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2,452,367

DRAIN TRAP CLEANING DEVICE

Filed April 5, 1946

2 Sheets-Sheet 1

Fig. 1.

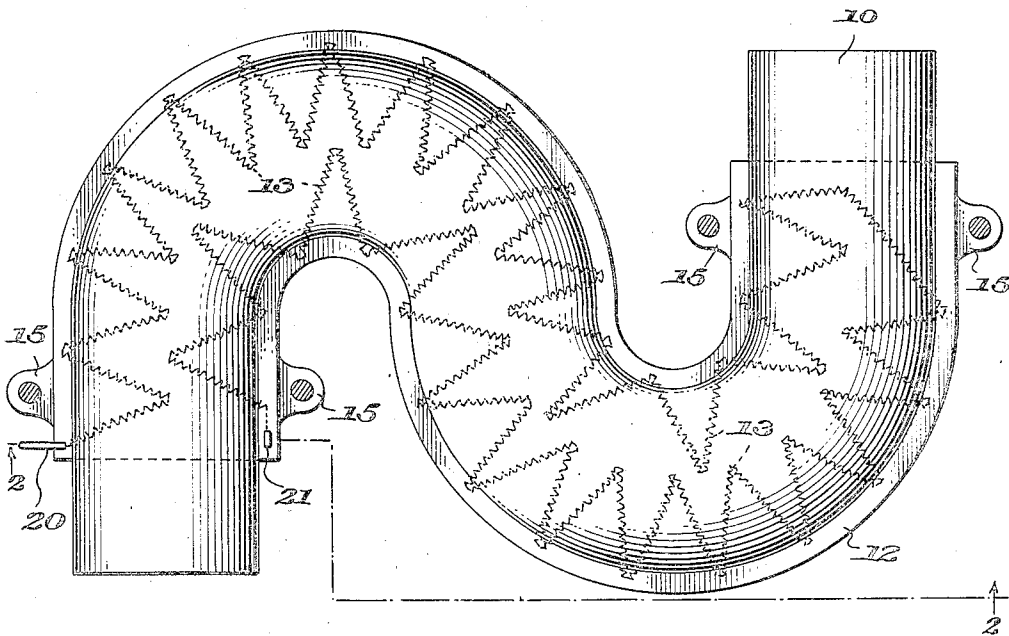
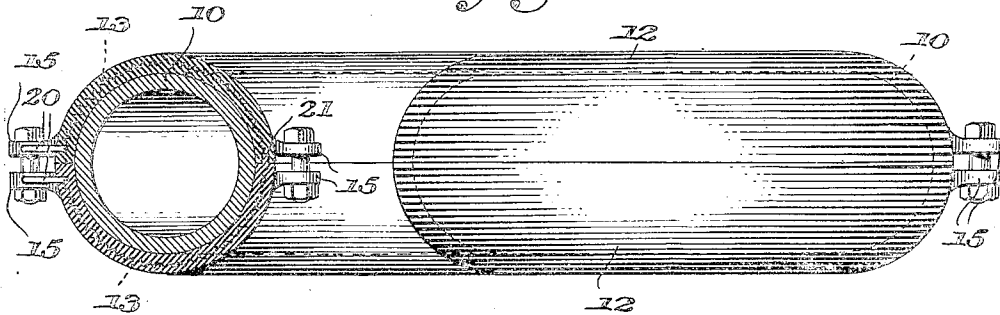


Fig. 2.



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Fig. 4.

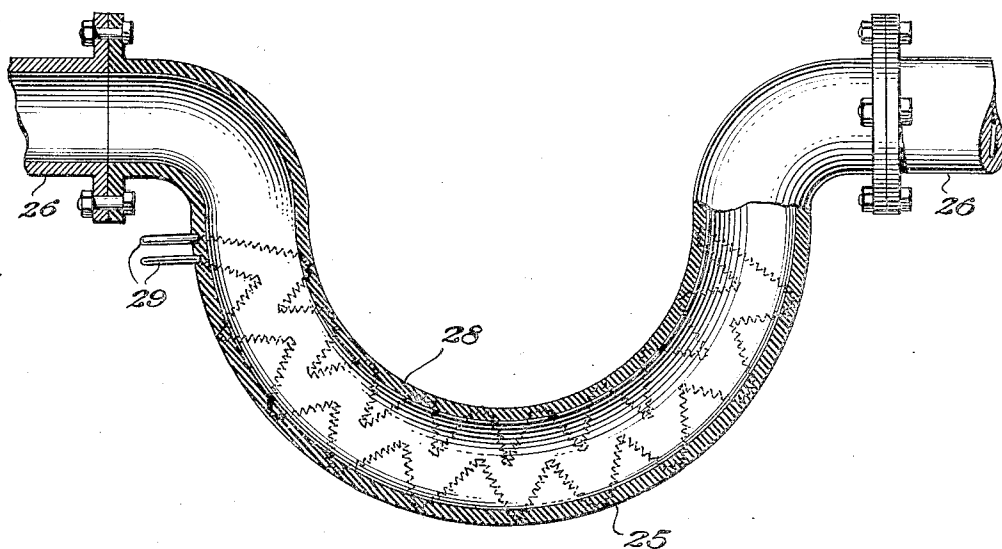
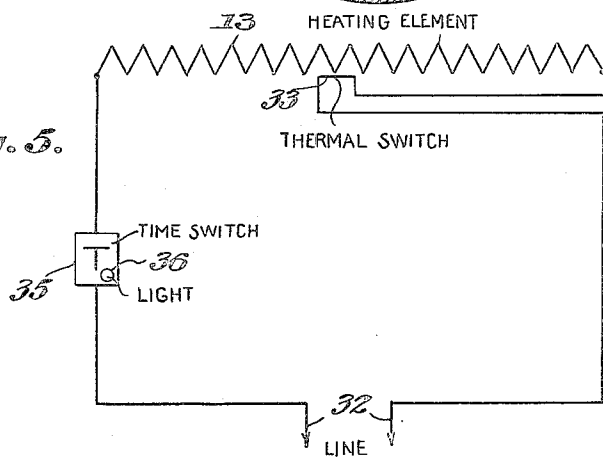


Fig. 3.



Fig. 5.



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UNITED STATES PATENT OFFICE

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DRAIN TRAP CLEANING DEVICE

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12 Claims. (Cl. 219—38)

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This invention relates to improvements in drain traps, for example the trap conventionally associated with household sink and lavatory outlets, and has for its object the provision of means whereby such traps may be conveniently and effectively freed of obstacles.

It is an old expedient to employ household lyes and other chemical mixtures in the cleaning of household drains. In general, these mixtures depend for effectiveness upon partial saponification of the fats and greases which collect in the drain; in some cases the chemical reaction causes mechanical scrubbing of the internal pipe surfaces, and the scrubbing action is aided by the evolution of heat resulting from the reaction of the chemicals with water. When properly employed, these methods are fairly effective, but when employed by persons who are not skilled chemists, injury to the user, to clothing, to floor coverings, etc., may result. Furthermore, many obstacles cannot be cleared satisfactorily because the amount of heat developed is insufficient; often the saponifying action is incomplete, insoluble soaps are formed in the course of reaction, excessively high concentrations of alkali are formed, and the reaction may take place principally at the surface rather than in the area of stoppage.

In recent years, attempts have been made to solve the problem of clogging drains, and to effect disposal of garbage, by the use of electrically powered units which grind the garbage, bones, and other refuse and flush them through the drains with a water stream. Such units are quite expensive and frequently develop objectionable odors. The units themselves furnish an area in which putrefactive organisms may develop rapidly.

In accordance with the present invention it is proposed to associate with the drain trap an electrical heating device which may be conveniently energized at frequent intervals, for instance once a day, the heating being so distributed over the surface area of the trap as to liquefy the grease which is largely responsible for formation of obstacles, whereby the obstruction may be readily removed by flushing hot water through the drain. Preferably the heating element is associated with the entire drain trap, but in the interest of simplicity and economy, heating may be confined to the lower bend of the trap in which drainage liquids are constantly present and in which there is the greatest tendency to form grease deposits. By frequently boiling out the area in which obstacle material aggregates,

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sanitation is promoted in that many organisms can be killed off.

In the preferred form of my invention, heat is supplied by means of a separate unit which is readily applicable to existing traps, but the invention contemplates the provision of traps having the electrical heating element permanently associated therewith, the improved trap being employed as a replacement or substitute for existing traps.

It is a feature of my invention that the energization of the trap heating means may be controlled automatically so as to limit the duration of the heating period and to prevent excessive heating. For instance, I may associate with the heating circuit a time-controlled switch which may be manually operated to energize the circuit, and which is released automatically on the expiration of a predetermined period of time, signaling means being associated with the circuit to apprise the user of the termination of the heating period so that the drain may be promptly flushed to remove the obstruction and the melted grease. I may also employ a thermally responsive switch in the heating circuit in order to prevent damage from overheating and emanation of objectionable odors.

Further objects and features of the invention will be apparent from a description of the following drawings, in which

Figure 1 is a side elevation of a drain trap showing one section of a heating jacket applied thereto;

Figure 2 is a view partly in section, taken on the line 2—2 of Figure 1;

Figure 3 is a transverse section of one portion of the heating jacket shown in Figure 1;

Figure 4 is a side elevation, partly in section, showing a modification of the structure illustrated in Figure 1; and

Figure 5 is a wiring diagram, illustrating a circuit suitable for the control of the heating element.

In order to facilitate an understanding of the invention, reference is made herein to the several embodiments illustrated in the accompanying drawings, and specific language is employed to describe the same. It will nevertheless be understood that no limitation of the invention is thereby intended, various further alterations and modifications of the described structures being contemplated, such as would occur to those skilled in the art to which the invention relates.

Referring first to the form of invention illus-

trated in Figures 1 to 3, it will be observed that the heating device constitutes a unit for attachment to a standard household S trap 10 of the type employed for the draining of kitchen sinks. The heating unit is constituted by a jacket 12, which may be formed of electrically insulating material such as ceramics or appropriate plastics containing asbestos, having imbedded therein one or more electrical heating elements 13. The jacket 12 is shaped to conform to the contour of the trap 10 and is preferably split longitudinally to facilitate application thereof to the trap. In the drawings it is illustrated as comprising two sections, these sections being provided at points spaced in the length thereof with cooperating ears or lugs 15 for the reception of bolts by means of which the two sections may be clamped together so as to embrace or encompass the trap.

In the event the jacket 12 is formed of ceramic or appropriate material or the like, the heating element or elements 13 may be imbedded in the material during the molding of the jacket. I prefer, however, to form the jacket of separate inner and outer sheaths, the outer sheath being of relatively hard material, such as an appropriate plastic, and the inner sheath being of soft material such as asbestos, the heating element being imbedded between the two sheaths. The specific disposition of the heating element is not critical, but it should be so arranged as to distribute the heat over a substantial area of the trap. The element need not extend over or be arranged to heat the entire trap surface; it is of principal importance that the lower bend of the trap, which has a shape described herein-after as a segment of an annulus, being U-shaped as viewed in longitudinal section, be supplied with an adequate amount of heat, properly distributed to facilitate the liquefaction of grease at this critical point. Some types of trap, for instance the so-called running trap, obviously require heating only over the trap bend, there being little tendency for the grease to settle elsewhere.

In Figures 1 and 2, I have shown the use of a single heating element in each of the two longitudinal sections of the jacket, the heating element in each section terminating at one end in a terminal 20 for connection with a suitable source of electrical energy, for example the conventional 110 volt supply line, and at the other end in a coupling element 21 positioned to electrically connect with a corresponding coupling element on the opposing section, the arrangement being preferably such that the coupling elements 21 are intimately contacted when the two sections are clamped in position on the drain trap. The two terminals 20 may extend outwardly of the respective jacket sections and are positioned in adjacent relation for engagement by a conventional female connector, whereby the unit is supplied with current from the source.

Various tests have demonstrated the efficiency of the invention in the clearing of seriously blocked traps. For example, a glass S trap, permitting visual observation of the operation, having an inside diameter of approximately 1 3/4 inches, was wrapped with resistance wire at the lower bend, the wire extending up each side of the trap about 2 inches, the volume of the trap being 330 ml. Two plugs formed by impregnating cotton with a standard fat mix consisting principally of beef tallow and fat drippings were inserted in the trap, one plug being placed near the bottom of the trap on the sink side and the

other near the top of the trap near the overflow. Additional fat mix was poured in the trap until it was approximately 2 inches thick; the trap was almost full of water between the plugs, and the sink connection was full.

Current was then passed through the heating element and in about two minutes it was observed that both plugs were melted and loosened. By pouring water in the top of the trap, the plugs were forced out.

In another test, the same trap was blocked with a plug consisting of the fat mixture and including also strips of bird's-eye cloth and hard soap made by treating sodium stearate with calcium and magnesium chlorides. Current was applied to the heating element for a short time to melt the mixture to a solid mass, which was then allowed to set for several days. The current was then again applied to the heating element, and within two minutes the plug softened sufficiently to permit the water above it to channel through. After two more minutes of heating, the plug was washed from the trap by pouring in hot water.

In conducting the test just described, employing a line voltage of 115 volts, the heating element consumed 0.6 kilowatt in the four-minute operation. Thus the power consumed in freeing the drain was approximately .04 kilowatt hour.

Various other tests, conducted in an effort to demonstrate the surprising efficiency of the device under conditions simulating those normally encountered in the household, were conducted with the use of different blocking mixtures. As an example, one of the mixtures employed was the following:

	Percent
Human hair	1.35
Fat drippings	15.60
Beef tallow	75.00
Hyflo Super Cel	2.20
Coffee grounds	1.35
Tea leaves	1.35
Powdered soap	1.35
Epsom salt	1.35
Ground soybean meal	.45

All such mixtures were promptly and effectively removed by flushing after a brief heating period.

In Figure 4 is illustrated an embodiment of the invention in which the heating element is embedded in the drain trap, it being observed that this is to all intents and purposes a full equivalent of the separately applied jacket hereinbefore described. In this figure, the trap shown is of the running type, comprising a segmental annulus or bend portion 25 which is interposed in a substantially horizontal drain line 26, but such a trap may obviously be otherwise shaped, for instance to conform to the usual S trap employed with household sinks, as in Figures 1 and 2. The trap may be composed of electrical insulating material, for instance of appropriate ceramic or molded plastic, the heating element 28 being imbedded in the material during molding, and being provided with conventional terminals 29 whereby the element may be connected to a source of supply, such as the usual service main.

It is proposed to employ, in either of the embodiments of the invention hereinbefore specifically described, a device for opening the heating circuit whenever the temperature exceeds a predetermined value. It is also desirable, as hereinbefore pointed out, to provide a time-controlled switch, whereby the duration of the heating period will be automatically limited. A circuit em-

bodying both these features is shown in Figure 5, in which the heating element is indicated at 13, and the leads to the supply line are shown at 32. A thermally actuated switch 33 is arranged in series in the heating circuit and may comprise the conventional bimetallic element which is positioned to absorb heat emanating from some portion of the heating element. The bimetallic element is so adjusted that the heating circuit remains closed until the temperature exceeds a predetermined level, at which time the circuit is opened to momentarily open up the flow of heat to the trap.

A time-controlled switch 35 is also positioned in series in the heating circuit. Preferably this switch is of a known type adapted to be manually closed, and having incorporated therewith timing mechanism for opening the switch on the expiration of a predetermined period of time, say six to eight minutes. If desired, an indicating device, such as a light bulb 36, is arranged in the circuit so as to be energized only while the switch 35 is closed, in order that the termination of the heating period may be called to the attention of the user. Thus when the signal light 33 is extinguished, as the result of the opening of the time switch, the user may flush the trap with hot water, thereby washing away any obstruction, and clearing the trap of the liquefied greasy material.

Observation has shown that by the periodical use of a heating device of this character, for instance daily or weekly operation thereof, drains may be maintained continually in a free and sanitary condition. The invention is especially useful in conjunction with garbage disposal equipment which, as hereinbefore indicated, offers serious problems as the result of the substantial amount of grease and solid material which must be passed through the drain trap.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A plumbing drain trap having an electrical heating element embedded in the lower bend thereof, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said bend, said element having terminals for connection to a source of electrical energy.

2. A plumbing drain trap including a portion formed of electrically insulating material having an electrical heating element embedded therein, said portion defining the lower bend of the trap, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said bend, said element having terminals for connection to a source of electrical energy.

3. A plumbing drain trap having an electrical heating element associated therewith, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said trap to melt solidified grease adhering to the inner surface of the trap, said element having terminals for connection to a source of electrical energy.

4. A plumbing drain trap having an electrical heating element associated therewith, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said trap to melt solidified grease adhering to the inner surface of the trap, said element having terminals for connection to a source of electrical energy, said trap including an inner metal-

lic wall, and an outer removable insulating jacket, said element being embedded in said jacket.

5. A plumbing drain trap having an electrical heating element associated therewith, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said trap to melt solidified grease adhering to the inner surface of the trap, said element having terminals for connection to a source of electrical energy, said trap being formed as a molded unit having said element embedded therein.

6. A device for cleaning plumbing drain traps comprising a jacket having a portion shaped to conform generally to a segment of an annulus and dimensioned to embrace the lower bend of a trap, and electrical heating means so embedded in said jacket as to provide a distributed heating zone for heating said trap bend, said heating means having terminals for connection to a source of electrical energy.

7. A device for cleaning plumbing drain traps comprising a jacket having a portion shaped to conform generally to a segment of an annulus and dimensioned to embrace the lower bend of a trap, said jacket being split in the direction of its length to permit application thereof to the trap.

8. A device for cleaning plumbing drain traps comprising a jacket having a portion shaped to conform generally to a segment of an annulus and dimensioned to embrace the lower bend of a trap, electrical heating means so embedded in said jacket as to provide a distributed heating zone for heating said trap bend, said heating means having terminals for connection to a source of electrical energy, and a time controlled switch interposed between said heating means and said source, whereby the duration of the heating period may be predetermined.

9. A device for cleaning plumbing drain traps comprising a jacket having a portion shaped to conform generally to a segment of an annulus and dimensioned to embrace the lower bend of a trap, electrical heating means so embedded in said jacket as to provide a distributed heating zone for heating said trap bend, said heating means having terminals for connection to a source of electrical energy, and a thermal responsive switch arranged in series with said heating means to render the latter inoperative whenever a predetermined temperature is exceeded.

10. A plumbing drain trap having an electrical heating element associated with the lower bend thereof, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said bend, said element having terminals for connection to a source of electrical energy.

11. A plumbing drain trap having an electrical heating element associated with the lower bend thereof, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said bend, said element having terminals for connection to a source of electrical energy, and a time controlled switch interposed between said heating element and said source, whereby the duration of the heating period may be predetermined.

12. A plumbing drain trap having an electrical heating element associated with the lower bend thereof, said heating element being so disposed as to effect distribution of heat over a substantial portion of the area of said bend, said element having terminals for connection to source of electrical energy, and a thermal responsive switch arranged

in series with said heating element to render the latter inoperative whenever a predetermined temperature is exceeded.

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