March 24, 1925. 1,530,659

J. W. FORCE

TANK CLEANING DEVICE

Filed April 15, 1924 2 Sheets-Sheet 1

Fig. 1.

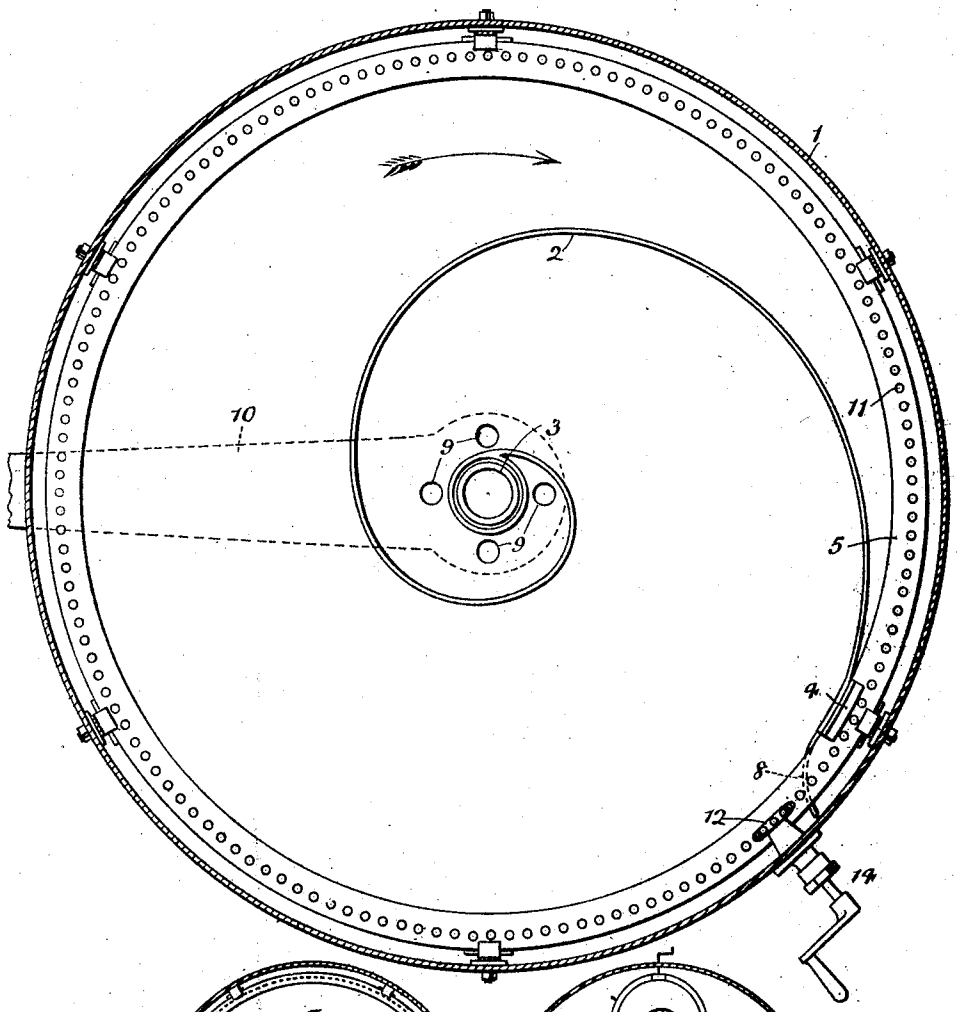


Fig. 5.

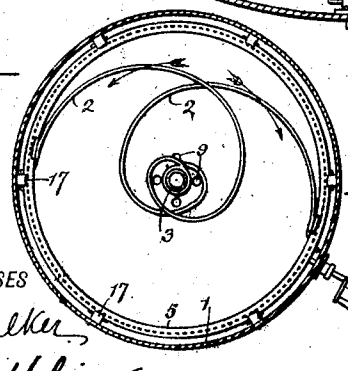
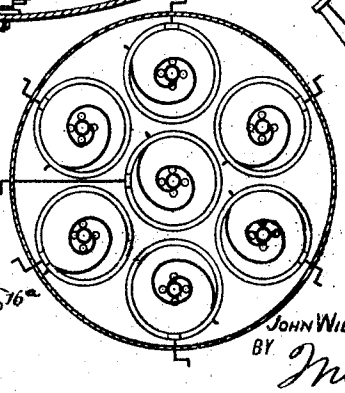


Fig. 6.



WITNESSES

H. T. Walker

Robert I. Hulsizer

INVENTOR

JOHN WILMINGTON FORCE

BY Munn & Co

ATTORNEYS

March 24, 1925. 1,530,659

J. W. FORCE

TANK CLEANING DEVICE

Filed April 15, 1924 2 Sheets-Sheet 2

Fig. 4.

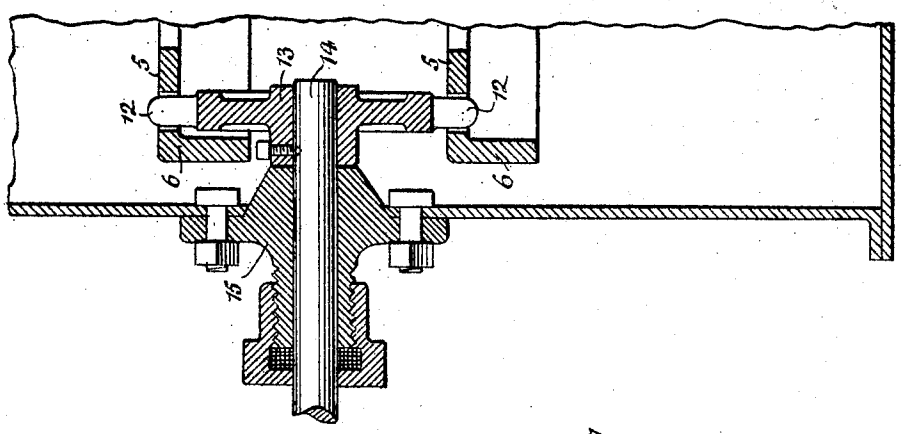


Fig. 3.

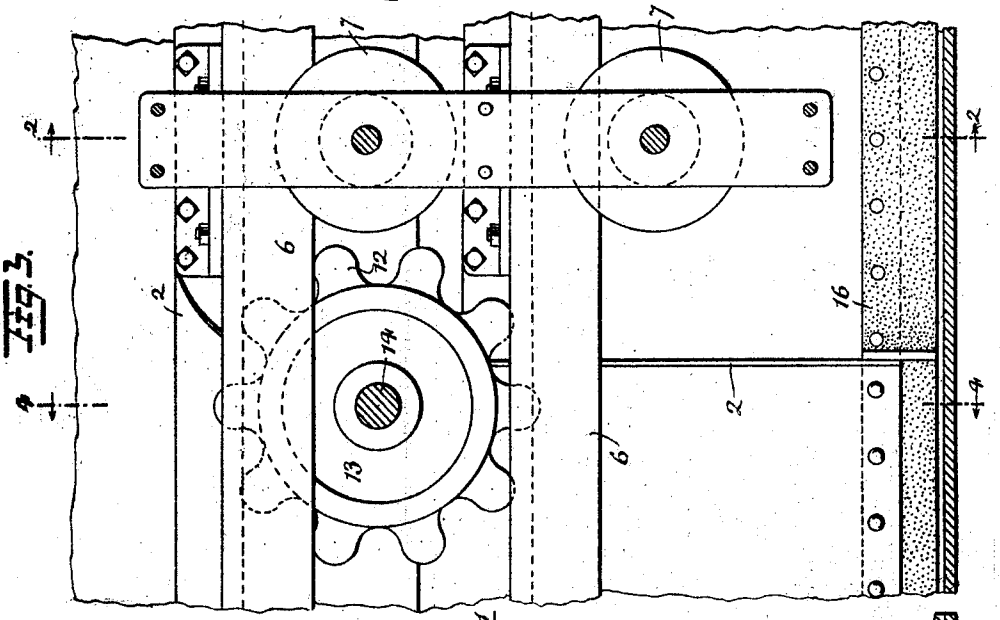
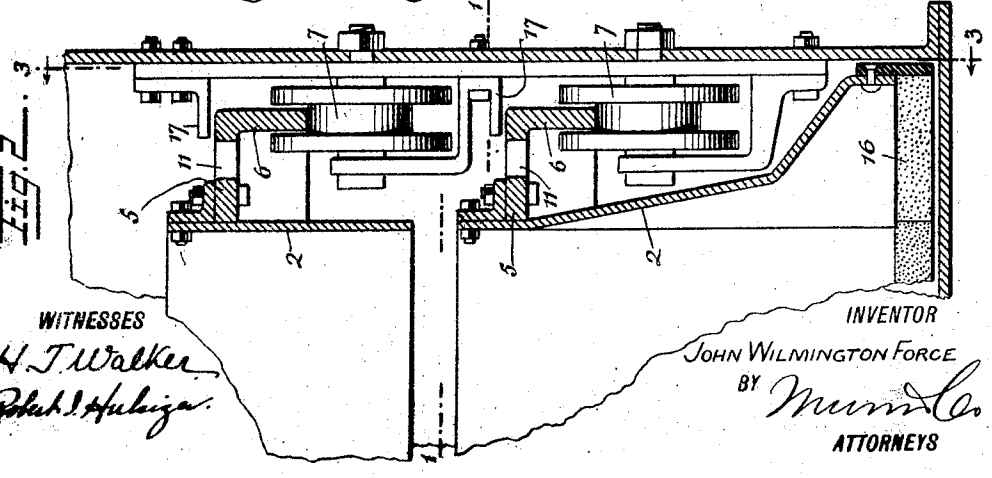


Fig. 2.



WITNESSES

H. J. Walker

Robt. I. Hulsizer

INVENTOR

JOHN WILMINGTON FORCE

BY Munn & Co.

ATTORNEYS

Patented Mar. 24, 1925. 1,530,659

UNITED STATES PATENT OFFICE.

JOHN WILMINGTON FORCE, OF SOUTH BEND, TEXAS, ASSIGNOR OF ONE-FOURTH TO MARTIN M. POTTER AND ONE-FOURTH TO CHARLES O. GIBSON, BOTH OF YOUNG COUNTY, TEXAS.

TANK-CLEANING DEVICE.

Application filed April 15, 1924. Serial No. 706,791.

To all whom it may concern:

Be it known that I, JOHN WILMINGTON FORCE, a citizen of the United States, and a resident of South Bend, in the county of Young and State of Texas, have invented a new and Improved Tank-Cleaning Device, of which the following is a full, clear, and exact description.

This invention relates to a tank cleaning device, and has for an object the provision of a simple, strong and rugged device capable of being readily operated by any ordinary workman from outside a tank for the purpose of quickly and efficiently accomplishing the removal from the tank of any residual material contained therein.

Another object concerns the provision of a simple and efficient device whereby heavy residual material such as settles in an oil and chemical tank can be readily removed.

The invention is illustrated in the drawings, of which—

Figure 1 is a horizontal section taken through the tank;

Fig. 2 is a partial vertical section taken on the line 2—2 of Fig. 3;

Fig. 3 is a section taken on the line 3—3 of Fig. 2;

Fig. 4 is a section taken on the line 4—4 of Fig. 3;

Fig. 5 is a horizontal section taken through the tank employing a modified form of the invention; and

Fig. 6 is a horizontal section taken through the tank in which a still further modified form is shown.

The forms of the invention shown in the drawings are preferred forms, although it is understood that other modifications in the construction and arrangement of the parts and in the character of the materials used may be adopted without departing from the spirit of the invention as set forth in the appended claims.

It has hitherto been a rather difficult, laborious, time consuming and expensive matter to remove residual material from tanks, especially oil tanks or tanks in which chemical liquids, solids or other substances have been stored. Generally the residual material is gummy in character and adheres rather intimately to the walls and on the bottom of a tank so that workmen have had to go into the tank through suitable manholes and scrape the material out. This process is not only difficult for but objectionable to the workmen, consumes considerable time and requires quite a little effort.

I have developed a simple means which can be attached to any tank and which can be operated from outside the tank to quickly and efficiently remove substantially all of the residual material.

The invention considered generally includes the disposition within the tank, or within any particular portion of the tank, of a curved movable vane or blade, the inner end of which is rotatably mounted on a suitable support and the outer end of which is mounted on some suitable carrier which can be operated by suitable mechanism from outside the tank, so that the outer end of the vane is moved around in a circle with the central support having the inner end of the vane or blade as the center, and in so moving, the blade or vane, by reason of its curvature, will act as a sort of plow to move any material with which it comes into contact from the outer portions of the tank toward the center. The tank at the center portion of the space covered by the rotation of the blade is provided with apertures in its bottom through which the material can be discharged either by gravity or other suitable means.

It is within the scope of the invention to employ more than one blade located at different levels within the tank and operable by means of a single actuating device located outside the tank.

The invention as shown in the drawings, which represents one or two preferred forms of the invention, comprises the application to a tank 1 of a curved vane or blade 2 to be disposed within the tank, or within a certain portion of the tank, for the purpose of moving material from the outer portions of the tank to a central portion of the space covered by the blade in its movement so that the material can be removed through suitable openings formed in the tank adjacent or near its central portion. As shown in Fig. 1, the blade or vane is preferably rotatably mounted on the central post 3 and the blade is suitably curved in a somewhat spiral form to its outer end, which is fastened by any suitable clamp 4 to a carrier ring 5. This carrier member or ring 5, as shown in Fig. 1, is provided with a dependent flange

6 (see Fig. 2), and this flange is adapted to ride on a plurality of grooved rollers 7 mounted around the inner periphery of the tank 1 at intervals. The outer end of the blade, as shown at 8, is flared outwardly so as to lie closely adjacent the inner surface of the drum, whereby in rotating the blade the maximum amount of material can be moved from the outer edges of the tank toward the central portion of the tank. In the vicinity of the central portion of the tank, or the central portion of the area covered by the blade 2 in its movement, are disposed a plurality of holes 9, which may be of any suitable size and adapted to receive the material so that it can be moved either by gravity or other means through the bottom of the tank. Beneath the bottom of the tank a chamber, indicated by the dotted lines 10 in Fig. 1, can be formed to receive the discharged material and carry it off to some desired point. In order to move the carrier ring or band 5 it is provided with a plurality of perforations 11 into which the teeth 12 on a cogwheel 13 project. This cogwheel is mounted on a shaft 14 suitably journaled at 15 in the walls of the tank, the outer end of the shaft being provided with any suitable means, such as a handle 16ª, so that it can be turned. It is quite obvious from a consideration of Figs. 2, 3 and 4 that the cogwheel 13 can engage with two carrier bands, one above and one below the cogwheel, as shown in Fig. 4 particularly, so that the two blades connected respectively to the two bands can be operated. This idea is shown more schematically in Fig. 5, the bands operating in opposite directions and encircling the central post or support 3 at different levels.

These two vanes or blades are shown in Fig. 2. This construction is desirable where tanks are even almost full of a thick, gummy sediment and it is desired to quickly move the mass of material toward the center of the tank where it can be withdrawn, preferably by gravity.

The bottom vane, as shown in Fig. 2, is preferably spaced a slight distance above the bottom of the tank to avoid any bolt or rivet heads which may be formed thereon, but is provided with a flexible member 16, suitably connected thereto, which will sweep over these obstructions and yet lie so close to the bottom as to effectively sweep the sediment from the floor of the tank.

As shown in Fig. 2, it will be noticed that flange plates such as 17 are disposed above the carrier plate at the points where they rest on the rollers 7 so as to hold the carrier plates in position on the rollers 7.

As shown in Fig. 6, it may be sometimes desirable to provide a plurality of carrier bands or rings 5 through a tank if the tank is quite large, and to provide a separate handle for each band, and to be operated from without the tank. In this way the entire tank can be quickly cleared of sediment to a major extent, although not entirely.

It will be obvious, therefore, that I have provided a simple, efficient, strong and durable device for removing sediment from a tank, especially viscous sediment, and that the device can be very easily operated by any ordinary workman from without the tank, eliminating to a substantial extent the necessity for workmen to go into the tank to remove the necessary amount of the residue.

What I claim is:—

1. A device for cleaning tanks, which comprises a base or support located within a tank, an inner curved blade rotatably mounted on said support within the tank, a rotatable ring disposed within the tank to which the outer end of the blade is connected, and means connected to the ring and extending without the tank for operating the ring, whereby the blade may be rotated, the curvature of the blade moving the material within the tank from the outer edges to the center, the bottom of the tank adjacent the center of rotation of the blade being provided with apertures for the discharge of the material.

2. A device for cleaning tanks, which comprises a base or support located within a tank, an inner curved blade rotatably mounted on said support within the tank, a rotatable ring disposed within the tank to which the outer end of the blade is connected, and means connected to the ring and extending without the tank for operating the ring, whereby the blade may be rotated, the curvature of the blade moving the material within the tank from the outer edges to the center, the bottom of the tank adjacent the center of rotation of the blade being provided with apertures for the discharge of the material, the outer end of the blade being flared or curved to lie closely adjacent the inner surface of the tank.

3. A device for cleaning tanks, which comprises a base or support located within a tank, an inner curved blade rotatably mounted on said support within the tank, a rotatable ring disposed within the tank to which the outer end of the blade is connected, means connected to the ring and extending without the tank for operating the ring, whereby the blade may be rotated, the curvature of the blade moving the material within the tank from the outer edges to the center, the bottom of the tank adjacent the center of rotation of the blade being provided with apertures for the discharge of the material, the outer end of the blade being flared or curved to lie closely adjacent the inner surface of the tank, the bottom of the blade being spaced flatly above the

bottom of the tank, and a flexible sheet of material fastened to the bottom of the blade to sweep over the bottom of the tank and flexibly pass over any obstructions thereon.

4. A device for cleaning tanks, which comprises a rotatable ring mounted within the tank, means in the tank for supporting said ring, said ring being perforated, a cogwheel, the teeth of which engage in the perforations, a shaft on which said cogwheel is mounted and extending in a leak-tight manner through the walls of the tank, means for operating said shaft to rotate the ring, a curved blade, the outer end of which is connected to the ring, and a supporting member centrally disposed with respect to the center of rotation of the ring, the inner end of the blade being connected to said supporting member.

5. A device for cleaning tanks, which comprises a rotatable ring disposed within the tank, a plurality of rollers supported within the tank, a flange on said ring dependably bearing on said rollers for the purpose of supporting the ring, a plurality of flanged plates disposed above the ring throughout its circumference to keep the ring bearing on the rollers, said ring being apertured, a cogwheel the teeth of which engage said apertures, the shaft on which said cogwheel is mounted extending through the tank wall for operation from without, a curved blade or vane the outer end of which is connected to the ring, and a central support located within the tank adjacent the center of rotation of the ring, to which support the inner end of the blade is connected.

6. A device for cleaning tanks, which comprises a rotatable ring disposed within the tank, a plurality of rollers supported within the tank, a flange on said ring dependably bearing on said rollers for the purpose of supporting the ring, a plurality of flanged plates disposed above the ring throughout its circumference to keep the ring bearing on the rollers, said ring being apertured, a cogwheel the teeth of which engage said apertures, the shaft on which said cogwheel is mounted extending through the tank wall for operation from without, a curved blade or vane the outer end of which is connected to the ring, and a central support located within the tank adjacent the center of rotation of the ring, to which support the inner end of the blade is connected, said tank having a plurality of apertures in its bottom adjacent the central support, the outer end of the blade being flared or curved to lie closely adjacent the inner surface of the tank.

JOHN WILMINGTON FORCE.