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MACHINE FOR MAKING ELECTRICAL CABLES.

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FIG. 1.

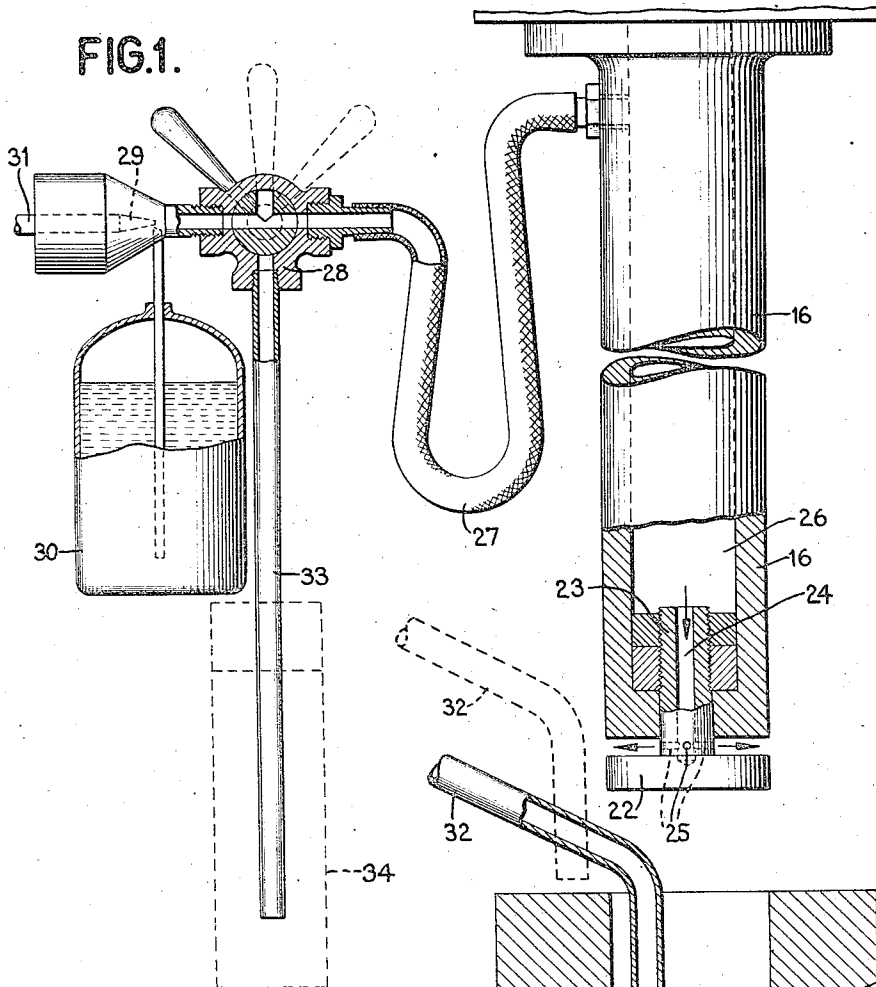
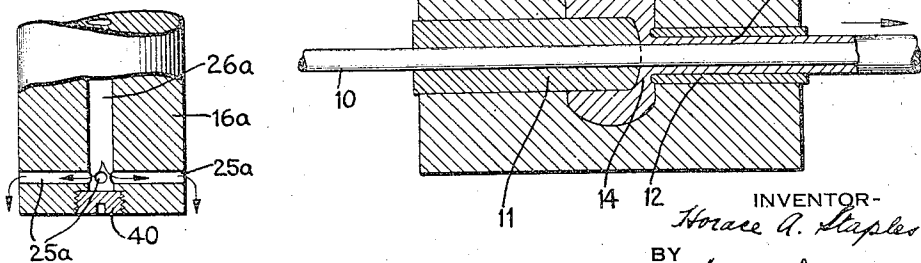


FIG. 2.



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MACHINE FOR MAKING ELECTRICAL CABLES

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Original application April 23, 1932, Serial No.
607,063. Divided and this application October
6, 1932, Serial No. 636,494

3 Claims. (Cl. 207—9)

The present invention relates to improvements in machines for making electrical cables and more particularly to improved machines for applying metal sheaths to electrical cables, to the general end that an improved and more homogeneous and perfect sheath may be produced than heretofore.

More particularly the present invention relates to improvements in the machine which forms the subject matter of the copending application of William A. DelMar and Earle A. Mitchell, Serial No. 601,430, filed March 26, 1932.

According to the aforesaid application, provision was made for minimizing the possibility of the introduction of undesired oxide into the sheath of a metal cable as the same is formed from successive metal charges in an extrusion press.

The present invention has for its object the provision of an improved machine for making a metal sheathed cable wherein provision is made for introducing a special atmosphere such as a reducing or inert gas into the extrusion press below the ram as the ram is withdrawn, which special gas atmosphere prevents the formation of undesirable oxide upon the top surface of the preceding metal charge and which special gas atmosphere is also maintained in the metal press during the recharging of the press with a new metal charge so that oxide formation upon the surface of or in the new lead charge is also precluded.

A further object of the present invention resides in the provision of an improved machine for making electrical cables wherein provision is made for introducing an inert or reducing gas into the press chamber when the ram is being withdrawn and for maintaining such gas atmosphere in the chamber during the recharging of the press.

A further object of the present invention resides in the provision of an improved machine with provisions for lubricating a lead press prior to a charging operation whereby subsequent extrusion operations are facilitated.

A further object of the present invention resides in the provision of an improved machine for making lead sheath cable wherein a reducing or inert gas atmosphere together with a quantity of a lubricating medium may be introduced into the lead press cylinder prior to the introduction of a new charge of lead therein, which atmosphere and lubricating medium cooperate to prevent the formation of undesired oxide upon the lead in the cylinder and which lubricating medium also serves to lubricate the walls of the cylinder to facilitate the subsequent extruding operation.

Further and other objects of the present invention will be hereinafter set forth in the ac-

companying specification and claims and shown in the drawing, which by way of illustration shows what I now consider to be a preferred embodiment of the invention.

The drawing shows in

Figure 1 the improved machine by which the present improved method of making a lead sheath cable is carried out; and

Fig. 2 shows a slightly modified construction of ram.

The customary process of applying a lead sheath to a cable comprises the passing of the cable 10 through a closely fitting die 11 which almost abuts another die 12 of a diameter slightly greater than that of the cable. Lead in a hot but solid form is pressed into the space 14 between the two dies and thence into the cylindrical space 15 between the cable and the inside of the larger diameter die. The pressure for extruding the lead sheath is obtained by a hydraulic ram 16 which presses upon a lead charge 17 in the cylinder or lead press chamber 18.

Due to the large amount of lead which has to be used, particularly for a cable of even normal length, it is generally impracticable to perform the extruding operation continuously. It is necessary to stop and recharge the cylinder 18 from time to time and during these recharging operations oxide may be formed upon the surface of the old lead charge 17 or in the new lead which is being introduced into the cable or upon the top of the new lead charge. This undesired oxide formation occurs due to the presence of free oxygen in the air in the cylinder and due to the heated condition of the lead. Accordingly, imperfect cables are produced.

In order to prevent the formation of the undesirable oxide, which subsequently becomes introduced into the lead sheath of the cable during the extruding operations, the previous procedure is modified as will now be described.

The ram 16 is provided with a dummy head 22 carried on a stud 23 slidably fitting the head of the ram 16. The stud 23 is interiorly hollowed out as indicated at 24 and from this hollowed out passage in the stud ports or passages 25 extend laterally as shown. The interior of the ram is also provided with a hollowed portion or conduit 26. Connected to the upper portion of the ram and in communication with the conduit portion 26 is a flexible connection 27 which extends to a three-way valve generally designated 28. Beyond the three-way valve 28 is an atomizing device 29 for atomizing a lubricating medium such as oil which is taken into the atomizing device 29 from a reservoir 30. 31 is a pipe or conduit through which a reducing or other inert gas such as illuminating gas, carbon dioxide, steam or the like is supplied under pressure. Such gas

free from free oxygen will hereinafter be termed "a special atmosphere".

After one lead charge has been extruded, the plunger or ram head 22 is in contact with the upper surface of the previous lead charge which surface is substantially at the bottom of the cylinder 18. With the ram in lower position, the three-way valve 28 is thrown to a position to admit a mist of lubricating oil and the reducing or other inert gas through the flexible conduit 27 into the interior of the ram. The ram is then raised and the mist of oil and reducing gas is sprayed on the walls of the chamber or lead press cylinder as the ram is withdrawn upwardly. It will be understood that the dummy head 22 on the ram drops and allows the mist to flow laterally to the walls between the upper part of the dummy head and the lower part of the plunger arm. The gas and lubricating medium passes around the dummy head and down into the space between the top of the previous lead charge and the ram, as the ram is withdrawn upwardly. In this way a reducing atmosphere or inert gas atmosphere is maintained in the chamber or space above the old lead charge between the upper surface thereof and the ram as the ram is being withdrawn. The lubricating medium sprays the bore of the lead press with oil, preventing sticking of the ram and facilitating the subsequent extruding operation.

The next step in the operation is to fill the chamber of the metal press cylinder or container with a new charge of metal such as lead. Such metal, for example molten lead, is introduced into the chamber or container of the extrusion press through a removable pipe 32 which leads to a lead pot or lead pump or other source of metal supply. The pipe 32 during the filling operation, is extended down into the special atmosphere in the container. After filling such pipe 32 is removed. During this filling operation the three-way valve 28 is shifted to a position to shut off further supply of gas and lubricating medium and to establish communication between conduit 27 and a pipe 33 so that upon subsequent lowering of the ram, gas can escape from the press chamber through the ram to the atmosphere. Pipe 33 may extend directly to atmosphere or it can extend into a water seal indicated by dotted lines at 34. The lead is then introduced into the press chamber within press cylinder 18 and the reducing gas atmosphere is gradually displaced and discharged through pipe 33. During the filling operation it will be appreciated that the reducing gas or other inert atmosphere within the chamber 18 prevents oxidation of the lead either in the new lead charge, which is introduced in a molten state, or upon the top surface of the old lead charge 17.

The machine is then ready for the subsequent extruding operation. During the extruding operation the three-way valve is shifted to closed position and extrusion proceeds in the usual manner.

By the above procedure oxygen is prevented from reaching the surface of the old lead charge or the molten lead while such lead is being introduced into chamber 18. The reducing gas or inert gas which was introduced in the chamber or cylinder of the lead press upon upward withdrawal of the ram prevents oxygen from the air from entering the chamber and precludes oxide formation.

Furthermore the lubricating medium supplements the reducing or inert gas upon being highly heated since such lubricating medium under heat itself becomes converted into hydro-carbon gas which has reducing characteristics.

Figure 2 shows a modified form of ram. With this form the supplemental or dummy head 22 is dispensed with and in lieu thereof the ram 16a is so shaped that its lower integral portion constitutes the head. An interior conduit 26a is provided as before and openings or passages 25a extend to the periphery of the ram. Preferably a closing plug 40 is provided in the lower face of the ram 16a. With this construction the gas which is supplied under pressure to conduit 26a escapes into the space below the ram upon withdrawal of the ram by passing from passages 25a around the edges of the lower end of the ram. The diameter of the lower end of the ram permits such gas flow. With the construction shown in Fig. 1 the diameter of the supplemental or dummy head is such as to provide for such gas flow upon upward withdrawal of the ram.

The present application constitutes a division of my copending application Serial No. 607,063, filed April 23, 1932, for Methods and machines for making lead sheathed cable. The method herein set forth is claimed in the aforesaid parent application, Serial No. 607,063.

What I claim is:

1. A machine for making a metal sheathed cable and comprising in combination, a chamber for receiving heated metal and from which the sheath is adapted to be extruded, a ram cooperable with said chamber for exerting pressure on metal therein, the said ram having an interior passage, a source of gas, and means for conducting a special gas atmosphere from said source and through said passage into said chamber during the withdrawal of said ram whereby air is excluded from said chamber during extruding operations.

2. An extrusion press comprising in combination, a cylinder adapted to receive heated metal and provided with outlet means for forming a tubular sheath, a ram cooperable with said cylinder for forcing metal therefrom through said outlet means, the said ram having an interior passage communicating with outlets at that portion of the ram which enters the cylinder first, means comprising an extension head movably mounted on said ram for closing said last mentioned outlets when the ram is moving into the cylinder and for opening said last mentioned outlets when the ram is being withdrawn from the cylinder, and means for supplying an oxygen-excluding special gas atmosphere through said passage and last mentioned outlets and into the cylinder.

3. A machine for making a metal sheathed cable and comprising in combination, a chamber for receiving heated metal and from which the sheath is adapted to be extruded, a ram cooperable with said chamber for exerting pressure on metal therein, the said ram having an interior passage, a source of gas, and means for conducting a special gas atmosphere from said source and through said passage into said chamber during the withdrawal of said ram whereby air is excluded from said chamber during extruding operations, and means for supplying lubricant to said special gas atmosphere and thereby causing the latter to carry the lubricant into said chamber.

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