



(11) (21) (C) **2,056,729**  
(22) 1991/11/29  
(43) 1992/06/11  
(45) 2000/09/05

(72) Mitsch, Brian M., US

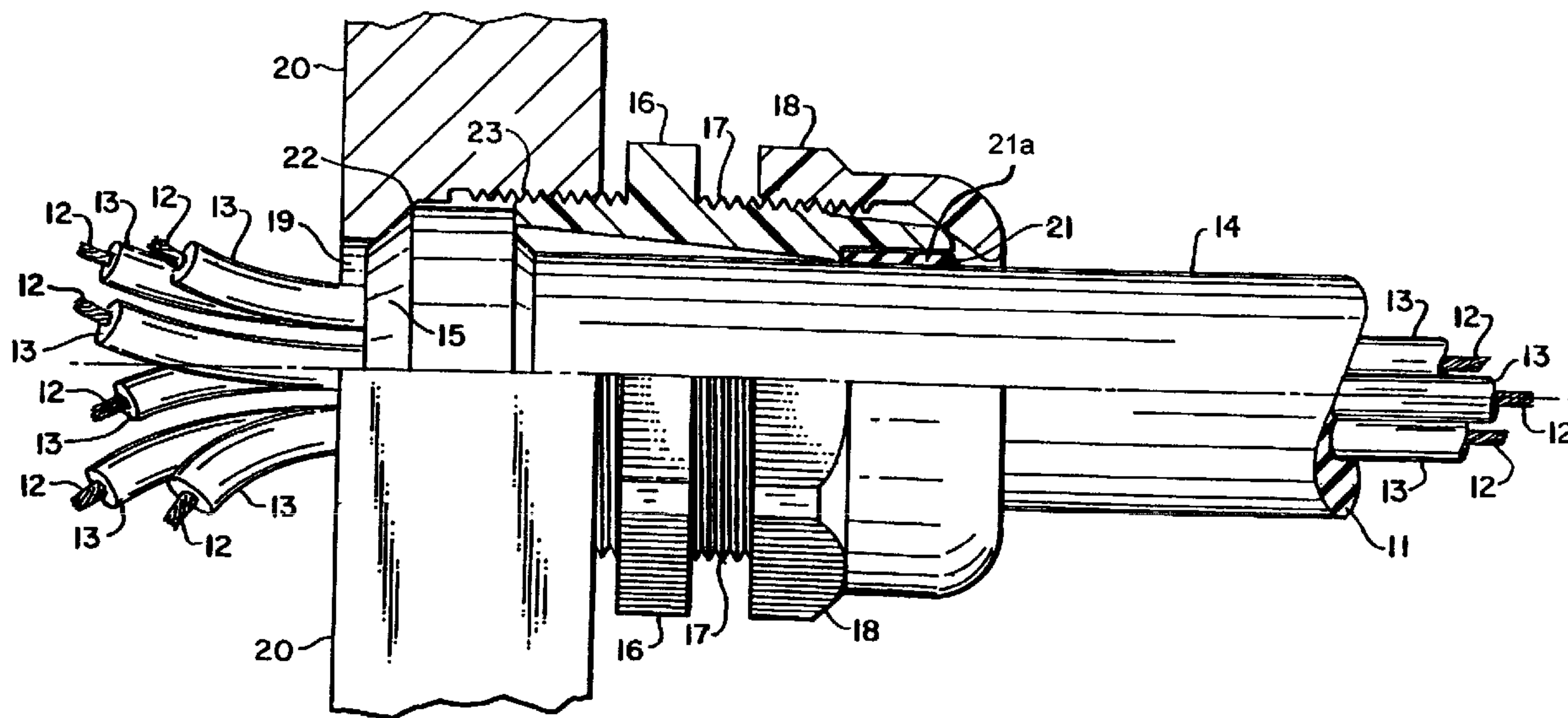
(73) PENTAIR PUMP GROUP, INC., US

(51) Int.Cl.<sup>5</sup> H02G 15/013

(30) 1990/12/10 (624,827) US

(54) **DISPOSITIF D'INSERTION DE CORDON D'ALIMENTATION  
ELECTRIQUE**

(54) **ELECTRICAL POWER CORD ENTRY DEVICE**



(57) The invention of this disclosure is an economical sealing device that utilizes two seals to protect an electrical power cord or cable from its environment. The cord or cable couples a power source to electrical equipment that is located behind a material. A standard cord grip is used to push a molded assembly, (which is located at the end of the cable passing through the material) against a molded seat assembly to obtain a first seal. The second seal is obtained by tightening the cord grip with a nut.



**ABSTRACT OF THE DISCLOSURE**

---

The invention of this disclosure is an economical sealing device that utilizes two seals to protect an electrical power cord or cable from its environment. The cord or cable couples a power source to electrical equipment that is located behind a material. A standard cord grip is used to push a molded assembly, (which is located at the end of the cable passing through the material) against a molded seat assembly to obtain a first seal. The second seal is obtained by tightening the cord grip with a nut.

## **BACKGROUND OF THE INVENTION**

This invention relates to electrical devices and more particularly to an electrical power cord entry device that provides a fluid tight joint between the electrical device and the cord.

Many electrical devices receive electrical power by having a cord or cable connected to a plug, which is inserted into an electrical socket.

Typically the cord or cable has a covering to protect the cord or cable against the accumulation of moisture and against corrosion. In general, the outer jacket of a cable will be waterproof in the way that a garden hose is waterproof. Water will not penetrate the jacket under normal conditions but will be carried along the length of the cable if it enters at the end of the cable or through a break in the cable jacket.

If a cable is to be used underwater or in a severe moisture environment, and one end must enter a sealed device which is underwater or in the wet environment, a means must be provided to keep water or moisture from entering the device and the cable at the point of entry of the cable. A molded cord end will isolate interior and exterior environments from each other and prevent wicking by the insulation in

the cord. If the cable is reasonably round and firm, a packing gland may be used. Sealing compounds are often used in conjunction with the packing gland to obtain a tight mechanical seal.

The prior art obtained a double seal by using castings and stripped leads together with a potting compound. One of the difficulties with the above process was that the process was labor intensive and hence expensive.

Reference may be had to the following patents for further information concerning the state of the prior art.

United States Patent No. 4,481,697 issued November 13, 1984 to Walter N. Bachle and assigned to the assignee of this application discloses a body member, a grommet, a strain relief member and a nut. Tightening the nut onto the body member results in radial forces between the grommet and the cord to restrain the cord and provide a water tight seal. The grommet is stuffed into the body member by an interaction between the grommet and the strain relief member as the nut is engaged with the body member.

United States Patent No. 3,891,294 issued June 24, 1975 to Robert A. Phillibert and assigned to the assignee of this application discloses a two part clamping device that is adapted to fit within a locking collar that is used at the outer end of a

connector. The Clamping device is provided with suitably designed flanges that can be inserted through an aperture and into the interior of the locking collar from the outside. A pair of ears, for each of the clamping device parts, extend radially outwardly from either side thereof, such ears lying in a plane which passes near the longitudinal axis of the clamping device. Each of such ears is provided with a screw receiving hole, and a pair of screws are used to bring the two parts of the clamping device together, so as to clamp or grip the cable or cord.

United States Patent No. 4,350,840 issued September 21, 1982 to Leonard H. Michaels discloses a compression chamber with a distortable grommet which has independent gripper elements that are socketed into the grommet so that the gripper elements perform a compound closing action on the cord with the result that the cord grip has great flexibility as to the range of sizes and types of cords it will accept.

United States Patent No. 4,549,038 issued October 22, 1985 to Fred Masheris et al. discloses a cord grip that contains a compression chamber with a distortable grommet which has gripper elements associated therewith so that the gripper elements perform a closing action on the cord in response to reduction in the volume of the compression chamber.

## **SUMMARY OF THE INVENTION**

This invention overcomes the difficulties of the prior art by providing an improved economical cord or cable entry sealing device that utilizes two seals. In a two sealing device two seal failures must occur before a leak is obtained. The apparatus of this invention utilizes a standard cord grip to push a molded assembly against a thick seat to obtain a primary seal. The secondary seal is obtained by tightening the cord grip or strain relief grip. A standard thread sealant may be placed over the threads to improve the quality of the seals.

It is an object of this invention to provide a new and improved cord or cable entry sealing device that utilizes two seals.

It is another object of this invention to provide a new and improved economical cord or cable entry sealing device that utilizes two seals.

It is a further object of this invention to provide a double sealing entry device that utilizes a standard cord grip to compress the molded cord or cable ends.

More specifically and in accordance with the invention, there is provided a sealing device for sealing an electrical cord having an outer protective sheath and a molded assembly at one end through an opening in a wall having a seat adjacent said wall, the sealing device comprising: a first sleeve adapted for engagement around the outer protective sheath and for engagement with the wall, the first sleeve for axial and radial compression of the molded assembly against the seat and protective sheath respectively so as to form a first seal between the protective sheath and wall; and, a second sleeve adapted for engagement around the outer protective sheath and for engagement with the first sleeve, the second sleeve for axial and radial compression of the first sleeve against the outer protective sheath so as to form a second seal between the protective sheath and first sleeve.

In accordance with a further embodiment, there is provided a sealing device wherein the first sleeve includes a first end for engagement with the wall and a second end for engagement with the second sleeve wherein the second end is adapted to receive a seal ring between the protective sheath and first sleeve.

In accordance with yet a further embodiment, there is provided a sealing device wherein second sleeve includes a bevelled inner surface for compressing the second end of the first sleeve against the protective sheath.

In accordance with still yet a further embodiment, there is provided a sealing device wherein the seat includes a seat bevelled surface and the first sleeve includes a first sleeve bevelled surface and the molded assembly includes first and second bevelled surfaces corresponding to the seat bevelled surface and the first sleeve bevelled surface.

In yet still a further embodiment, there is provided a sealing device wherein the first sleeve and wall have corresponding threads for tightening the first sleeve within the wall.

In a still further embodiment, there is provided a sealing device wherein the first sleeve and second sleeve have corresponding threads for tightening the second sleeve against the first sleeve.

Other objects and advantages of this invention will become apparent as the following description proceeds, which description should be considered together with the accompanying drawing.



## **BRIEF DESCRIPTION OF THE DRAWING**

The invention will be better understood by reference to the accompanying single Figure which is an elevational view partially in section showing one form of the apparatus of this invention.

## **DESCRIPTION OF A PREFERRED EMBODIMENT**

Referring now to the drawing in detail, the reference character 11 represents an electrical cord or cable that is used for the transmission of electrical power. The cord 11 contains stranded bare copper conductors 12 and each individual conductor 12 is covered with its own layer of insulation 13. The cord 11 is covered by a tough protective material 14, such as a synthetic rubber material like Neoprene. The material 14 protects the conductors 12 against the environment.

The molded cord end 15 is attached to one of the ends of the cord 11. In some embodiments pin connectors, spade connectors or other terminations may be molded into the cord end. A standard cord grip or strain relief grip 16, which may be flexible, is placed over the molded cord end 15 in order to compress the end 15 against a seat of the wall 22. The grip 16 has screw

threads 17 along a portion of its outer surface. The nut 18 engages the threads 17 and forces the grip 16 and the nut 18 together so as to compress the seal ring 21a against protective material 14.

In order to accommodate the passage of electrical current from a power source to an electrical device, (not shown) that may be in a wet environment, an opening 19 is provided in the wall 20 of the electrical device. The opening 19 provides means for the entry of the conductors 12 into the electrical device.

It will be seen that the cooperation between the threads 23 of grip 16 and wall 20 produce a first sealing surface at location 22. In addition, it will be seen that the cooperation between the threads of the nut 18 and the threads 17 of the grip 16 to produce a second sealing surface at seal ring 21a or location 21. Thus, it will be seen that the cooperation of the grip 16 produces an axial force that is essential to the seal at location 22 and the nut 18 produces a radial force that is essential to the seal at location 21. Thus, two seals are obtained with little difficulty and expense. A standard thread sealant (not shown) may be placed over the threads 23 to improve the quality of the seals.

The above specification has described a new and improved power cord entry device that has two fluid seals. It is realized that the above description may indicate to those skilled in the art additional ways in which the principles of this invention may be used without departing from its spirit. It is, therefore, intended that this invention be limited only by the scope of the appended claims.

## **CLAIMS**

1. A sealing device for sealing an electrical cord having an outer protective sheath and a molded assembly at one end through an opening in a wall having a seat adjacent said wall, the sealing device comprising:

a first sleeve adapted for engagement around the outer protective sheath and for engagement with the wall, the first sleeve for axial and radial compression of the molded assembly against the seat and protective sheath respectively so as to form a first seal between the protective sheath and wall; and,

a second sleeve adapted for engagement around the outer protective sheath and for engagement with the first sleeve, the second sleeve for axial and radial compression of the first sleeve against the outer protective sheath so as to form a second seal between the protective sheath and first sleeve.

2. A sealing device as in claim 1 wherein the first sleeve includes a first end for engagement with the wall and a second end for engagement with the second sleeve wherein the second end is adapted to receive a seal ring between the protective sheath and first sleeve.

3. A sealing device as in claim 2 wherein second sleeve includes a bevelled inner surface for compressing the second end of the first sleeve against the protective sheath.

4. A sealing device as in any one of claims 1-3 wherein the seat includes a seat bevelled surface and the first sleeve includes a first sleeve bevelled surface and the molded assembly includes first and second bevelled surfaces corresponding to the seat bevelled surface and the first sleeve bevelled surface.

5. A sealing device as in any one of claims 1-4 wherein the first sleeve and wall have corresponding threads for tightening the first sleeve within the wall.

6. A sealing device as in any one of claims 1-5 wherein the first sleeve and second sleeve have corresponding threads for tightening the second sleeve against the first sleeve.

