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METHOD OF PLUGGING CABLES

Filed Sept. 1, 1928

Fig. 1.

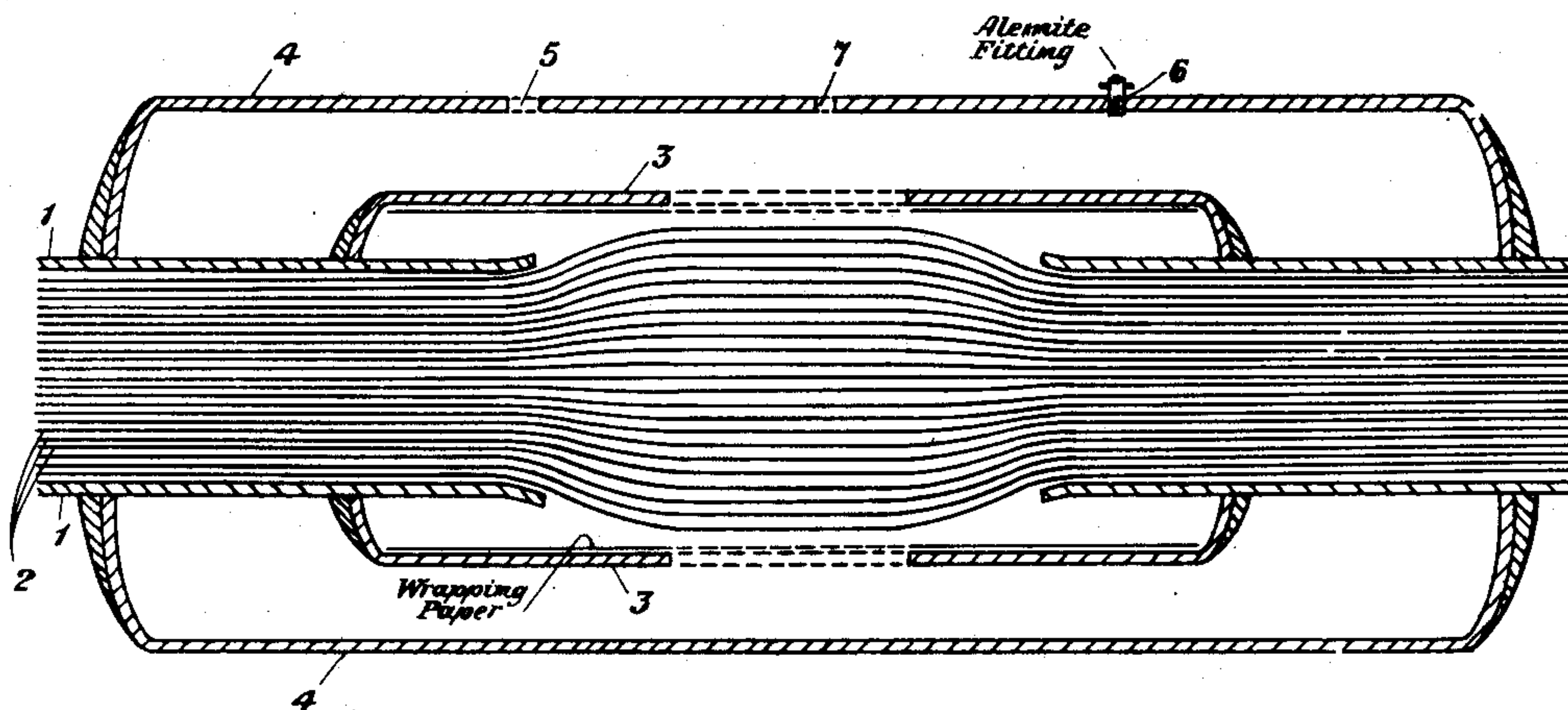


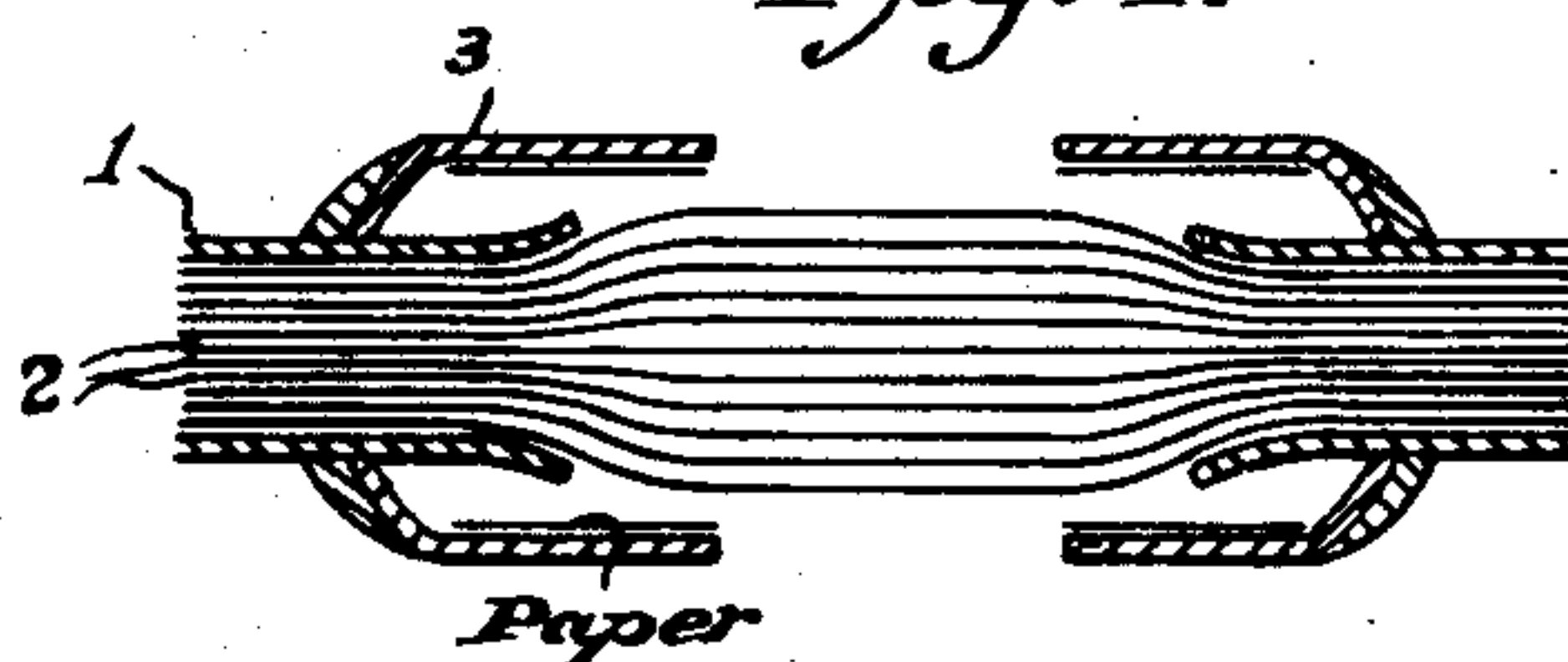
Fig. 2.



Fig. 3.



Fig. 4.



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METHOD OF PLUGGING CABLES

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This invention relates to cables, and more particularly to arrangements for plugging a cable in order to prevent the flow of gas through the cable during pressure tests.

5 In certain cases of cable testing it is desirable that gas pressure be maintained in order that mechanical defects, such as holes in the sheath, may be detected and in order to prevent the entrance of water which
10 might otherwise occur before the defects could be located and repaired. When gas pressure is used for such purposes it is, of course, necessary or at least desirable to seal the cable at two or more points to prevent the flow of gas along the cable or the
15 escape of gas at the terminals—that is, to confine the gas to the cable section under test. Various gas-tight plugs for this purpose have been used or suggested, the essential idea upon which these plugs have
20 been based is that of filling a cable sleeve with molten wax, the single sleeve being placed over the cable at a place where a short section of the sheath has been removed.
25 Such plugs have not been satisfactory, chiefly for the reason that the wax, upon cooling, shrinks away from the inner surface of the sleeve and small leakage paths are formed over which the gas passes to other sections
30 of the cable.

The applicant's arrangement for plugging a cable against the flow of gas therethrough is based in part upon the idea of filling a sleeve with molten wax but has important
35 novel features and important advantages over any plugging arrangement heretofore suggested and known to the applicant. Thus, it is to be understood that the applicant claims as his invention not the broad
40 idea of employing wax to seal a cable section but the novel method indicated by the following illustrative description and claimed hereinbelow.

45 The principal object of this invention is the provision of gas-tight plugging arrangements which do not permit slight leakage of gas over small paths between the wax and the enclosing lead, thus giving satisfactory sealing even in the case of relatively high
50 pressures.

Another object of the invention is the provision of gas-tight plugging arrangements which permit of satisfactory construction and application in the field.

In general, the applicant plugs a cable 55 against the flow of gas therethrough by removing a short section of the cable sheath, wiping a lead sleeve over the opening, filling this sleeve with molten wax, cutting a transverse strip from the sleeve, wiping a second
60 and larger lead sleeve over the first sleeve and filling the outer sleeve with molten wax.

The invention will be more clearly understood when the following detailed description is read with reference to the accompanying drawing, of which Figure 1 shows in
65 longitudinal section a cable plugged at one point in accordance with the invention, and Figs. 2, 3 and 4 indicate the various earlier steps of the applicant's method. 70

With reference to the details of the drawings, there is shown a cable having an enveloping sheath 1 and a plurality of conductors 2. When it is desired to seal the
75 cable against the flow of gas through the section shown, the sheath 1 is removed over a short length of the cable, say about ten inches. (See Fig. 2.) Preferably, the conductors 2 are separated as indicated to permit the wax to penetrate and fill the inter-
80 stices. The ends of the cable sheath which bound the gap should be slightly flared in order to prevent the cutting of or other damage to the conductors. Assuming that
85 the cable has a diameter of approximately $2\frac{1}{2}$ inches, care should be taken in the separating of the cable conductors that the extended diameter of the group of conductors be slightly less than, say, four inches. A
90 four-inch split sleeve 3 having a length of about 14 inches is now placed over the opening in the cable sheath. (See Fig. 3.) This sleeve should be lined with a layer of wrapping paper or similar material, as indicated
95 in the drawing, in order that the conductors 2 may not come in contact with the sleeve 3. This layer of paper may be regarded as replacing the ordinary cable bandage. The sleeve 3 is wiped in place as shown, and a
100 small filling hole 8 is then made through the

lead of the sleeve and through the paper lining. In addition a vent hole 9 is made through the sleeve and lining. Wax heated to approximately 375° F. is poured over the sleeve and over the cable for about two feet on either side of the sleeve for the purpose of heating the cable and the sleeve. With the cable and the sleeve thoroughly heated, wax at a temperature of about 300° F. is poured through the opening in the sleeve by means of a funnel. During this operation the sleeve and the neighboring portion of the cable should be kept hot. When no more wax can be poured through the opening the sleeve is allowed to cool.

A transverse band of about four inches, including the area through which the filling and vent holes were pierced, is now carefully cut out of the middle of the sleeve 3, as indicated in the drawing (see Fig. 4), the cut being carried through the paper lining but care being taken that the wax (not shown) is not cut. A second sleeve 4 considerably larger than the sleeve 3—six inches in diameter, for instance—and having a length of approximately 20 inches is now placed over the sleeve 3 and wiped in place, as indicated in the drawing. Three small holes 5, 6 and 7 are made in this outer sleeve 4. A grease fitting is placed in the hole 6, and through the other hole 5 wax at a temperature of 350° F. is poured into the outer sleeve. The opening 7 serves as a vent hole. When no more wax can be added by the pouring method, the sleeve 4 is allowed to cool and the filling and vent openings 5 and 7 are sealed with solder. Wax at about 250° F. is then forced into the sleeve through the opening 6 with a grease gun until the operation of the gun indicates that considerable pressure has been created in the sleeve. Then the grease fitting is removed and the opening 6 is sealed.

It will be understood from an examination of the above description that the outer sleeve 4 is in effect a reservoir from which molten wax is forced into the inner sleeve 3 and into any voids which may exist between the cable conductors 2 and the enveloping sheath 1 and sleeve 3. When the wax in the outer sleeve 4 cools it shrinks tightly about the cable and the inner sleeve 3, and the cable is satisfactorily plugged against the flow of gas.

While approximate measurements have been indicated in the above description of the cutting of the sheath 1 and the placing over the cable of the sleeves 3 and 4 this is, of course, merely for the purpose of illustration. In general, it is to be understood that, while the invention has been specifically described as embodied in a certain form and as applied to a certain type of cable, this description does not limit either the scope or the application of the invention.

The true limitations are to be found by an examination of the appended claims.

What is claimed is:

1. The method of plugging a cable against the flow of gas therethrough which consists in removing a short section of the cable sheath, wiping a sleeve over the open section of the cable, filling the sleeve with a sealing compound, removing the middle section of the sleeve, wiping an outer sleeve on the cable over the first sleeve and filling the outer sleeve with a sealing compound.

2. The method of plugging a cable against the flow of gas therethrough, the cable comprising a plurality of insulated conductors and an enveloping sheath, which consists in removing a short section of the sheath, separating the conductors, wiping a sleeve over the open section of the cable, filling the sleeve with a sealing compound, removing the middle section of the sleeve, wiping an outer sleeve on the cable over the first sleeve and filling the outer sleeve with a sealing compound.

In testimony whereof, I have signed my name to this specification this 30th day of August, 1928.

CHARLES E. BALDWIN.