

May 31, 1938.

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2,119,465

METHOD OF MANUFACTURING COMMERCIAL RUBBER TUBES OR FABRIC HOSE

Filed April 27, 1935

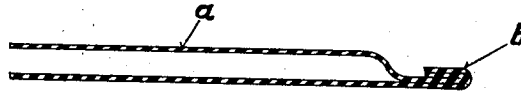


Fig. I

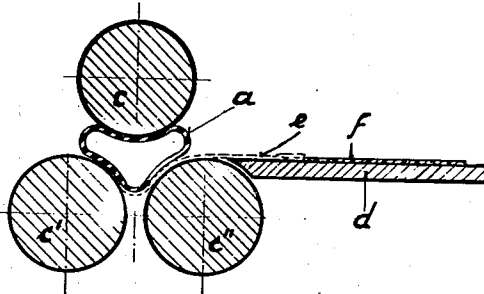


Fig. II

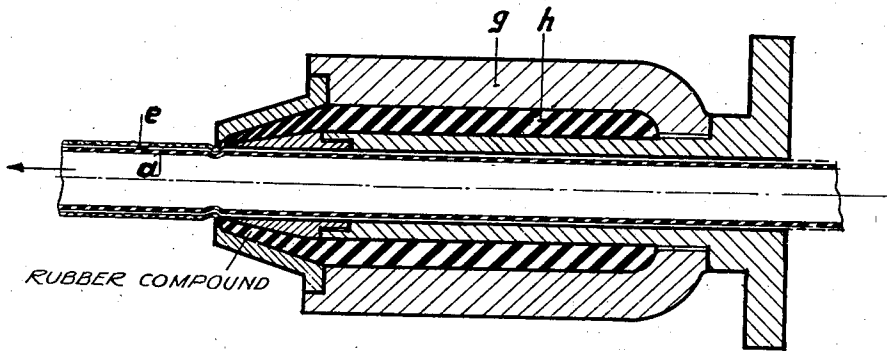


Fig. III

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2,119,465

METHOD OF MANUFACTURING COMMERCIAL RUBBER TUBES OR FABRIC HOSE

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Application April 27, 1935, Serial No. 18,659
In Germany December 16, 1933

4 Claims. (Cl. 154—8)

The present invention consists in a method of manufacturing commercial rubber tubes with fabric coverings in which the fabric coverings and the other wall-reinforcing means are wound on without the use of a mandrel inserted in the inner rubber tube, and in which the vulcanization of the tube with the fabric covering and provided with other wall-reinforcing means can be effected without an inserted mandrel.

The inner rubber tube is filled with an inert liquid, e. g. water or an aqueous solution of inert salts or with an inert gas, care being taken to avoid subjecting the inner tube to such pressure as would cause it to expand, the tube being thereupon closed at its ends and provided with a covering of fabric or of cord threads (with or without weft threads), together with other wall-reinforcing means, the indifferent gas being air, nitrogen, carbonic acid, etc. The covering and other wall-reinforcing means, while being wrapped, lie along their entire length upon surfaces, for instance rollers of a known three-roller device employed for such covering windings and are laid with the use of externally applied pressure at right angles to the direction of the axis of a tube around the inner tube.

The tube thus obtained is vulcanized.

The inner rubber tube filled with the liquid or with the gas is stressed uniformly at right angles to the axis of the tube over its entire length that is to say, in the case of this mode of winding over the coverings and the wall-reinforcing means. Since, moreover, the tube, during the winding of the coverings and the other wall-reinforcing means, lies protected over its entire length between surfaces, then the required amount of pressure can be employed without danger of deforming the inner tube, such as is necessary to prevent the inclusion of air between the layers of the coverings or other wall-reinforcing means. By this means the elastic nature of the filling of the inner tube is of particular advantage because it is rendered possible thereby to even out the inequalities, particularly at the overlapping points, between the individual superposed layers of the wrappings and other wall-reinforcing means.

This particular advantage is not attained when mandrels are employed or even in the case of the known method in which a mandrel is not employed, but in which the tube is not simultaneously and uniformly wrapped over its entire length with coverings and other wall-reinforcing means.

The use of the three-roller device in the case

of the method in which a mandrel is employed for manufacturing the tube is known. It is not known, however, to use the three-roller device to provide a tube with coverings and other wall-reinforcing means without the simultaneous employment of a mandrel.

The tube manufactured in the manner described, owing to the fact that inclusion of air between the layers is sufficiently avoided, can be vulcanized without being covered with a winding material and without a casing of metal, e. g. a lead casing or press mould.

In order to impart to the finished tube a good appearance, a coating of rubber compound can be resorted to in conjunction with the covering winding, said coating being effected by means of the hose or tube machine. In addition an outer rubber coating may also be applied.

By means of the new method various advantages are attained, for instance a simplified and considerably cheaper manufacture of commercial rubber tubes and hose-pipes, simplified apparatus, improved quality of the finished product, particularly in regard to strength of the tube to higher pressures, and the possibility of heating it in the open, i. e. vulcanization outside of a mould or a winding replacing the mould.

In the accompanying drawing:

Fig. 1 shows a cross-section of a part of the tube *a*, the end *b* of which is compressed and then folded down.

Fig. 2 shows a cross-section of the tube *a* between the roller *c*, *c'*, *c''*, which is covered by the fabric *e* placed on the table *d* and the cover adhering to the said fabric.

Fig. 3 shows a longitudinal section of a part of the tube *a* already provided with the fabric *e*; the said tube being supplied with a coating of rubber compound *h* in the cross-head *g* of a tubing machine.

What I claim is:

1. A method of manufacturing rubber tubes having fabric coverings comprising filling a rubber tube with an inert fluid at approximately atmospheric pressure, applying pressure to said tube along at least one line parallel to the longitudinal axis of said tube to partially collapse said tube, applying a fabric covering to the surface of the tube at right angles to the axis thereof while in its partially collapsed condition, applying an outer rubber coating and finally vulcanizing the tube in the open.

2. A method of manufacturing rubber tubes having fabric coverings comprising closing both ends of a tube, applying pressure to said tube

along at least one line parallel to the longitudinal axis of said tube to partially collapse said tube, applying a fabric covering to the surface of the tube at right angles to the axis thereof while in its partially collapsed condition, applying an outer rubber coating and finally vulcanizing the tube.

3. A method as claimed in claim 2 wherein the application of pressure to the tube and the application of the fabric covering take place substantially simultaneously.

4. A method as claimed in claim 2 wherein the fabric is gummed.

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