Feb. 1, 1966 R. SIEMIANOWSKI 3,233,078

AUTOMATIC DEVICE FOR PREVENTING ICE FORMATION IN GUTTERS AND DOWNSPOUTS

Filed May 6, 1963 2 Sheets-Sheet 1

Fig. 1.

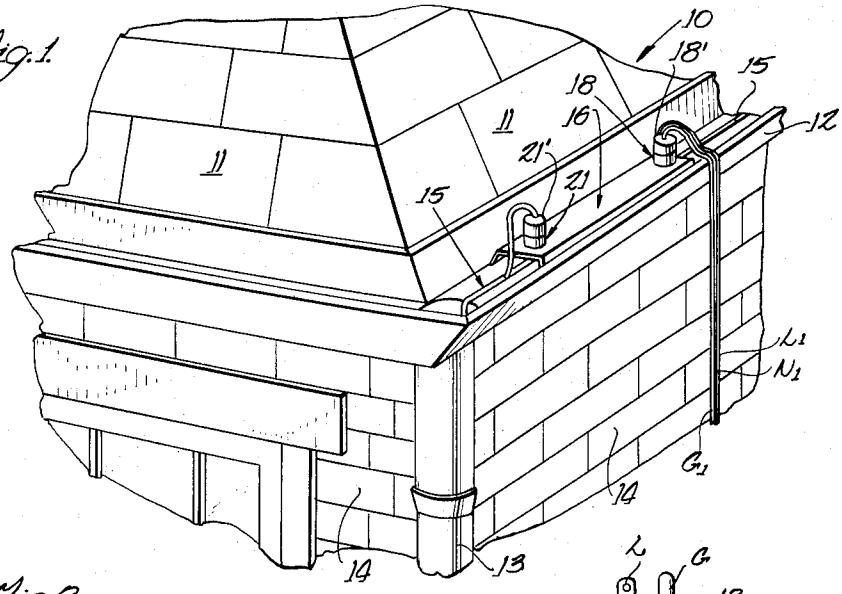


Fig. 2.

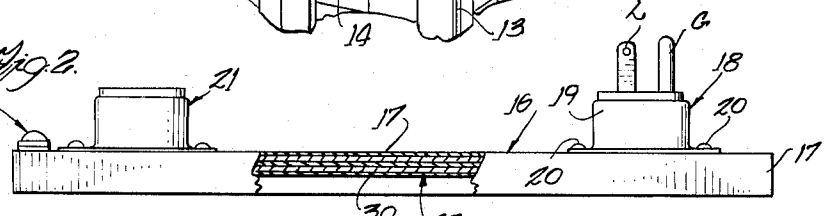


Fig. 3.

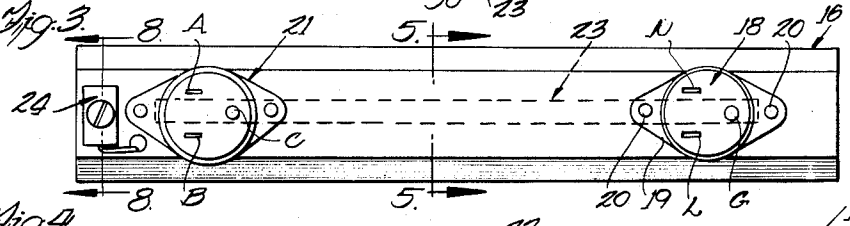


Fig. 4.

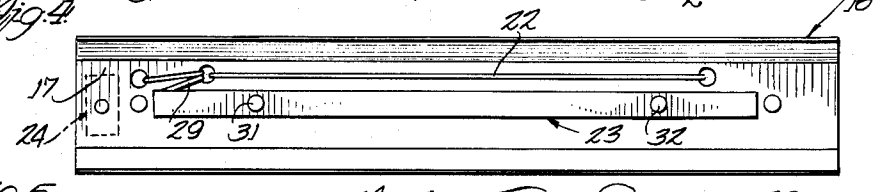


Fig. 5.

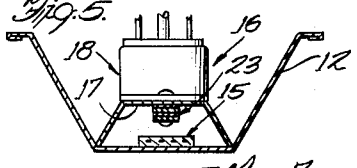


Fig. 6.

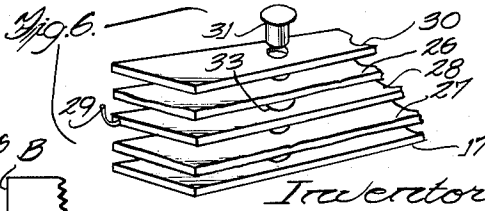
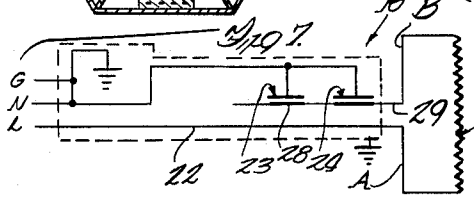


Fig. 7.



Inventor
Roman Siemianowski
by Pennie and Smoco
Attorneys

Feb. 1, 1966 R. SIEMIANOWSKI 3,233,078

AUTOMATIC DEVICE FOR PREVENTING ICE FORMATION IN GUTTERS AND DOWNSPOUTS

Filed May 6, 1963 2 Sheets-Sheet 2

Fig. 8.

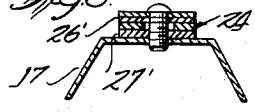


Fig. 9.

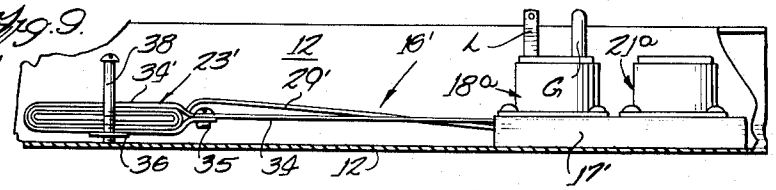


Fig. 10.

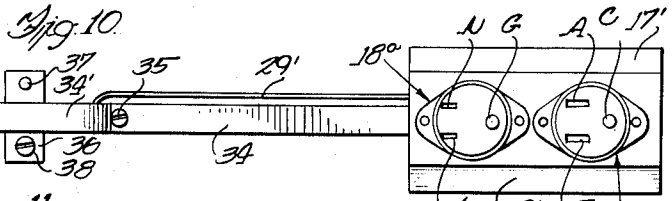


Fig. 12.

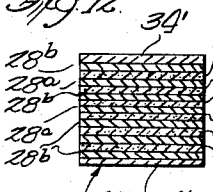


Fig. 11.

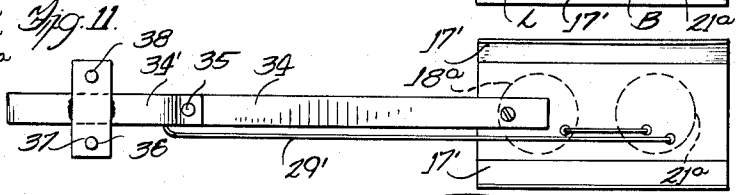
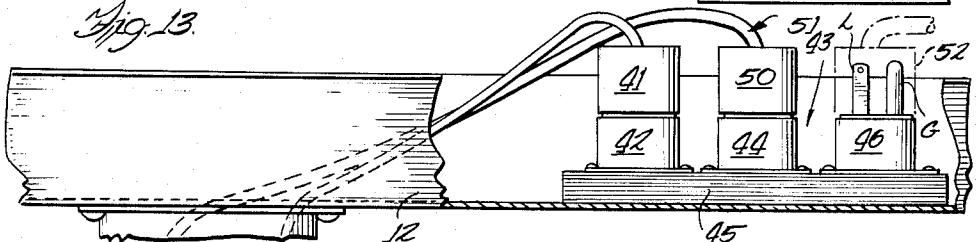


Fig. 13.



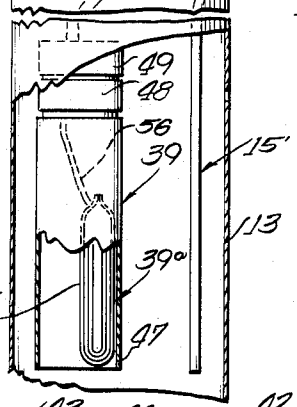


Fig. 14.

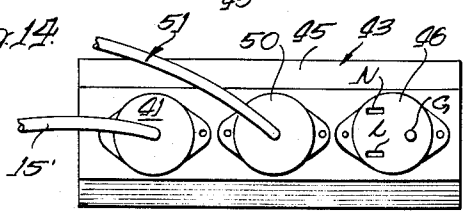


Fig. 15.

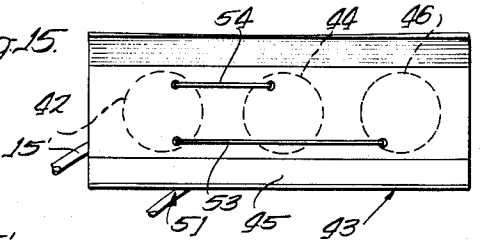
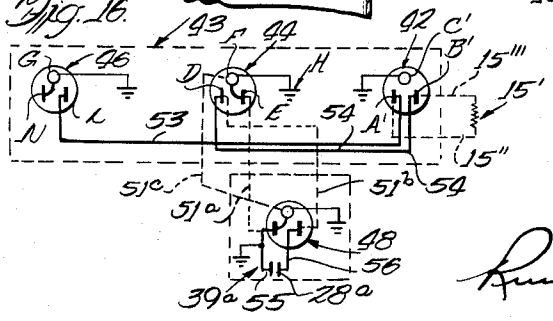


Fig. 16.



Inventor
Romare Siemianowski
Rummler and Snow
Attorneys

United States Patent Office

3,233,078

Patented Feb. 1, 1966

3,233,078

AUTOMATIC DEVICE FOR PREVENTING ICE FORMATION IN GUTTERS AND DOWNSPOUTS

Roman Siemianowski, 1647 N. Paulina St., Chicago 22, Ill.

Filed May 6, 1963, Ser. No. 278,107
8 Claims. (Cl. 219—213)

This invention relates to a moisture-sensitive device for automatically creating a liquid flow channel in ice clogged drain gutters and associated downspouts when the same becomes dammed up by ice formation therein. More in particular this invention relates to a moisture sensitive electric switch device in combination with a drain gutter or downspout having an electric heating element positioned therein.

Oftentimes accumulated snow on a roof begins to thaw particularly when exposed to direct sunlight even though the shade temperature of the atmosphere is appreciably below the freezing point of water. During such times the liquid water from the melting snow often trickles down the sloped roof into the drain gutter where it freezes into solid ice. Thus the gutter soon becomes dammed with ice and consequently the gutter ceases to function as a drain which often results, during subsequent thawing, in flow of water into the open space below the roof through the soffit of the eave thus rotting the lumber and causes other damage. Also since the water cannot drain down the gutter pipe or downspout it overflows over the edges of the gutter and subsequent freezing causes formation of icicles.

One known means to overcome the above difficulty is to position an electrical resistance type of heating element in cable or tape form along the upper surface of the bottom of the gutter and extending it down into the downspouts. Thus when the tape heating element is electrically energized the heat evolved prevents liquid water entering the gutter from freezing therein and the water in liquid form drains and discharges through the downspouts normally. However, this means for overcoming the aforesaid difficulty has serious drawbacks for either the tape heating element must be electrically energized constantly throughout the cold weather which wastes electric energy during periods when there is no snow or ice on the roof or, in the alternative, the electric current must be applied by manual operation of a suitable switch. The main disadvantage in the latter case is that one must be weather-observant constantly in order to make such a system economically operative in the performance of its intended function.

The present invention overcomes the aforestated difficulty by providing, in combination with a gutter having an electric resistance heating tape, an electrolytic switch which automatically closes the circuit for energizing the electric tape during the presence of water and conversely opens the circuit when water is eliminated. It is therefore a prime object of the present invention to provide an electrolytic switch which is in open circuit condition in the absence of water and in closed circuit condition in the presence of water.

Another important object of the present invention is to provide an electric heating system for forming a trough or channel in ice formed in gutters and associated downspouts employing the electrolytic switch of the preceding object wherein the system is energized only during a period when liquid water is present.

A further object of the present invention is to provide a water sensitive electrolytic switch which may in a simple manner be adapted for operation with existing drain gutters and downspouts having an electric resistance heating element for automatically inhibiting the formation of ice dams therein.

A still further object of the present invention is to provide an adjustable device for forming a channel in the ice in drain gutters according to preceding objects at low cost.

Still another object of the present invention is to provide automatic means for energizing an electric heating element in a downspout for forming a channel in the ice therein which is independent of the condition in the associated drain gutter.

These and other desirable and inherent objects will become more apparent from the ensuing description of preferred embodiments of the invention, the appended claims and the annexed drawings wherein:

FIGURE 1 is a perspective view of a roof having a gutter and downspout, partly broken away, illustrating the electric resistance heating element and electrolytic switch system of this invention in position for operation;

FIG. 2 is a side elevation, partly in section and partly broken away, of one form of the electrolytic switch device of this invention;

FIG. 3 is a plan view of the electrolytic switch of FIGURE 2;

FIG. 4 is a bottom elevation of the electrolytic switch of FIGURE 2 showing additional construction details;

FIG. 5 is a sectional view taken on line 5—5 of FIGURE 3 but positioned in a drain gutter illustrating construction details not apparent from the preceding figures;

FIG. 6 is a perspective view, partly broken away, illustrating one electrolytic switch unit in disassembled form;

FIG. 7 is a schematic diagram showing the electric circuitry of the system shown in the preceding figures;

FIG. 8 is a sectional view taken on line 8—8 of FIGURE 3 showing an electrolytic switch unit in assembled form on the supporting frame;

FIG. 9 is a side elevation, partly in section and partly broken away, of a modified form of the electrolytic switch device of this invention wherein the distance between the electrolytic switch unit and the bottom of the drain gutter is adjustable;

FIG. 10 is a plan view of the modified form of the device shown in FIGURE 9;

FIG. 11 is a bottom view of the device of FIGURES 9 and 10;

FIG. 12 is an enlarged sectional view, taken on line 12 of FIGURE 10, showing the construction of the electrolytic switch unit thereof;

FIG. 13 is a view, partly in section and partly broken away, of a system for de-icing of a downspout employing another modification of an electrolytic switch device which is operative independent of the condition of its associated gutter;

FIG. 14 is a plan view of a disengageable electric connector adapted for electrically interconnecting the power source to the electric heating element with the modified form of electrolytic switch electrically interposed in the circuit of the system illustrated in FIGURE 13;

FIG. 15 is a bottom view of the connector of FIGURE 14; and

FIG. 16 is a schematic diagram showing the electric circuitry of the system shown in FIGURE 13.

Referring now to the drawing it will be seen from FIGURE 1 that the numeral **10** indicates generally a building such as a house or home having a sloped roof **11** directed downwardly toward a drain gutter **12** having at least one downspout **13** for collecting and conducting rainwater to a suitable discharge point in a conventional manner. The gutter **12** is usually mounted in secured relation to the outer edge portion of eaves formed by the juncture of the roof **11** with the vertical wall **14** as is commonly known. An electric resistance type heating element in tape form **15** is supported upon the upper side of the gutter **12** as is evident from FIGURES 1 and 5 and may also extend downwardly within the downspout **13**. It will thus be appreciated that when the heating element **15** is electrically energized the heat evolved is sufficient to prevent freezing of liquid water collected by the gutter **12** prior to the point of discharge directed by the downspout **13**. The electrolytic switch device for automatically energizing the heating element **15** during the period when the gutter **12** is collecting water from the roof **11** will now be explained.

The electrolytic switch assembly, generally indicated at **16**, comprises a frame **17** which may for convenience be of a substantially trapezoidal or U-shaped cross-section as is evident from FIGURES 1 and 5. The frame **17** may be but not necessarily constructed of ordinary galvanized iron of the type commonly employed in the construction of gutters. On one end portion of the frame **17** is mounted in secured relation an electric energy receiving male plug indicated at **18**. The male plug **18** is of conventional construction having three extending prongs L, N and G (FIGURE 3) adapted to be inserted in a corresponding female receptacle **18'** (FIGURE 1) leading to a source of electric energy through corresponding lead wires L_1, N_1 and G_1. The prong G is in direct connection with the ground through lead wire G_1 for preventing the frame **17** and gutter **12** from becoming dangerously charged with electric current. This is accomplished simply by firmly grounding the contact in the power source female receptacle **18'** corresponding to the prong G and its lead wire G_1. The prong N of the male plug **18** is connected to the neutral side of the source of electric energy and the prong L is connected to the other side of the source of power which is commonly referred to as the "hot" line. As is evident from FIGURE 7 the prongs G and N are electrically connected together which connection may be conveniently accomplished by a jumper wire on the internally disposed terminals for prongs G and N in the male plug **18**. The prongs G and N are connected electrically to the frame **17** through the metal housing **19** and metal mounting means such as rivets two of which are shown at **20** in FIGURES 2 and 3. Thus the frame **17** is electrically grounded through the prongs G and N as described.

Disposed on the other end portion of the frame **17** is a conventional female electric receptacle indicated at **21** in FIGURE 1 adapted to receive in electric connection a plug **21'**. The heating element **15** is electrically connected to the internally disposed terminals of the receptacle **21** which are designated in FIGURE 3 as A, B and C. Leads or connections A and B lead to the heater element **15** while C is connected in ground relation with the frame **17** and, if of metal construction, to the gutter **12** by a jumper fixed to the gutter pipe or by contact with the frame **17**.

In FIGURE 7 it will be seen that the "hot" lead L from the source of power is connected directly to one side of the heater element **15**. This is accomplished structurally within the assembly **16** by means of insulated wire **22** (FIGURE 4) connecting electrically the prong L of the plug **18** with the terminal A of the receptacle **21**. Thus when connected as illustrated in FIGURES 1 and 7 the "hot" lead L from the power source is connected directly to one side of the heater element **15**.

Now in order to complete the circuit from the power source to the heating element **15** the embodiment of the assembly **16** as shown in the drawing includes two electrolytic switch units indicated generally at **23** and **24** in FIGURES 2 and 3. As will be seen from the drawing the electrolytic switch unit **23** is relatively large in physical size as compared with unit **24**. Therefore the electrolytic switch unit **23** will be described in detail and it may be assumed that switch unit **24** is of identical construction except for size.

Referring now to FIGURE 6 it will be seen that the electrolytic switch unit **23** comprises a pair of porous, permeable or moisture-absorbent sheets or strips of material **26** and **27** which when dry functions as an electrical insulating material or dielectric element. While there are numerous materials available for such purpose it was found that commercially available soft asbestos paper functioned quite adequately in the embodiments of the invention disclosed herein. Sandwiched between the strips **26** and **27** is a metal plate or electrode **28**, such as copper, which plate **28** is electrically connected to the other side of the heating element **15** at B as evident from FIGURE 7. This is structurally accomplished by soldering or welding insulated conductor or wire **29** to one edge portion of the electrode plate **28** as best seen in FIGURE 6. The insulated conductor **29** is connected to prong B of the receptacle **21** as shown in FIGURES 3, 4 and 7. The strips **26** and **27** with the metal plate electrode **28** sandwiched therebetween as described are secured to the frame **17** compressively by a metal bracket plate **30** employing conventional securing means such as rivets, two of which are shown at **31** and **32** in FIGURE 4. In this respect it will be seen from FIGURE 6 that in the pile-up or stack-up of members **17**, **26**, **27** and **30** the receiving holes therethrough for the rivet **31** are properly sized for reception of the rivet **31** but the corresponding hole **33** in the electrode plate **28** is substantially larger for in assembling the switch unit **23** the securing rivets, such as metal rivet **31**, must not be in electrical contact with the electrode plate **28**. Should contact of metal rivet **31** be made with the electrode plate **28** the switch unit **23** would be inoperative for as will be seen later and in such event the heating element **15** would be energized constantly which is undesirable. In this respect it is pointed out that the securing means, such as rivet **31**, is in contact with the frame **17** which is electrically grounded as previously explained. At this point it will be apparent that the electrolytic switch **23** may, if desired, be comprised of a plurality of first and second electrodes positioned alternately with a dielectric element sandwiched between each pair of electrodes in pile-up or stack-up relation. The first electrodes would in such instance correspond electrically to electrode plate **28** and the second electrodes would correspond electrically to bracket plates **30** and frame **17**.

As will be seen from the drawing the electrolytic switch unit **23** is in elongated form and secured to the underside of the frame **17** in rigid relation thereto. A smaller electrolytic switch unit **24** may be positioned at one end of the assembly **16** to heat the frame **17** when the dielectric elements **26'** and **27'** thereof become wet with water. Since the unit **24** is much smaller than unit **23** its internal resistance when wet is greater and hence will generate heat.

FIGURES 9 through 12 illustrate a modified form of the electrolytic switch assembly designated **16'**. The modified assembly **16'** includes a male plug **18*a*** and receptacle **21*a*** mounted on supporting frame **17'**. Connected integrally to one end of the frame **17'** is a metal arm **34** having a looped portion **34'** at the outer end thereof as shown best in FIGURE 9. The looped portion **34'** may conveniently be made by bending a portion of the metal strip comprising the arm **34** into a loop and securing the end thereof by any conventional means such as rivet **35**. Secured as by welding or the like transversely to the bottom of the looped portion **34'** is bracket element

36 having at least one threaded bore therein as at 37. Threadedly fit into one or both of the bores 37 is an adjusting screw 38. From FIGURE 9 it is thus apparent that by rotating the adjusting screw 38 resting on the upper surface of the floor of the gutter 12, the looped portion 34' of arm 34 can be positioned at any selected distance from the floor of the gutter 12 for a purpose described later herein.

Within the looped portion 34' of the arm 34 is an electrolytic switch unit 23'. The electrolytic switch unit 23' functions in the same manner as that of switch unit 23 but is modified in its construction. The switch unit 23' comprises a pair of elongated dielectric elements or strips 26*a* and 27*a* with a copper electrode plate 28*a* sandwiched therebetween and another electrode plate 28*b* in contact with the opposite side of one of the dielectric elements 26*a* or 27*a*. The dielectric elements 26*a* and 27*a* together with the electrodes 28*a* and 28*b* are wound spirally and then flattened to the elongated configuration shown in FIGURE 9 thus forming a multi-layered switch unit 23' having a cross-section illustrated in FIGURE 12. The plate electrode 28*a* is electrically connected to B of the receptacle 21*a* through insulated conductor 29'.

The looped portion 34' of the arm 34 being in electrical contact with the frame 17' and electrode 28*b* is grounded to the prongs G and N in the same manner as that described for assembly 16. Thus the electrical connections for the assembly 16' are the same as that for assembly 16 shown in FIGURE 7. However, the added advantage of assembly 16' over that of assembly 16 is the adjustability by means of screw 38 for controlling selectively the distance of the electrolytic switch 23' from the floor of the gutter 12. As will be apparent later herein this arrangement permits flow of liquid water in the gutter 12 to a predetermined depth without activating the electrolytic switch 23' thus avoiding the closing of the circuit to the heating element 15 when the gutter 12 is not dammed with ice but draining the water normally.

For operation the electrolytic switch assembly 16 or 16' is positioned within a section of the gutter 12 as indicated in FIGURES 5 and 9. The assembly 16 or 16' preferably should be positioned adjacent to a downspout for rain gutters are slightly sloped toward a downspout to ensure complete drainage of water collected from the roof. The assembly 16 or 16' is electrically connected as described consistent with the diagram of FIGURE 7.

Now when it rains, sleets or snows the moisture contacts the electrolytic switch unit 23, 23' or 24, the porous material dielectric elements 26, 27 or 26*a*, 27*a* (e.g. asbestos paper) absorbs the moisture forming or completing an electrolytic cell which immediately commences to conduct electric current from the metal electrode plate 28 and 28*a* to the frame 17 or 17' through the bracket plate electrode 30 or, in the case of assembly 16', through the looped portion 34' of the arm 34, thus closing the electrical circuit to the heating element 15. The heating element 15 thus energized begins to heat and causes the ice and/or snow to melt at the point of contact with the heating element 15 to create a channel for the liquid water to flow to the downspout. Water passing over the heating element 15 portion beneath the frame 17 permeates the electrolytic switch 23 either by immersion or water creepage (migration) along the walls of frame 17 and the switch 23 being electrically in parallel relation with switch 24 thus further decreasing the electrical resistance of the connection between the heating element 15 and the source of power. Also the switch 24 being activated warms the frame 17 thereby keeping the ice and snow from encasing the frame 17.

When all water collected by the gutter 12 is completely drained the water in the dielectric elements (strips 26 and 27 or 26*a* and 27*a*) begins to drain and evaporate. As removal of water from the dielectric elements progresses the electrical resistance therethrough correspondingly increases and the switch unit (e.g. switch 23) itself begins to heat which increases the rate of water removal therefrom. When all water from the dielectric elements is thus removed the current flow therethrough terminates and the temperature of the switch returns to ambient temperature. Therefore the heating element 15 is no longer energized and no power loss is experienced until the assembly 16 or 16' is again subjected to the presence of water as above described.

It should be understood that the electrolytic switch 24 may be omitted if desired since the operation of switch 23 or 23' does not depend on the operation of switch 24.

It should also be understood that the assembly 16 or 16' may contain any desired number of electrolytic switches. Obviously the assembly 16 or 16' must contain at least one electrolytic switch unit to function according to this invention. It should also be apparent that the assembly 16 or 16' will function equally as well in wooden gutters as in metal gutters for the gutter does not serve as an electric conductor for operating the device.

Sometimes ice will first begin to form in a downspout adjacent to the point of discharge. The opening progressively gets smaller until closure results which acts like a plug in the downspout and the downspout soon fills and freezes. This is particularly the case when at least the lower portion of the downspout is in the shade and thus, in the manner previously explained, the trickling water freezes as it comes into contact with the colder portion thereof. In such case the assembly 16 or 16' would function to energize the heating element 15 after the downspout became plugged with ice and the water becomes dammed up in the gutter. The net result is that the entire heating element 15 in either or both the gutter and downspout is belatedly energized. It thus becomes desirable in some applications to suspend an electrolytic switch unit within the downspout for energizing the heating element 15 disposed in the downspout which, if desired, may function entirely independent of an assembly 16 or 16' in the gutter, or in the alternative may in some instances serve in place of assembly 16 or 16'. Thus in FIGURE 13 the downspout 13 connected with gutter 12 is provided with an electrolytic switch assembly generally indicated at 39 suspended on an insulated three-conductor cable 51. One end of the cable 51 is attached electrically to a male plug 50 removably inserted in receptacle 44 of a connector member generally indicated at 43. The connector member 43 comprises a pair of electric receptacles 42 and 44 mounted side-by-side on a support member 45 in rigid relation. The support member 45 may conveniently be constructed similar to frame 17 or 17'. In addition a male plug 46 similar to plug 18 is rigidly secured to the support member 45.

The electrolytic switch assembly 39 may comprise a metal tube 47 open at the bottom end having a male plug 48 rigidly attached thereto. The plug 48 is constructed electrically in the same way as the plugs 46–18 having ground neutral jumper connection. The male plug 48 is inserted into the female receptacle 49 of a three-wire electrical extension cord 51 of standard construction, having "hot," neutral and ground conductor wires. The male plug 50 of extension cable 51 is inserted into receptacle 44 of connector member 43. Thus conductors 51*a*, 51*b* and 51*c* connect the metal tube 47 and the switch unit 39*a* therein to connector member 43 and terminal B' of receptacle 42 as shown in FIG. 16.

Inserted in the receptacle 42 is the male plug 41 of the heating cable 15'. The conductor 15'' of the heating cable 15' electrically connects contact A' of receptacle 42 to one side of the heating element 15' and the other conductor 15''' electrically connects contact B' of receptacle 42 to the other side of the heating element 15' as indicated in dotted lines in FIGURE 16. The plug 46 is electrically connected to the source of electric energy by receptacle 52, shown in phantom lines in FIGURE 13, in the same manner as that described for the plug 18.

Referring now to FIGURE 16 it will be seen that the

"hot" line L of plug 46 is connected to terminal A' of receptacle 42 through conductor 53 which in turn is connected to one side of the heater element 15' through conductor 15''. The other side of the heater element 15' through conductor 15''' electrically connects with terminal B' of receptacle 42. The terminal B' of receptacle 42 is electrically connected through conductor 54 to terminal D of receptacle 44. Terminal D of receptacle 44 is electrically connected to the electrode plate 28*a* of electrolytic switch 39*a* through conductors 51*b* and 56. The outer metal element 55, corresponding to the loop portion 34' of arm 34 in assembly 16', of the electrolytic switch unit 39*a*, is grounded and also connected to terminal E of receptacle 44 through conductor 51*a* of the cable 51. The terminal E of receptacle 44 is grounded by an internally disposed jumper to terminal F which is grounded at H in the same manner as prongs N and G of plug 46 are grounded. Thus it will be seen that if moisture enters the dielectric elements of electrolytic switch 39*a* it closes the circuit thereby energizing the heating element 15' in the same manner as that described for switch 23 of assembly 16 or switch 23' of assembly 16'. The electrolytic switch unit 39*a* in the metal tube 47 as shown in FIGURE 13 is constructed in the same manner as switch 23' of assembly 16' previously described, the outer metal element 55 grounded at E, H and G as shown which also of course grounds the metal tube 47.

Having thus described preferred embodiments of the invention it can thus be seen that the objects of the invention have been fully achieved and it must be understood that modifications may be made which do not depart from the spirit of the invention as described in the specification and drawing herein and the appended claims.

What is claimed is:

1. In combination with a drain gutter and drain downspout therefor having an electric heating element connectable to a source of electric energy for inhibiting the formation of ice therein an electrical circuit, an electrolytic switch device positioned in said drain, said device being sensitive to the presence of water for closing the electric circuit between said heating element and said source, said device comprising a support means, a first electrode secured to said support means and electrically connected to one side of said source, a second electrode mounted in secured relation to said support means and electrically connected to one electrical side of said heating element, the other electrical side of said heating element being electrically connected to the other side of said source, a water permeable dielectric element disposed between said electrodes in abutting relation, said dielectric element being at least partly exposed to the atmosphere whereby atmospheric moisture permeating said dielectric element completes the formation of an electrolytic cell for conducting electric current between said electrodes to close said circuit thereby energizing said heating element to inhibit the freezing of water in said drain, and a housing for said dielectric element having top and side walls only, allowing water access to said switch by water rising in said drain gutter.

2. For a drain gutter having an electric heating element connectable to a source of electric energy in energizing relation for inhibiting ice formation in said gutter, an electrical circuit, an electrolytic switch device sensitive to the presence of water for closing said circuit comprising a first electrode electrically connected to one side of said circuit and a second electrode electrically connected to the other side of said circuit, a water permeable dielectric element disposed between said electrodes in abutting relation and at least partly exposed to the atmosphere whereby water from said atmosphere permeating said dielectric element completes the formation of an electrolytic cell for conducting electric current between said electrodes to close said circuit, and a housing for said dielectric element having top and side walls only, allowing water access to said switch by water rising in said drain gutter.

3. In combination with a drain gutter having an electric heating element connectable with a source of electric energy in electric circuit relation for inhibiting the formation of ice in said gutter, an electrical circuit, an electrolytic switch device sensitive to the presence of water, said electrolytic switch device being positioned in exposed relation to the atmosphere in said drain gutter whereby water contacting said device completes the formation of an electrolytic cell thereby closing said electric circuit for energizing said heating element, when water rises in said drain gutter, and a housing for said electrolytic switch having top and side walls only.

4. In combination with a drain gutter and drain downspout therefor having a heating element connectable to a source of electric energy for inhibiting the formation of ice therein, an electrical circuit, an electrolytic switch device sensitive to the presence of water for closing an electric circuit between said heating element and said source comprising a frame having top and side walls only, a first electrode secured to said frame and electrically connected to one side of said source, a second electrode mounted in secured relation to said frame and electrically connected to one side of said heating element, the other electrical side of said heating element being electrically connected to the other side of said source, and a water permeable dielectric element disposed between said electrodes in abutting relation, said dielectric element being at least partly exposed to the atmosphere, and within said frame, whereby atmospheric moisture rising in said drain permeating said dielectric element completes the formation of an electrolytic cell for conducting electric current between said electrodes to close said circuit thereby energizing said heating element to inhibit the freezing of water in said drain.

5. The combination according to claim 4 wherein the position of said electrodes with said dielectric element is adjustable in height with respect to said gutter.

6. The combination according to claim 4 wherein said first and second electrodes with said dielectric elements are wound spirally to increase the area of surface contact of said electrodes with said dielectric element to decrease electric resistivity of said switch when moisturized.

7. In combination with a downspout associated with a drain gutter having a heating element connectable to a source of electric energy in energizing relation for inhibiting ice formation in said downspout, an electrical circuit, an electrolytic switch device disposed in a closed tubular member open only at the bottom suspended in said downspout, said electrolytic switch device being sensitive to the presence of water for closing said circuit, said switch device comprising a first electrode electrically connected to one side of said circuit and a second electrode connected to the other side of said circuit, and a water permeable dielectric element disposed between said electrodes in abutting relation and at least partly exposed to the atmosphere whereby water from said atmosphere rising in said downspout permeating said electric element completes the formation of an electrolytic cell for conducting electric current between said electrodes to close said circuit.

8. The combination of an electrolytic switch device according to claim 7, including a connector member having a male plug connected electrically to said source of electric energy, a first receptacle on said connector member electrically connected to said heating element, a second receptacle on said connector member electrically connected to said electrolytic switch device, said plug and said receptacles being interconnected electrically whereby said heater element is electrically connected to said source when water permeates said dielectric element of

said electrolytic switch device for energizing said heating element.

References Cited by the Examiner

UNITED STATES PATENTS

1,943,062	1/1934	Driscoll	244—134
2,051,725	8/1936	Lawson	200—61.05
2,057,506	10/1936	Scholz	246—428
2,507,039	5/1950	Miller	219—213
2,617,972	11/1952	Nutter	200—61.05 X
2,687,721	8/1954	Ellison	200—61.05
2,699,484	1/1955	Michaels	219—213
2,717,957	9/1955	Ohlheiser	340—234 X
2,726,294	12/1955	Kroening	200—61.05

RICHARD M. WOOD, *Primary Examiner.*