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METHOD OF AND APPARATUS FOR TREATING MOVING MATTER

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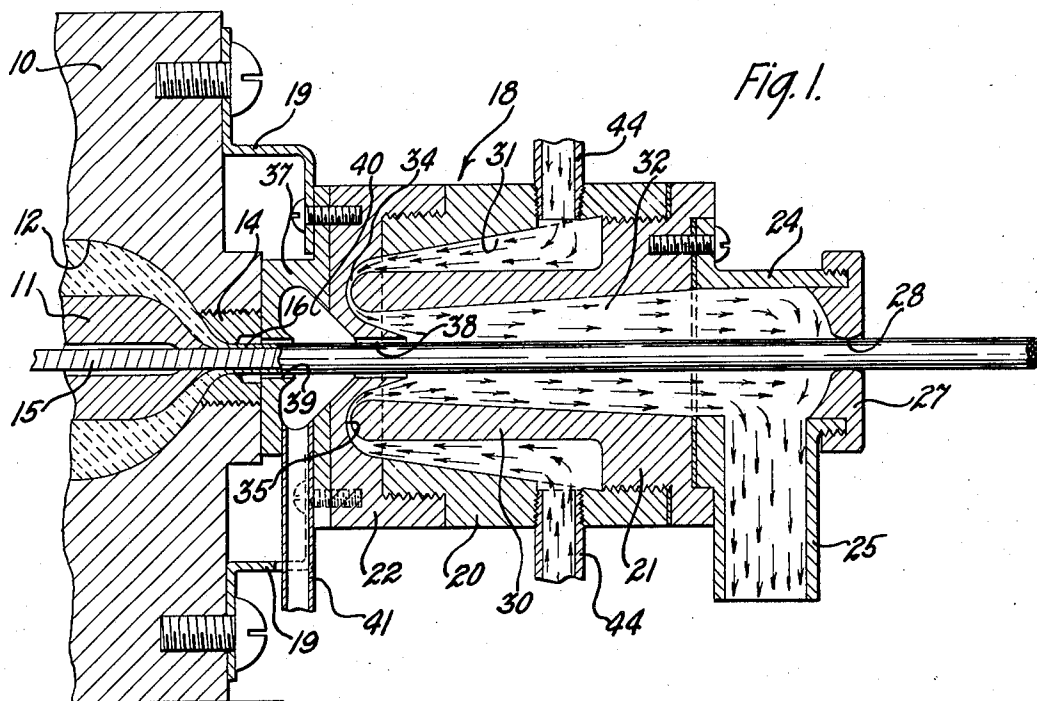


Fig. 1.

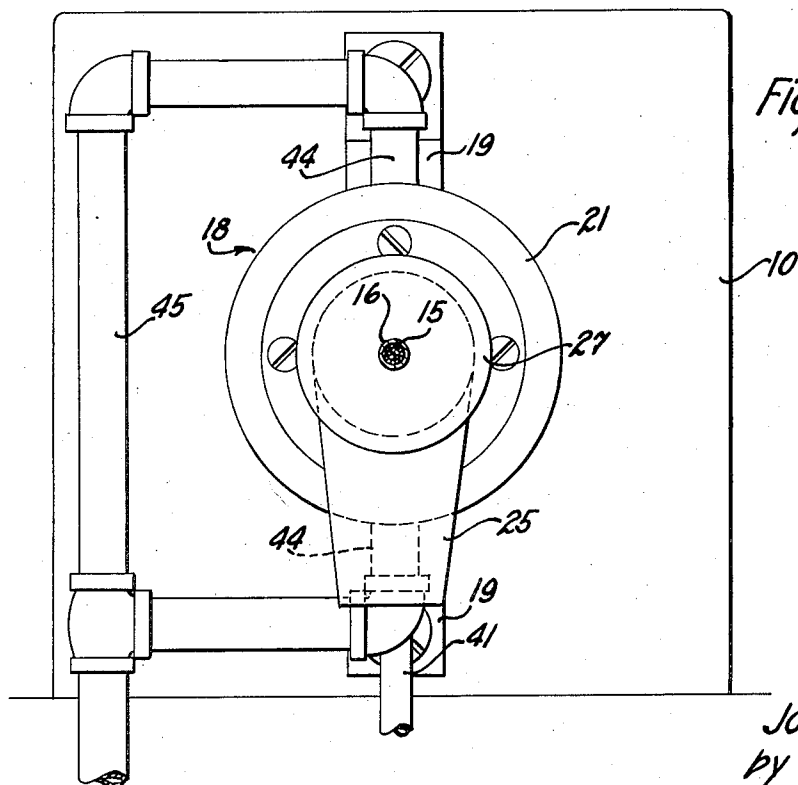


Fig. 2.

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UNITED STATES PATENT OFFICE

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METHOD OF AND APPARATUS FOR TREATING MOVING MATTER

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This invention relates to a method of and apparatus for treating moving matter, and more particularly to a method of and apparatus for quenching matter being extruded.

5 In the extrusion of certain kinds of material, it has been found that an improved product is obtained when the material is quenched immediately after it leaves the extruding die. Thus, in the extrusion of lead
10 alloy cable sheathing, it has been discovered that an improved product is produced when the sheathing is quenched immediately after it is extruded.

The principal object of the present invention is to provide an improved, simple and efficient method of and apparatus for treating moving matter.

Although the invention is obviously capable of various applications, it may be employed to particular advantage in conjunction with the method of and apparatus for continuously extruding lead cable sheathing disclosed in Patent No. 1,720,759, issued July 16, 1929, to John Edson Boynton.

15 In accordance with a preferred embodiment of the present invention, the cable sheathing, immediately after leaving the extruding die, is advanced through a chamber of gradually increasing cross section wherein it is subjected to a cooling medium applied directly thereto in such manner that an aspiratory action is provided whereby leakage of the cooling medium is prevented. Although various kinds of cooling mediums may be employed, water at room temperature has proven very satisfactory. Means is provided for causing the condensation of the steam produced by the water contacting with the extruded material. The used water and the
40 condensed steam are discharged through suitable conduits provided for that purpose.

Other features and advantages of the invention will become apparent from the following detailed description, reference being
45 had to the accompanying drawing, wherein

Fig. 1 is a longitudinal vertical section of a quenching apparatus embodying the features of the invention and by means of which the improved method of quenching extruded matter may be practiced, and

Fig. 2 is an end elevational view of the apparatus shown in Fig. 1.

It is believed that the invention will be clearly understood from the following detailed description of a preferred embodiment thereof. As shown in the accompanying drawing, the reference numeral 10 designates a portion of a hollow block within which is supported a core tube 11 designed and arranged so as to provide an annular passage 60 12 for the matter to be extruded. The passage 12 tapers toward the discharge end thereof and communicates with an extruding die 14 threaded or otherwise secured within the hollow block 10. The reference numeral 65 15 designates a cable which is advanced through the core tube 11 and the die 14 by any suitable means (not shown). As the cable passes through the extruding die, a sheathing of lead 16 is extruded thereon. For
70 a detailed description of the construction and operation of the extruding apparatus, reference is had to Patent No. 1,720,759 above referred to.

In accordance with a feature of the present invention, the extruded sheathing 16, immediately after leaving the die 14, is advanced through a quenching device designated generally by the reference numeral 18. The quenching device is removably supported by means of brackets 19, 19 secured to the block 10, and comprises an outer cylindrical casing 20 having a concentric inner cylindrical casing 21 threaded at one end thereof and a cup-shaped member 22 threaded at the opposite end thereof. Secured to the forward end of the inner cylindrical casing is a sleeve 24 having a downwardly projecting discharge tube 25 secured thereto or formed integral therewith. A cap 27 threaded upon the forward end of the sleeve 24 is provided with a central aperture 28 for the passage of the sheathed cable therethrough.

As shown in Fig. 1, a reduced portion 30 of the inner cylindrical casing 21 is spaced from the outer casing 20 so as to provide an annular chamber 31 therebetween. The inner casing 21 and the sleeve 24 provide a continuous chamber 32 which communicates with the discharge tube 25. The chamber 32 is in com- 100

munication with the chamber 31 through a relatively narrow arcuate passage 34 provided between the rounded end of the inner casing 21 and the bottom of an annular groove 35 formed in the member 22. It will be observed that both of the chambers 31 and 32 taper toward the interconnecting passage 34. The reason for this construction will hereinafter become apparent.

Secured to the member 22 is an annular plate member 37 which is disposed in close proximity to the extruding die 14. The members 22 and 37 are provided with central apertures 38 and 39, respectively, for the passage of the sheathed cable therethrough. Formed in the members 22 and 37 is an annular compartment 40 which communicates with the chamber 32 through the aperture 38. Extending downwardly from the compartment 40 and communicating therewith is a drain pipe 41.

In the operation of the above described quenching apparatus, a cooling medium, preferably water at room temperature, is introduced under pressure into the forward end of the chamber 31 through one or more conduits 44 connected to a supply source through a main conduit 45. Due to the tapered construction of the chamber 31, the water attains a high velocity as it passes through the passage 34 into the chamber 32 after which the velocity is reduced due to the tapered construction of the chamber 32, which also produces an aspiratory action, thus preventing leakage of the water through the aperture 38. Because of the annular shape of the passage 34, the water is directed equally around the sheath, completely submerging it and effecting a quick and uniform cooling thereof. Best results are obtained when just enough water is used to completely fill the discharge tube 25. This prevents the entrance of air through the discharge, promotes a steady uniform flow through the chamber 32, and establishes the maximum aspiratory action.

Substantially all of the steam which may be produced by the water contacting with the heated extruded sheath is carried along by the water and discharged through the tube 25. That which escapes through the aperture 38 condenses in the compartment 40 and is discharged through the drain pipe 41. Thus, the possibility of water or steam coming in contact with the extruding die is eliminated.

Although the invention as herein illustrated and described is particularly well adapted for quenching extruded cable sheathing, it should be understood that the novel features of the invention are capable of various other applications within the scope of the appended claims.

What is claimed is:

1. A method of treating moving material, which consists in subjecting the material to

a fluid applied directly thereto with an aspiratory action.

2. A method of quenching material being extruded, which consists in subjecting the material to a cooling medium applied uniformly to the whole surface thereof with an aspiratory action.

3. In an apparatus for treating moving material, a member having a conical treating chamber wherein fluid is applied to the material with an aspiratory action, and means cooperating with the member to provide an annular chamber disposed concentrically with respect to the treating chamber and communicating therewith.

4. In an apparatus for treating material being extruded, a cylindrical member having formed therein a conical treating chamber wherein fluid is applied to material with an aspiratory action, a cylindrical casing disposed concentrically with respect to the member and cooperating with a surface of the member to provide an annular chamber and means cooperating with the member to provide an annular passage interconnecting said chambers.

5. In an apparatus for treating moving material, a member having formed therein a conical treating chamber wherein fluid is applied to the material with an aspiratory action, an outer casing enclosing the member and cooperating with a surface thereof to provide an annular chamber disposed concentrically with respect to the treating chamber, means cooperating with the member to provide an annular passage interconnecting said chambers, and a member having a chamber communicating with the treating chamber.

6. In an apparatus for treating material being extruded, a tubular member, means cooperating therewith to provide a treating chamber, a cylindrical casing disposed concentrically with respect to the member and cooperating therewith to provide an annular chamber, and a member secured to the casing and cooperating with the tubular member to provide an annular passage interconnecting said chambers, the chambers tapering toward said annular passage.

7. In an apparatus for quenching material being extruded, a tubular member, means cooperating therewith to provide a quenching chamber, a cylindrical casing disposed concentrically with respect to the tubular member and cooperating with a surface thereof to provide an annular chamber communicating with the quenching chamber, means for introducing a quenching fluid into said annular chamber, an outlet for the used fluid communicating with the quenching chamber, a member having a steam condensing chamber communicating with the quenching chamber, and an outlet for the condensed steam com-

communicating with said steam condensing chamber.

8. In combination with an apparatus for extruding material including an extruding die, a device for quenching the material being extruded comprising a member having formed therein a conical quenching chamber wherein fluid is applied to the material with an aspiratory action, a member having a steam condensing chamber communicating with the conical quenching chamber and mounted upon the extruding apparatus closely adjacent the extruding die, and means for introducing quenching fluid into the quenching chamber in an annular jet.

9. In an apparatus for quenching material being extruded, a tubular member, means cooperating therewith to provide a conical quenching chamber, a cylindrical casing disposed concentrically with respect to the member and cooperating therewith to provide an annular chamber communicating with the quenching chamber, diametrically opposed means for introducing a quenching fluid into said annular chamber, and means for removing the fluid from the quenching chamber, the conical quenching chamber diverging from the annular chamber toward the last mentioned means.

10. A method of quenching material being extruded, which consists in subjecting the material to a fluid applied thereto at a high velocity and retained thereabout at gradually decreasing velocity and gradually increasing pressure.

11. A method of quenching material being extruded, which consists in bringing two diametrically opposed streams of quenching fluid together to form an annular jet, increasing the velocity of the quenching fluid, causing the fluid to impinge upon the material to be quenched at the increased velocity, then decreasing the velocity of the fluid while retaining it in contact with the material to effect a cooling action thereon, and finally withdrawing the used quenching fluid from contact with the material.

In witness whereof, I hereunto subscribe my name this 31st day of May, A. D., 1927.

JOHN EDSON BOYNTON.