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PIPE LEAKAGE DETECTOR

2,918,033

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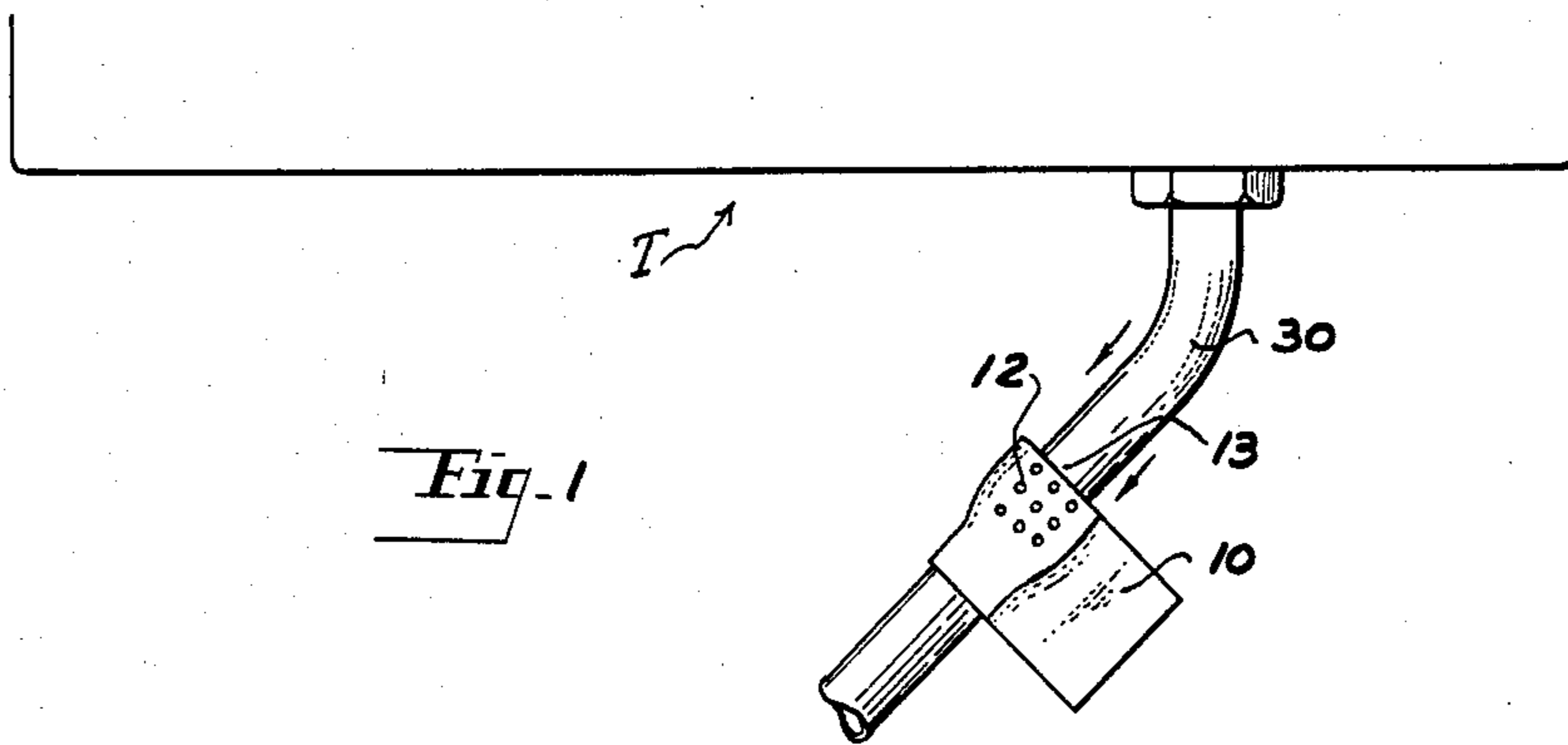


Fig. 1

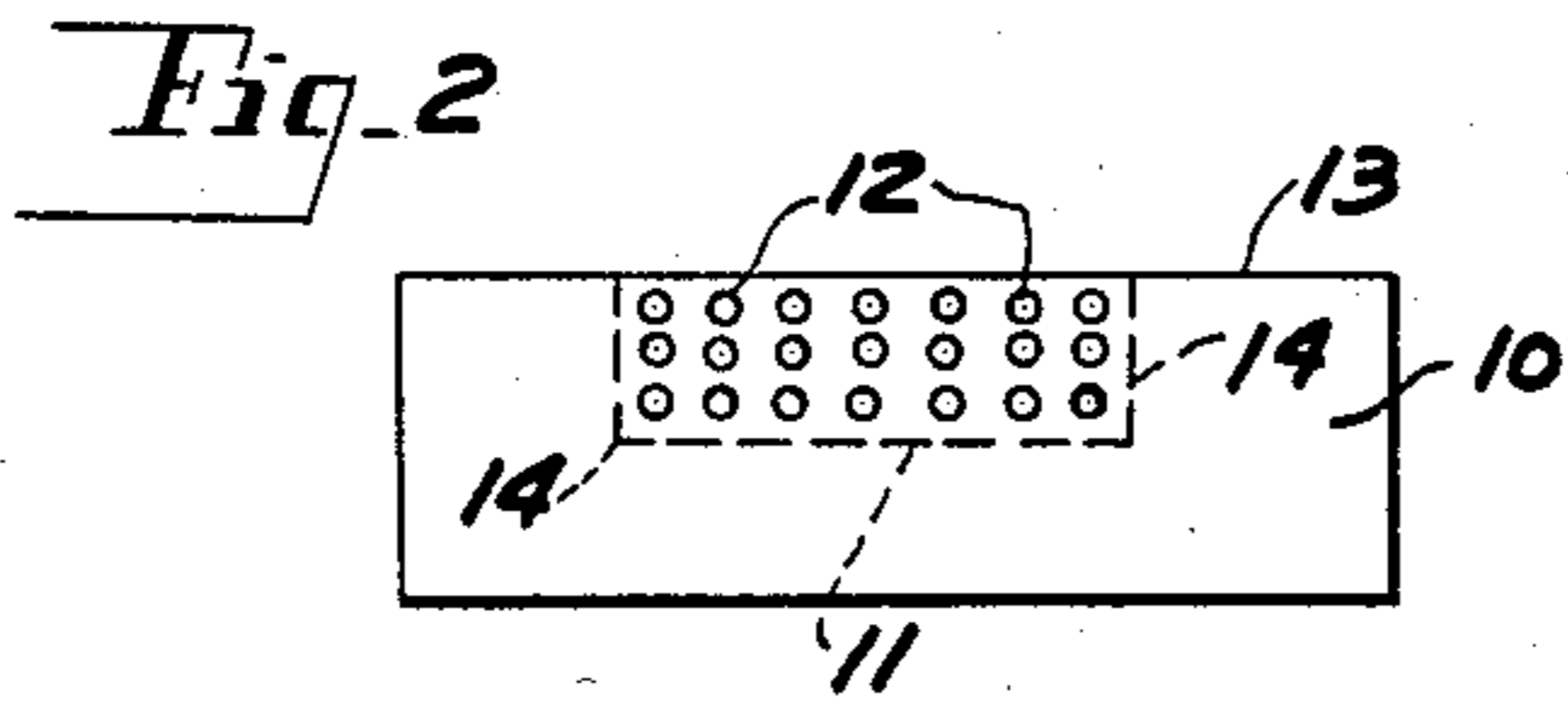


Fig. 2

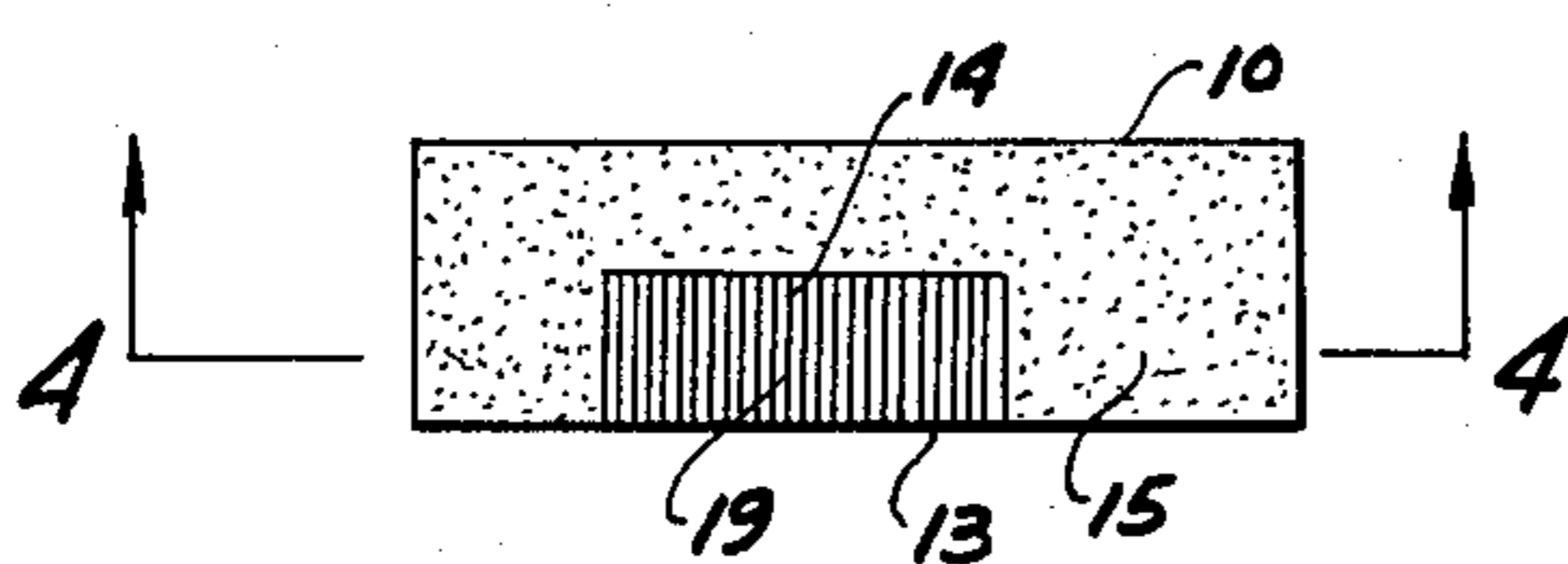


Fig. 3

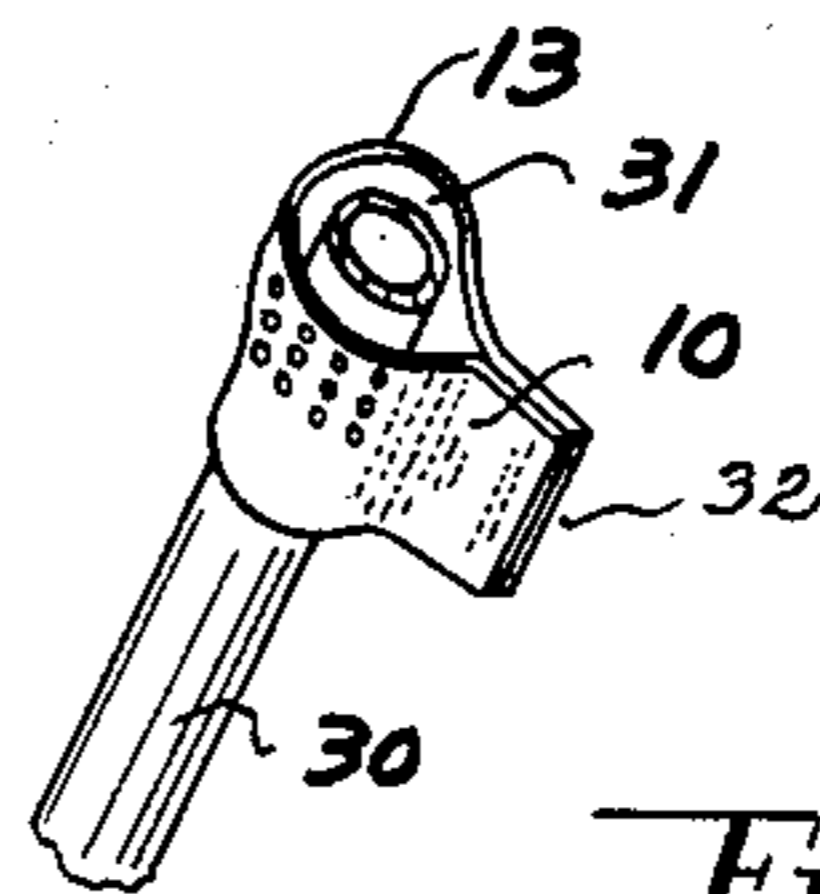


Fig. 5

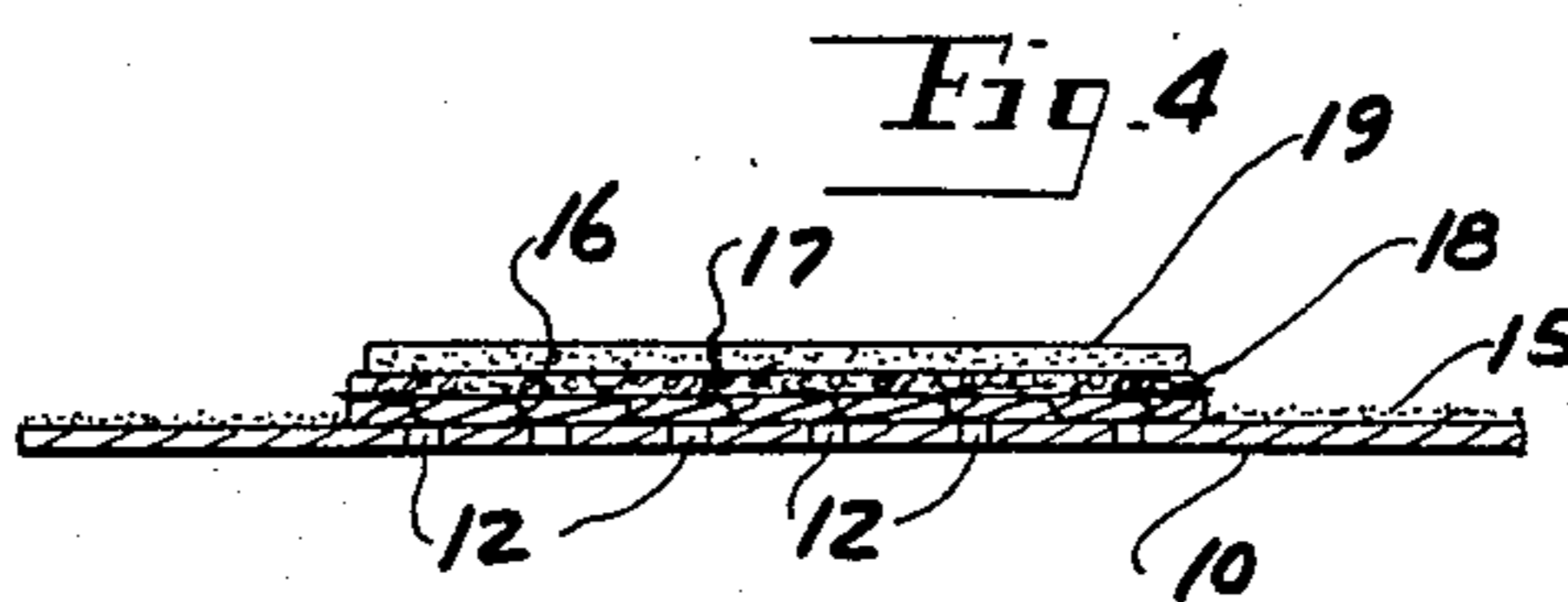


Fig. 4

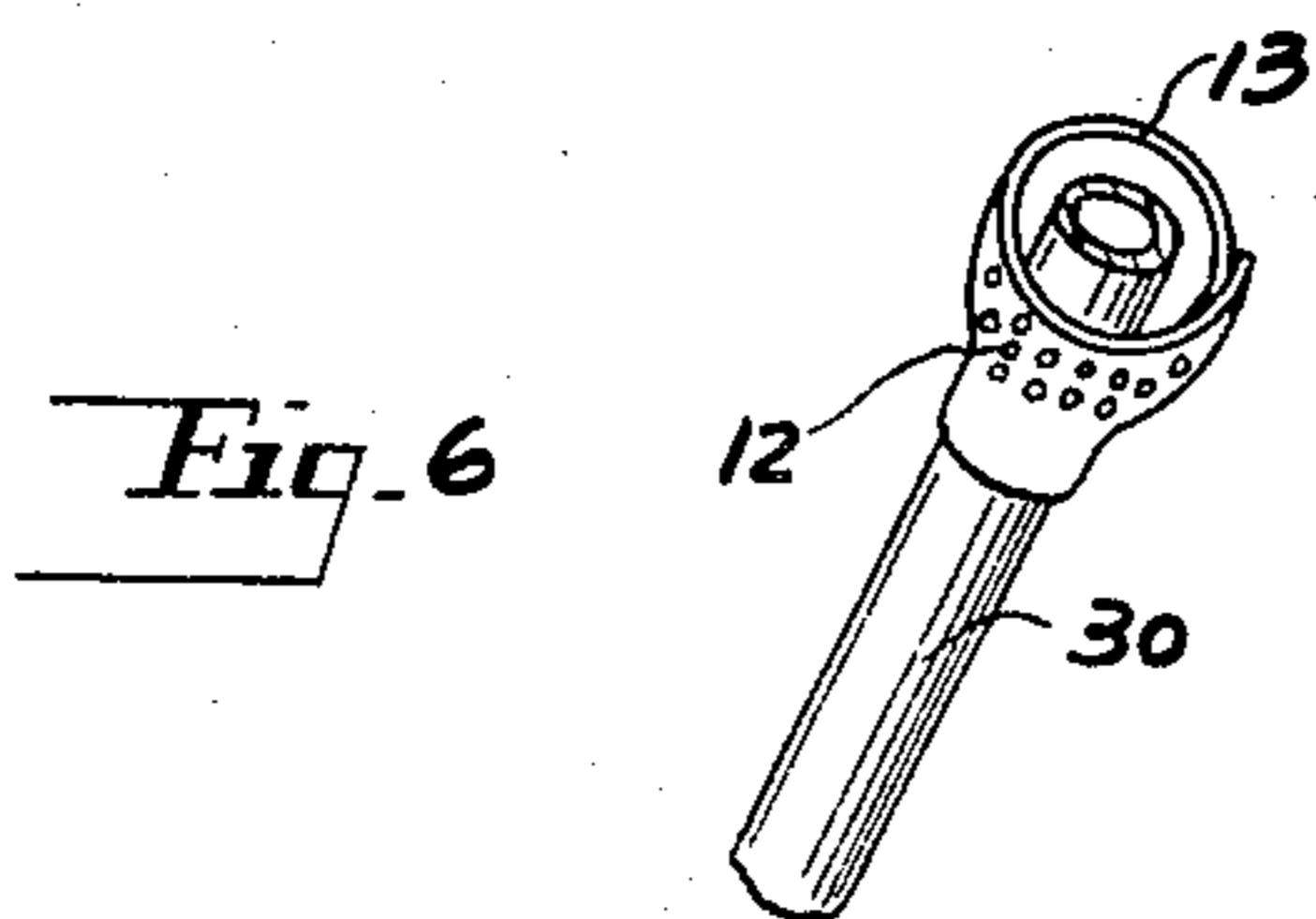


Fig. 6

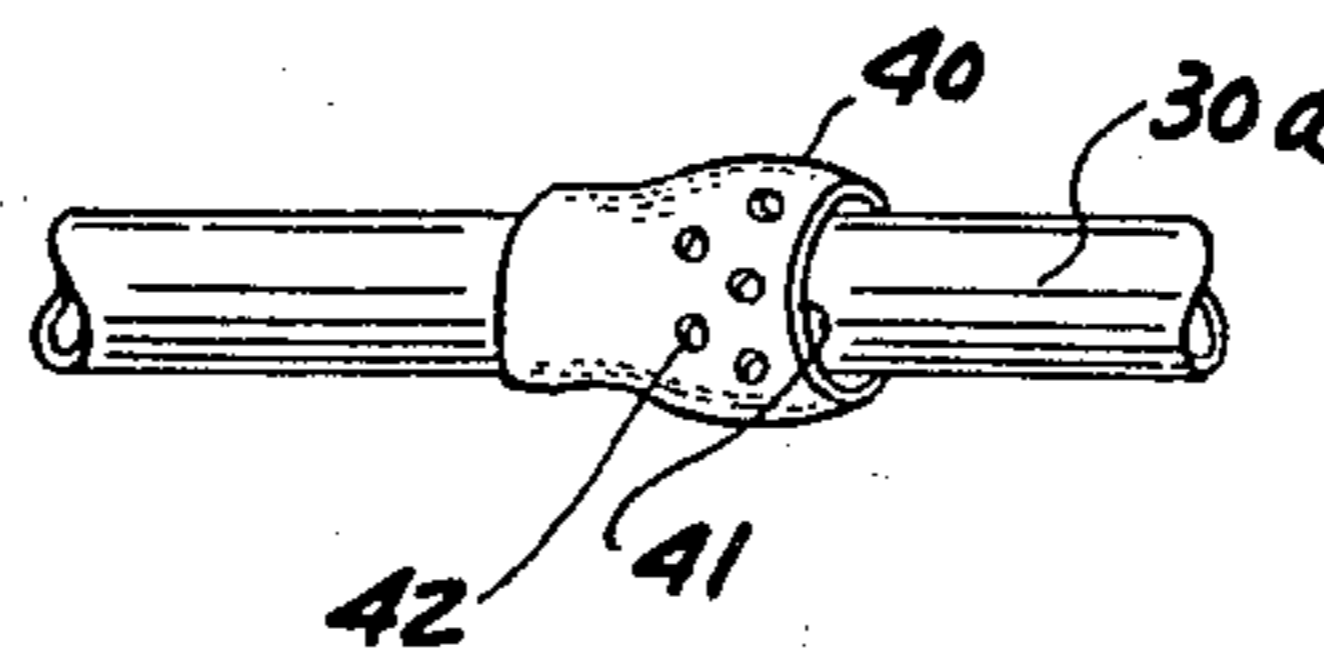


Fig. 7

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2,918,033

PIPE LEAKAGE DETECTOR

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3 Claims. (Cl. 116—114)

My invention pertains to means adapted to be applied to a pipe, such as a fuel-carrying line in an airplane, which means will visually indicate the presence of a liquid on the outer surface of the pipe in case of a leakage developed at some point along said line but seeping towards said indicating means.

More specifically, my invention pertains to a band adapted to be applied over a pipe, preferably at a point below a joint of said pipe to another, the band including a dry coloring agent normally concealed within the band but capable of being absorbed by said liquid and carried thereby towards the outer surface of the band where, because of a contrast in color with respect to the band itself, it would be readily noticed.

My further object is to provide an indicator in the shape of a cup having an outwardly-flaring mouth to permit easier reception of the seeping liquid and an accumulation thereof within the cup in sufficient quantity to penetrate interior layers of the band in order that the liquid and the coloring matter carried thereby may be brought towards the surface of the band.

Another object of the improvement is to provide a detector in which the band is provided with an adhesive substance on one face thereof in order that the band may be readily applied to a pipe in such a manner as to permit adjustment to pipes of different diameters.

I shall now describe my improvement with reference to the accompanying drawings in which:

Fig. 1 is a side elevational view of a pipe leading from a container, the view including my indicator applied to said pipe;

Fig. 2 is a plan elevational view of the detector in the form of a band, the view disclosing the top surface thereof;

Fig. 3 is a plan elevational view of the back side of the same band;

Fig. 4 is a sectional view on line 4—4 of Fig. 3;

Fig. 5 is a perspective view of the band shaped about the length of a pipe into a cup-shaped receptacle;

Figs. 6 and 7, respectively, are perspective views of modified detectors.

Similar numerals refer to similar parts throughout the several views.

The detector comprises a band consisting of a few component elements. More specifically, it consists of a tape 10 of thin and flexible plastic material, the tape being of uniform thickness and width throughout its length. A portion of the tape, to one side of its medial line 11, lengthwise of said tape, is provided with a plurality of perforations or apertures 12, these being confined to a rectangular area defined on one side by said median line 11 and at the other side by the outer rim 13 of the tape, while its two end sides are defined by lines 14 running transversely to the length of the strip 10, but each being spaced from the respective end of said strip.

The opposite or back surface of the tape 10 is coated with an adhesive substance marked 15. Laid over the

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openings 12 on the side coated with said adhesive substance, and retained thereby in its place, is a rectangular piece of textile cotton fabric 16. This is covered by a similar rectangular piece of gauze 17 which is bonded to the piece 16. Preferably this bonding ought to be limited to the marginal portions of the gauze, as shown at 18. Finally, on the side remote from the cotton fabric, the gauze carries a layer 19 of dry coloring matter contrasting with the color of the tape and of the type which will be readily soluble in the liquid which is carried by the pipe on which the detector is mounted.

Thus, in the case where the pipe is used to convey gasoline, the coloring matter must be of a type which will not be affected by atmospheric moisture, water, or water vapors, but which will be readily soluble in gasoline.

It will be understood that instead of having said coloring matter in the form of a layer on top of the gauze, the gauze may be impregnated therewith.

No particular coloring matter is specified herein, for the reason that the nature of the coloring matter is not at all critical. However, to cite an example, the coloring matter may consist of a gamma-ferric oxide hydrate compounded with a drying oil, such as linseed oil, the coloring matter thus produced being bright orange in hue.

For operative use the band shown in Fig. 2 is wrapped about a pipe 30 in such a manner that the portion containing the perforations 12 will encircle the pipe. This is shown in Fig. 1 in which the letter "T" indicates a tank to which pipe 30 is connected. The portion of the band coated with adhesive substance will be made to adhere to the pipe as a means of supporting the detector in its place, while the portion provided with said apertures will only loosely encircle the pipe so that the rim 13 of the band will be spaced from the pipe. In addition, the wrapping of the band is effected in such a manner as to impart to the loosely-wrapped portion of the band the shape of an outwardly-flared cup, thus leaving within the cup a free space 31. The end portions of the band may be stuck together, in which case they would project radially, as shown at 32, with relation to the pipe, or, if the band is short enough, the band may be formed into said cup, as shown in Fig. 6, without leaving any outwardly-extending ends.

Fig. 7 shows a modified detector in which the band instead of being formed into a cone-shaped cup is first preformed to result in the formation of a bulbous or spherical container 40, one end of which, being coated with an adhesive substance, is tightly wound about a pipe 30a. At the other end the container, being open, is defined by a rim 41 which is spaced from said pipe 30a. As in the case of the detectors already described, the band of which the detector is made is of the same kind and structure, with the exception of the above-named preforming of the band to produce the bulbous appearance.

The manner in which the detector is to be used is quite obvious. Because of its structure, the detector is best adapted for use on pipes which are disposed vertically or at an angle to a horizontal line. It will be understood that the cup portion of the detector ought to be open upwardly for reception and collection in the cup of liquids seeping along the pipe downwardly in the direction of the cup. The liquid, accumulating in the cup, would dissolve the coloring matter, seep through the gauze into the textile fabric, and would color said fabric with sufficient intensity to be seen from outside the cup through the apertures 12 in the plastic tape 10.

The detector shown in Fig. 7 may be found useful even on pipes which normally are disposed in a horizontal position but which occasionally may be turned at an angle upwardly. Such an eventuality may occur

in an airplane where in the course of a flight, beginning with the ascending phase, a fuel line normally horizontal may be turned upwardly with the upward turn of the plane. A quantity of fuel reaching the bulbous cup would be retained there even during a continuous horizontal flight, and thus serve its purpose of dissolving the coloring matter and giving an indication of a leak.

After having described my invention, what I wish to claim is as follows:

1. A leakage-indicating device for a pipe, the device consisting of a length of a tape having an area intermediate its ends, and to one side of a median longitudinal line provided with a plurality of apertures, one side of the tape being coated with an adhesive substance, a piece of textile cotton material disposed over the area and kept thereby said adhesive substance, a piece of gauze laid on top of said textile cotton material, and bonded thereto, and a layer of coloring element spread over said gauze, the tape being adapted to be wound about the pipe to have the gauze with the dye element formed into a cup encircling the pipe but being out of contact therewith and to bring the portion of the tape coated with an adhesive substance into adhesive engagement with the pipe.

2. A leakage-indicating device for a pipe disposed at an upward angle, the device consisting of a tape having the form of a frusto cone open at both ends and adapted to be seated axially upon a pipe, the constricted end of the cone being its lower end and being coated with an

adhesive substance for adhesion to the outer surface of the pipe, the outwardly-flared other or upper end of the tape being provided with a plurality of perforations, including a layer of textile material bound to the inner surface of the cup, a piece of gauze bonded to the outer surface of the textile material, the gauze being impregnated with a dye element soluble in the liquid contained in the pipe, said upper end of the cone being spaced from the pipe and being open upwardly.

3. A leakage-indicating device for a pipe disposed at an upward angle and adapted to convey a liquid, the device having the form of a frusto cone encircling the pipe and having a constricted lower portion and an outwardly-flaring upper portion, the wall of the cone consisting of a plastic band, a lining of a textile cotton material, a piece of gauze bonded to the inner surface of the cotton material, the gauze being impregnated with a dye soluble in the liquid carried by the pipe and of a color contrasting with that of the tape, said plastic band being provided in its outwardly-flaring portion with a plurality of apertures.

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