

1

2,801,323

FLEXIBLE HOSES

Andrew George Heron, Benton, Newcastle upon Tyne, England

Application May 26, 1955, Serial No. 511,333

5 Claims. (Cl. 219—39)

This invention relates to flexible hoses and is an improvement in or modification of the invention claimed in my patent application No. 12422/53.

In the form of hose described in the parent specification comprising two coaxial braided wire conductors insulated from one another, in the event of any fault arising in the insulation, the risk of leakage between the two conductors extends throughout the area of the conductors, that is to say the length of the hose multiplied by the circumference of the braided wire conductors.

The main object of the invention is to provide a form of such twin conductor heating hose in which the potential fault area is substantially reduced. Another object is at the same time to provide a method of manufacture of the hose which will substantially reduce the risk of break-down of the insulation.

According to the invention the one conductor consists in a line conductor of compacted cross section which extends longitudinally along the wall of the hose.

Preferably the line conductor takes the form of a strip; and to impart flexibility to it, it may be formed by flattening a length of braided conducting wire.

The other conductor may be of braided wire of circular cross section; or it may consist of two or more parallel braided wire conductors of segmental cross section.

By making the resistance of the line conductor less than that of the other conductor, the latter may be used virtually as the heating conductor, and the line conductor as virtually a return conductor only. On the other hand, if desired, the line conductor may be of such resistance relatively to the other conductor that it also dissipates some heat.

In order to reduce to a minimum the risk of break-down in the insulation, the line conductor is made as a separate insulated conductor according to well-known methods of manufacturing insulated cables, and subsequently bonded to the wall of the hose, preferably during the manufacture of the latter. As the separate line conductor can be tested for faults prior to its application to the hose, the likelihood of insulation faults subsequently arising is reduced to an absolute minimum.

In use for spraying viscous material from a spraying gun, if the material to be heated does not require the air to be heated, the ends of the two conductors adjacent the gun are joined preferably through the gun, and their other ends connected across the low voltage secondary winding of the step-down transformer as described in the parent specification. However, if the air is to be heated as well as the material to be sprayed, the strip conductors of the two hoses are not used, and the two other conductors are electrically connected at their gun ends, preferably by the gun itself as described in the parent specification with reference to the use of a heated air hose in addition to the heated material hose.

In the event of the one conductor being in the form of a number of parallel braided wire conductors of segmental cross section the different conductors are con-

2

nected in series in order to make a suitable heating circuit across the secondary of the transformer.

The invention will now be described by way of example with reference to the accompanying drawings in which the line conductor is in the form of a strip of flattened braided conducting wire.

In the drawings:

Fig. 1 is a cross section of a hose in which the conductor is of braided wire of circular cross section.

Fig. 2 is a similar view of Fig. 1 in which the other conductor consists in a number of parallel braided wire conductors of segmental cross section.

Fig. 3 is a semidiagrammatic arrangement of one application of the hose according to the invention to a spraying gun.

Referring more particularly to Fig. 1, A is the rubber body portion of the hose, and B is a braided wire conductor of circular cross section embedded in the said body. C is a strip of rubber in which is embedded a flattened strip of braided conducting wire D, which is separate from the body of the hose, but is bonded to the latter during the manufacture of the latter.

Fig. 2 is a similarly constructed hose to that of Fig. 1, but with a number of segmental braided wire conducting strips E, which are connected in series at their ends to provide a suitable heating circuit, with the braiding D as the return conductor, across the secondary F¹ of a step-down transformer F, the series connexions being shown in dotted and chain lines respectively.

Fig. 3 shows a spraying gun G to the spraying nozzle of which is connected the heating hose A, its conducting braiding B being electrically connected to the body of the gun, to which is also connected the strip braiding D of the strip C. H is the air hose which is not heated. The other ends of the braidings B and D are connected to the secondary F¹ of the step-down transformer F, while the other end of the hose A is connected to a supply tank G.

With the hose according to the invention, should there be a fault in the insulation between the two conductors, as the area between the two conductors is relatively small, the chance of such fault lying in this area is relatively small; while by manufacturing the hose as above described, the likelihood of faulty insulation occurring is also very small.

By making the portion of the gun adjacent the passage leading to the spraying jet of metal having an electrical resistance such that this portion is in the electrical circuit, the heat is generated up to the spraying jet.

I claim:

1. A flexible heating hose, said hose having embedded therein two braided wire line conductors insulated from each other; one of said conductors serving as a return conductor and comprising a flattened braided conducting wire of a circular cross section and extending longitudinally along the wall of the hose; the other conductor serving as a heating conductor; the resistance of the first conductor being less than that of the said other conductor; the ends of the two conductors adjacent one end of the hose being joined together and their other ends adapted to be connected across a source of electric current.

2. A flexible heating hose, said hose having embedded therein two braided wire line conductors insulated from each other; one of said conductors serving as a return conductor and being of compacted cross-section and extending longitudinally along the wall of the hose; the other conductor being of braided wire of circular cross-section and serving as a heating conductor; the resistance of the first conductor being less than that of the said other conductor; the ends of the two conductors adjacent one end of the hose being joined together and their other ends

3

adapted to be connected across a source of electric current.

3. A flexible heating hose, said hose having embedded therein two braided wire line conductors insulated from each other; one of said conductors serving as a return conductor and being of compacted cross-section and extending longitudinally along the wall of the hose; the other conductor comprising a plurality of parallel braided wire conductors of segmental cross-section and serving as a heating conductor; the resistance of the first conductor being less than that of the said other conductor; the ends of the two conductors adjacent one end of the hose being joined together and their other ends adapted to be connected across a source of electric current.

4. A flexible heating hose, said hose having embedded therein two braided wire line conductors insulated from each other; one of said conductors serving as a return conductor and being of compacted cross-section and extending longitudinally along the wall of the hose; the other conductor comprising a plurality of parallel braided wire conductors of segmental cross-section connected in series and serving as a heating conductor; the resistance of the first conductor being less than that of the said other conductor; the ends of the two conductors adjacent one end of the hose being joined together and their other ends adapted to be connected across a source of electric current.

4

5. A flexible heating hose, said hose having embedded therein two braided wire line conductors insulated from each other; one of said conductors serving as a return conductor and comprising a flattened braided conducting wire of circular cross-section and extending longitudinally along the wall of the hose; the other conductor being of braided wire of circular cross-section and serving as a heating conductor; the resistance of the first conductor being less than that of the said other conductor; the ends of the two conductors adjacent one end of the hose being joined together and their other ends adapted to be connected across a source of electric current.

References Cited in the file of this patent

UNITED STATES PATENTS

1,252,614	Pieper	Jan. 8, 1910
1,809,714	Mathews	June 9, 1931
1,905,343	Carpenter	Apr. 25, 1933
2,274,839	Marick	Mar. 3, 1942
2,516,864	Gilmore	Aug. 1, 1950
2,526,405	Peep	Oct. 17, 1950
2,652,093	Burton	Sept. 15, 1953
2,657,097	New	Oct. 27, 1953