

March 23, 1954

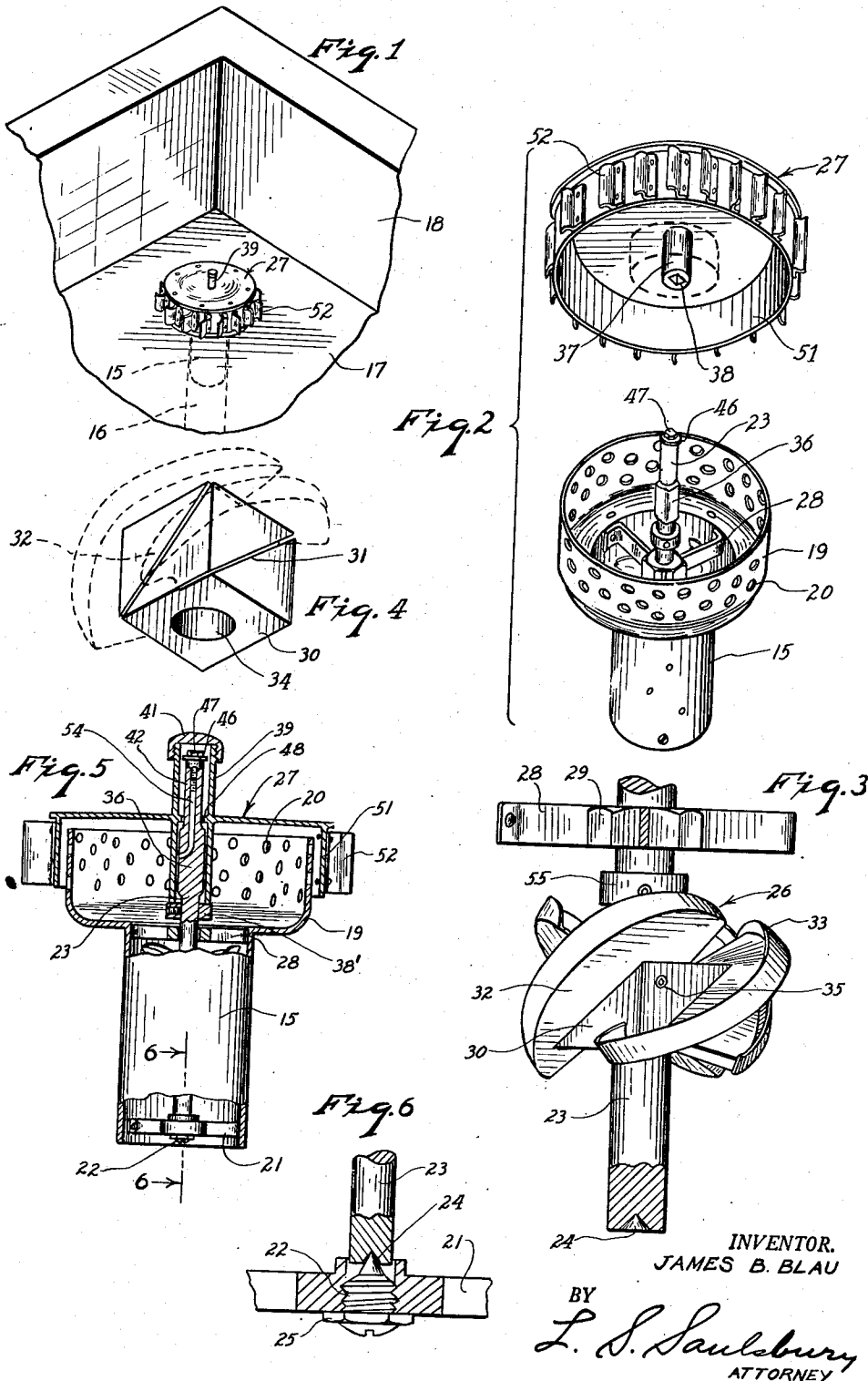
J. B. BLAU

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ANTICLOGGING DEVICE FOR ROOF DRAINS

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2 Sheets-Sheet 1



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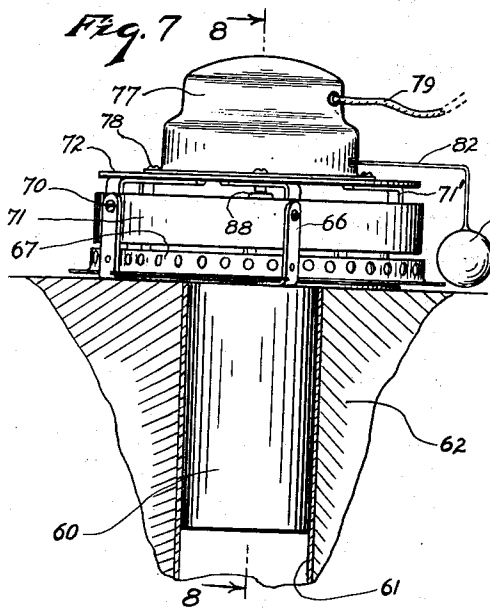
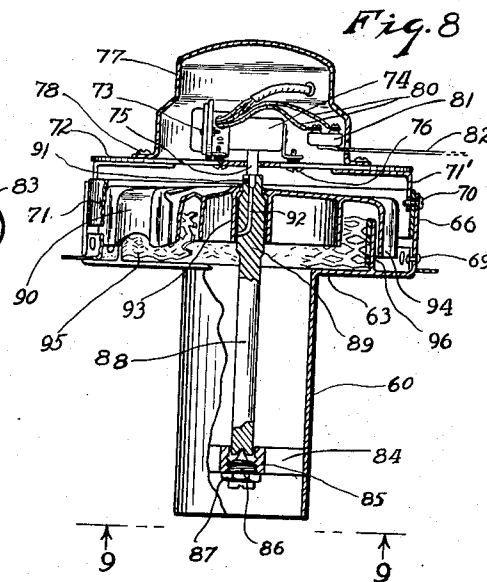
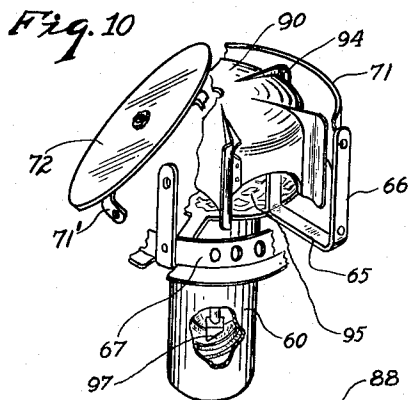
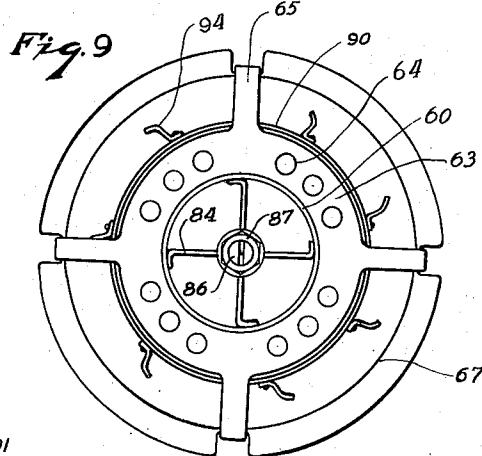
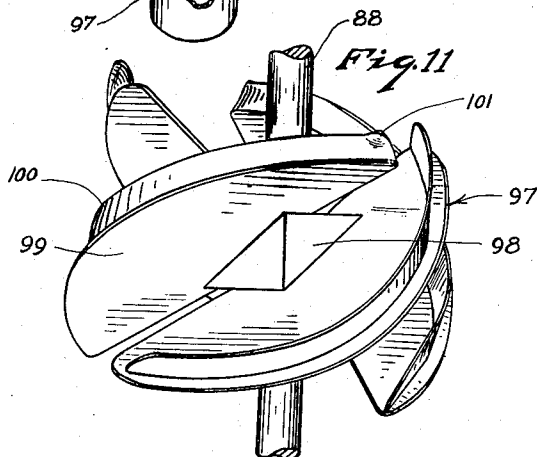
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2 Sheets-Sheet 2



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ANTICLOGGING DEVICE FOR ROOF DRAINS

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1 Claim. (Cl. 210-88)

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This invention relates to an anti-clogging device for roof drains.

It is an object of the present invention to provide an anti-clogging device wherein its rotating head or vane structure can be effected with great speed by the water entering the device and with sufficient speed to maintain the device clean and clear of floating debris such as leaves and sticks and thereby keep the roof drain pipe from becoming clogged therewith.

It is another object of the present invention to provide a turbine wheel for anti-clogging devices adapted to be turned about a vertical axis that will receive the water from a counterclockwise direction and from above in order that the rotating head or anti-clogging vane structure may be rotated in a counterclockwise direction which is the normal direction of rotation of water entering a down spout or drain and wherein the rotor or turbine wheel is supported with the vane structure on a common shaft and on a pin or spindle bearing disposed in the bottom of the unit.

It is another object of the present invention to provide an anti-clogging device for roof drains which can be converted for use either to be driven by an electric motor, that is when power is available, or can have the turbine wheel applied and driven from the water power of the water entering the roof drain.

Other objects of the present invention are to provide a down spout turbine or anti-clogging device for roof drains which is of simple construction, inexpensive to manufacture, has a minimum number of parts, easy to install in the roof drain or down spout, compact, a unitary structure, durable and sturdy, requires little maintenance and efficient in operation.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which

Fig. 1 is a perspective view of one anti-clogging device of the present invention installed in a roof drain.

Fig. 2 is a collective view of the device with the rotating head separated from the driving shaft.

Fig. 3 is an enlarged fragmentary view of the driving shaft and of the turbine wheel.

Fig. 4 is a perspective view of the turbine hub.

Fig. 5 is an elevational view of the device with portions broken away and shown in section.

Fig. 6 is an enlarged view of the adjustable pin bearing and as viewed on line 6-6 of Fig. 5.

Fig. 7 is an elevational view of a convertible

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electric motor and turbine rotor device constructed according to another form of the invention.

Fig. 8 is a fragmentary and vertical sectional view taken generally on line 8-8 of Fig. 7.

Fig. 9 is a bottom plan view taken on line 9-9 of Fig. 8.

Fig. 10 is a fragmentary and collective perspective view of the form of the invention shown in Fig. 7.

Fig. 11 is an enlarged elevational view of the turbine rotor used with the device shown in Fig. 7.

Referring now particularly to Figs. 1 to 6, 15 represents a sleeve casing which is adapted to fit the upper end of a down spout or roof drain 16 leading from the top of a roof 17 having a raised top wall 18. This casing is enlarged on its upper end to provide a strainer portion 19 having perforations 20. In the lower end of the casing 15 is a pin bearing bracket 21 having an adjustable pin 22 adapted to support vertically extending turbine shaft 23. This shaft has a small hole 24 in the end thereof for receiving the pointed end of the bearing 22. A lock nut 25 is provided upon the adjustable bearing 22 to secure the bearing in its adjusted position.

The shaft 23 carries a turbine wheel structure, indicated at 26, and the vane structure 27 which surrounds the perforated portion 19 to remove the debris from tending to clog the perforations 20 as the water passes toward the drain pipe 16. The shaft 23 is supported above the turbine wheel structure 26 and within the upper end of the sleeve casing 15 by a bearing bracket 28 fixed therewithin. This bearing bracket has a central hub structure 29 and arms extending outwardly therefrom for attachment to the inner wall of the sleeve casing 15 whereby to provide spaces through which the water may flow without interference.

The turbine wheel structure 26 includes a square hub 30 having saw slits 31 cut diagonally in each of the four sides of the hub and blades 32 disposed in each of the slits of the hub. It has been determined that water, on entering a drain opening, tends to rotate in a counterclockwise direction and accordingly, the blades 32 have been arranged to receive the water from that direction so that the turbine wheel and the shaft will be rotated in a counterclockwise direction as viewed from the top of the device and in turn the vane structure 27 will be similarly rotated to push away the debris as the water enters the drain or perforated portion 19 of the sleeve casing. Each blade has a peripheral flange 33 in order to retain the water upon the impinged surface

thereof in order that the weight of the water, upon passing downwardly over the surface, will give added movement to the turbine wheel and the parts connected thereto. This flange 33 extends along the lower edge of the blade to hold some of the water upon the surface thereof. The hub 30 is of the shape of a cube and the slits 31 extend diagonally from one corner to the other corner of a face. The slits can penetrate the structure to a substantial distance to bring the blades in close proximity to one another. The hub 30 has a hole 34 that tightly receives shaft 23. A set screw 35 is adjustable in the hub to finally secure the hub to the shaft 23.

The shaft 23 has a squared portion 36 for receiving a depending central projection or hub 37 having a squared opening 38. A driving connection of the shaft with the vane structure 27 is accordingly effected. When the vane structure is at rest, the lower end of the depending portion 37 may come to rest upon a set collar 38'. The water, upon entering the perforated portion 19 will cause air to be collected in the top of the vane structure 27 and the vane structure to be lifted. The vane structure, accordingly, will float while water is being passed downwardly through the drain. In order to prevent the escape of the air, a tubular portion 39 is provided on the top of the vane structure and is closed at its upper end by a cap 41. The shaft 23 has a portion 42 that extends into the tubular portion 39 and a washer 45 is fixed to the upper end thereof by a bolt 47. This washer will be engaged by a flange 48 as the float is elevated whereby to limit the upward movement of the vane structure and the disengagement thereof.

The vane structure has a cylinder wall portion 51 to which a plurality of vanes 52 are connected. These vanes 52 are circumferentially spaced from one another and are curved and bent to give a sweeping action to the floating debris, such as leaves, sticks and the like that may be harboring about the drain opening and floating in the water. These vanes will automatically brush aside this floating debris so that access of the debris is not had to the perforations 20 in the portion 19.

In the upper end of the shaft 23 is an oil passage 54 which leads to the squared portion 36 of the shaft so that oil or grease deposited in the upper end in any suitable manner can pass downwardly through the shaft and outwardly to lubricate the squared surfaces on the squared portion 36 and the surfaces in the squared opening 38 whereby to prevent any tendency for the main structure 27 to resist the upward floating or downward movement. A set collar 55 is secured to the shaft 23 above the turbine wheel structure 26.

Referring now particularly to Figs. 7 to 11, there is shown a modified form of the invention wherein the rotating vane structure can be operated either by an electric motor turned on and off by a float switch or by a turbine wheel structure. According to this form of the invention there is a sleeve casing 60 adapted to be inserted in a drain pipe 61 of a building structure 62. Upon the upper end of the sleeve casing 60 is a flange 63 adapted to rest upon the roof surface about the drain pipe 61. This flange has a plurality of lightening holes 64 and radially extending projections 65 bent up at their ends, as indicated at 66.

Carried on these projections 65 is a perforated bottom ring 67 serving as a strainer and elevated thereabout is a solid ring 71. The bottom ring 67 is fixed to the upstanding portions 66 of the

projection by rivets 69 and the upper ring is made secure upon the portions 66 by screws 70 that enter inwardly extending angle brackets 71'. These brackets 71' have a motor supporting plate 72 thereon. An electric motor 73 having reduction gearing 74 and an output shaft 75 is secured to the top of the plate 72 by screws 76.

Over the top of the electric motor and its reduction gearing is a hood 77 that is also secured to the supporting plate 72 and by means of screws 78. A cable 79 extends through the cover 77 and the wires thereof connect with the electric motor 73 to supply the same with electric current. Other wires 80 connect with a float switch 81 secured to the cover within the same and having a float arm 82 extending outwardly therefrom and having a float 83. This float 83 lies near the top of the roof surface so that any body of water building up can engage the float to start the electric motor for the purpose to be presently described.

In the lower end of the sleeve casing 60, there is secured a bearing bracket 84 having an internally threaded hub portion 85 for receiving an adjustable bearing pin 86. This pin is held in its adjusted position by a lock nut 87. The pin 86 supports a vertically extending shaft 88 which has a square portion 89 on its upper end for drivingly receiving a rotary vane structure 90. In the upper end of the shaft, the output shaft 75 is made secure by a set screw 91. An oil or grease passage extends into the squared portion 89 of the shaft as indicated at 92 and through which oil or grease can be projected by any suitable means in order that the faces of the squared portion and of a central structure 93 can be lubricated to permit the free floating of the rotating vane structure 90 upon the shaft. The vane structure 90 is so shaped that air may be collected in the top of the same to effect a lifting of the vane structure as may be required to allow more water to pass beneath the same. The vane structure is driven at a predetermined speed and vanes 94 thereon will tend to keep the debris washed away from the drain and from an expanded metal strainer 95 extending upwardly from the flange 63 and held by projections 96.

This same unit can be run by a turbine wheel structure 97 secured to the shaft 88 and upon the removal of the combined electric motor and gear reduction unit. The turbine wheel structure 97 comprises a hub 98 of cubical shape in which diagonally extending slots have been cut and semi-circular vanes 99 disposed in the slots whereby to provide a cluster of such vanes against which water descending through the drain may impinge. As mentioned above, it has been found that the water tends to rotate in a counterclockwise direction and accordingly these blades 99 are arranged to receive the force of the water coming from that direction and so as to rotate the shaft 88 with the vane structure 99 thereof in a counterclockwise direction. Each blade 99 has a flange 100 extending upwardly from the water receiving face thereof so as to prevent the outward spread of the water upon striking the face and to require the water to move downwardly over the face of the blade in order that its weight will give motion to the shaft. The upper end of the flange is flared slightly, as indicated at 101.

It will be apparent that with this form of the invention the device can be operated either by the electric motor or by the turbine wheel structure 97. It should now be apparent that there has been provided an anti-clogging device for roof

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drains which is of simple construction and easy to install in the drain pipe and which will remove and keep the drain open at all times, free of any debris that may have accumulated about the opening.

I claim:

In an anti-clogging device for roof drains, a sleeve casing adapted to fit the upper end of the drain pipe on the roof, a strainer portion connected to the upper end of the sleeve casing, a 10 vertically extending shaft in the sleeve casing and strainer portion, pin bearing means in the lower end of the sleeve casing for supporting said shaft for rotation, an upper shaft bearing, a hub of cubical formation secured to said shaft within the 15 sleeve casing, said hub having four faces and diagonally extending slots cut in said faces, turbine blades secured in said slots to the hub, said blades having peripheral upwardly extending flanges on their water receiving surfaces, said 20 shaft having a squared portion, a rotating vane structure comprising a cylindrical wall and a top wall sealed thereto to form an air tight floatable structure and having a hub portion with a squared opening slidably connected to the squared portion 25 of the shaft, said vane structure extending over the strainer portion and about the side thereof and having vanes, said top wall having an opening therein and a tubular formation extending upwardly from the top portion and about the 30 opening, said shaft having a portion extending upwardly beyond the squared portion and through the opening vanes on the outer side of said cylindrical wall in the top portion of the vane struc-

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ture, said shaft extension having a threaded opening therein and an oil passage extending therefrom to the squared portion of the shaft to lubricate the surface thereof to permit free floating 5 movement of the vane structure, a washer connected to the shaft extension and a screw bolt fixing said washer to the shaft extension and closing the threaded opening of the oil passage, a cap removably secured to the upper end of the tubular formation, said top portion having a radially inwardly extending flange within the tube formation engageable with the washer on the upper end 10 of the shaft extension to limit the upward movement and displacement of the vane structure from the shaft.

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