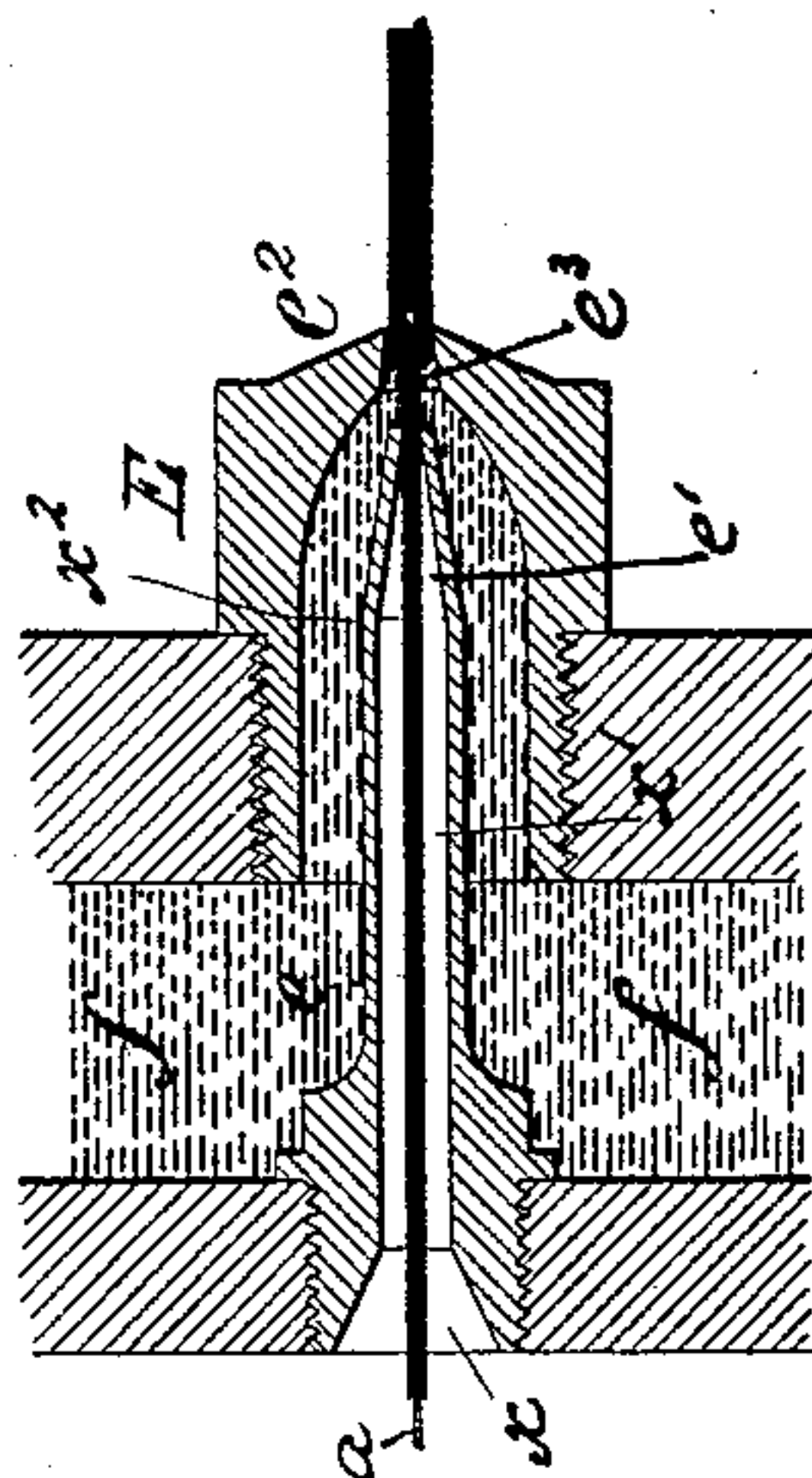


Fig. 3.



INVENTOR:

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per H. H. Hardingham,  
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# UNITED STATES PATENT OFFICE.

THEODOR GUILLEAUME, OF COLOGNE, GERMANY.

## MANUFACTURE OF RUBBER-COATED WIRE, &c.

SPECIFICATION forming part of Letters Patent No. 483,110, dated September 20, 1892.

Application filed October 2, 1891. Serial No. 407,570. (No model.) Patented in England June 18, 1890, No. 9,472, and in Germany August 14, 1890, No. 60,167.

*To all whom it may concern:*

Be it known that I, THEODOR GUILLEAUME, a subject of the Emperor of Germany, residing at Cologne, in the Empire of Germany, have invented certain new and useful Improvements in the Manufacture of Rubber-Covered Wire, &c., (for which I have obtained Letters Patent in Great Britain, dated June 18, 1890, No. 9,472, and in Germany, dated August 14, 1890, No. 60,167,) of which the following is a specification.

The object of my invention is to provide a wire, rope, or cable with successive seamless coverings of india-rubber or rubber compound. Heretofore, so far as my knowledge extends, it has not been found possible to apply more than one seamless covering of india-rubber to a wire, rope, or cable, though the wire, rope, or cable has been given successive seamless coverings of gutta-percha and the like, and successive coverings of rubber have been applied by winding on strips or ribbons successively.

In carrying out my invention I first apply to the wire, rope, or cable, by means of a suitable apparatus, a seamless coating or layer of rubber. I then pass the wire thus covered through a refrigerating apparatus, which cools, hardens, and solidifies the coating. The coated wire is then drawn through another apparatus, which applies a second coating of rubber, and the wire thus provided with two coatings is passed through another refrigerating apparatus. It may then be wound on a reel or it may be drawn through other similar apparatus for additional coatings to be applied.

The apparatus which applies the second coating of rubber has a die of novel construction, which causes that coating to be applied in such a manner as to enable it to firmly adhere to the coated wire, so that there is little or no liability for inequalities in the consistency of the coating to occur, and there are no breaks at any point.

The subject-matter deemed novel is specifically set forth in the claims.

The accompanying drawings show one way of carrying out my invention. Such parts as

are common and well known are indicated diagrammatically, the novel apparatus being represented more specifically.

Figure 1 is a view, partly in side elevation and partly in section, of the apparatus employed. Fig. 2 is a corresponding plan; and Fig. 3 is a longitudinal section, on an enlarged scale, of the improved die.

The apparatus illustrated is adapted to simultaneously cover two wires and to apply two successive coatings to each wire. The apparatus may, however, be so modified that a greater number of wires may be operated upon at one time, or more than two coatings may be applied. Each wire, strand, or cable is supplied from a drum or reel *b* and is wrapped around a drum *g*, rotated by means of a pulley *g'*, over which passes a belt *g''*, driven by any suitable prime motor. The wire is first drawn through an apparatus *c* of any suitable construction, which applies a coating or layer of rubber or rubber compound. In this apparatus I may use a die such as shown in Fig. 3, although this specific formation of die is not essential in the first coating apparatus; but a die of suitable construction should be employed to apply the coating uniformly and equally about the wire. The wire *a* after being drawn through the apparatus *c* passes through a tube *d*, located in a tank *d'*, which may contain a freezing mixture. I may, however, substitute for such apparatus any other suitable apparatus for refrigerating the coated wire as it leaves the coating apparatus. After leaving the refrigerating apparatus the wire passes through a second coating-machine *c'*, which is similar in general construction to the coating-machine *c*, but is provided with a die such as shown in Fig. 3. This die comprises two members, an inner die or nozzle *e* and an outer die *E*. The inner die or nozzle *e* has a flaring mouth or opening *x* and a circular bore *x'* extending from the flaring mouth *x* to the point *x''* near the end of the nozzle. From the point *x''* to the extreme end of the nozzle the bore of the die tapers in an outward direction toward the axis of the bore, so that as the coated wire passes through the nozzle the taper part *e'*, the point of which is alone in



contact with the coated wire, does not produce sufficient friction to disturb the coating on the wire. The outer die E surrounds the taper end  $e'$  of the inner die. The inside of its front wall  $e^2$  is curved or tapered around the end  $e'$ , which terminates in front of the wall  $e^2$  opposite an opening  $e^3$ , tapering from its inner end in an outward direction toward the produced axis of the bore of the inner die.

The coating material for the second layer is supplied through the passage  $f$  and is forced into the die E surrounding the nozzle  $e$ . It is taken up by the coated wire after it leaves the inner die, the thickness of the layer being defined by the size of the tapered or conical opening  $e^3$ . The shape of the opening  $e^3$  is such that undue friction is avoided, with the result that a smooth solid coating uniform throughout the entire length of the wire is applied. After leaving the second coating apparatus the wire with the double coating passes through a refrigerating apparatus similar to that first described. It then passes around the drum  $g$ , as before explained, and from the drum is wound onto a reel  $b'$ .

The apparatus is so arranged that the second coating is applied while part of the wire is receiving the first coating.

In Figs. 1 and 2,  $a$  indicates the bare wire,  $a'$  the wire supplied with the first coating,

and  $a^2$  the wire having both the first and second coatings.

I claim as my invention—

1. The herein-described method of coating a wire, rope, or cable with india-rubber or rubber compound, which consists in applying to the wire a seamless coating of rubber, refrigerating or cooling the wire thus coated to harden and consolidate the coating, then applying a second seamless coating of rubber, and thereupon refrigerating or cooling the coated wire to harden or consolidate the second coating, substantially as described.

2. The herein-described apparatus for applying successive seamless layers of rubber or rubber compound to a wire, rope, or cable, comprising a coating apparatus having a die through which the wire is drawn, a refrigerating or cooling apparatus through which the coated wire passes, a second coating apparatus provided with an inner die  $e$ , having an elongated bore tapering at the exit end inwardly toward its axis to its extreme outer end, and a second refrigerating or cooling apparatus through which the wire with the double coating passes, substantially as described.

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Witnesses:

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