Oct. 23, 1951 B. E. SIEVERT 2,572,208

WATER RUNOFF CONTROL CONSTRUCTION

Filed Jan. 8, 1947 2 SHEETS—SHEET 1

Fig. 1.

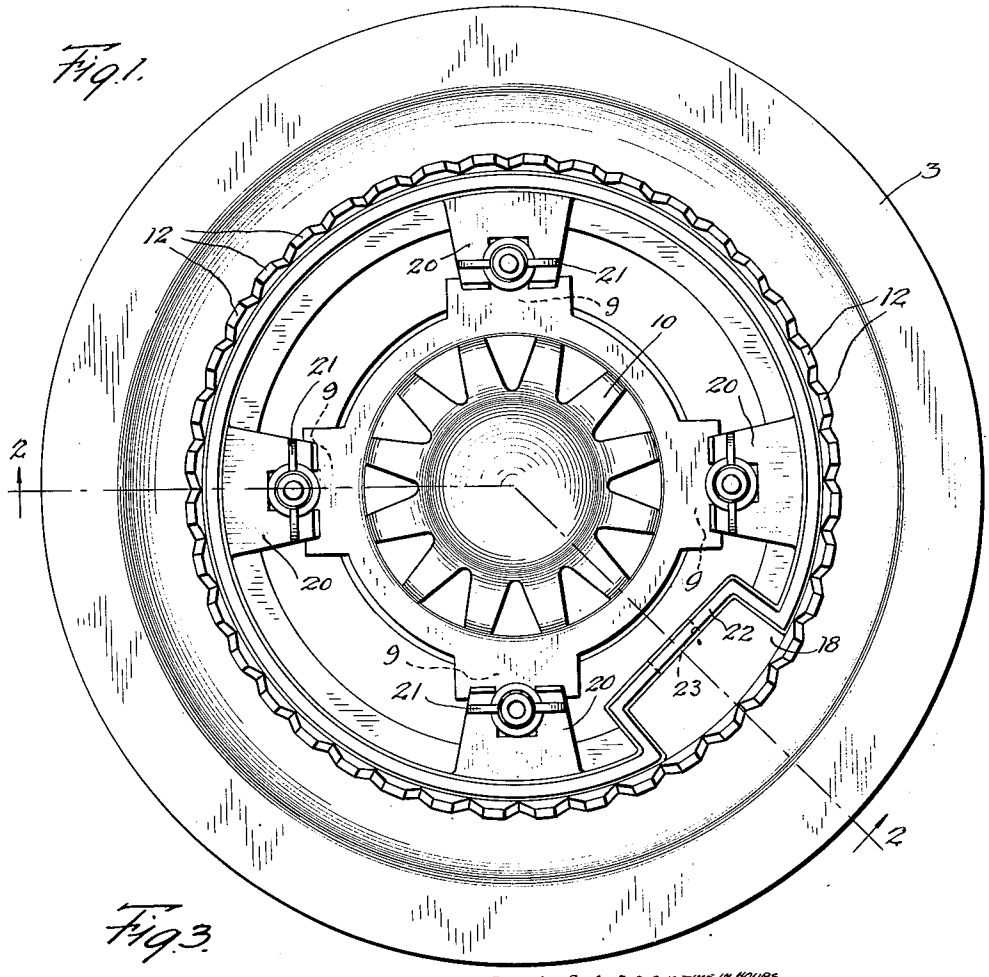
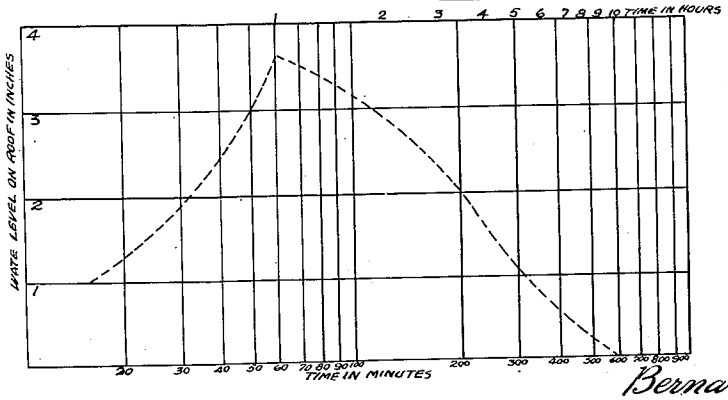


Fig. 3.



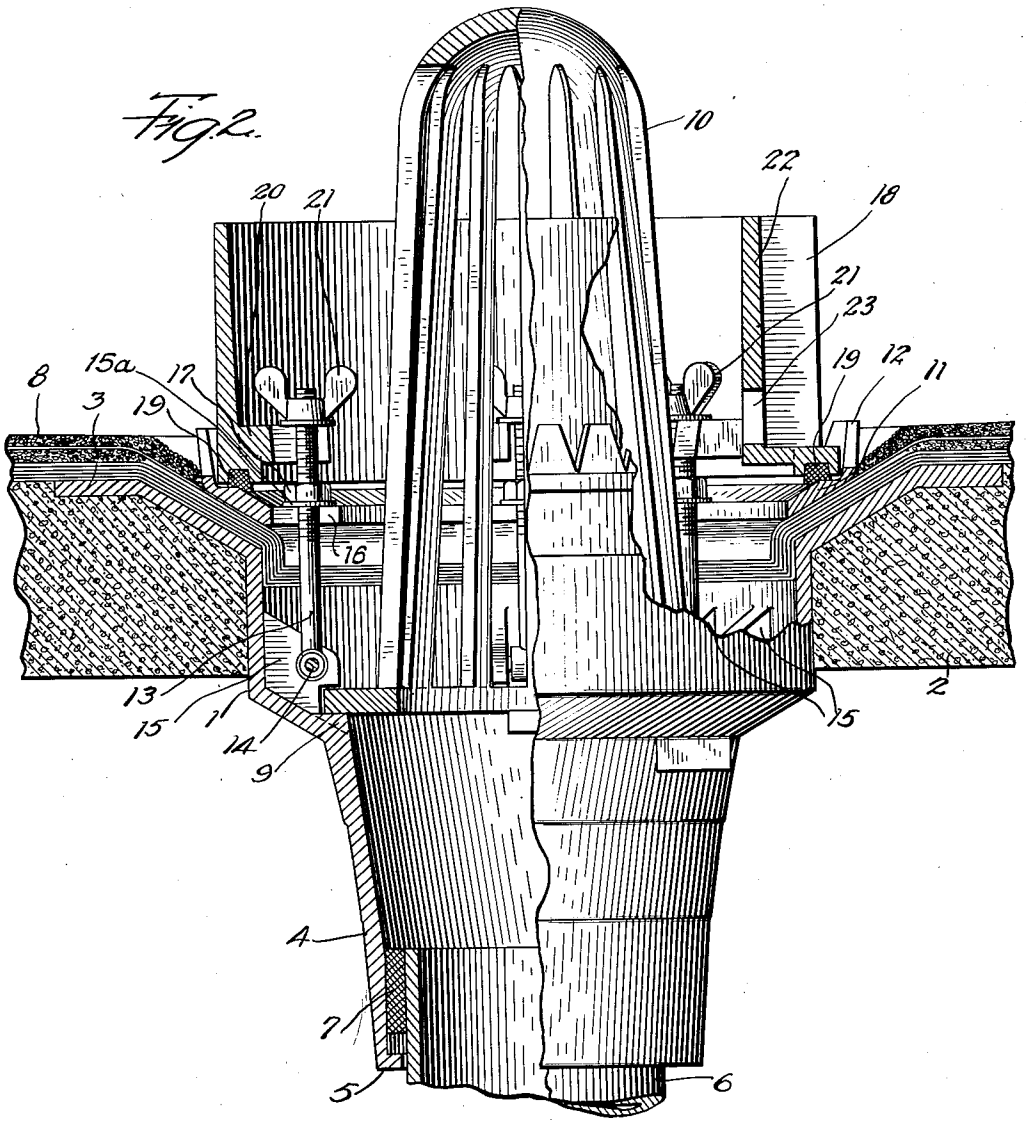
INVENTOR.
Bernard E. Sievert.
BY
Thiess, Olson & Mackenbrock.
Attys.

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Fig. 2.



INVENTOR.
Bernard E. Sievert.
BY
Thies, Olson & Mecklenburger.
Attys.

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WATER RUNOFF CONTROL CONSTRUCTION

Bernard E. Sievert, Chicago, Ill., assignor to Woodruff & Edwards, Inc., Elgin, Ill., a corporation of Illinois

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3 Claims. (Cl. 182—31)

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The present invention relates to a drain construction and has special reference to a drain construction for controlling the run-off of rain-water or other liquid from a relatively large surface such as a plant or factory roof.

More particularly the present invention relates to a drain construction having means for limiting the rate at which an accumulation of water may flow into the drain until such time as the water may exceed a predetermined depth when the water is permitted to escape down the drain at a rate equal to the maximum capacity of the drain.

In congested areas, such as industrial districts, the run-off of rain-water presents a serious problem. Large areas are covered by buildings and other structures. When it rains, the water, instead of falling on the earth and being absorbed to a considerable extent thereby, falls on buildings or other constructions from whence practically all of it flows to the storm sewers provided for receiving it. Consequently, when there is a heavy rainfall, the sewers frequently become overloaded and back up, causing considerable damage. In many instances municipalities have refused building permits because of insufficient sewer capacity.

The present invention is designed to prevent the overloading of the sewers during a heavy rainfall and accomplishes this result by restricting the flow from the various expansive areas upon which the water may collect, to a percentage of the known heaviest rainfall in that area so that the water is fed slowly into the drain or drains. However, if the depth increases beyond a predetermined limit, such for example as would result in a dangerous load on the roof or other area, the water is automatically permitted to run off as rapidly as the drains can handle it. With the proper arrangement of the control means, such an occurrence would be extremely rare.

An object of the present invention is to provide a drain construction for controlling the rate of flow into the drain of accumulated water from a roof or other expansive area.

Another object is to provide a control construction of the type above referred to which will permit the accumulated water to enter the drain to the full capacity of the drain whenever a predetermined depth of accumulated water is exceeded.

Further objects and advantages will be apparent from the specification and claims when considered with the accompanying drawings, in which latter

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Fig. 1 is a top plan view of a drain construction embodying the present invention;

Fig. 2 is a cross-sectional view partially in elevation taken along the line 2—2 of Fig. 1; and

Fig. 3 is a graph based on a uniform rainfall of four inches per hour, showing the rate of accumulation of water and a desired rate of discharge thereof through said drain construction.

Referring more particularly to the drawings, there is shown a drain construction embodying the present invention comprising a substantially bowl-shaped main body portion 1 adapted to be placed in an aperture provided therefor in any desired type of roof construction, that shown in Fig. 1 being concrete. The main body portion which is provided with a substantially horizontally extending flange 3 is preferably positioned in the roof aperture during construction of the roof. A downwardly directed tube 4 having an inwardly extending flange 5 is provided at the lower end of the main body portion 1. The tube 4 is designed to fit over a downspout or other vertical drain pipe 6, a suitable ring or packing 7 being provided between the two to prevent the escape of any liquid therebetween.

The drain is so positioned in the roof that the upper face of the horizontal flange 3 is substantially flush with the top of the cement or other comparable portion of the roof. The roof and the flange may thereafter be covered with the usual tar or asphalt and gravel 8.

A lip 9 having a substantially horizontal upper face is provided on the inside of the main body portion 1 for supporting a dome strainer 10 provided with vertically extending slots or openings therein. A flashing ring 11 having a serrated gravel stop or guard 12 is secured by suitable means to the main body portion 1. While various means may be employed, that illustrated comprises bolts 13 carried by shafts 14 pivotally mounted between spaced ears 15. The flashing ring 11 is provided with inwardly extending lugs 15a having slots 16 therein for receiving the bolts 13. Nuts 17 securely hold the flashing ring 11 in proper position when tightened against the upper face of the lugs 15.

With the construction heretofore described, any accumulated water such as from a rainfall or melting snow could run off immediately to the full capacity of the drain and vertical pipe 6. Consequently, in certain areas such as industrial districts where roofs and other surfaces cover large portions of the area a heavy rain overloads the sewers and causes the water to back up. In order to prevent this and con-

trol the flow of accumulated water to the downwardly directed passageway in the drain, a barrier or collar 18 is positioned on the flashing ring 11 about the downwardly extending drain passageway. A gasket 19 is recessed into the lower face of the barrier to prevent water escaping thereunder. The barrier is also secured in place by the bolts 13 which extend up into the barrier and fit into the slotted lugs 20 thereon. Wing nuts 21 engaging the top of the lugs 20 hold the barrier tightly against the flashing ring 11.

The barrier 18 which is preferably made of metal, and as shown in Fig. 1 may be thicker at the base than at the top, is provided with an inwardly off-set portion 22. An opening 23 provided in the bottom of the off-set portion 22 controls the flow of liquid through the barrier to the downwardly extending passageway of the drain. While the opening 23 is preferably round, it may be any other desired shape such as triangular, oval or elongated.

The area of the hole in the barrier is preferably determined with reference to substantially the maximum rainfall per hour in the locality in which the drain is to be used. For example, if the rainfall, which is assumed to be uniform, amounts to 4 inches per hour for one hour, it is desirable that the rainfall flow off the roof at an average rate of ten per cent (10%) of the rainfall rate as illustrated in the chart (Fig. 3). Thus at the end of one hour of maximum rainfall the height of the accumulated water on the other surface would be about 3.6 inches, some of the water having escaped through the opening during the hour. Consequently the hole 23 has an area to permit the accumulated water to pass into the drain and flow off by the end of nine more hours. This will prevent overloading of the storm sewers and at the same time will not result in too great a load for a roof. However, in order to prevent any overloads on the roof, the barrier 18 is of a height to permit the water to flow over the top thereof and into the downwardly extending passageway whenever the maximum desirable or safe depth is exceeded. Consequently, the discharge of water down the drain is limited by the area of the opening 23 until the depth of the accumulated water is above the top of the imperforate portion of the barrier when the excess of water above the barrier is permitted to escape to the full capacity of the drain and downspout.

It has been found that in most sections of the country the area of the opening 23 should be based upon the assumption of a maximum rainfall of 4 inches per hour for one hour. On this assumption the area of the opening may be determined by the formula

$$A=\frac{d^2}{0.00061+}$$

where A is the roof area in square feet and d is the diameter of a round opening in inches. Having the diameter of a round opening, the area thereof may be easily ascertained by the formula

$$\frac{\pi d^2}{4}$$

If the maximum rainfall is substantially more or less than the 4 inches per hour assumed, the orifice in the barrier may be made larger or smaller.

Instead of employing a single opening to permit the flow of water through the barrier, a plurality of openings may be employed in which case the total area of the openings is preferably determined by the formula above given, the same as when a single hole is relied upon.

While I have shown and described a particular embodiment of the present invention, it is to be understood that various changes may be made therein without departing from the scope of the present invention and it is to be understood that all such changes are within the purview thereof.

I claim:

1. In a drain construction having a downwardly directed passageway, means for limiting the rate of flow of fluid from the area thereabout to said passageway comprising an upstanding barrier provided with at least one opening in a side thereof positioned substantially about and extending a substantial distance above said passageway and substantially preventing the passage of fluid within a predetermined depth from said area to said passageway except through said barrier opening, said opening being of a predetermined size to limit the rate of flow of fluid therethrough.

2. In a drain construction having a downwardly directed passageway, means for limiting the rate of flow of fluid from the area thereabout to said passageway, comprising an upstanding barrier provided with at least one opening in the lower portion of a side thereof positioned substantially about and extending a substantial distance above said passageway and substantially preventing the passage of fluid within a predetermined depth from said area to said passageway except through said barrier opening, said opening being of a predetermined size to limit the rate of flow of fluid therethrough.

3. In a drain construction having a downwardly directed passageway, means for limiting the rate of flow of fluid from the area thereabout to said passageway comprising an upstanding barrier positioned about and extending a substantial distance above said passageway having an inwardly offset portion in one side with at least one opening in a side wall of said offset portion, said barrier acting to substantially prevent the passage of fluid within a predetermined depth from said area to said passageway except through said barrier opening, said opening being of a predetermined size to limit the rate of flow of fluid therethrough.

BERNARD E. SIEVERT.

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