Dec. 22, 1959 F. C. JACK 2,918,077

AUTOMATIC STORM DRAIN OUTLET

Filed Feb. 13, 1957 2 Sheets-Sheet 1

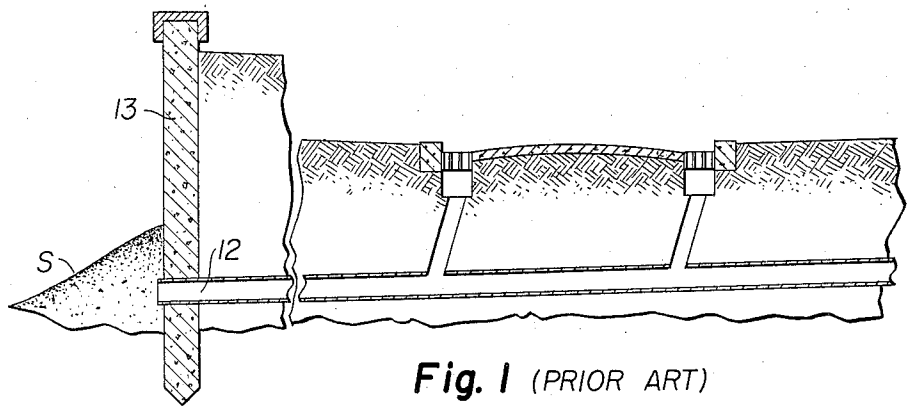


Fig. 1 (PRIOR ART)

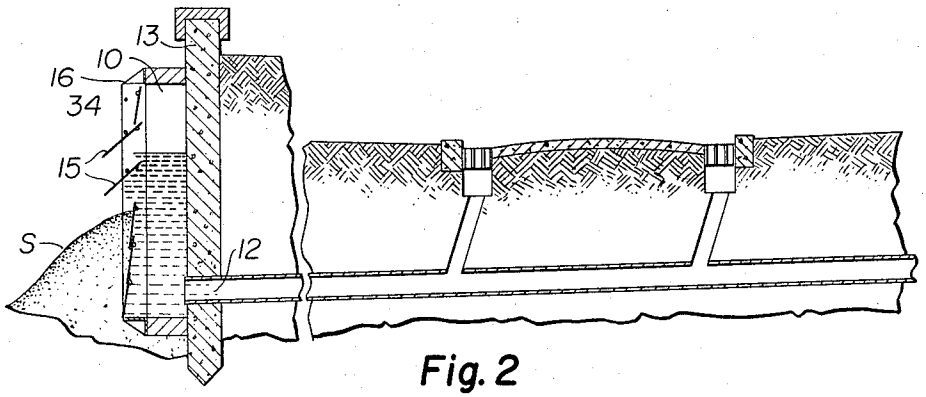


Fig. 2

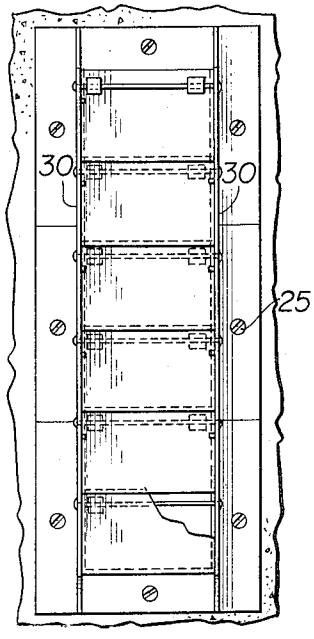


Fig. 3

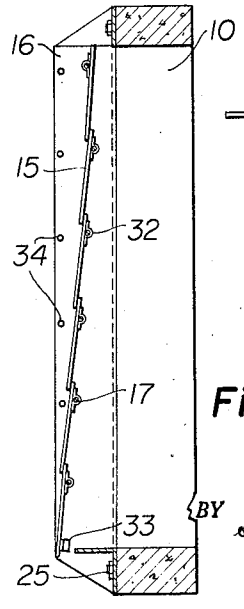


Fig. 4

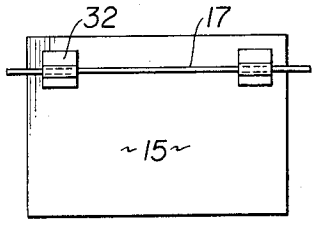


Fig. 5

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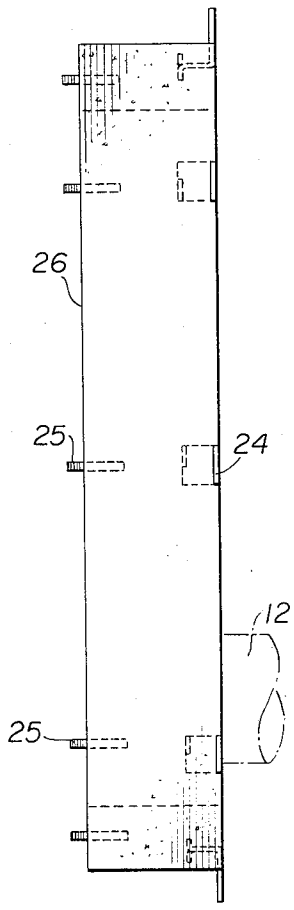


Fig. 6

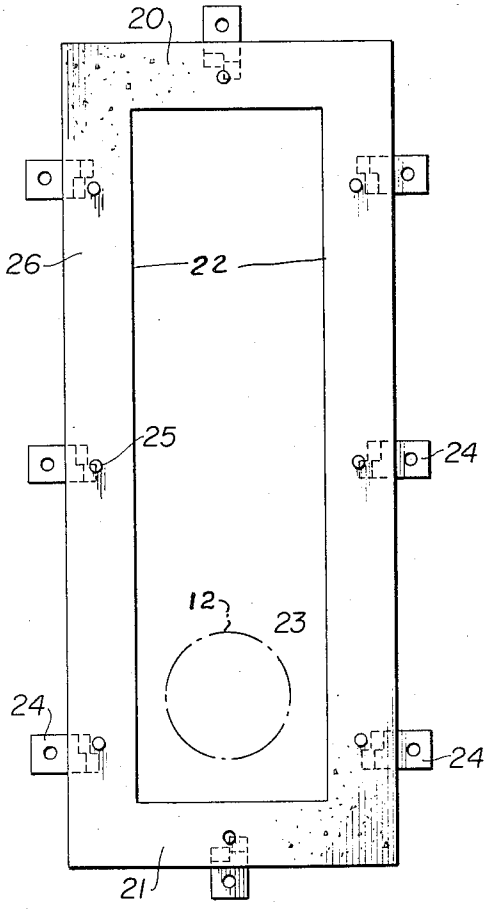


Fig. 7

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AUTOMATIC STORM DRAIN OUTLET

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Application February 13, 1957, Serial No. 639,980

6 Claims. (Cl. 137—268)

This invention is directed to drains and more particularly to an automatic valving drain outlet mechanism for use in connection with drainage systems installed for drainage of sea front property.

In many instances ocean fronting property is protected by a concrete sea wall located to afford protection of the property from high seas while affording dry beach formation. Thus the concrete sea wall usually is located inland from the normal mean tide level so that in normal weather there will be at least a small strip of dry beach between the sea and the sea wall even at high tide. This is the condition prevailing during normal weather. The sea wall is backed by filled in land comprising streets with attendants storm sewers that have outlet to the sea through sewer lines having outlets extending through the sea wall at drainage levels slightly above the beach sand. Thus storm drainage to street catch basins, which are connected to the storm sewers, affords drainage of the shore lands back of the sea wall. The depth of installation of the sewer lines is limited by the beach elevation or level relative to the street level.

However, high seas build up the sand against the sea wall thus burying the sewer outlets and often filling them with beach sand to the extent of three or more feet with resulting flooding of the streets and property of the community. Digging away of the sand to expose the storm sewer outlet and probing the exit end of the drainage line has been the practice to relieve the flooded condition of the streets and property behind the sea wall.

The general object of the present invention is the provision of a storm sewer outlet mechanism which will serve to maintain the exit end of the storm sewer open to beach discharge of the storm sewer water regardless of the height of the beach sand deposited against the sea wall.

A further object of the present invention is the provision of a storm sewer exit mechanism which will assure the discharge of storm drainage above the surface of the beach sand and several feet above the level of the drain outlet whereby piled up sand will be flushed away from the level of the storm sewer outlet.

A still further object of the invention is the provision of a vertically sequentially operable series of valves which may be arranged with an attachable riser well connected to the exit end of an existing storm sewer line extending through the sea wall.

Other objects of the present invention will become apparent to those skilled in the art from the following description of one form of the invention as shown embodied in the accompanying drawings. The essential characteristics of the invention are summarized in the claims.

In the drawings:

Fig. 1 is a diagrammatic section of a beach sea wall and storm sewer system inland of the sea wall and showing the drainage system blocked by drifted beach sand;

Fig. 2 is a duplication of Fig. 1 with the exit end of the storm sewer equipped with my invention;

Fig. 3 is a front elevation of a louver valving mechanism;

Fig. 4 is a cross sectional elevation showing a riser box structure interposed betwen the louver valves and the exit end of a storm sewer line;

Fig. 5 is a rear view of one of the louver valve members;

Fig. 6 is a side elevation of the riser structure; and

Fig. 7 is a front elevation of the riser structure.

My invention contemplates the use of storm sewer water for the purpose of washing away piled up beach sand from the exit end of the storm sewer, a common condition with the piled up sand S as shown by Fig. 1, and I accomplish this method by providing a riser well extending upwardly from the sewer outlet with one wall thereof formed by a series of louver valve members **15** which are normally closed to prevent the ingress of beach sand into the well and to the outlet end of the storm sewer line. The riser or well structure **10** preferably is formed of molded concrete and battened to the sea wall **13** with the lower end of the well structure in communication with the outlet end **12** of the storm sewer line. This riser well construction may be a part of the valve apparatus if desired. The louver valves **15** and the frame work **16** supporting them are preferably formed of non-corrosive stainless steel or navy bronze metal thereby to withstand the corrosive action of sea air and water. The louver valves **15** are arranged one above the other to swing freely on horizontal axes or rods **17** and are closed normally by gravity relative to each other and the frame, as shown in Fig. 4 in overlapping relation. The louver valves are limited in outward swing by pins **34** to direct the storm water escaping therethrough downwardly onto the sand obstructing the opening of the immediately adjacent lower louver. Thus the water guiding action of each louver is to direct the water escaping therethrough from the riser well downwardly upon the sand S blocking the louver therebeneath. This action is shown by Fig. 2 of the drawings illustrating a high storm water condition of the land and streets behind the sea wall.

The specific riser or well structure **10** is provided by a hollow rectangular concrete moulding having top and bottom walls **20** and **21**, and integral side walls **22** which are secured as a unit to the face of the rear wall in such relation that the sewer line **12** shown in dot and dash lines is located near the bottom of the well structure. The back side of the unit is then closed by the sea wall providing in effect a back wall for the riser or well with communication established between the sewer line and the riser. Securing lugs or cleats **24** are cast in the well structure to afford bolting attachment to the sea face of the sea wall **13**. Stud bolts **25** may also be cast in the well structure adjacent the vertically extending opening of the seaward or front face **26** of the well structure as shown in Figs. 6 and 7. These stud bolts afford attachment of a valve carrying frame **16** to the seaward face of riser structure **10**.

The louver pivot rods **17** extend through openings formed in the side walls **30** of the louver supporting

frame and in a demonstrating installation the louvers are dimensioned to be approximately 8" x 12" in depth and width respectively.

The louver supporting frame may be approximately four feet in height and formed of right angle sections with a vertical opening approximately three feet and seven inches in height and one foot wide so that the side edges of the louvers swing freely within the frame. This frame may be built up of 3" x 5" angles of stainless steel with the 3" leg placed against the sea wall or riser well structure and secured thereto by stud bolts 25. There is space behind the louvers within the frame affording a rising of the water behind the louvers as will be noted in Fig. 4. It will be noted in Fig. 4 that the horizontal axes of the louver supporting rods 17 lie in a plane tilted from the vertical so that the louvers are normally swung inwardly by gravity toward closed position with the bottom edges in overlapped rotation of about one inch with respective underlying louvers.

Any suitable means for mounting the louvers 15 on the pivot rods 17 may be used such as U brackets 32. Each louver below an upper one serves as an inward stop for the upper one except the bottom louver which is stopped by brackets 33. Pins 34 may serve as louver stops on the outward swing of the louvers so that the escaping water is directed downwardly.

Upon installation the drift sand S (see Fig. 1) is cleared away; the drain outlet cleaned of sand; and the concrete unit providing the riser or well (Figs. 7 and 8) is attached to the sea wall 13 by lag screws or bolts extending through the cleats 24 and into the sea wall with the outlet end 12 of the storm sewer opening into the lower part of the well structure. The louver carrying frame may then be bolted to the concrete riser structure so that the series of louver valves constitute the sea or outward wall of the riser well.

As drifting sand S accumulates in front of the device the lower louver valves become submerged by the sand and this condition may exist over a period of time. Meanwhile the outlet end of the storm sewer is protected against clogging sand. Eventually when a rain storm occurs, the storm water will discharge into the riser well 10, but the lower sand submerged louver valves will be prevented from opening. The storm water thus continues to rise in the system and in the riser well until the water level rises to one of the upper louver valves not obstructed by sand. Thereupon the water is discharged downwardly above the drifted sand built up about the lower part of the apparatus. The action of the elevated discharge of the water results in a washing away of the piled up sand obstructing the lower louver valves thus freeing these valves in a vertically downward sequence until the lowermost louver is freed.

It is to be seen that by the use of my apparatus the already shallow sewer drain system can be maintained automatically by the action of the storm water and without constant servicing.

To those skilled in the art it will be apparent that the riser well can be a part of the sea wall structure per se with a vertically extending seaward opening; also that the riser well structure of Figs. 6 and 7 could be a cast or built up metal frame, the essential idea being to have a self-cleaning or elevated discharge of the storm water to wash the drifted sand away from the outlet end of the storm sewer. It is also apparent that the riser well may be a part of the louver carrying frame with sufficient back space behind the louvers having a flow capacity equal to or greater than the flow capacity of the sewer line 12. The apparatus may be made to have any desired height depending upon the local conditions to be met or could be installed in units one above the other where high tides prevail. Also the check valve characteristics of the apparatus permits of its use with storm sewers discharging into rivers subject to flooding. Several of the units can be associated with the discharge end of large storm sewer outlets as will be obvious to those skilled in the art.

I claim:

1. In combination with the outlet end of a storm sewer drainage line extending through the lower portion of a sea wall, a riser well structure on the sea wall in communication with the outlet end of the storm sewer and extending upwardly from the sewer outlet, said well structure being open on the seaward side thereof, a series of sequentially operable check valve means disposed at successively higher levels normally closing the sea side opening of the well structure, and abutment means associated with each valve means for limiting the respective valve movements to outward positions causing each valve means to direct water passing therethrough downwardly past an adjacent lower valve means.

2. In combination with the outlet end of a storm sewer drainage line extending through the lower portion of a sea wall, a riser well structure on the sea wall in communication with the outlet end of the storm sewer and extending upwardly from the sewer outlet, said well structure being open on the seaward side thereof, a series of sequentially operable dependent louver valve means disposed at successively higher levels for normally closing the said seaward side opening of the well structure and adapted to swing outward under water pressure in the well toward open position when not obstructed by drifted sand, and abutment means limiting the degree of opening of the respective louver valve means thereby to cause a louver valve means to direct water passing therethrough downwardly upon sand blocking the opening of a lower louver valve means.

3. In combination with the outlet end of a storm sewer drainage line extending through the lower portion of a sea wall, a riser well structure secured to the sea wall in communication with the outlet end of the storm sewer and extending upwardly from the sewer outlet, said well structure being open on the seaward side thereof, a frame structure secured to the riser well, a series of sequentially operable outwardly opening dependent louver valve means carried by the frame structure at successively higher levels to normally close the seaward side opening of the well structure, and abutment means limiting the extent of outward opening of the respective louver valve means.

4. A sea side storm sewer outlet means comprising in combination: a storm sewer drainage line having its outlet end at beach level, an upwardly extending riser well in communication with the outlet end of the storm sewer drainage line, said riser well extending above the sewer outlet and having an upwardly extending opening in the seaward side thereof, a plurality of outwardly swingable dependent louver valve members arranged one above the other, each dependent from a pivot located above its center of gravity to close normally the upwardly extending opening of the well.

5. In combination with the outlet region of a storm sewer drainage line extending through a sea wall at a beach level, a riser well structure connected to a sea opening of said drainage line and extending upwardly of the sea wall contiguous thereto, a gravity closure valve closing the sea opening of the drainage line, said riser well structure being juxtaposed to the gravity closure valve and extending thereabove and said riser well having an opening located above the gravity closure valve with associated means for directing overflow water passing through the opening downwardly upon debris obstructing the opening of the gravity closure valve.

6. A sea side storm sewer outlet means for a storm sewer line extending through a sea wall for discharge at beach level and comprising in combination: the outlet end of a sewer line, a sea wall, a vertically extending frame structure adapted to be applied to the seaward side of said sea wall with the outlet end of said storm sewer line opening into the lower region of said frame struc-

ture, said frame structure having a vertically extending seaward opening, a vertical series of dependent outwardly swing-opening louver valves gravity biased normally to close said opening, a storm water riser well formed in the frame behind said louver valves and abutment means limiting the swing of the louver valves to cause each valve to direct water downwardly upon debris blocking an adjacent louver valve.

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