Jan. 27, 1970 H. A. WILLIAMS ET AL 3,492,409

HIGH VOLTAGE CABLE TERMINATION

Original Filed Oct. 28, 1963

Fig. 1

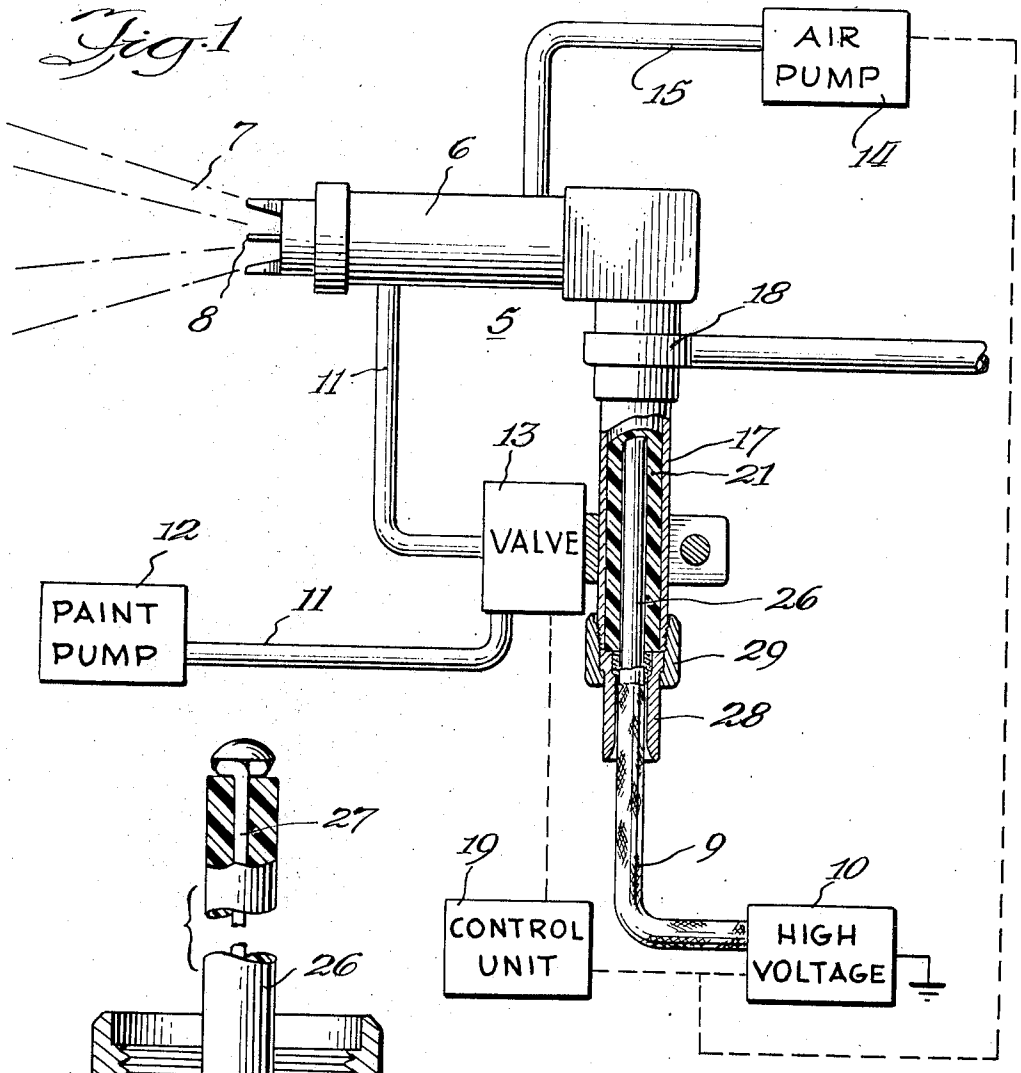
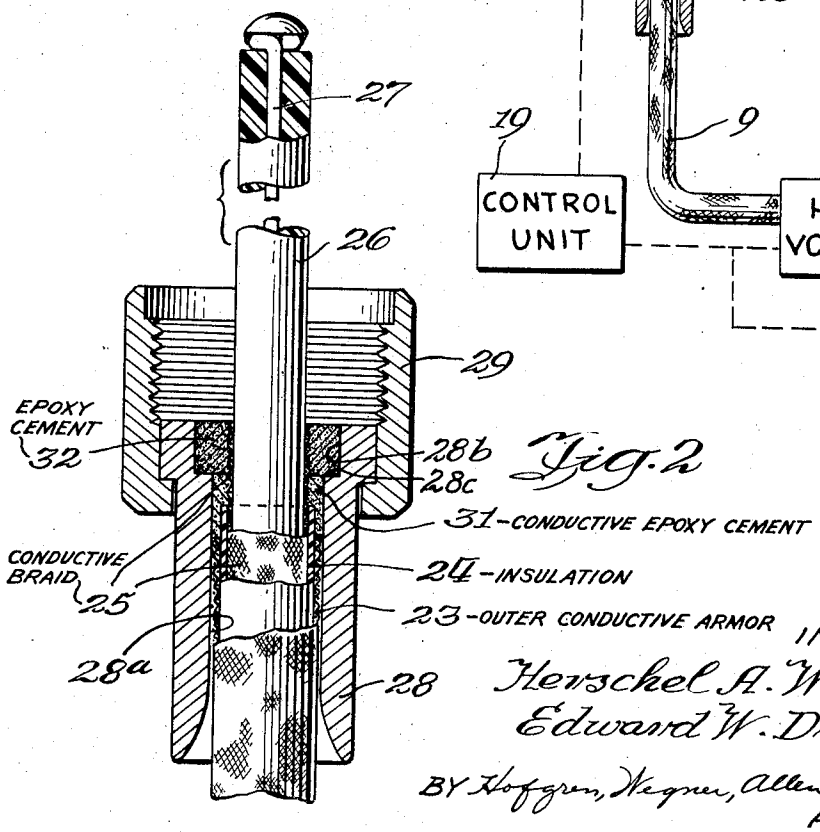


Fig. 2



INVENTORS

Herschel A. Williams

Edward W. Drum

BY Hofgren, Wegner, Allen, Stellman & McCord

ATTORNEYS

United States Patent Office

3,492,409

Patented Jan. 27, 1970

3,492,409

HIGH VOLTAGE CABLE TERMINATION

Herschel A. Williams, Manchester, Tenn., and Edward W. Drum, Indianapolis, Ind., assignors to Ransburg Electro-Coating Corp., a corporation of Indiana

Original application Oct. 28, 1963, Ser. No. 319,142, now Patent No. 3,292,860, dated Dec. 20, 1966. Divided and this application Oct. 6, 1966, Ser. No. 584,709

Int. Cl. H02g *15/02, 15/08;* H01r *13/54*

U.S. Cl. 174—78 9 Claims

ABSTRACT OF THE DISCLOSURE

A high voltage cable having a conductive braid sheath secured to a terminal fitting sleeve with a conductive cement providing electrical continuity and a structural cement providing a physical connection.

This application is a division of Williams et al., Ser. No. 319,142, filed Oct. 28, 1963, now Patent 3,292,860.

This invention relates to a high voltage cable termination, particularly for securely anchoring a cable to a device, as an electrostatic spray gun.

A high voltage cable, such as that used with electrostatic coating equipment, has a central body of insulating material, as polyethylene, with a conductor in the center thereof. Surrounding the polyethylene body is a woven conductive covering which is grounded. A thin sheath of insulating material surrounds the woven conductive covering. A metallic element surrounds the insulating sheath providing physical protection for the cable. It is necessary to attach the cable securely to the device with which it is used, with a good electrical connection at least to the woven conductive covering and a mechanical connection to anchor the cable securely.

A feature of the invention is that the high voltage cable has a terminal fitting including a sleeve with a bore through which the cable extends. The braid of the cable is electrically connected to the sleeve with a conductive cement and the cable is securely anchored in the fitting with a structural cement.

Further features and advantages of the invention will readily be apparent from the following specification and from the drawings, in which:

FIGURE 1 is a diagrammatic illustration of a system embodying the invention; and

FIGURE 2 is an enlarged fragmentary section through the cable fitting.

In a hand spray gun the various connecting cables or hoses, as for paint, air and high voltage, should enter the gun in such a manner that they do not destroy the balance or maneuverability of the gun. It is generally desirable that they enter through the rear of the gun and preferably through the base of the handle. This presents certain problems in isolating the coating material passage from the high voltage circuit.

In the system of FIGURE 1 of the drawings, spray gun **5** has a barrel portion **6** with a spray **7** of particles of coating material emitted from the front thereof and directed generally toward articles to be coated, carried by a grounded conveyor (not shown). A spray charging electrode **8** is connected through a circuit in the gun (not shown) and high voltage cable **9** with a source **10** of high voltage, establishing a high intensity electrostatic field extending from the electrode to the grounded articles. The spray particles acquire a charge and are attracted to and deposited on the grounded articles. A coating material conduit **11**, of insulating material, is connected with the gun near the front of the barrel and supplies coating material from a pump **12** through a valve **13**. Air pump

14 is connected through hose **15** with an air inlet at the rear of the barrel **6**.

A conductive support **17** extends downwardly from the rear of barrel **6** through a carrier ring **18** on which the gun is mounted. Valve **13** is mounted on gun support **17**.

A control unit **19**, shown diagrammatically, may be provided to control valve **13**, high voltage source **10** and air pump **14**. The details of the control unit are not important to the present invention. It is sufficient to point out that paint valve **13** should not be opened except when both air and high voltage are available.

A high voltage circuit housing has a first leg which extends through the bore of barrel **6** and a second leg **21**, at right angles to the first leg, which extends through steel support tube **17**. The high voltage housing is of a suitable high dielectric material, as polyethylene.

The high voltage cable, best seen in FIGURE 2, has an outer conductive and protective member **23** surrounding a neoprene sheath **24**. Within the sheath is a braid **25** of conductive material which overlies the polyethylene insulating body **26**. Insulating body **26** and inner conductor **27** extend through leg **21** of the high voltage housing. The fitting which is secured to the cable and provides for attachment of the cable to the lower end of support **17**, includes a ferrule **28** and a threaded ring **29**. Ferrule **28** has bore portions **28***a* and **28***b* of differing diameter with shoulder **28***c* between. The outer conductive member is fastened to narrower bore portion **28***a*. It is important that a good electrical connection be formed between the braid and the ferrule, to ground the apparatus through the inner braid which is grounded at the high voltage power supply **10**. Thus, support **17** and coating material valve **13** (FIGURE 1) are electrically grounded.

A quantity of conductive epoxy cement **31** connects the braid **25** and ferrule. The remainder of the recess between the ferrule and the cable is filled with a body **32** of structural epoxy cement which secures and retains the braid and bears against shoulder **28***c*, locking the cable and ferrule together.

We claim:

1. In a high voltage electrical device having a high voltage cable with inner conductor, a layer of insulating material and a conductive sheath, a connecting fitting, comprising:

a conductive sleeve having a bore through which the cable extends into said device, said bore having an outer portion and an inner portion;

a body of conductive cement between said conductive sheath and the sleeve in the outer portion of the bore; and

a body of structural cement between the cable and the sleeve in the inner portion of the bore, securing the cable against movement outwardly of the fitting.

2. The cable and cable fitting of claim **1** wherein said body of structural cement and said sleeve have interlocking surfaces.

3. The cable and cable fitting of claim **2** wherein the outer bore portion is narrower than the inner bore portion, with a wall surface joining the inner walls of said bore portions, said body of structural cement bearing against said wall surface.

4. The cable and cable fitting of claim **3** wherein said wall surface is a shoulder generally perpendicular to each bore portion.

5. The cable and cable fitting of claim **1** wherein said cable has a protective covering outside said conductive sheath which terminates short of the body of conductive cement between the conductive sheath and fitting.

6. The cable and cable fitting of claim **5** wherein said protective covering includes an insulating sheath surrounded by a conductive element.

7. In combination, the high voltage cable and the high voltage cable fitting of claim 1 and an electrostatic spray gun connected to the high voltage cable and to the high voltage cable fitting.

8. The combination of claim 7, wherein the fitting further includes a ring securing the fitting to the gun, the ring including a flange and the sleeve including a flange which engages with the flange of the ring whereby the cable is attached to the gun.

9. The combination of claim 8, wherein the ring is threaded and is turned onto a threaded conductive support of the electrostatic spray gun.

References Cited

UNITED STATES PATENTS

2,043,341	6/1936	Turechek	174—76 X
2,520,705	8/1950	Wittlinger	174—35.1
3,117,298	1/1964	Grunwald	338—312
3,367,578	2/1968	Juvinall et al.	239—15
2,402,049	6/1946	Ingalls	339—89 X

LARAMIE E. ASKIN, Primary Examiner

U.S. Cl. X.R.

174—78; 339—89; 239—15