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STATIC ELIMINATING MEANS FOR CARBON DIOXIDE APPARATUS

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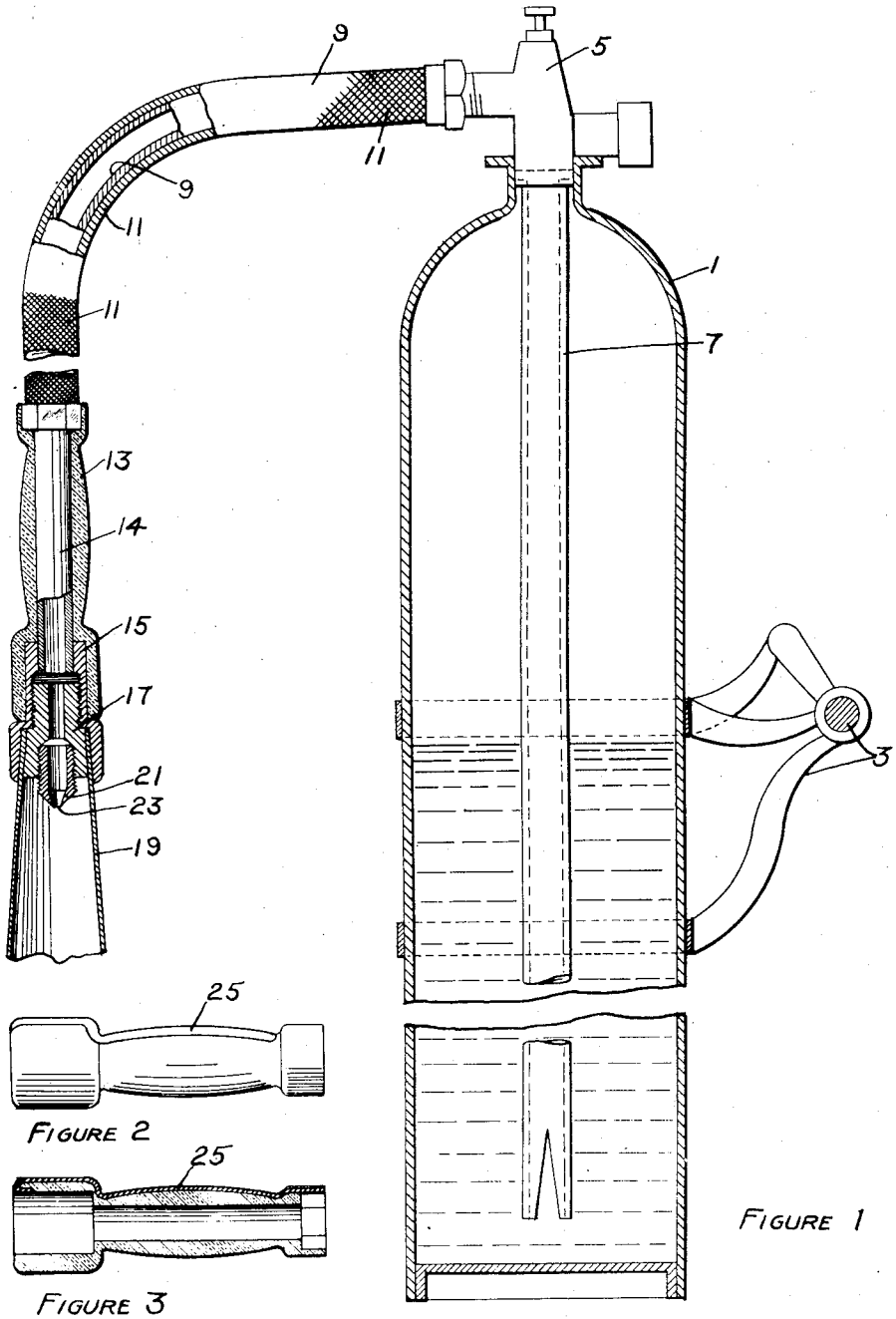


FIGURE 1

FIGURE 2

FIGURE 3

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STATIC ELIMINATING MEANS FOR CARBON DIOXIDE APPARATUS

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The present invention relates to a handle for use with a carbon dioxide fire extinguishing apparatus.

One of the detrimental features attending the use of a carbon dioxide fire extinguishing apparatus is the generation of charges of static electricity, when the gas is released from the container in which it is stored and is passed through the conduits which lead the fire extinguishing medium to the fire which is to be extinguished. The constant brushing of the gas along the inner surface of the conduits at a very high velocity causes the generation of static electricity. The magnitude of the charge generated is, of course, dependent on a great many variable features such as the temperature and atmospheric conditions during the discharge, whether the extinguisher and the operator are perfectly or imperfectly grounded, and other causes which will not be enumerated.

Often when the extinguisher is portable and the discharge of the gas is to be directed by the person who uses the extinguisher, that person will receive severe shocks of static electricity from the extinguisher which are very uncomfortable although they are not dangerous.

These shocks are of two kinds, which may be conveniently termed discharge shocks and equalization shocks, of which the discharge shocks are the kind that occur when the electrostatic potential has built up sufficiently to jump to ground either through the extinguisher or the operator, while the equalization shocks are the kind that occur when the discharge takes place from the extinguisher to the operator, due to the difference in potential between the operator and the extinguisher, either when the operator touches some electrostatically conductive part of the extinguisher or is close enough to the extinguisher at some point to have the charge jump to him, the latter condition usually occurring at the handle of the extinguisher, which is ordinarily of a material which is non-conductive both thermally and electrostatically.

The discharge shocks are not capable of being eliminated under ordinary conditions, as they are the shocks that usually are felt when an object electrostatically charged is suddenly discharged while it is in contact with the person. Of course, when either the object, in this instance the extinguisher, or the operator or other person contacting it is perfectly grounded, no discharge shock is felt, because the charge is drained off before any potential is built up. Another condition under which no discharge shock is felt is when both the extinguisher and the operator are perfectly insulated from ground, in which case no discharge takes place. But these are ideal conditions which are not usually encountered in practice.

However, even when the extinguisher and the operator are perfectly insulated from ground, equalization shocks occur, while this same kind of equalization shock takes place under the more usual condition when both the extinguisher and the operator are imperfectly grounded, and it is the object of the present invention to eliminate these equalization shocks, by equalizing the respective electrostatic potentials of the extinguisher and the operator.

It is a further object to provide a means which will permit equalization of the electrostatic potential between the extinguisher and the operator at all times without subjecting the operator to equalization shocks.

These and further objects will be readily apparent from the following description of which the drawing is a part and in which:

Figure 1 is a view of a typical portable carbon dioxide fire extinguisher shown partially in section and in which the static eliminating means of the present invention has been incorporated.

Figure 2 is a plan view of another embodiment of the present invention.

Figure 3 is a view in cross section of the device of Figure 2.

Referring to Figure 1, a container 1 of well known construction in which carbon dioxide is maintained under sufficient pressure to form a liquid body is illustrated. This container is provided with brackets and handle 3, in order that the container may be readily carried about. The end of the container is provided with a discharge valve 5 to which is secured the dip tube 7 which extends downwardly into the container to a point close to the bottom thereof so as to be immersed in the liquid. The discharge connection of the valve is attached to a suitable pipe or conduit 9 which is preferably in a flexible form. This conduit is covered with a flexible fabric 11 and terminates in a handle 13. The flexible conduit 9 is secured to a rigid conduit 14 which in turn is secured to a nipple 15 having a passage therethrough and is enlarged to form a thimble at the end as shown. A hollow plug 17 is adapted to threadedly engage with the nipple 15 and to telescope with the thimble portion thereof. The shield 19 is securely held in place between the thimble and the plug. The plug 17 has secured to it a nozzle 21 having a discharge orifice 23.

As is clear from the drawing this structure comprises a one nozzle arrangement.

The handle 13 disclosed in this case is particularly useful in connection with apparatus of the type just referred to and will now be described in greater detail.

The handle has a wall of a resilient material so that the operator may grip it securely. The material of which this handle is made is preferably of rubber in order to be a good thermal insulator against heat or cold, and at the same time it should be a comparatively good conductor of static electricity. Handles of the general shape of handle 13 have long been known and used. Such handles have been supplied in order that an operator of the extinguisher could direct the discharge of the gas from the container. These handles have been made of a material which was a very poor thermal conductor so that the extreme cold which occurs in the apparatus due to the expansion of the carbon dioxide from a liquid to a gaseous form cannot penetrate the handle and freeze the operator's hand.

Since rubber has been previously used because of its thermal insulation properties and flexibility it was desired to secure a rubber which would conduct static electricity and still retain these two qualities. A rubber which fulfills all of these requirements is a rubber having a high carbon content. Such a rubber will not only be a good heat insulator and flexible but it also will conduct static electricity.

Another embodiment of the invention, which lacks one of the advantages of the handle shown in Figure 1, is shown in Figure 2. This handle is likewise made of rubber but the rubber in this instance need not be of electrostatic conducting rubber. Into the wall of this handle is molded a metal insert 25 which is best illustrated in Figure 3. The metal insert is merely a band which runs from the inside of the handle over a portion of the exterior of the handle. The metal band is in direct contact with the extinguishing apparatus since it bears directly on the nipple 15 that is in direct electrical contact with the conduit 9. The contact area between the insert 25, the nipple 15 and the rigid conduit 14 is not large enough to conduct very much cold to the hand of the operator but it is sufficient to permit conduction of all of the electrostatic potential which is set up. The disadvantage of the type of handle using a metal insert is that the metal is a ready conductor of heat or cold and there is a possibility that the operator may therefore have his hands chilled by contact with the metal insert.

It must of course be understood that while the invention has been specifically described with respect to forms of handles particularly fitted for carrying out the invention, the handles are of no particular utility apart from the general combination of the extinguisher and means for providing an electrostatic conducting path between the extinguisher and the handle, without which path no continuous equalization of potential would take place.

From the two embodiments of the invention described, it is readily seen that as long as the operator is holding the handle of the extinguisher, there is a path from the extinguisher to the operator, through which any electrostatic potential built up in the extinguisher may flow to the operator. The operator will therefore always be at the same potential as the extinguisher, and can never receive a shock from the extinguisher due to a difference in potential between the two.

Although specific embodiments of the invention have been described, it is obvious that other physical embodiments of the invention will be readily apparent to those versed in the art, and accordingly it is not desired to be strictly limited to the disclosure, but rather to the scope of the appended claims.

I claim:

1. A carbon dioxide fire extinguisher comprising a container of carbon dioxide, a valve on the container adapted to release the carbon dioxide, a conduit connected to the valve outlet, a shield associated with conduit, and a handle on the conduit to control the direction of discharge from the shield, said handle being adapted to prevent thermal conductivity and permit electrostatic conductivity therethrough.

2. The combination with a carbon dioxide fire extinguisher of a handle comprising a handle proper preventing electrostatic conductivity and a portion adapted to conduct an electrostatic potential, and means forming an electrostatic conducting path between the extinguisher and the portion of the handle adapted to conduct an electrostatic potential.

3. A rubber handle for a carbon dioxide fire extinguisher in association with means adapted to permit electrostatic conduction from the interior to the exterior thereof.

4. A carbon dioxide fire extinguisher comprising a container of carbon dioxide, a valve on the container adapted to release the carbon dioxide, a conduit connected to the valve, a shield associated with the conduit, and a handle on the conduit to control the direction of discharge from the shield, said handle comprising a handle proper preventing thermal conductivity and electrostatic conductivity, and means associated therewith adapted to permit electrostatic conductivity between the exterior and interior of the handle.

5. In combination a source of carbon dioxide under pressure, a discharge conduit for said source, a handle associated with said conduit arranged to prevent electrostatic and thermal conduction therethrough, and a metal piece inserted in the handle adapted to permit electrostatic conduction from the conduit to the handle.

6. In combination a source of carbon dioxide under pressure, a discharge conduit for said source, handle means associated with said conduit adapted to prevent electrostatic conduction therethrough, and means associated with the handle constructed and arranged to permit electrostatic conduction from the conduit around said handle.

7. In combination a source of carbon dioxide under pressure, a discharge conduit for said source, a handle associated with said conduit adapted to prevent electrostatic conduction therethrough, and a metal piece inserted in the handle to permit electrostatic conduction from the conduit to a point exterior of said handle.

8. A carbon dioxide fire extinguisher comprising a source of liquid carbon dioxide, a valve to control the release of the carbon dioxide, a conduit associated with the valve, a shield associated with the conduit into which the carbon dioxide discharges in gaseous and solid form, a heat insulating handle associated with the conduit and shield, and electrostatically conductive means associated with the handle and the extinguisher to equalize the electrostatic potential between the extinguisher and the operator, whereby the operator will not be subject to equalizing electrostatic shocks.

9. A carbon dioxide fire extinguisher comprising a container of carbon dioxide, a conduit connected to the container, a shield associated with the conduit through which the carbon dioxide discharges, a handle on the conduit adapted to prevent thermal conductivity and permit electrostatic conductivity therethrough, and means forming an electrostatic conducting path between the shield and the handle.

10. The combination with a carbon dioxide fire extinguisher provided with a shield through which the carbon dioxide discharges of a handle comprising means to prevent thermal conductivity through the handle from the extinguisher to the operator, and means effecting an electrostatic conducting path from the shield to the operator.

11. In combination a source of carbon dioxide under pressure, a discharge conduit for said source, and handle means associated with said conduit constructed and arranged to prevent thermal conduction therethrough and having in association therewith means adapted to permit electrostatic conduction from the interior to the exterior thereof, said handle means being in electrostatic conductive relationship with the conduit.

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