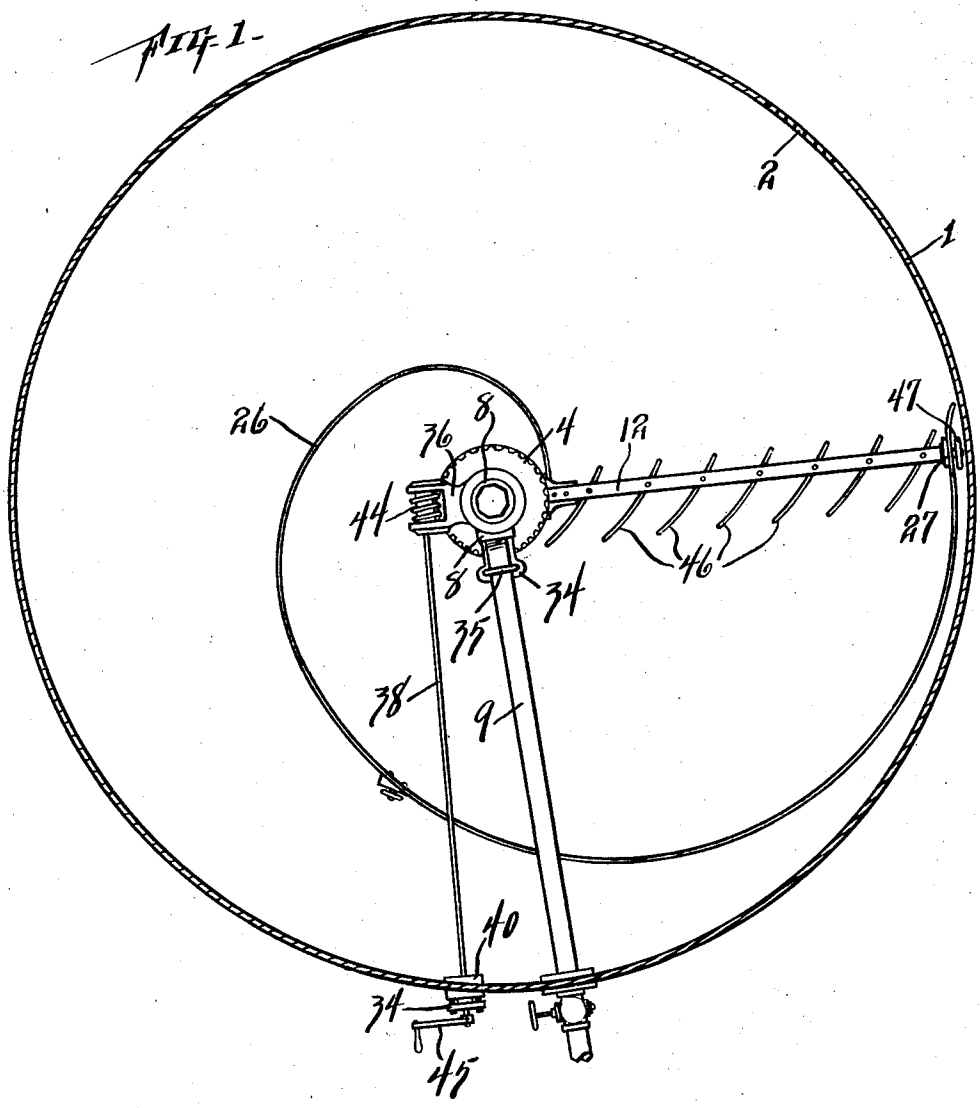
Feb. 1, 1927. 1,616,218

J. W. FORCE

TANK CLEANING DEVICE

Filed June 24, 1926 3 Sheets-Sheet 1

Fig. 1.



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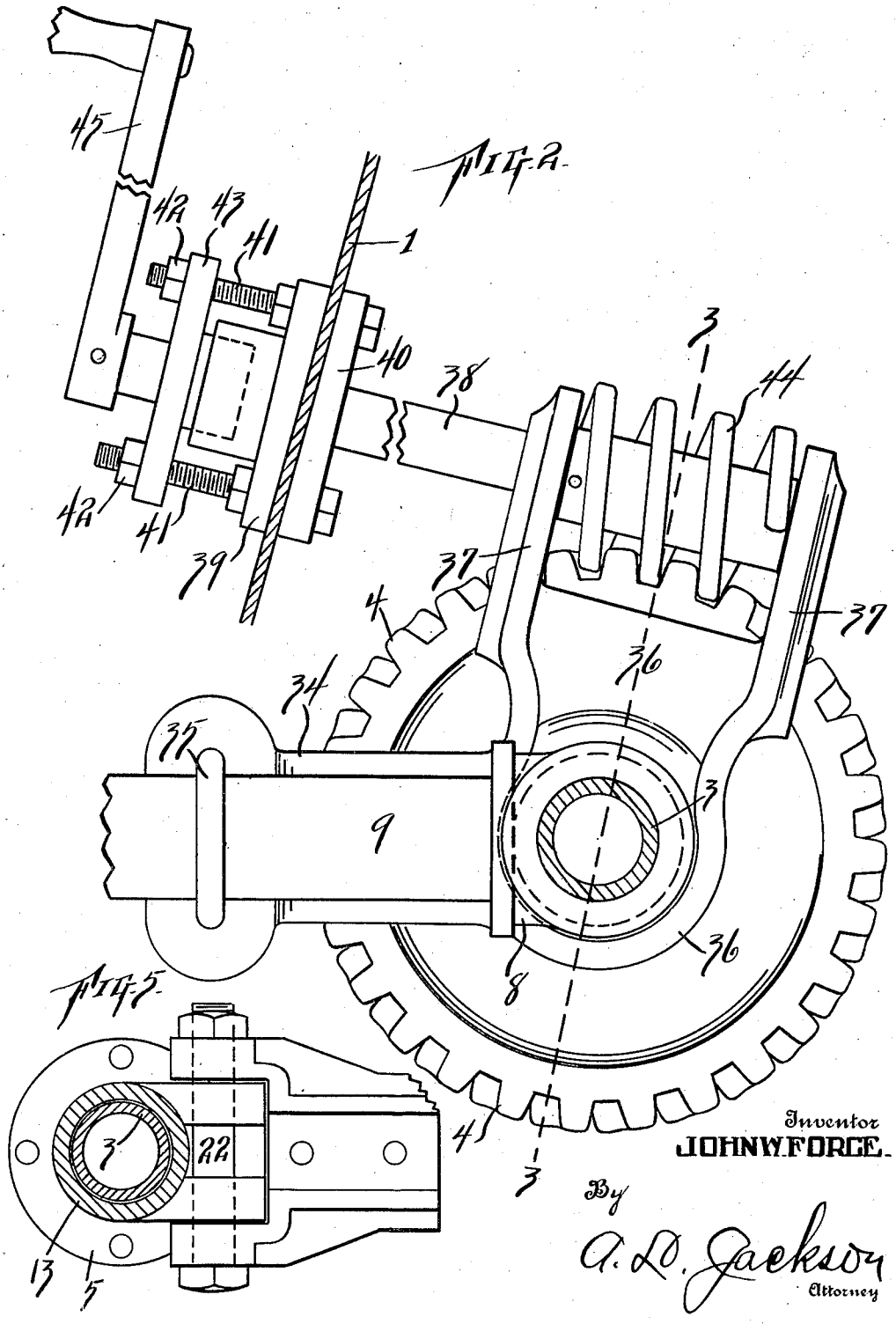
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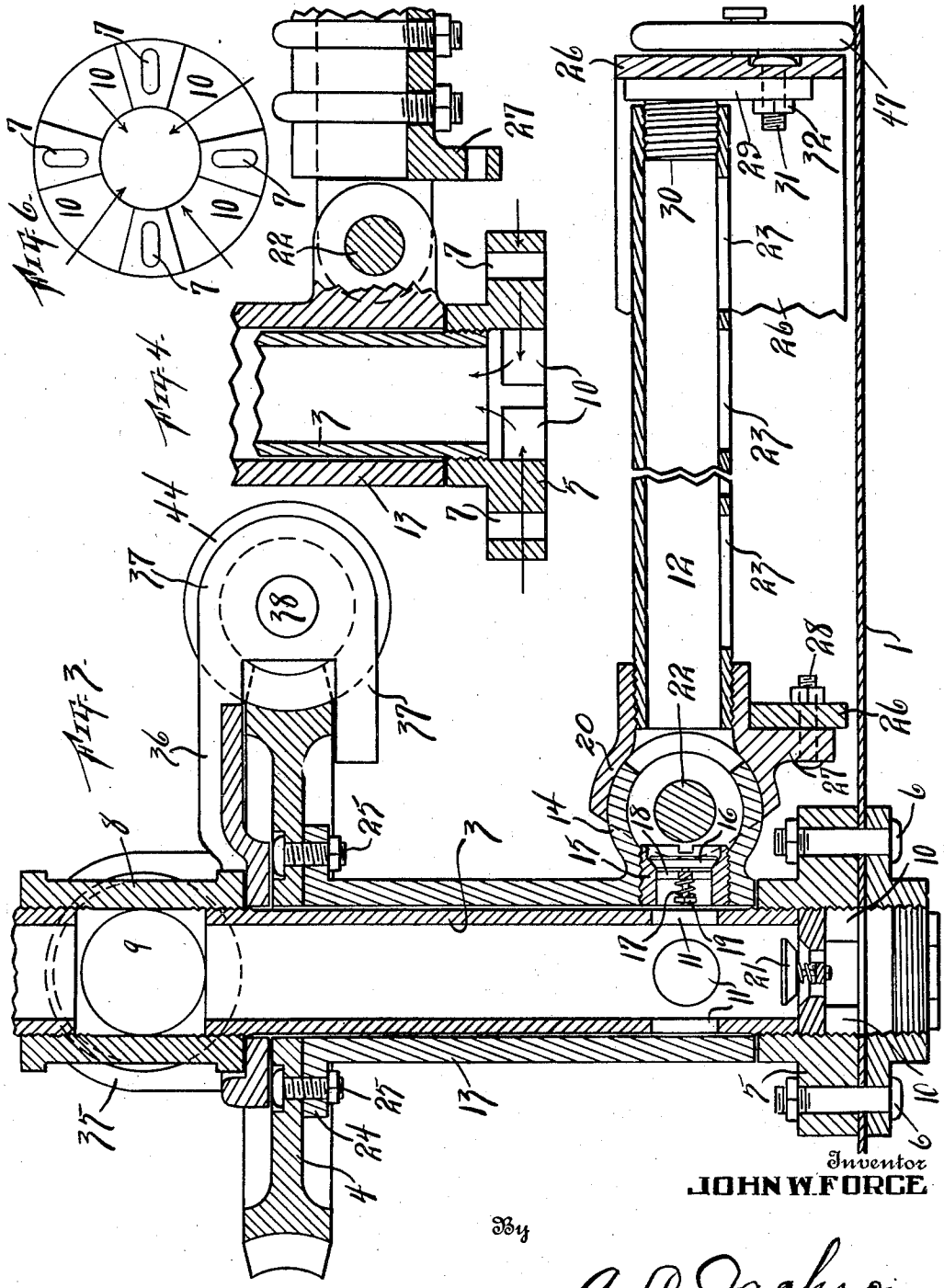
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Patented Feb. 1, 1927. 1,616,218

UNITED STATES PATENT OFFICE.

JOHN W. FORCE, OF CLEBURNE, TEXAS.

TANK-CLEANING DEVICE.

Application filed June 24, 1926. Serial No. 118,394.

My invention relates to tank cleaning devices; and more particularly to means for stirring and releasing sediment in the bottom of tanks, such as oil tanks, water tanks, chemical tanks, and the like, and forcing the sediment towards the central part of the tank and for removing the sediment from the tank and also for utilizing the reverse motion of the mechanism for throwing sediment through a manhole in the side or bottom of the tank, ahd to provide efficient means for carrying out these objects. Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application.

Fig. 1 is a horizontal section of a tank showing the stirring and cleaning mechanism.

Fig. 2 is an enlarged detail view of the stirring and cleaning mechanism.

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

Fig. 4 is a vertical section, taken on similar lines to that of Fig. 3, but showing a variation in the lead shaft.

Fig. 5 is a plan view of the same.

Fig. 6 is an inverted plan view of the standard, showing the passages leading to the vertical pipe.

Similar characters of reference are used to indicate the same parts throughout the several views.

The drawings show a horizontal section of a tank 1 provided with a manhole 2. The manhole 2 may be at any suitable location, either in the side or in the bottom near the side. A vertical discharge pipe 3 serves as a spindle for the worm gearing 4, and serves as an inlet pipe for injection of steam or other element for treating oil or sediment in the bottom of the tank, and also serves as the main discharge pipe for removal of sediment. The pipe 3 is centrally positioned in the tank and is screwed into an anchor 5 which is bolted to the bottom of the tank 1 by means of bolts 6 which pass through elongated holes 7. The holes 7 are elongated for adjusting the pipe centrally on the bottom of the tank 1. A T-pipe 8 is screwed on the upper end of the pipe 3 for making a connection of the discharge pipe 9. The anchor 5 has passage ways 10 for outward passage or discharge of sediment or other material to be removed from the tank. The pipe 9 may also be utilized for injecting steam or other element for treating oil, or chemicals, or sediment. When the steam or other element is injected through the pipe 9, the steam or other element or chemical passes out of the pipe 3 through openings 11 so that the steam or chemical will be injected into the lower part of the oil or sediment near the bottom of the tank. The steam or chemical is distributed from the openings 11 by means of a perforated pipe 12. The gearing 4 is mounted on a sleeve hub 13. The sleeve hub 13 supports a ball and socket joint for connecting the pipe 12 in operative relation to the pipe 3. A ball like member 14 is formed on the sleeve hub 13. A valve seat 15 is screwed into the inner end of the ball like member for an inlet valve 16 which is held normally closed by a spring 17. The stem of the valve 16 projects through a web 18 and the spring 18 is mounted on the stem of the valve between the web 18 and the key 19 on the end of the stem. A socket member 20 engages the ball like member and is screwed on the pipe 12 for supporting the pipe 12 in a horizontal position. The injected fluid will force the valve 16 open against the tension of the spring 17. At the same time, the injected fluid will close the outlet valve 21. When sufficient treating fluid has been injected into the tank and the necessary stirring action taken (as hereinafter explained), the force will be released from injecting the fluid. The position of the valves 16 and 21 will be changed. The valve 16 will be closed and the outlet valve 21 opened. The weight of the oil or other material in the tank will then force the sediment out through pipe 3 and pipe 9 or through the bottom of the tank, the sediment or other material escaping through the passage ways 10. The ball and socket joint, consisting of ball like member 14 and socket member 20 are held in operative relation by a bolt 22. The pipe 12 is provided with elongated perforations 23 for injecting the steam or other treating element into the liquid to be treated. The gear wheel 4 is attached to the flange 24 of the sleeve 13. The pipe 3 serves as a spindle for the rotation of the agitating means.

Means are provided for agitating or stirring the sediment or other material of the tank. An agitator or blade 26 is attached to a flange 27 on the socket member 20 by means of a bolt 28 and is preferably involute

or curved in form. The outer end of the agitator 26 is attached to the flange 29 which is integral with the head of a plug 30 which is screwed into the end of the pipe 12. The agitator 26 is attached to the flange 27 by a bolt 31 with a nut 32. As the agitator is moved about the tank, the sediment or other material will be forced by the shape of the agitator 26 towards the center of the tank. The agitator and the pipe 12 move at the same time. Means are provided for rotating the pipe 12 and the agitator 26. A bearing bracket 36 is mounted on the hub of the gear wheel 4 and this bracket is held in operative relation on the rub of the wheel 4 by the T-pipe connection 8. This bracket bearing has a support 34 for the pipe 9 and the pipe 9 is secured thereto by a U-bolt 35. The bracket 36 has bearing arms 37 for the shaft 38 which is journaled therein and the shaft 38 is also journaled in the bearing 39 which is attached to the tank 1 by a clamping bar 40 and bolts 41 with nuts 42 and clamping bar 43. A worm pinion 44 is rigid with the shaft 38 and meshes with the worm gear wheel 4. A crank 45 is used for turning the shaft 38.

The pipe 12 may be provided with scrapers or stirrers 46 so that there will be double agitation of the sediment or whatever material is to be treated. It is apparent that the pipe 12 may be bent or curved similar to the curvature of the agitator 26 to perform the function of the agitation or stirring. An antifriction roller 47 supports the outer end of the pipe 12.

When the crank 45 is turned, the power will be applied for moving the stirring elements. The power will be transmitted through the gearing 4 and 44, and the sleeve 13 for driving the agitating devices. The material in the bottom of the tank may be simply agitated or stirred without the use of a treating material. But it is apparent that the treating material may be used in combination with the agitating devices.

Various changes in the construction, sizes, proportions and arrangement of the several parts may be made without departing from my invention.

What I claim is,—

1. A tank cleaning mechanism comprising a central spindle and means for anchoring the spindle centrally to the bottom of the tank, a driven gear wheel provided with a sleeve hub rotatably mounted on said spindle, agitating devices carried by said sleeve hub and adapted to move in close proximity to said bottom, a driving gear wheel provided with fixed bearings and meshing with said driven gear, and means extending outside of said tank for actuating said driving gear wheel.

2. A tank cleaning mechanism comprising a central spindle rigidly anchored centrally to the bottom of said tank, a worm gear wheel provided with a sleeve hub rotatably mounted on said spindle, an agitator operatively connected to said sleeve hub and projected outwardly in close proximity to the bottom of said tank, a worm pinion meshing with said worm-gear wheel and provided with bearings supported on the hub of said worm wheel, and means extending outside of said tank for actuating said worm pinion.

3. A tank cleaning mechanism comprising a hollow spindle, an anchoring support for positioning said spindle rigidly to the central portion of the bottom of said tank and provided with passages therethrough communicating with said hollow spindle and said tank, a pipe extending from the outside of said tank and communicating with said spindle, a perforated pipe operatively connected to said spindle and extending radially over the bottom of said tank in close proximity to said bottom, means for rotating said pipe about said spindle, and an agitator carried by said pipe, said spindle having perforations adapted for communicating with said perforated pipe.

4. A tank cleaning mechanism comprising a hollow spindle having perforations near the lower end thereof, an anchoring support for positioning said spindle rigidly to the central portion of the bottom of said tank and provided with passage ways therethrough communicating with said spindle and with said tank, a pipe extending from the outside of said tank to and operatively connected to said spindle for injection and ejection purposes, a pipe operatively connected to said spindle adjacent to said perforations and provided with elongated perforations and extending radially over and close to the bottom of said tank, means for rotating said perforated pipe, and a roller for supporting the outer end of said perforated pipe as it is rotated.

5. A tank cleaning mechanism comprising a hollow spindle, an anchoring support for positioning said spindle rigidly to the central portion of the bottom of said tank and provided with passage ways for liquid therethrough, a worm gear wheel provided with a hub sleeve rotatably mounted on said spindle, agitating means carried by said hub sleeve for sweeping over the bottom of said tank in close proximity thereto, including a perforated pipe operatively connected with said spindle, a bearing bracket operatively connected to the hub of said gear wheel, a worm pinion meshing with said worm gear wheel and provided with a shaft journaled in said bracket, means for driving said worm pinion, and control valves for controlling the injection and ejection of treating material through said spindle and perforated pipe.

6. A tank cleaning mechanism comprising a hollow spindle, an anchoring support for positioning said spindle rigidly to the bot-

tom of said tank and provided with passage ways therethrough communicating with said spindle and said tank, a worm gear wheel provided with a sleeve hub rotatably mounted on said spindle, agitating means carried by said sleeve hub, a bearing bracket mounted on the hub of said worm gear wheel, a worm pinion provided with a shaft journaled in said bracket, means for driving said shaft, a T-pipe screwed down on said spindle and clamping said bracket on the hub of said worm gear wheel, and means for circulating a treating fluid through said spindle and agitating means.

In testimony whereof, I set my hand, this 5th day of June, 1926.

JNO. W. FORCE.