June 2, 1931. C. W. ANDERSON 1,808,279

SCUM REMOVING DEVICE

Filed Oct. 17, 1929 4 Sheets-Sheet 1

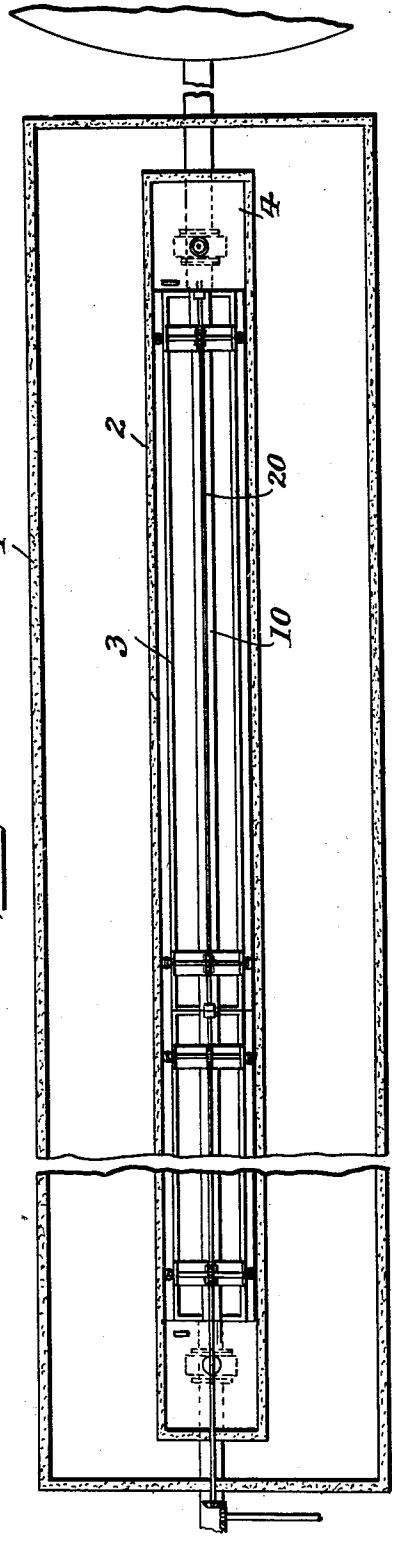

Fig. 1.

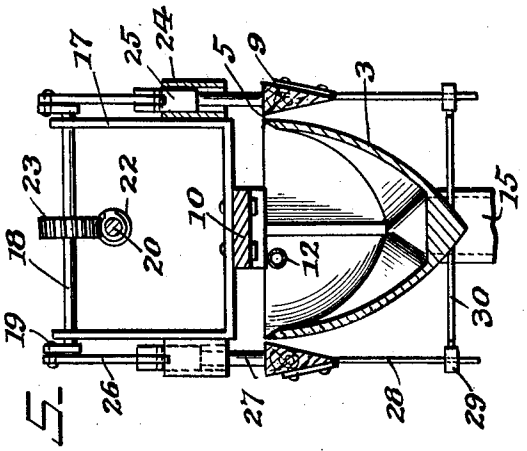

Fig. 5.

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SCUM REMOVING DEVICE

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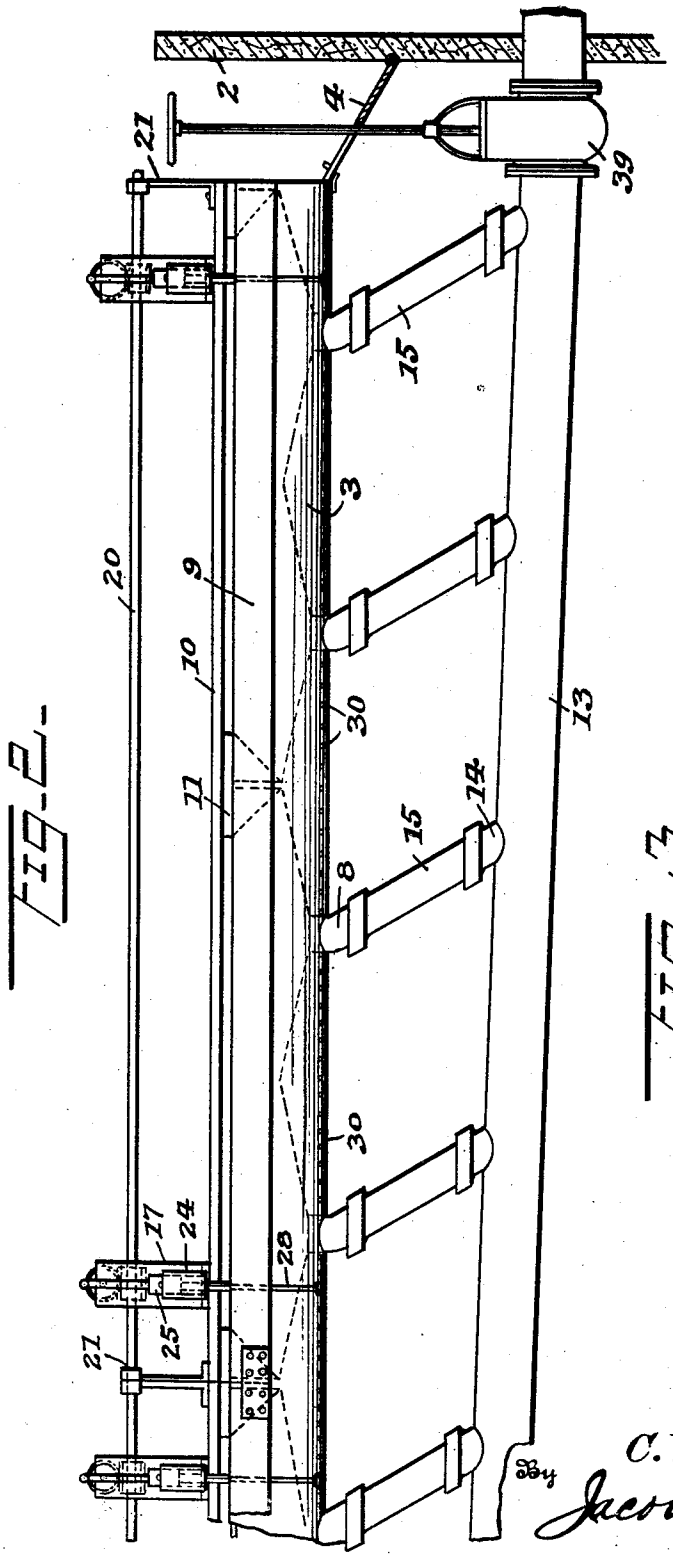

Fig. 2.

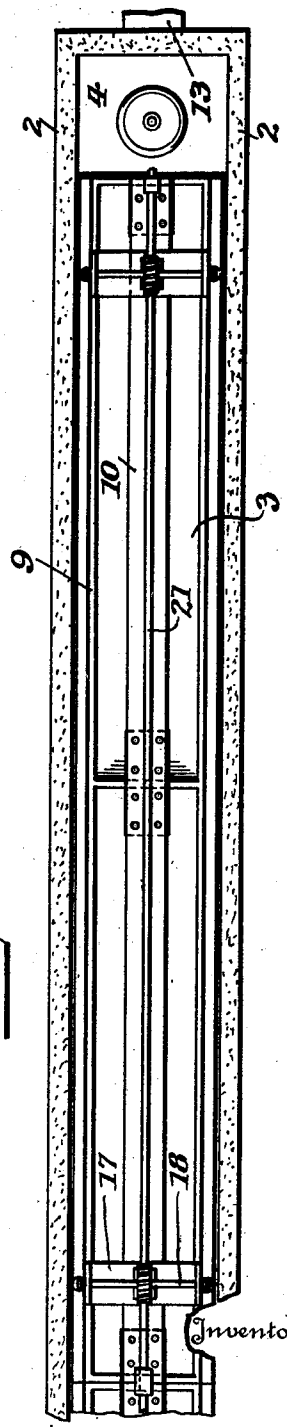

Fig. 3.

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SCUM REMOVING DEVICE

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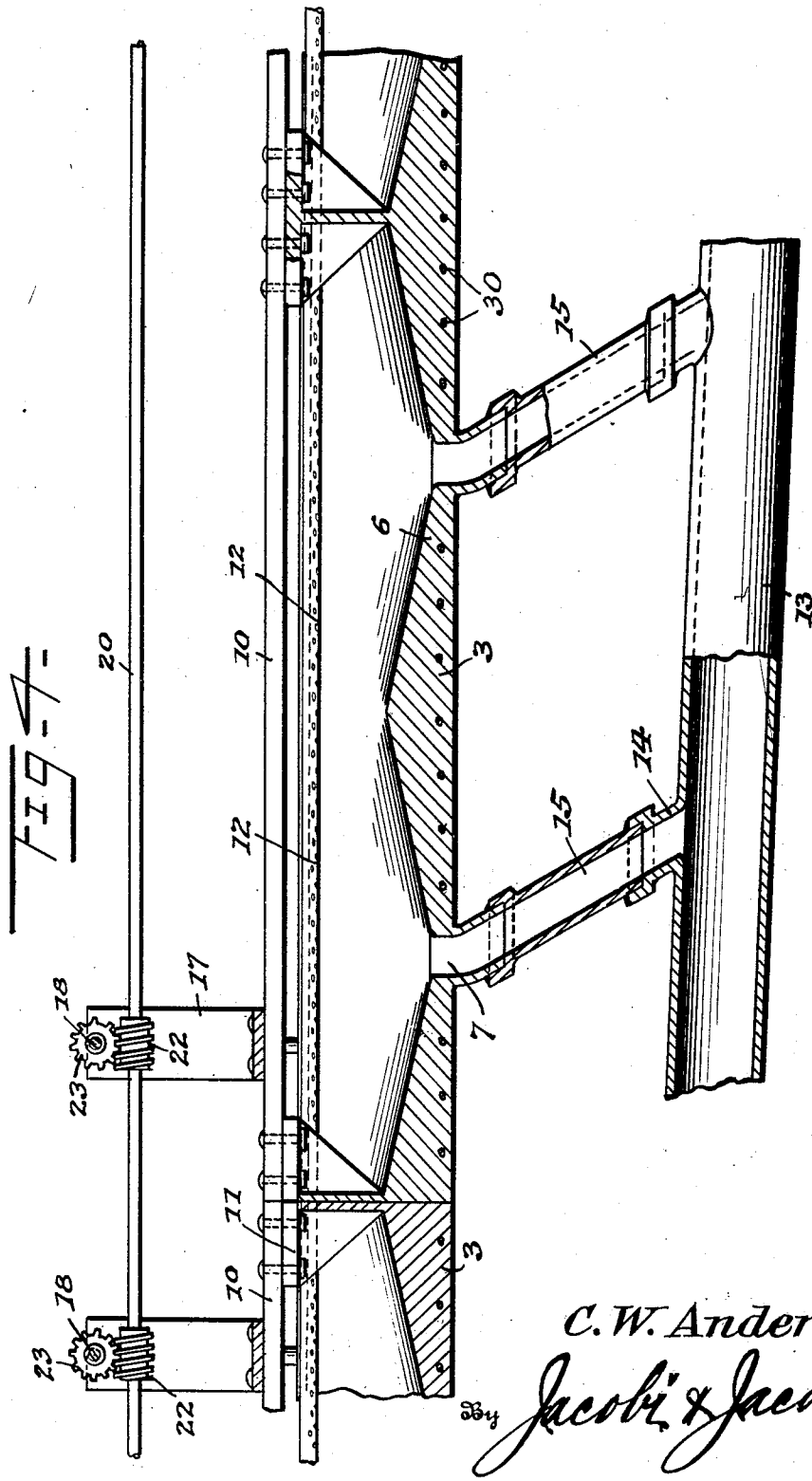

FIG. 4.

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SCUM REMOVING DEVICE

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Fig. 6.

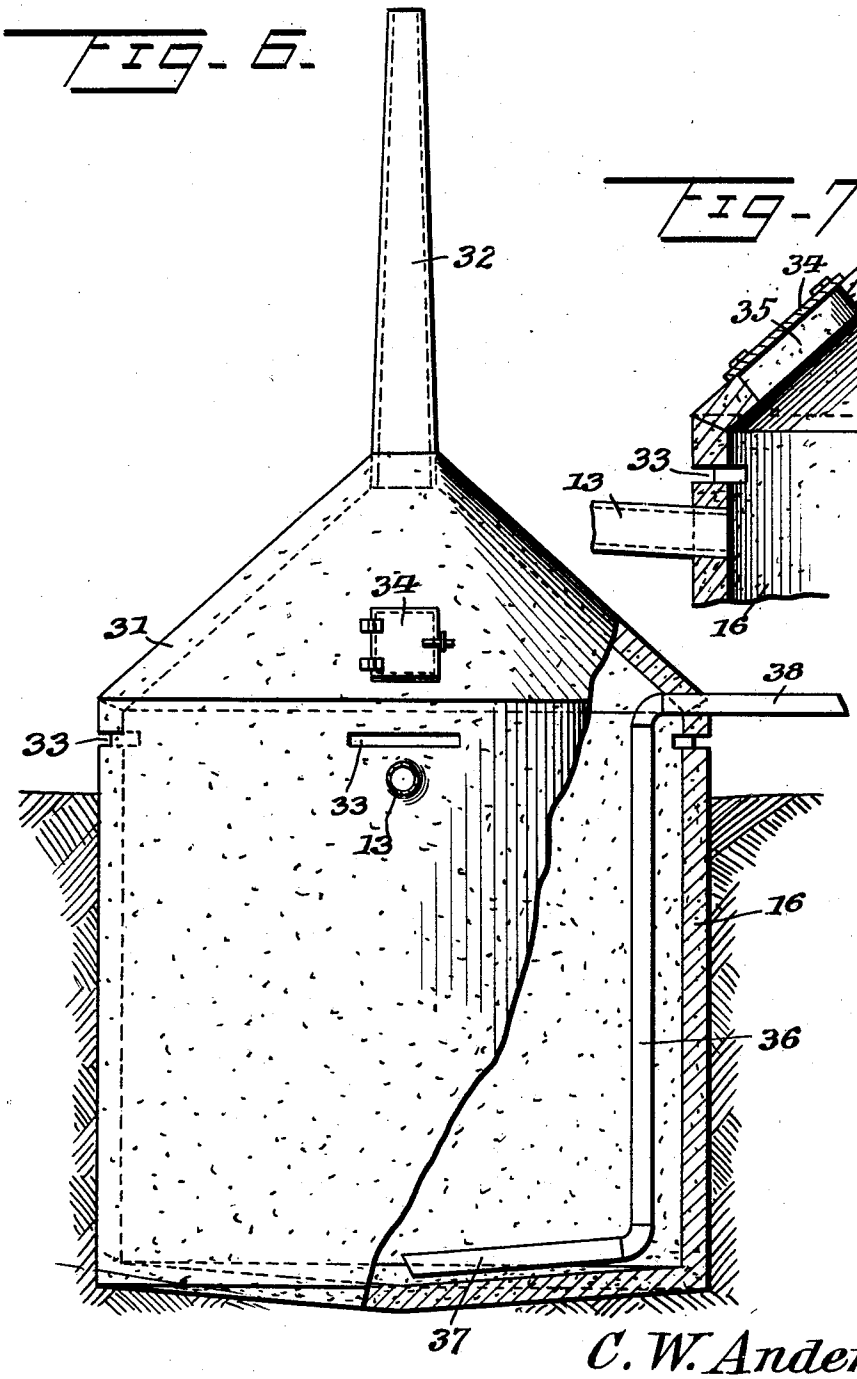

Fig. 7.

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UNITED STATES PATENT OFFICE

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SCUM REMOVING DEVICE

Application filed October 17, 1929. Serial No. 400,355.

The present invention relates to improvements in liquid separation or purification apparatus and has reference more particularly to a scum removing device.

At the present time, the systems employed in filtration beds draw off the sludge every few days to the dry beds. This sludge is often partly decomposed and possesses a disagreeable odor. This system must be employed on account of the excess foam and scum which rises to the surface of the vent tank and this scum soon cakes there and the gas bubbling up through the water in the vent tank causes the scum to flow over the top of the tank thus rendering conditions very unsanitary.

It is therefore the aim of the present invention to provide a means for effectively removing the scum completely as fast as the same accumulates, a storage tank being provided for receiving the scum.

One of the important objects of the present invention is to provide a scum removing device that includes a skimmer trough for disposition in a stationary manner within the vent tank, means being arranged between the sides of the skimmer trough and vent tank for causing the scum and foam to be delivered into the trough, said trough being provided at spaced intervals with outlet pipes at the bottom thereof for carrying off the scum to the storage tank.

A further and important object is to provide a scum removing device that will at all times be positive and efficient in its operation, the same being simple in construction, inexpensive, strong and durable.

Other objects and advantages of the present invention will become apparent from the following description when taken in connection with the accompanying drawings.

In the accompanying drawings wherein like reference characters indicate corresponding parts throughout the several views thereof.

Figure 1 is a plan view of the scum removing device showing the same positioned within a vent tank.

Figure 2 is an enlarged side elevation of the scum removing device.

Figure 3 is a plan view for more clearly disclosing the relationship of the skimmer trough with respect to the vent tank and also illustrating the longitudinally extending float bars arranged between the sides of the vent tank and adjacent sides of the skimmer trough.

Figure 4 is an enlarged vertical longitudinal sectional view through the skimmer trough showing the outlet pipes extending from the bottom thereof and communicating with the main discharge line.

Figure 5 is a vertical transverse section through the skimmer trough and the float bars showing the actuating means for said float bars.

Figure 6 is an enlarged view partly in elevation and partly in section of the storage tank, and

Figure 7 is a detail sectional view through the trap door and adjacent portion of the storage tank.

In the drawings wherein for the purpose of illustration is shown a preferred embodiment of the present invention, the numeral 1 designates a substantially rectangular shaped open top main tank within which there is centrally located a longitudinally extending open top vent tank 2 that is adapted to be supported in the main tank 1 in any suitable stationary manner. The tanks 1 and 2 are preferably constructed of plastic material.

Forming a salient part of the present invention is the sectional skimmer trough 3 that is arranged longitudinally within the vent tank 2, the ends of the skimmer trough being spaced from the respective ends of the tank 2 and suitable trap doors 4 provide closures for the end portions of the vent tank. The sections of the trough may be secured together in any suitable manner and upon referring to Figure 5 of the drawings it will be observed that the trough tapers gradually toward its bottom, the side walls of the trough being curved and the upper edges of the side walls are beveled as indicated at 5 for a purpose to be presently described. Furthermore, each section of the trough is formed with the sloping faces 6

in the bottom thereof, said sloping faces merging with the respective outlet openings 7 formed in the bottom of each section of the skimmer trough and projecting downwardly from each outlet 7 is the angularly disposed nipple shown at 8 more clearly in Figure 4 of the drawings.

The side walls of the skimmer trough 3 are spaced with respect to the adjacent side walls of the vent tank 2 in order to accommodate the wedge shaped float bars 9 that extend longitudinally for vertical movement within the vent tank 2 between the vent tank and the respective sides of the skimmer trough. The float bars 9 are provided for the purpose of delivering the scum and foam into the skimmer trough 3 and the manner in which the float bars function will be hereinafter more fully described in detail.

A series of planks 10 extend longitudinally across the central top portions of the sections of the trough 3, the same being supported in slight spaced relation with respect thereto by means of the supporting brackets 10 and 11. Suspended from the planks 10 for disposition longitudinally within the central upper portion of the sectional trough 3 in the perforated sprinkler pipe shown at 12, the same having connection at one end with a suitable source of water supply, not disclosed, and the purpose of this sprinkler pipe is to wash off the inner side walls of the skimmer trough so that the same will be maintained free of any deposits of scum or foam.

The main discharge line or conduit for the scum and foam is shown at 13 and the same extends longitudinally within the lower portion of the vent tank 2, and upon referring to Figure 2 it will be noted that the discharge pipe 13 is directed downwardly at an incline toward its discharge end. The several outlet nipples 8 communicate with the main discharge pipe 13 and to this end the discharge pipe 13 is formed at spaced intervals with the angularly disposed nipples 14 that are adapted to be arranged in alinement with the respective nipples 8 and suitable connecting pipes 15 are arranged between the nipples 8 and 14.

The discharge end of the pipe 13 extends through the end of the vent tank 2 as well as through the adjacent end of the main tank 1 and extends into the upper portion of a storage tank 16, shown in Figure 6. The construction of this storage tank will also be hereinafter more fully described in detail.

Mounted on the planks 10 are the substantially U-shaped brackets 17, each of which supports the transverse driven shaft 18, the ends of the shaft 18 being journaled for rotation through the upper ends of the arms of the respective U-shaped brackets 17 and a crank 19 is associated with each end of each shaft 18. A longitudinally extending drive shaft 20 is arranged across the top of the skimmer trough 3, the same being preferably located below the transverse driven shaft 18 and suitable supports 21 extend upwardly from the ends of the outermost planks to receive the drive shaft 20. One end of the drive shaft extends over the adjacent end wall of the main tank 1 and is adapted to be driven by any suitable source of power. The drive and driven shafts are operatively connected together through the medium of the worms and worm gears 22 and 23, respectively.

Secured on the outer face of each arm of each U-shaped bracket 17 adjacent the lower end thereof is an open ended sleeve or cylinder 24 within which is operable a plunger 25. The plunger 25 is in turn operatively connected to its respective crank 19 through the medium of the connecting rods 26 while the lower end of each plunger 25 is operatively connected to the adjacent float bar 9 through the medium of the vertical rod 27. In this manner, the float bars 9 are operatively connected with the cranks 19 associated with the driven shaft 18 whereupon said float bars will be caused to move upwardly and downwardly when the drive shaft 20 is actuated.

Guide rods 28 extend downwardly from the lower edges of the float bars 9 and are disposed through suitable guide rings 29 arranged on the outer ends of certain ones of breaker rods 30 which breaker rods extend transversely through the lower portion of the sectional skimmer trough 3 throughout the length thereof. The breaker rods are provided for the purpose of preventing the accumulation of broken sticks or other objects which would impede the removal of the scum and foam.

The storage tank 16 is also preferably constructed of plastic material and the same is for the major portion embedded within the ground. The storage tank 16 is preferably of cylindrical formation and is provided with a conical top 31 from the apex of which extends the metallic gas discharge spout 32. It will be noted that the discharge pipe 13 extends into the side of the tank 16 directly above the surface and the projecting portion of the body of the storage tank is formed at spaced intervals with the vents 33 and a trap door 34 provides a closure for the entrance 35 formed in the conical top 31 whereby access to the tank may be had for the purpose of making repairs whenever necessary.

A pipe 36 is arranged vertically within the storage 16 adjacent the side wall thereof, the lower end of said pipe terminating adjacent the bottom and having communication with a horizontally disposed pipe 37 that provides an entrance for the sediment

collecting in the bottom of the storage tank and which sludge may be removed and the liquid also removed through the pipe 36, the upper end of the pipe 36 having communication with the outlet pipe 38 that leads to a pump, not shown.

A gate valve of any conventional construction is arranged in the pipe 13 adjacent the end of the vent tank 2, this gate valve being shown generally at 39 and the actuating means therefor extends upwardly through the trap door 4 as clearly indicated in Figure 2.

In the operation of my skimming device, the float bars 9 will be caused to move upwardly and downwardly in the vent tank 2 thus causing the scum or foam to be discharged into the sectional skimmer trough 3 over the beveled upper edges 5 thereof and the sloping bottom walls 6 will cause such scum that is delivered to the sectional trough to be discharged into the pipe 13 through the outlets 7 from which the scum and foam is carried off into the discharge tank 16. The sprinkler pipe 12 will wash off any scum or foam that may deposit on the inner side walls of the trough 3 and in this manner, the scum and foam will at all times be removed as fast as the same accumulates.

As the skimmer trough is stationary in the vent tank 2, and as the water level in the sewage system reaches a maximum and minimum, the trough is preferably placed at the maximum or high daily level where it will operate for six or seven hours every day and when the water falls, the foam in the system will still fall into the trough for this foam often rises seven or eight inches above the water level of the vent tank.

It will thus be seen from the foregoing description, that I have provided an improved scum removing device that will at all times be positive and efficient in carrying out the purposes for which it is devised, and due to its simplicity said scum removing device can be readily and easily installed in a sewage system at a very low cost.

While I have shown a preferred embodiment of the invention, it is understood that minor changes of the size, shape and arrangement of parts may be resorted to without departing from the spread of the invention and the scope of the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a liquid receiving tank, a skimmer trough arranged within the tank, a scum and foam discharge pipe having communication with the bottom of the trough, and means operable adjacent the exterior of the trough for delivering scum and foam into the same, and transversely disposed breaker rods extending from the lower portion of the trough for disposition within the tank.

2. In combination with a liquid containing tank, a stationary skimmer trough arranged therein and being spaced from the side walls of the tank, a series of outlets extending from the bottom of the trough, a main discharge pipe having communication with said outlets, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering scum and foam into the trough, and means for actuating the float bars.

3. In combination with a liquid containing tank, a stationary skimmer trough arranged therein and being spaced from the side walls of the tank, a series of outlets extending from the bottom of the trough, a main discharge pipe having communication with said outlets, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering scum and foam into the trough, means for actuating the float bars, the upper edges of the sides of the trough being beveled.

4. In combination with a liquid containing tank, a stationary skimmer trough arranged therein and being spaced from the side walls of the tank, a series of outlets extending from the bottom of the trough, a main discharge pipe having communication with said outlets, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering scum and foam into the trough, means for actuating the float bars, and a flush pipe extending longitudinally within the trough.

5. In combination with a liquid containing tank, a stationary skimmer trough arranged therein and being spaced from the side walls of the tank, a series of outlets extending from the bottom of the trough, a main discharge pipe having communication with said outlets, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering scum and foam into the trough, means for actuating the float bars, and transversely disposed breaker rods carried by the bottom portion of the trough and extending beyond the sides thereof.

6. In combination with a liquid receiving tank, a skimmer trough arranged within the tank, a scum and foam discharge pipe having communication with the bottom of the trough, transversely disposed breaker rods extending from the lower portion of the trough for disposition beyond the sides of the trough, guide rings carried by the outer ends of certain breaker rods, vertically movable members arranged exteriorly of

the sides of the trough for delivering the scum and foam into the trough, and a guide rod extending downwardly from said members and operable within the respective guides.

7. In combination with a liquid receiving tank, a skimmer trough arranged therein, said trough tapering gradually toward its bottom, the bottom of the trough being formed with opposed sloping faces, said trough being formed with a series of outlet openings located at the point of merger of each pair of sloping faces, a main discharge pipe arranged below the trough and having communication with the respective outlets.

8. In combination with a liquid receiving tank, a skimmer trough arranged therein, said trough tapering gradually toward its bottom, the bottom of the trough being formed with opposed sloping faces, said trough being formed with a series of outlet openings located at the point of merger of each pair of sloping faces, a main discharge pipe arranged below the trough and having communication with the respective outlets, and means operable in the tank exteriorly of the sides of the trough for delivering the scum and foam into the trough.

9. In combination with a liquid receiving tank, a skimmer trough arranged therein, said trough tapering gradually toward its bottom, the bottom of the trough being formed with opposed sloping faces, said trough being formed with a series of outlet openings located at the point of merger of each pair of sloping faces, a main discharge pipe arranged below the trough and having communication with the respective outlets, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering scum and foam into the trough, and means for actuating the float bars.

10. In combination with a liquid receiving tank, a stationary skimmer trough arranged therein and spaced from the side walls of the tank, a scum and foam discharge pipe having communication with the bottom of the trough, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering the foam into the trough, actuating means for the float bars including a drive shaft arranged longitudinally above the skimmer trough, transversely disposed driven shafts connected with the drive shaft and means for operatively connecting the outer ends of the transverse shafts with the float bars.

11. In combination with a liquid receiving tank, a stationary skimmer trough arranged therein and spaced from the side walls of the tank, a scum and foam discharge pipe having communication with the bottom of the trough, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering the foam into the trough, actuating means for the float bars including a drive shaft arranged longitudinally above the skimmer trough, transversely disposed driven shafts connected with the drive shaft, and crank and pinion connections between the outer ends of the driven shafts and the respective float bars.

12. In combination with a liquid receiving tank, a stationary skimmer trough arranged therein and spaced from the side walls of the tank, a scum and foam discharge pipe having communication with the bottom of the trough, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering the foam into the trough, actuating means for the float bars including a drive shaft arranged longitudinally above the skimmer trough, transversely disposed driven shafts connected with the drive shaft, and crank and pinion connections between the outer ends of the driven shafts and the respective float bars, and transversely disposed breaker rods carried by the bottom portion of the trough and extending beyond the sides thereof.

13. In combination with a liquid receiving tank, a stationary skimmer trough arranged therein and spaced from the side walls of the tank, a scum and foam discharge pipe having communication with the bottom of the trough, float bars arranged for vertical movement between the outer side walls of the trough and the adjacent sides of the tank for delivering the foam into the trough, actuating means for the float bars including a drive shaft arranged longitudinally above the skimmer trough, transversely disposed driven shafts connected with the drive shaft, and crank and pinion connections between the outer ends of the driven shafts and the respective float bars, and transversely disposed breaker rods carried by the bottom portion of the trough and extending beyond the sides thereof, guide rings carried by the outer ends of certain breaker rods, and guide rods depending from the float bars and operable through the respective guide rings.

In testimony whereof I affix my signature.

CARL W. ANDERSON.