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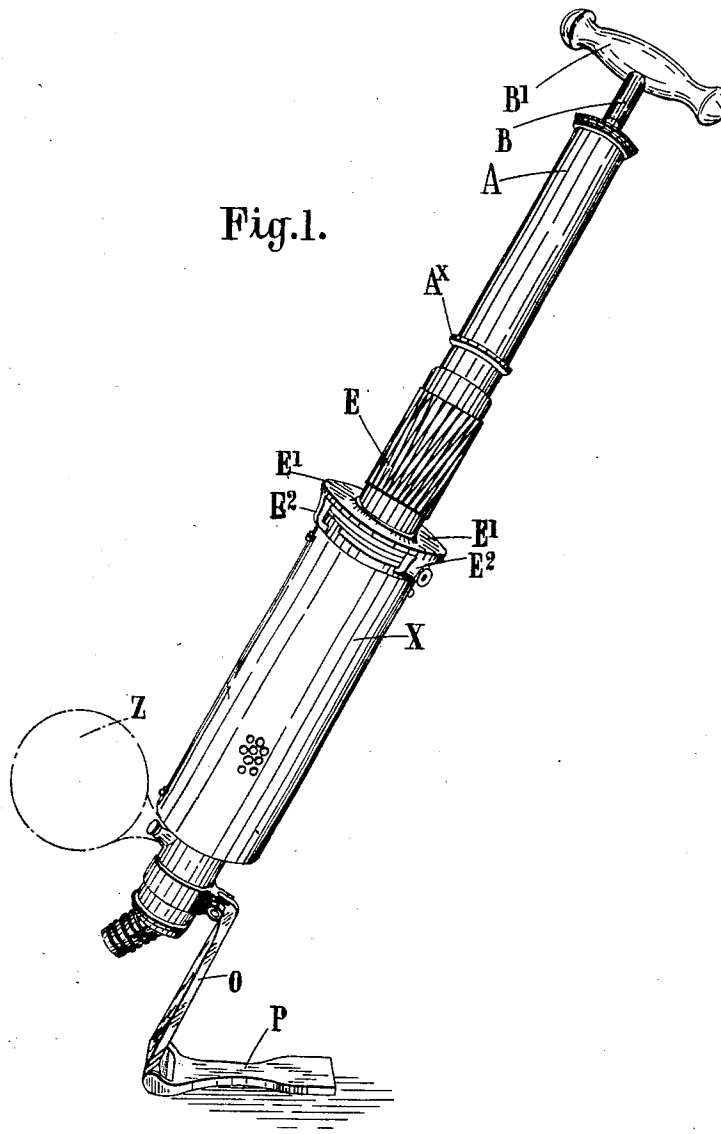
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SMOKE TESTING APPARATUS FOR PIPES, DRAINS, AND THE LIKE

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2 Sheets-Sheet 1



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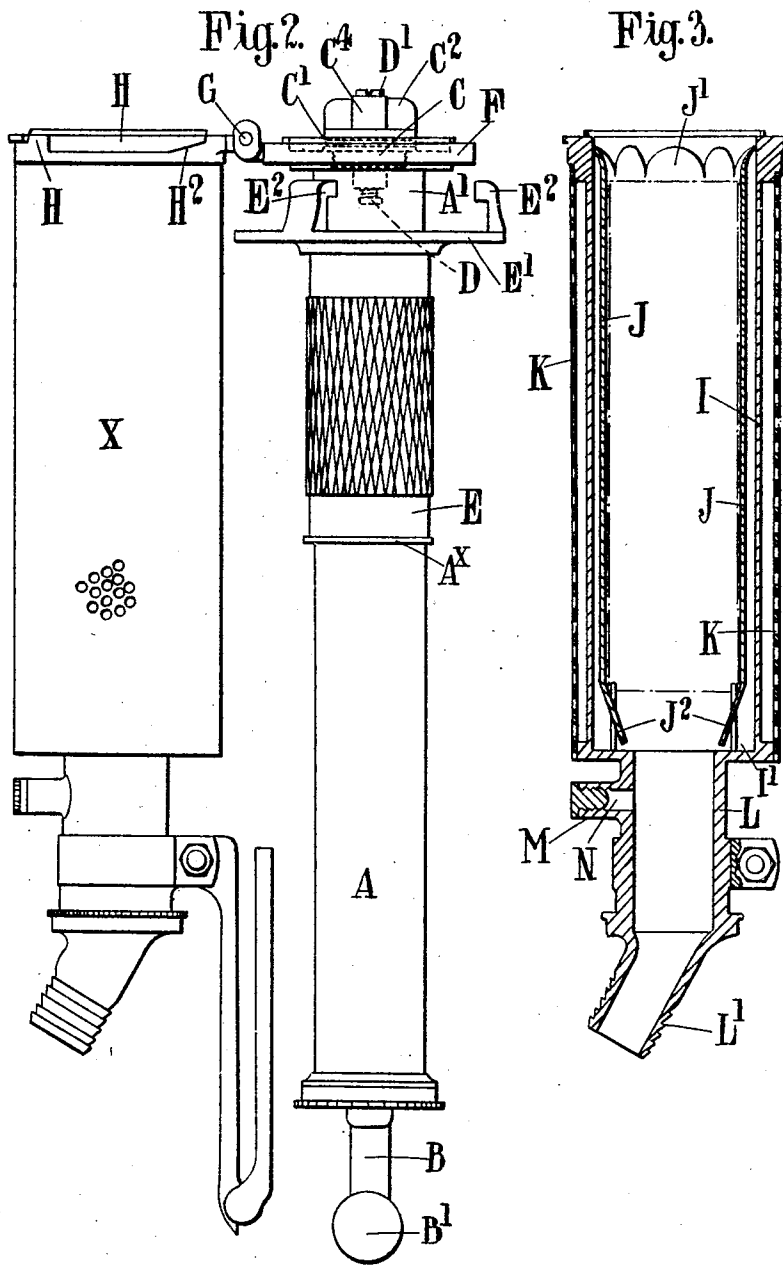
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SMOKE-TESTING APPARATUS FOR PIPES, DRAINS, AND THE LIKE.

Application filed May 20, 1927, Serial No. 193,048, and in Great Britain June 8, 1926.

This invention relates to portable apparatus for testing pipes, drains or the like by the injection of smoke, said apparatus being of the type embodying a receptacle for a smoke-producing substance adapted for connection to a force pump of the hand-reciprocated type with a back-pressure or non-return valve between the two. An object of the present invention is to provide a simple, light and more readily portable device of this nature occupying but little space for carrying and readily erected with the pump and smoke receptacle in longitudinal alignment for use.

To this end, according to the present invention, a smoke-testing apparatus of the type referred to comprises a receptacle for the smoke-producing substance, a reciprocating hand pump with the discharge end of the barrel hinge-jointed to the smoke-receptacle so that the two may be swung substantially parallel for packing and readily erected in alignment for use, means for effecting tight joint between them when so erected, and a pressure-indicating device communicating with the discharge end of the smoke-receptacle to show the existence of any pressure above atmospheric in the pipe, drain or the like under test.

The means for ensuring a tight joint may advantageously consist of a sliding member mounted on the outside of the pump barrel and carrying jaws adapted to be received in slots in a collar on the end of the smoke receptacle with sloping surfaces on the said collar which act when the sliding member is turned on the pump barrel to produce a tight joint between the end of the smoke receptacle and the pump barrel.

The smoke receptacle, which may conveniently be of cylindrical form, is preferably provided with a detachable liner mounted within the receptacle in such a manner that an air space is left between the liner and the wall of the receptacle to reduce the heating of the latter in use. Also to enable the receptacle to be held in the hand while the device is being operated a perforated metal screen or sleeve may surround the smoke receptacle and be spaced apart somewhat from it. I am aware that proposals have been made to fit a liner detachably and otherwise within the smoke receptacle of devices of this nature and also to space it from the walls of the receptacle, and I make no claim in this per se, nor do I claim generally in

this connection the use of pressure-indicating devices such as inflatable bags or balloons.

An embodiment of my present invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a view in elevation of an apparatus according to my present invention with the parts (viz pump barrel and the chamber for holding the substance for producing smoke etc.) in alignment and attached together in readiness for use.

Fig. 2 is a view in elevation—on an enlarged scale—of the apparatus with the said parts folded.

Fig. 3 is a vertical sectional view of the said chamber or receptacle forming part of said apparatus for holding therein the combustible substance for producing smoke or gas.

Referring to the accompanying drawings:—

A is the barrel of a reciprocatory pump of the known type; B being the rod and B¹ the handle for operating the piston or plunger of said pump.

At the outlet end A¹ of said pump there is fitted a screw cap or cover C provided with an external flange C¹ and wings C² whereby said cap C can be screwed into the end of the pump barrel and the flange C¹ forced tightly against the outside of said end of the barrel. This cap C is provided with a central passage-way or barrel C³ through which passes the spindle of the spring-loaded valve D, which spindle at its outer end is provided with a head or enlargement D¹ adapted to make a tight fit against the top of the barrel C⁴ and against which it is normally kept pressed by the action of the spring on the valve spindle D.

The exterior of the pump barrel A is provided with a fixed collar A²; and between this collar and the outlet end A¹ there is mounted the sleeve E adapted to slide loosely along the barrel A within the limits between the collar A² and the outlet end of the barrel.

This sleeve E carries thereon the flange or collar E¹ which latter is provided with jaws E², for example three jaws E² spaced equidistant apart round the collar E¹.

F is a collar formed on or fixed to the outlet end A¹ of the pump barrel A, and provided at one side with one part of the hinge G by which it is hingedly attached to the

receptacle X for holding therein the combustible substance for producing smoke or gas. On the end of said receptacle X, adjoining said hinge part G, there is provided a collar H having three slots or cut-away portions H¹ for the jaws E² to pass through whereupon by giving the sleeve E a partial turn said inwardly projecting jaws E² will ride under the cam surface or sloping portions H² of said collar H (after the manner of a bayonet joint) to thus securely lock and hold the pump barrel A and receptacle X in alignment ready for use as shown in Fig. 1.

The receptacle X is constructed as follows:—

I is the main cylinder of said receptacle X for holding therein the material or substance for producing smoke or gas.

J is removable liner adapted to fit loosely inside said main cylinder I. This lining J is provided with a flared top edge J¹; while the bottom end of said lining is slit longitudinally on the opposite sides thereof to form tongues J² which are pressed inwardly to prevent the smoke or gas producing substance or cartridge containing said substance from passing beyond this end of the lining J.

K is a tubular outer sheathing or casing of perforated metal (of larger diameter than the main cylinder I) and mounted concentrically with respect to and spaced apart from said main cylinder I, so that this said outer sheathing K will not become too hot to be grasped by the hand of the operator when the apparatus is in use.

At the outlet end I¹ of this main chamber I there is provided a discharge pipe L and nozzle L¹ thereon; and this discharge pipe L is provided with a nipple M having a passage N therethrough, over which nipple M an inflatable and deflatable bladder or container of rubber or the like is secured in an air-tight manner. For example, the mouth of a toy balloon (such as indicated by Z, Fig. 1) may be stretched over said nipple and thus secured thereon.

Upon any pressure (above normal atmospheric pressure) arising in the passage L (through the operation of the pump) such inflatable container will be distended and thus give a visible indication or signal of such pressure.

N is a removable plug for inserting in the passage-way N of the nipple M when it is not desired or required for use to give the signal or indication as aforesaid as to pressure.

The discharge pipe L is shown provided with a downwardly projecting arm O fixed thereto to which is hinged a foot plate P so that in use this hinged plate P may be laid flat upon the ground and the foot of the operator placed thereon while operat-

ing the reciprocatory pump; but no claim is made to this device O, P, per se, as such device is well known in conjunction with ordinary reciprocatory pumps such for example as are used for inflating pneumatic tires of road vehicles.

In operation; after the smoke or/and gas producing substance has been ignited in the said chamber X and upon the pump being actuated then, as and when pressure (above atmospheric pressure) arises in the pipe or drain etc. which is being tested, this pressure will more or less inflate the heretofore deflated balloon Z attached on said nipple M, and thus will automatically and readily give a visible indication that more or less pressure has been produced in the pipe or drain etc. which is being tested.

Should such inflatable balloon Z be injuriously affected by the smoke or/and gas which enters the interior thereof during inflation, then same can be discarded and replaced by a new balloon at a very small cost.

What I claim is:—

1. Portable apparatus for smoke-testing pipes, drains, sewers and the like comprising a hand-operated piston pump, a receptacle for a smoke-producing substance hinged to the discharge end of the pump barrel, engaging means slidably mounted on the pump barrel for securing the latter and the smoke receptacle in air tight connection, a spring loaded non-return valve in the discharge end of the pump opening on the discharge stroke of the latter to admit air to the smoke receptacle and closing by the spring reaction on the suction stroke of the pump to prevent entrance of smoke into the latter, a tubular discharge extension of the smoke receptacle, and a connection in said extension for the attachment of an indicator for disclosing a pressure higher than atmospheric in the pipe, drain, sewer, or the like during the operation of the pump.

2. Portable apparatus for smoke-testing pipes, drains, sewers and the like comprising a hand-operated piston pump provided with a cylindrical barrel, a cylindrical receptacle hinged to the discharge end of the pump barrel and containing a removable tubular liner adapted for the reception of a cartridge of a smoke producing substance, a slidable sleeve on the pump barrel carrying hooks adapted to engage flanges on the adjacent end of the smoke receptacle, a detachable piece screwed into the discharge end of the pump barrel and containing a spring loaded non-return valve opening on the discharge stroke of the pump to admit air therefrom to the smoke receptacle and closing on the suction stroke of the pump to prevent entrance of smoke to the pump barrel, a tubular discharge extension of the smoke receptacle, and a nipple opening into

said tubular extension for the attachment of a pressure indicator.

3. Portable apparatus for smoke-testing pipes, drains, sewers and the like comprising a hand-operated piston pump provided with a cylindrical barrel, a cylindrical receptacle hinged to the discharge end of the pump barrel and containing a removable tubular liner adapted for the reception of a cartridge of a smoke producing substance, a slidable sleeve on the pump barrel carrying hooks adapted to engage flanges on the adjacent end of the smoke receptacle, a detachable piece screwed into the discharge end of the pump barrel and containing a spring loaded non-return valve opening on the discharge stroke of the pump to admit air therefrom to the smoke container and closing on the suction stroke of the pump to prevent entrance of smoke to the pump barrel, a tubular discharge extension on the smoke receptacle, a nipple opening into said tubular extension and closed by a screw plug and an inflatable balloon adapted to be attached to said nipple after removal of the plug so as to indicate to the operator the existence of a pressure higher than atmospheric in the pipe, drain, sewer, or the like during operation of the apparatus.

4. Portable apparatus for smoke-testing pipes, drains, sewers and the like comprising a hand-operated piston pump provided with a cylindrical barrel, a cylindrical receptacle hinged to the discharge end of the pump barrel and containing a removable tubular liner adapted for the reception of a cartridge of a smoke producing substance, a slidable sleeve on the pump barrel carrying hooks adapted to engage flanges on the adjacent end of the smoke receptacle, a detachable piece screwed into the discharge end of the pump barrel and containing a spring loaded non-return valve opening on the discharge stroke of the pump to admit air therefrom to the smoke container and closing on the suction stroke of the pump to prevent entrance of smoke to the pump barrel, a tubular discharge extension of the smoke receptacle, a nipple opening into said tubular extension for the attachment of a pressure indicator, and a hinged foot-plate attached to the smoke receptacle for holding the apparatus steady during operation.

5. Apparatus of the type referred to for smoke-testing pipes, drains, or the like comprising a receptacle for a smoke-producing substance, a reciprocating hand pump provided with a cylindrical barrel with the discharge end of the barrel hinge-jointed to the smoke-receptacle so that the two may be

swung substantially parallel for packing and readily erected in alignment for use, means for effecting a tight joint between them when so erected, and a pressure-indicating device communicating with the discharge end of the smoke-receptacle to show the existence of any pressure above atmospheric in the pipe, drain, or the like under test.

6. Apparatus of the type referred to for smoke-testing pipes, drains, or the like comprising a receptacle for a smoke-producing substance, a reciprocating hand pump provided with a cylindrical barrel with the discharge end of the barrel hinge-jointed to the smoke-receptacle so that the two may be swung substantially parallel for packing and readily erected in alignment for use, means for effecting a tight joint between them when so erected, and a pressure-indicating device communicating with the discharge end of the smoke-receptacle to show the existence of any pressure above atmospheric in the pipe, drain or the like under test.

7. Apparatus of the type referred to for smoke-testing pipes, drains, or the like comprising a receptacle for a smoke-producing substance, a reciprocating hand pump provided with a cylindrical barrel with the discharge end of the barrel hinge-jointed to the smoke-receptacle so that the two may be swung substantially parallel for packing and readily erected in alignment for use, and means for effecting a tight joint between them when so erected such means comprising a sliding member mounted on the outside of the pump barrel and carrying jaws adapted to be received in slots in a collar on the end of the smoke receptacle and cam surfaces on the said collar on the end of the smoke receptacle which co-act with said jaws when the sliding member is turned on the pump barrel to produce a tight joint between the end of the smoke receptacle and the pump barrel.

8. Apparatus in accordance with claim 5 and in which the smoke-receptacle is provided with a removable liner of such dimensions that an air space is provided between the said liner and the wall of the smoke-receptacle when the liner is in position.

9. Apparatus in accordance with claim 5 in which a perforated metal screen or sleeve is provided around and clear of the outside of the smoke receptacle with an interposed air space enabling the receptacle to be held in the hand during operation.

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