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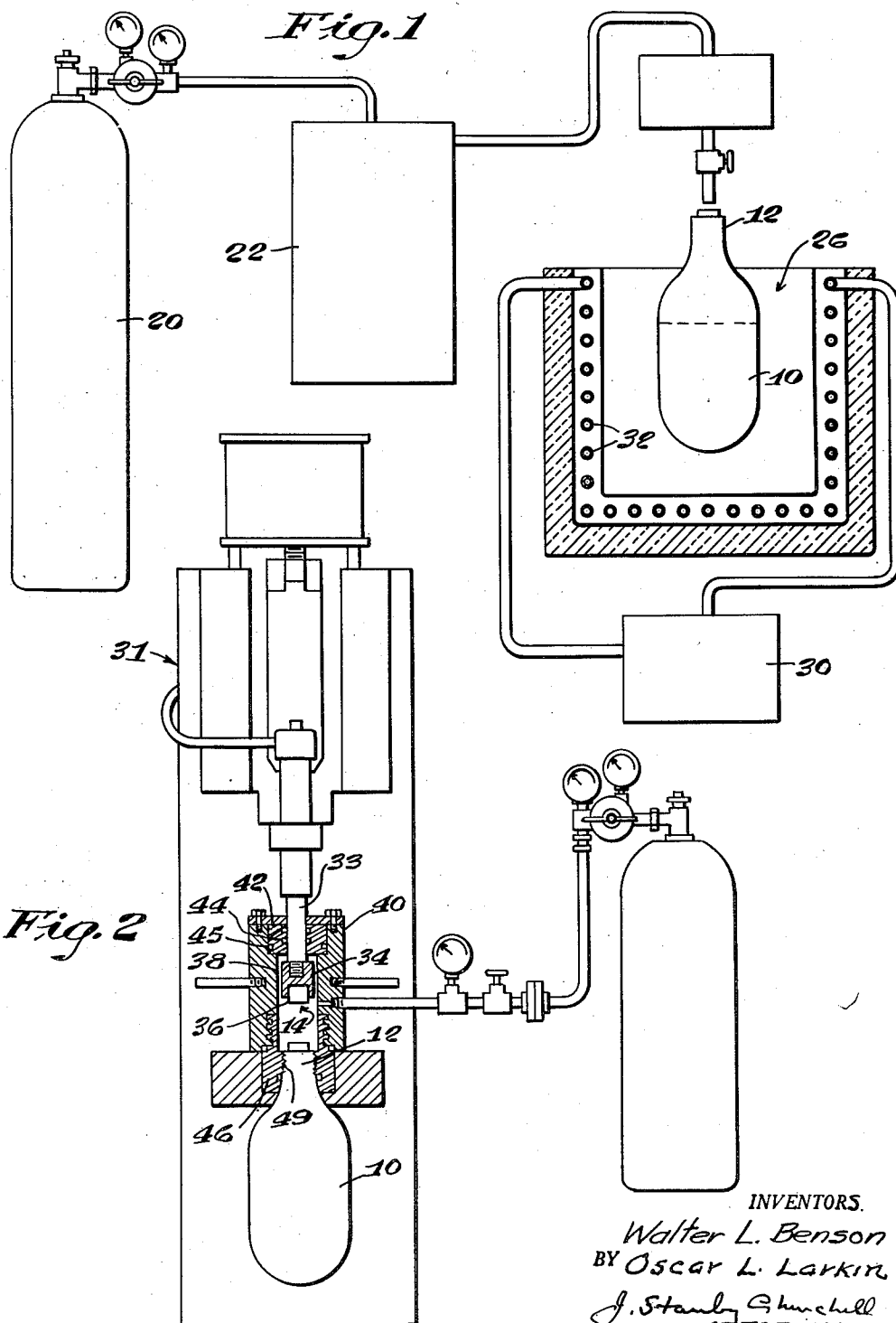
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APPARATUS FOR FILLING A FIRE EXTINGUISHER

Filed Dec. 19, 1951

2 Sheets-Sheet 1



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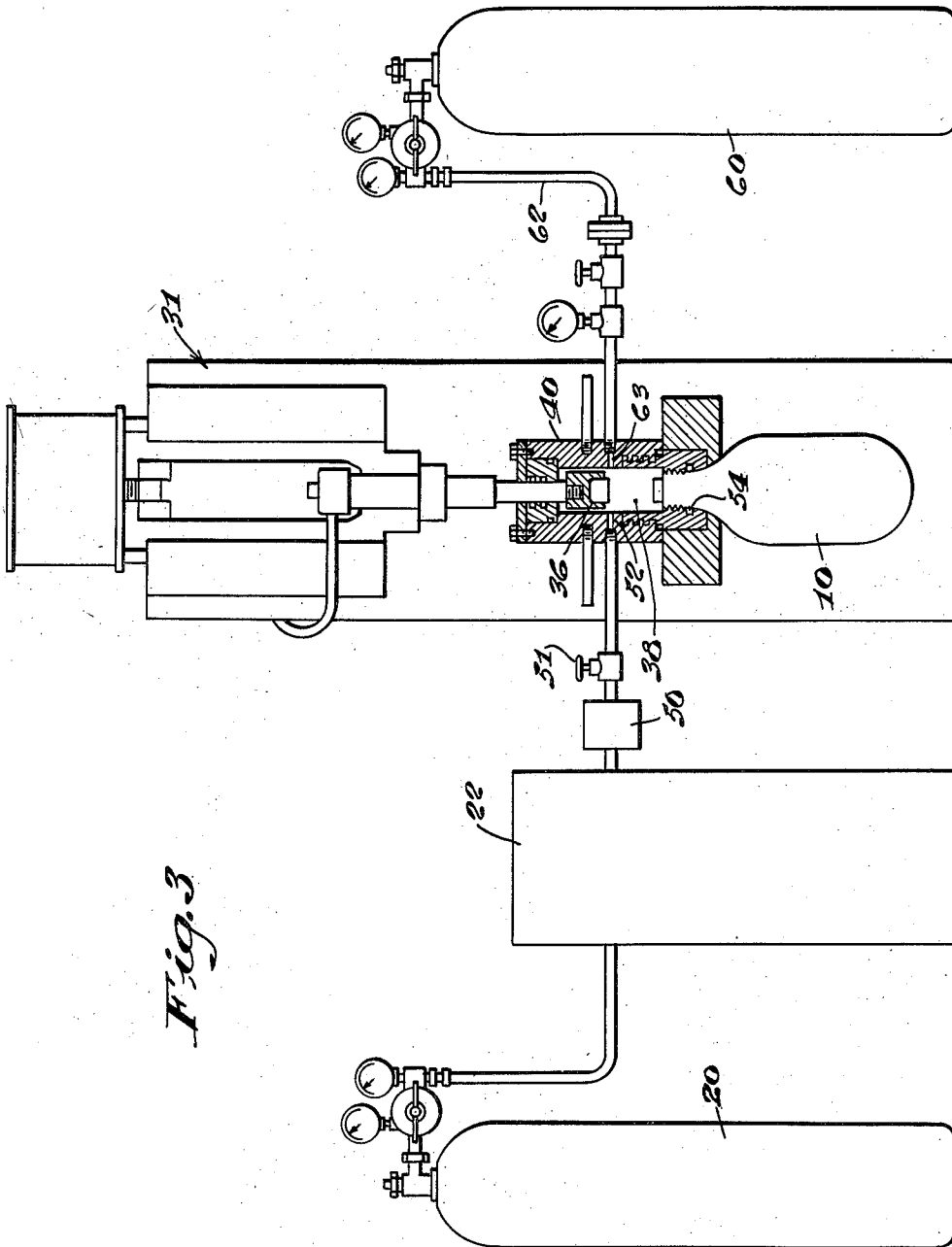


Fig. 3

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APPARATUS FOR FILLING A FIRE EXTINGUISHER

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1 Claim. (Cl. 53—268)

This invention relates to apparatus for filling a fire extinguisher.

One object of the invention is to provide a novel and practical method by which an extinguisher casing unit may be sealed and pressurized to form an extinguisher casing unit wherein the extinguishing medium is sealed within the unit under gas pressure.

A further and more specific object of the invention is to provide a novel and practical method by which the extinguisher casing of a fire extinguisher may be filled with an extinguishing medium, preferably comprising a halogenated aliphatic compound, which under atmospheric pressure and at room temperature is gaseous, but which is liquid under atmospheric pressure at low temperatures, and the filled extinguisher casing pressurized and sealed in a practical and convenient manner whereby the liquid extinguishing medium may be retained in liquid form until release of pressure during the operation of the extinguisher.

A still further object of the invention is to provide novel apparatus for use in filling an extinguisher casing with an extinguishing medium of the type above referred to and for pressurizing the same and for sealing the extinguisher casing to form a sealed pressurized unit.

With these general objects in view and such others as may hereinafter appear, the invention consists in the methods of and apparatus for forming a sealed pressurized extinguisher casing unit.

In general, the present invention contemplates a novel method for forming an extinguisher casing unit wherein the extinguishing medium is sealed within the casing under gas pressure. Such an extinguishing unit is designed for use in an extinguisher wherein provision is made for puncturing the seal to release the gas pressure when it is desired to release the gas under pressure and expel the extinguishing medium when it is desired to operate the extinguisher. The extinguishing medium may and preferably will comprise a halogenated aliphatic compound which under atmospheric pressure and at room temperature is gaseous, but which is liquid under atmospheric pressure at low temperatures, and the present method and apparatus for performing the filling and/or pressurizing and sealing operations enables such operations to be performed in a rapid, economical and safe manner.

In practice, the extinguishing medium may comprise a halogenated aliphatic compound which at low temperatures and under substantial pressure remains a liquid with minimum vapor pressure, and upon release of the gas pressure the liquid may be metered to the vapor phase to form an extinguishing gas. A suitable halogenated aliphatic compound may be selected from the compounds disclosed in the publication of October 1951, in the National Fire Protective Association's quarterly publication, and particularly in the article by J. Malcolm, of the Engineer Research and Development Laboratories, Ft. Belvoir, Virginia. Such a compound may and preferably will comprise bromotrifluoromethane.

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In general, the extinguisher casing which is to be filled with the extinguishing medium and pressurized comprises a steel or metal casing 10 having a neck portion 12 which is threaded and upon which a sealing cap 14 is welded to close the open end of the casing. In the present method, the halogenated aliphatic compound is passed from a storage receptacle 20 in the form of a gas into an apparatus 22 for refrigerating it into liquid form. This apparatus may comprise known two-stage refrigerating apparatus, and after having been refrigerated to a temperature in the neighborhood of -110° F., the liquid compound is introduced into the extinguisher casing 10. This refrigerated liquid compound may be introduced into the extinguisher casing as an operation separate from the subsequent pressurizing and sealing operation, or it may be introduced into the casing while the latter is operatively supported in apparatus for performing the welding of the cap upon the neck of the extinguisher casing and to which the pressurizing gas, such as nitrogen, is supplied, as will be described. After the extinguisher casing has been filled with the desired weight of the extinguishing liquid and the extinguisher casing pressurized by gaseous pressure to the desired point, provision is made for automatically sealing a metal cap at the top of the extinguisher casing to close the open end thereof by known forms of welding equipment.

Referring now to the drawing, in Fig. 1, I have illustrated more or less diagrammatically apparatus for performing the steps of refrigerating the halogenated aliphatic compound to liquid form and then introducing a predetermined weight or volume thereof into the extinguisher casing while the latter is immersed in a refrigerating bath maintained at a temperature of from -90° F. to -115° F. In Fig. 2 I have illustrated more or less diagrammatically the apparatus by which the method of refrigerating the extinguishing medium to liquid form is performed and then introducing the same directly into the extinguisher while the latter is supported in operative relation to the welding mechanism by which the cap is subsequently welded upon the neck of the extinguisher casing to seal the same and also wherein the gas under pressure is arranged to be automatically introduced into the extinguisher casing while the latter is in the above-mentioned position.

In Figure 3, I have illustrated the fully automatic method.

Referring to Fig. 1, a supply of the extinguishing medium in gas form under pressure is stored within the usual form of metal cylinder 20. In practice, as stated, the extinguishing medium preferably comprises a halogenated aliphatic compound known as "halon," and when it is desired, the operator may, by manipulation of the usual form of valve mechanism, deliver the "halon" through suitable piping to a known form of two-stage refrigerating apparatus herein indicated at 22, and after passage through the refrigerating apparatus, the extinguishing medium emerges as a liquid at a temperature of approximately -110° F. A predetermined quantity is then introduced directly into the extinguisher casing 10 maintained within a refrigerating bath indicated generally at 26 at a temperature of from -90° F. to -115° F. In this manner the extinguishing medium is maintained in liquid form. As illustrated in Fig. 1, methylene chloride may be used for this refrigerating bath 26, or other equivalent liquid. A two-stage refrigerating system indicated at 30 is preferably utilized and the refrigerant pumped through cooling coils 32, as shown. The individual extinguisher casing 10 with the liquid extinguishing medium therein may be stored in the bath 26 until the remaining pressurizing and sealing operations are to be performed, as will be described.

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As indicated in Fig. 2, a known form of automatically operating welding apparatus is diagrammatically illustrated and indicated at 31. This apparatus includes a plunger 33 upon the lower end of which is screwed a piston 34 having a recess in its undersurface into which a metal cap 36 may be inserted. The piston 34 is arranged to run in a cylinder 38 within a head 40. The head 40 is provided with an upper gasket 42 having sealing rings 44 for engaging the reciprocating plunger 33 and sealing rings 45 for sealing the space between the gasket and the head. The lower portion of the head 40 has screwed therein a fitting 46, the lower end of which is provided with a beveled opening and internal threads 49 for the reception of the threaded neck 12 of the extinguisher casing 10.

In the fully automatic method, as illustrated in Fig. 3, the extinguishing liquid having been withdrawn from the storage tank 20 and liquefied in a two-storage refrigerating apparatus 22 is then passed through a metering device indicated generally at 50 controlled by a shutoff valve 51 and delivered through a pipe into an inlet port 52 leading to the chamber 38 from which the liquid flows down into the extinguisher casing 10 which has been previously screwed into operative position upon and sealed by the sealing rings 54. After the extinguishing liquid has been introduced the valve 51 is shut off, and then gas under pressure is introduced from the storage cylinder 60 through a pipe line 62 leading into an inlet 63 in the opposite side of the head 40 leading to the chamber 38.

Having thus described the invention, what is claimed is:

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Apparatus for producing a portable pressurized fire extinguisher having a sealed casing provided with a puncturable cap and containing an extinguishing medium of the type which at room temperature and atmospheric pressure is gaseous but which at low temperature under atmospheric pressure is liquid comprising: a head having a chamber therein, a supporting member reciprocable within said chamber and having provision for supporting said puncturable sealing cap; said head having a threaded opening in the lower end thereof for the reception of the threaded mouth of the extinguisher casing in communication with said chamber; said head having an inlet opening and means for introducing a predetermined amount of a refrigerated liquid extinguishing compound through said chamber and into the casing; said head having a second inlet opening and means for introducing a gas under pressure into the chamber and said casing; and means for reciprocating said supporting member and welding said puncturable metal cap onto the mouth of the extinguishing casing while the latter is supported in pressurizing and filling position.

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