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P. GOODMAN

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INFLATABLE CONDUIT STOPPER.

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Fig. 1.

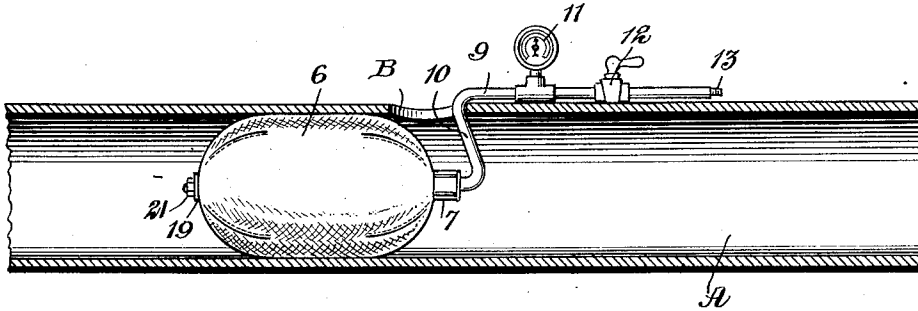


Fig. 2.

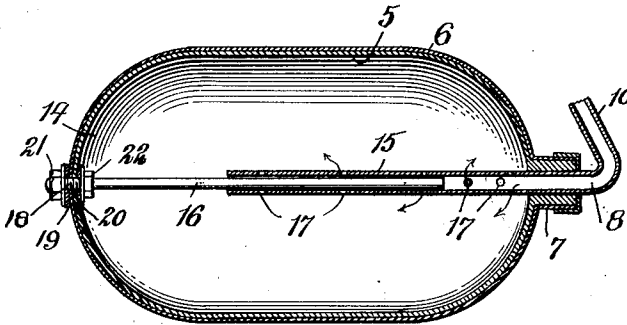
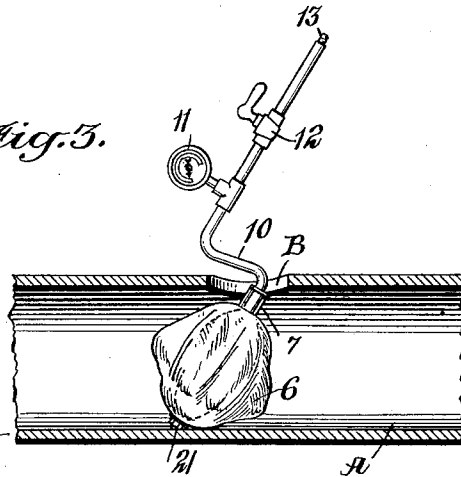


Fig. 3.



WITNESSES

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INFLATABLE CONDUIT STOPPER

Application filed February 25, 1930. Serial No. 431,218.

This invention relates to inflatable conduit stoppers in which an inflatable element for stopping the flow of fluid through a conduit is introduced in a deflated condition through a taphole in the conduit by means of a rigid tubular handle, through which handle pressure is subsequently applied to the interior of the inflatable element for inflating the same.

It has been found in practice that in attempting to deflate the inflatable element for withdrawal from the conduit through the taphole, that not infrequently the element when partially deflated has a tendency to turn backward at its unsupported end, thereby causing the device to jam in the conduit and render its removal difficult.

The present invention, therefore, aims to provide in combination with the inflatable element, means for limiting the longitudinal contraction of the inflatable element and which also functions to prevent the turning of the forward end of the same backward during the deflating operation.

More specifically, the invention comprehends in an inflatable conduit stopper which is positioned and removed by means of a rigid handle at its rear end, telescopically associated means located internally of the inflatable element of the stopper which serves to support and maintain the forward end of the element in axial alignment with the rear end wall, permitting of sufficient relative movement of the forward and rear ends to accomplish the purposes of the invention.

Other objects reside in the comparative simplicity of construction of the device, the economy with which it may be produced and the general efficiency derived therefrom.

With the above recited and other objects in view, reference is had to the following description and accompanying drawings, in which there is exhibited one example or embodiment of the invention, while the claims define the actual scope of the same.

In the drawing:

Figure 1 is a fragmentary sectional view through a conduit illustrating an inflatable stopper actively positioned therein.

Figure 2 is an enlarged longitudinal sectional view through the stopper.

Figure 3 is a view similar to Figure 1 illustrating the manner in which the stopper is inserted or removed from the conduit.

Referring to the drawing by characters of reference, the stopper includes an inner inflatable bag or element 5 of rubber or an equivalent material having an outer covering 6 of a relatively inelastic material which serves to definitely limit the expansion of the inner element when inflated. As is common to devices of this character, the inner element is provided at one end, hereinafter termed the rear end, with a tubular stem 7 which is suitably attached to a tubular handle 8 extending through the stem and outwardly therefrom. The tubular handle 8 is provided with an offset portion 9 joined to the handle 8 by an obtusely angled part 10, whereby the portion 8 may lie axially within the conduit A while the portion 9 is disposed externally of the conduit with the part 10 extending through the taphole B in the conduit. The portion 9 may be provided with a suitable pressure gauge 11 and with a cutoff valve 12, while its free end may be threaded or otherwise formed with means 13 for establishing a communicating connection with a pressure supplying means for the purpose of introducing pressure to the interior of the inflatable element 5 after the same has been initially inserted in the conduit in a deflated condition.

As previously stated, unless some means is devised for supporting and maintaining the forward end 14 of the element 5 in axial alignment with the rear stem end 7, there is commonly a tendency for the forward end to turn backward during the deflation of the element for the purpose of removing the same from the conduit. In order, therefore, to provide means for preventing this undesirable action, the tubular handle portion 8 is formed with an extending extremity 15 of considerable length, which protrudes forwardly and axially into the element 5. The extremity 15 extends forwardly beyond the longitudinal center of the element, preferably two-thirds or three-

quarters of the length of the element. A guide rod 16 is anchored concentrically to the forward end 14 of the element 5 and extends rearwardly and is telescopically received by the extremity 15 of the handle portion 8. Obviously, this arrangement allows for relative longitudinal movement between the stem end 7 and the forward end 14 of the element while preventing the forward end of the element from turning backward during the deflating operation. In order to avoid interference with the introduction of the inflating pressure to the element 5, the guide rod 16 loosely fits within the extremity 15 and the extremity 15 is formed with a plurality of openings or apertures 17. The guide rod 16 may be anchored to the forward end 14 of the element 5 and to the covering 6 in any desired manner, but as illustrated, the anchored end of the stem is threaded as at 18 and extends through aligned apertures in the bag 5 and its covering 6 with washers 19 and 20 disposed exteriorly and interiorly and with nuts 21 and 22 disposed exteriorly and interiorly.

From the foregoing, it will thus be seen that an inflatable conduit stopper has been devised which is provided with means that serve to prevent jamming of the same either during its insertion into the conduit or its removal therefrom.

What is claimed is:

1. An inflatable conduit stopper of the character described including an inflatable body having a rigid tubular handle communicating with the interior of the body and protruding from one end thereof for introducing an internal pressure thereto and for exhausting the pressure therefrom and means within the inflatable body for supporting and maintaining the opposite ends thereof in axial alignment while permitting free limited relative movement of said ends toward and away from each other, said means comprising an inwardly projecting portion of the tubular handle and a guide rod anchored concentrically to the opposite end of the inflatable body and telescopically slidable within the inwardly extending portion of the tubular handle.
2. In a conduit stopper adapted to be introduced through a taphole in the conduit, said stopper including an inflatable elongated body having substantially semi-spherical opposite ends, means located within said body for maintaining the ends in axial alignment while permitting limited free relative movement of the ends of the body toward and away from each other whereby to prevent turning of the leading end backward when deflating the body preparatory to effecting its removal from the conduit.
3. In a stopper including an inflatable element adapted to be introduced through a taphole in the conduit and subsequently inflated, means located within the inflatable element for maintaining the opposite ends thereof in axial alignment while permitting limited free relative movement of the ends of the element toward and away from each other, said means comprising axially slidable telescopically associated rigid guide members concentrically anchored at their outer ends to the opposite ends of the inflatable element.

Signed at Brooklyn, N. Y., in the county of Kings and State of New York, this 21st day of February, A. D. 1930.

PATRICK GOODMAN.