J. BOEKEL.

LEAK DETECTOR.

APPLICATION FILED DEC. 2, 1910.

989,691.

Patented Apr. 18, 1911.

Fig. 1.

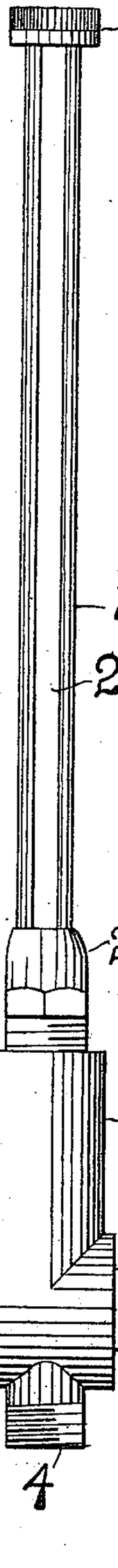


Fig. 2.

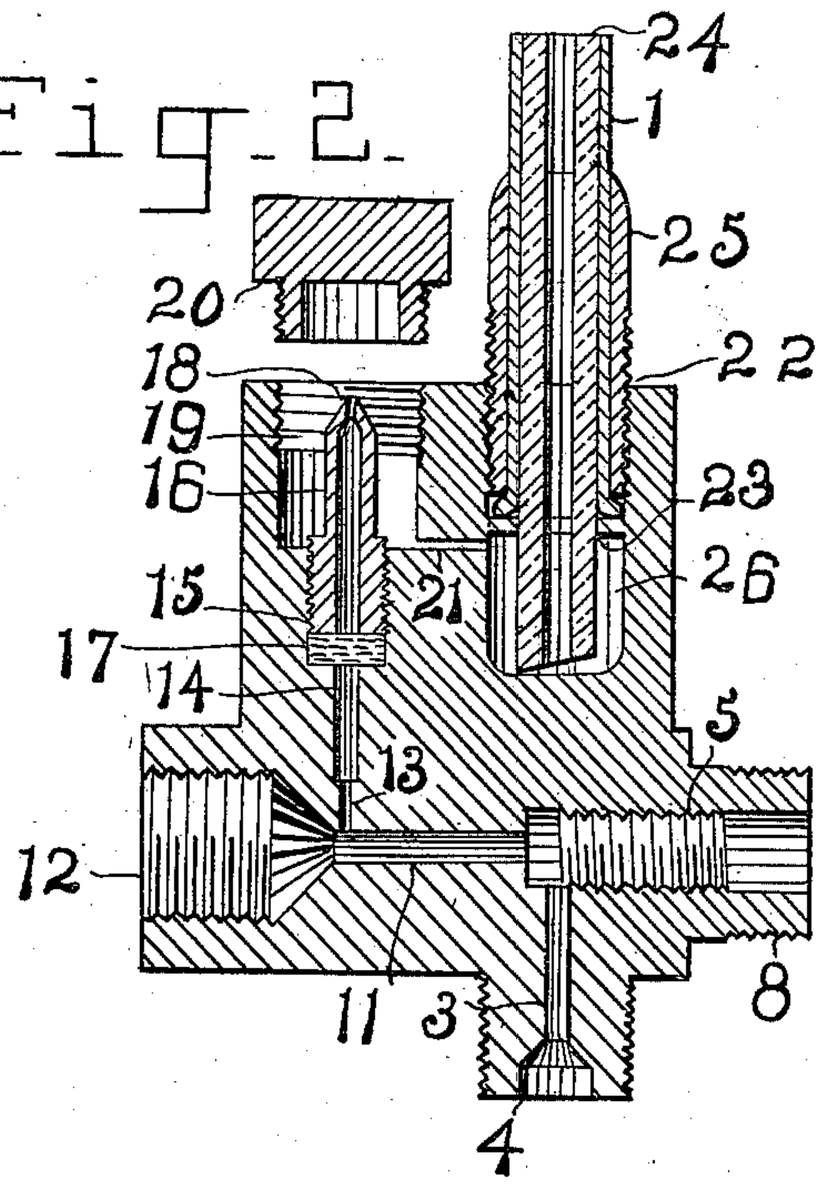


Fig. 3.

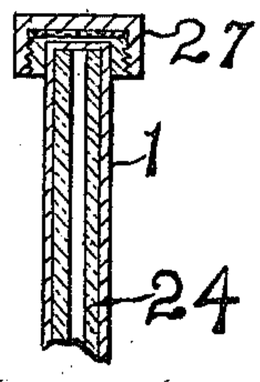
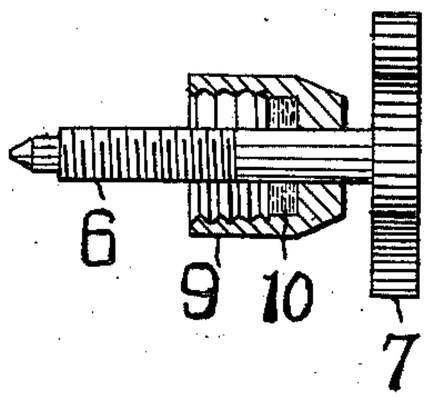


Fig. 4.



WITNESSES

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LEAK-DETECTOR.

989,691. Specification of Letters Patent. Patented Apr. 18, 1911.

Application filed December 2, 1910. Serial No. 595,250.

To all whom it may concern:

Be it known that I, JULIUS BOEKEL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Leak-Detectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to leak detectors of the mercury column type for use in pipes, tubular passages and wherever available. Such detectors as hitherto known depend on the support of a column of mercury by air or other fluid under pressure, lessened when leakage occurs, allowing the mercury column to descend. These devices are often subject to escape of mercury from the space or chamber receiving the lower end of the mercury tube when shipping or carrying the detector. To remedy this defect, I provide two chambers connected by a very narrow passage from the upper end of one to the lower end of the other, the former chamber containing the compressed air which supports the mercury column and the other containing a nipple or nozzle raised from its bottom and provided with a conoidal tip having a fine central bore down which any mercury must pass to escape from said second chamber into the passages of pipes below and finally out of the tester or detector. As a further guard against such loss of the mercury I provide packing below said nipple and screw-thread the latter and its socket so that by turning home the base of the nipple the packing may be compressed.

The present invention consists chiefly in the provisions above indicated for preventing the waste of mercury and as hereinafter more particularly set forth and claimed; also in the improved construction of the device which is very efficient, cheap to manufacture, simple and durable.

In the accompanying drawings: Figure 1 represents in exterior elevation an incased leak-detector embodying my invention; Fig. 2 represents a vertical longitudinal central section through the same, omitting the valve and a part of the mercury tube and its casing, the valve and slightly separating the plug 20; Fig. 3 represents a detail longitudinal section of the valve; and Fig. 4 represents a similar view of the upper part of the mercury tube, a casing and cap.

The upright mercury tube 24 of glass or any suitable material is covered by a longitudinally slit vertical casing 1, said parts being covered at the top by a cap 27 screwed on a corresponding enlargement of the upper end of said casing. As shown in Fig. 2, the lower end of said casing rests on an annular internal flange or shoulder 23 of a socket 22 formed in the block 2 which constitutes the solid body of the device, said socket being internally screw-threaded to engage an externally screw-threaded coupling 25 sleeved on said casing. This coupling bears against an annular external bead or flange at the lower end of said tube and detachably fastens the latter to said block. Below the shoulder 23 the said socket is extended into said block to form a compressed air and mercury chamber 26. The mercury tube 24 fits tightly in flange 23 and extends down through the latter to the bottom of the chamber 25 being beveled to admit the mercury.

A passage 3 opens from the air inlet nipple 4 into an internally screw threaded passage 5 which is provided with a valve seat for the air controlling needle valve 6, said valve being provided with a screw-threaded stem which engages similar threads in said passage 5 and a hand-wheel 7 on its outer end for adjusting said valve. Said passage 5 extends slightly outward from the side of said block through an integral externally screw-threaded nipple 8, on which is turned the perforated nut 9, a gasket 10 being inserted between the end of said nipple and the internal top of said nut and being perforated to allow of the passage of said valve and to make the closure of said passage air tight. Said passage 5 is connected by a long straight smaller passage 11 with an internally screw-threaded passage of nipple 12 which receives the externally screw-threaded end (not shown) of the pipe or tube to be tested. The conical tip of valve 6 enters the proximate end of passage 11 opening or closing the latter at will to admit or cut off the flow of air from passage 3 to passage 13 and beyond. Passage 11 is connected by a short branch passage 13 of smaller diameter to a larger passage 14, which connects with an internally screw-threaded passage 15. A nipple 16 provided with a correspondingly screw-threaded external part screws into

said passage 15, a felt or other suitable packing 17 being inserted between the end of said passage and said nipple for the purposes hereinafter to appear. Said nipple is bored centrally to same size as the passage 14 to near its end where the bore is narrowed down to a very small outlet 18, said nipple having its end of conical shape, centrally bored as above and projecting about the longitudinal center and nearly to the farther side, of a chamber 19, which is internally screw-threaded near its end and closed by the screw plug 20. Said chamber 19 is connected by means of a small passage 21 to the mercury and air pressure chamber 26, which is of the same capacity as chamber 19 and is provided with an annular shoulder 23, in which the mercury tube fits tightly, extending as above described into said chamber 22. It is to be noted that passages 13, 18 and 21 are all of the same cross-sectional size.

The operation is as follows: Connection from the compressed air supply is made to the nipple 4, the valve 6 is opened and the air admitted to passage 11 and the pipe or tube to be tested. When the air in said pipe has been slightly compressed the air will then be forced through the smaller passage 13, larger passage 14, through packing 17, through the larger bore of the nipple, through bore 18 into chamber 19 and through passage 21 into the mercury and compressed air chamber 26, forcing the mercury up in the mercury tube. The heavier the pressure of course the farther will the mercury be forced up in said tube. The valve 6 is then closed. If the mercury falls to any extent it will show that the air pressure is gradually diminishing by a leak in the pipe or tube being tested.

By making the passages 13, 18 and 21 very small it is almost impossible for the mercury to escape. In actual practice holding the article in every position successively only a very small drop of mercury worked its way through passage 21 into chamber 19. This could not escape from the latter because of the elevation and conical shape of nipple 16 and the smallness of passage 18. In the very improbable contingency of any mercury getting on the center of the tip of nipple 16 and slipping down the minute opening 18 into the central bore of said nipple it could not get past the packing 17 and would be forced back into its proper place as soon as the tester or detector was used again. This packing 17 also guards against sudden action of the air on the mercury, making it jump.

Any suitable material may be used without avoiding my invention, and any small change may be made in the arrangement of the passages and so forth without avoiding the scope of my invention or claims, but the preferred form of my invention is shown herein, and the preferred material for the body 2 is iron, since mercury does not adhere to it as it does to divers other metals.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A leak detector provided with a column of liquid supported by air or other gaseous fluid under pressure, a chamber communicating with the space normally below said column to receive any escaping fluid, and a conically-tipped nipple constituting the outlet from said chamber and extending up into said chamber for the purpose set forth.

2. A leak-detector provided with a column of liquid supported by air or other gaseous fluid under pressure and forming an air space under said column, a chamber communicating with said space to receive any escaping liquid, a nipple constituting the outlet from said chamber, adjustably screwed into the bottom of the latter and extending upward within said chamber and compressible packing under said nipple substantially as set forth.

3. A leak-detector provided with a column of liquid, a space below the same for receiving compressed air or other gaseous fluid to support said column, a separate chamber on one side of and obliquely above said space to receive any leakage from said column, a fine passage from the upper part of said space to said chamber and an outlet nipple raised from the bottom of the latter substantially as set forth.

4. In combination with a mercury tube and its casing, a controlling hand-operated valve, an air inlet, a closing plug, a detachable nipple and a block or body, the latter being recessed and screw-threaded for connection with a pipe and with the other above mentioned parts and provided with two communicating chambers and necessary connecting passages, one of said chambers being under the mercury tube for containing compressed air to support the mercury and the other chamber receiving any leakage of mercury and having said nipple extending upward within it as the only mercury outlet to the pipe, substantially as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS BOEKEL.

Witnesses:
WILLIAM HAAR,
JOHN H. SCHERER.