Oct. 13, 1925. 1,557,240

A. B. BUTTERWORTH

TANK CLEANER AND FLUID CIRCULATOR

Filed June 16, 1924 2 Sheets-Sheet 1

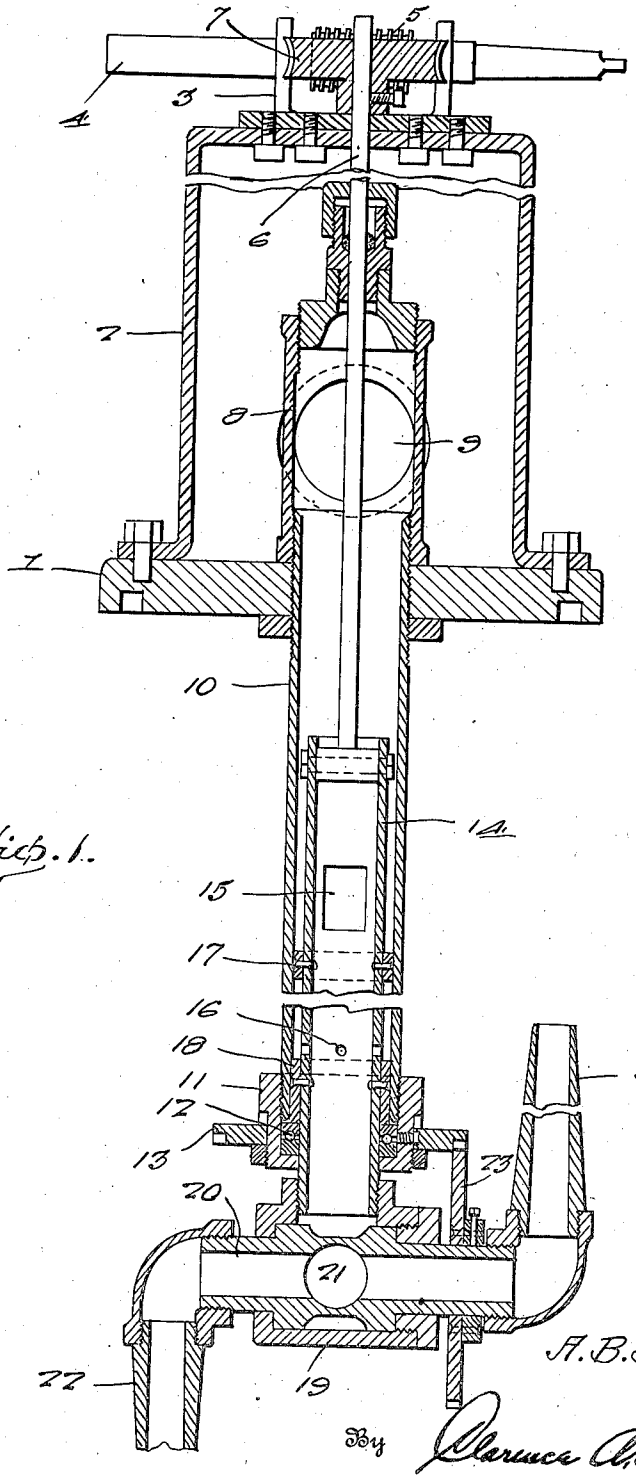


Fig. 1.

Inventor
A. B. Butterworth
By Clarence A. O'Brien
Attorney

Oct. 13, 1925. 1,557,240

A. B. BUTTERWORTH

TANK CLEANER AND FLUID CIRCULATOR

Filed June 16. 1924 2 Sheets-Sheet 2

Fig. 2.

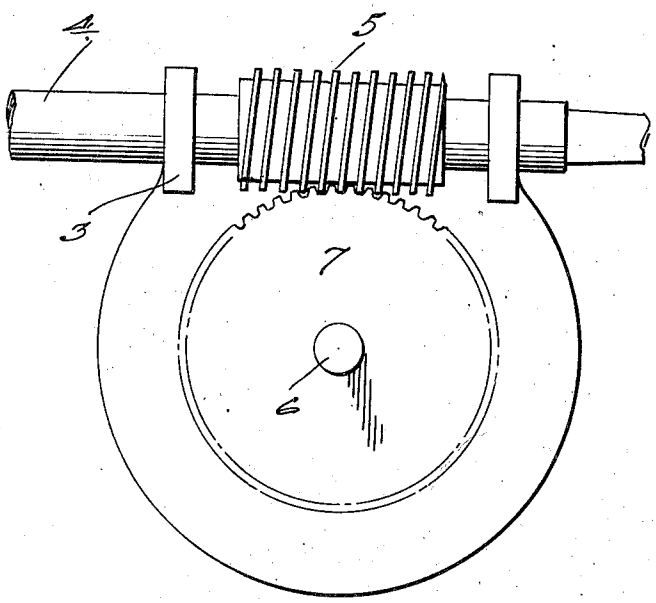
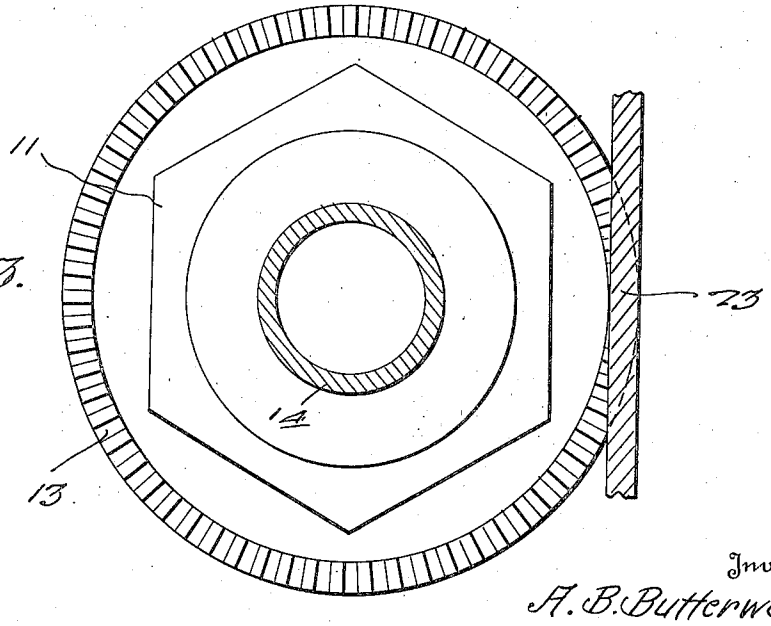


Fig. 3.



Inventor
A. B. Butterworth

By Clarence A. O'Brien.

Attorney

Patented Oct. 13, 1925. 1,557,240

UNITED STATES PATENT OFFICE.

ARTHUR B. BUTTERWORTH, OF PORT ARTHUR, TEXAS.

TANK CLEANER AND FLUID CIRCULATOR.

Application filed June 16, 1924. Serial No. 720,469.

To all whom it may concern:

Be it known that I, ARTHUR B. BUTTERWORTH, a citizen of the United States, residing at Port Arthur, in the county of Jefferson and State of Texas, have invented certain new and useful Improvements in a Tank Cleaner and Fluid Circulator, of which the following is a specification.

This invention relates to apparatus for circulating a fluid in a tank, for the purpose of cleaning the same, and it consists in the novel features and steps hereinafter described and claimed.

The apparatus includes a base member adapted to be applied to the tank and having a tube attached thereto, and adapted to enter the tank. Means are provided for supplying a column of the fluid to the upper or outer end of the tube. A yoke is mounted upon the base member, and a shaft is journalled into the yoke and extends down into the tube. Means are provided upon the yoke for rotating the shaft. A cylinder is carried at the lower end of the tube and is provided at points between its ends with openings. A barrel is carried at the lower end of the tube and a nipple is journalled in the barrel and disposed transversely of the cylinder and tube. Discharge nozzles are applied to the ends of the nipple and are disposed at right angles to the nipple. Intermeshing gear wheels are fixed one to the nipple and the other to the tube, and serve as means for rotating the nipple upon its own axis, as the nipple rotates about the axis of the tube.

In the accompanying drawings:

Figure 1 is a vertical sectional view of the tank cleaner apparatus.

Figure 2 is a top plan view thereof.

Figure 3 is a transverse sectional view, through the lower portion thereof.

The apparatus comprises a base 1, adapted to be applied to the end or top of the tank (not shown).

A yoke 2 is mounted upon the base 1 and a bracket 3 is mounted at the upper end of the upper intermediate portion of the yoke 2. A shaft 4 is journalled in the bracket 3 and carries a worm 5. A vertically disposed shaft 6 is journalled in the intermediate portion of the yoke, and carries at its upper end a worm wheel 7, which meshes with the worm 5. It is apparent that by rotating the shaft 4, the shaft 6 will be rotated through the intermeshing worm 5 and worm wheel 7. A piping is mounted upon the base 1 and is provided with an opening 9: through which the fluid may enter the said pipe. The fluid to be used is preferably composed of water, with a suitable quantity of caustic soda held in solution therein, or other detergent agent. A tube 10 is connected with the base 1 and the lower end of the pipe 8, and the collar 11 is carried at the lower end of the tube 10. Bearing balls 12 are interposed between the lower end of the tube and the intermediate portion of the collar and are housed within the collar. A gear wheel 13 is fixed to the collar 11. A cylinder 14 is connected to the lower end of the shaft 6, and is provided at its side with openings 15 and 16. The exterior wall of the cylinder 14 is spaced from the interior surface of the tube 10. Packing rings 17 and 18 are applied to the exterior surface of the cylinder 14 and bridge the space between the cylinder and the tube. A barrel 19 is connected with the lower end of the cylinder 14 and a nipple 20 is journalled for rotation in the said barrel. Said nipple is provided at a point between its ends with an opening 21, through which fluid may flow from the cylinder into the nipple. The nipple is open from end to end and discharge nozzles 22 are applied to the ends of the nipple. The nozzles 22 are disposed at right angles to the nipple and parallel with the cylinder.

As the shaft 6 rotates, as hereinbefore described, the cylinder 14 rotates in unison with the same. Thus the barrel 19 is swung about the axis of the cylinder 14, at the same time, a gear wheel 23, which is carried by the nipple 20 and which engages the gear wheel 13 is rotated, and thus the nipple is rotated upon its own axis. This rotary movement of the parts of the nipple 20 rotate the discharge nozzle 22 about the axis of the nipple 20 and parallel with the axis of the cylinder 14.

Therefore, the column of liquid which enters the tube 10 is rotated at its lower portion by the cylinder 14 and by the friction established between the edges of the openings 15 and 16 and the column of liquid. When the column of liquid enters the nipple 20, it is divided into branches, and these branches are rotated about the axis of the cylinder 14 and these branches rotate with the nipples 20 and upon the axis thereof. As the branches enter the dis-

charge nozzles 22, they are deflected at right angles to the nipple 20 and parallel with the axis of the cylinder 14 and the outer portions of the branches are rotated about the axis of the nipple 20. Thus, the fluid, as it is discharged from the nozzle has a swirling motion, and when the liquid in this condition is discharged into the tank, it swashes about the interior of the tank, and effectually cleanses the inner surface thereof.

Having described the invention, what is claimed is:

In a tank cleaner, a base, a tube extending through the base and supported thereby, means for introducing a column of liquid into the tube on one side of the base, a tubular cylinder journaled for rotation in the tube on the other side of the base and provided at points between its ends with openings, means for rotating the cylinder, a gear wheel fixed to the tube, a nipple journaled for rotation transversely across the lower end of the cylinder and provided at a point between its ends with openings which communicate with the interior of the cylinder, and a gear wheel carried by the nipple and meshing with the first mentioned gear wheel.

In testimony whereof I affix my signature.

ARTHUR B. BUTTERWORTH.