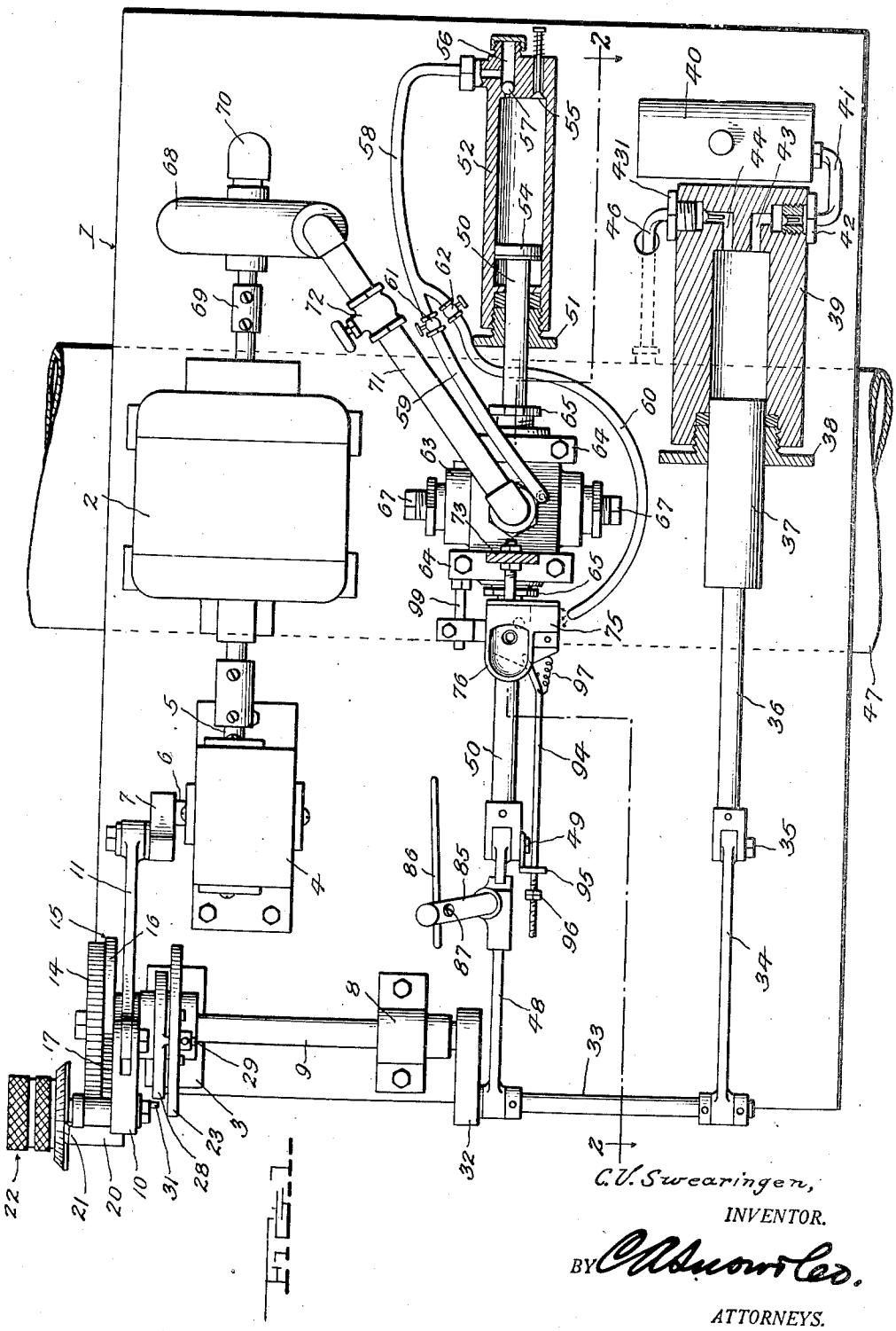
Dec. 5, 1944. C. V. SWEARINGEN 2,364,488

MEANS FOR TREATING FLUID

Filed May 23, 1941 3 Sheets-Sheet 1



C. V. Swearingen,
INVENTOR.
BY Albert Co.
ATTORNEYS.

Dec. 5, 1944. C. V. SWEARINGEN 2,364,488

MEANS FOR TREATING FLUID

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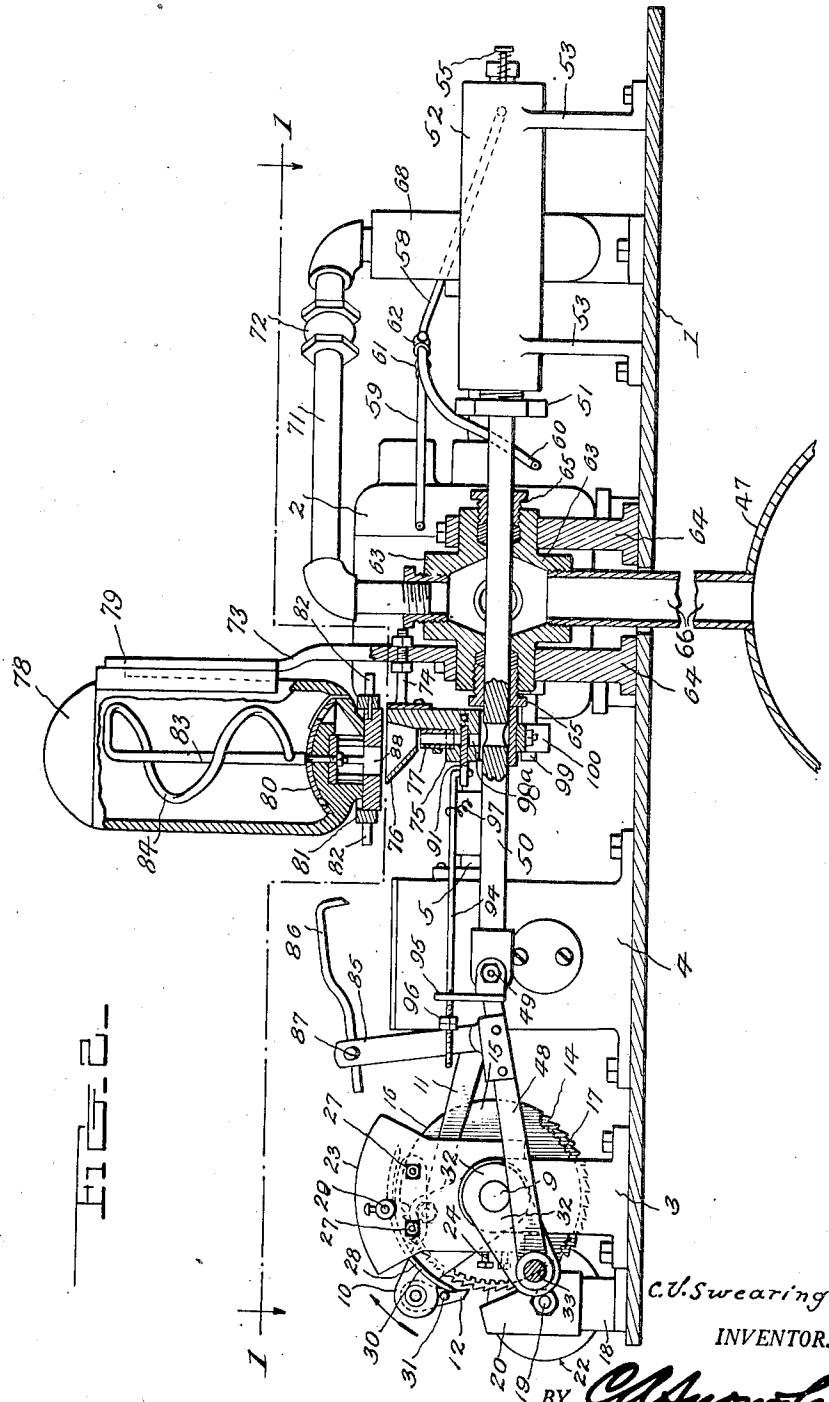


FIG. 2.

C. V. Swearingen,
INVENTOR.
BY C. V. Swearingen.
ATTORNEYS.

Dec. 5, 1944. C. V. SWEARINGEN 2,364,488

MEANS FOR TREATING FLUID

Filed May 23, 1941 3 Sheets-Sheet 3

FIG. 3.

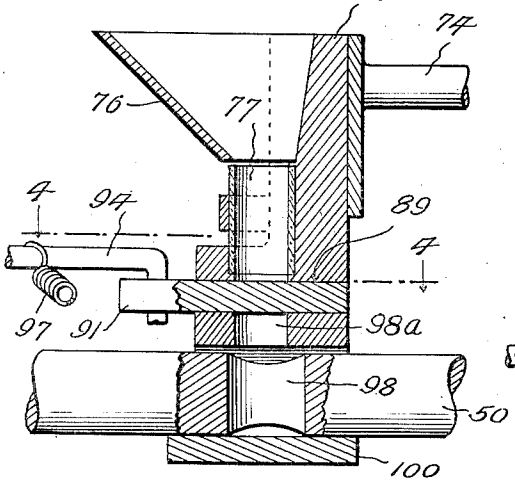


FIG. 4.

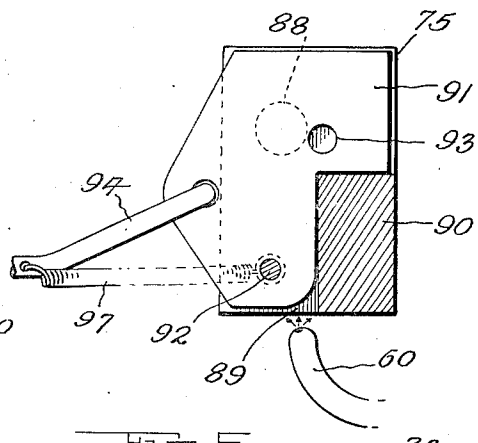


FIG. 5.

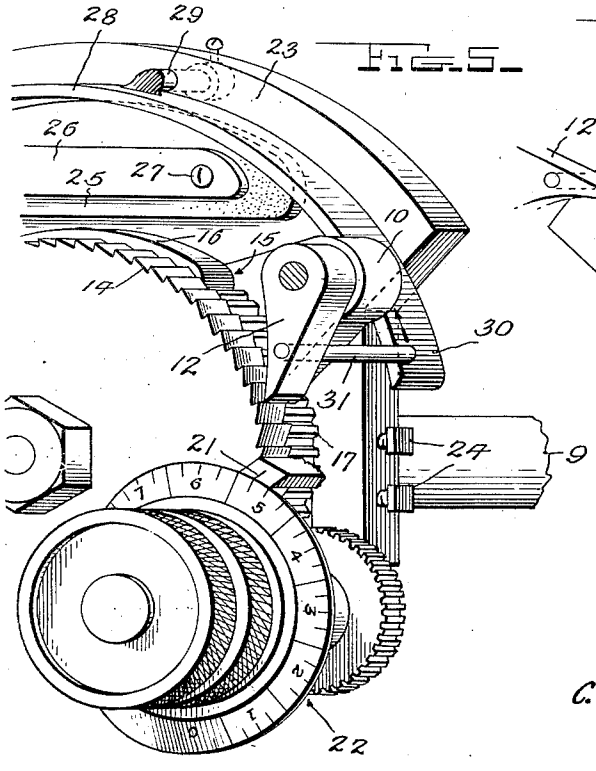
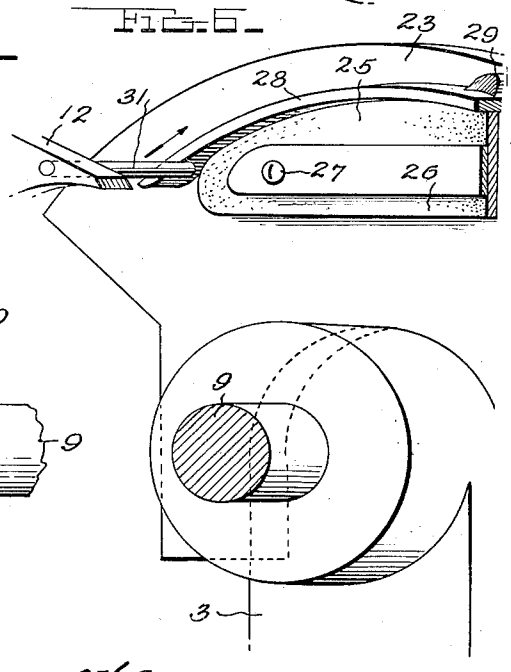


FIG. 6.



C. V. Swearingen,

INVENTOR.

BY Albon & Co.

ATTORNEYS.

Patented Dec. 5, 1944

2,364,488

UNITED STATES PATENT OFFICE

2,364,488

MEANS FOR TREATING FLUID

Clair V. Swearingen, Chattanooga, Tenn.

Application May 23, 1941, Serial No. 394,948

4 Claims. (Cl. 210—40)

The device forming the subject matter of this application is an improvement on the means for treating fluid which forms the subject matter of my prior Patent No. 2,237,851, issued on the 8th day of April, 1941.

In the patented machine, and in the device hereinafter disclosed, a novel means is provided for treating fluids, a somewhat general statement, which will be understood better as the description proceeds. Novel means is provided for delivering material in predetermined quantities, into a fluid, which may be under greater pressure than atmospheric pressure. Novel mechanism is supplied for controlling the delivery of the material and a novel dispensing device is provided, so far as the actuation thereof is concerned.

The present invention aims to provide novel means whereby the machine may be made to operate without noise, especially insofar as a pawl and ratchet mechanism is concerned. Another object of the invention is to improve the gate which controls the flow of one class of material and to provide means for actuating the gate. A further object of the invention is to provide novel means whereby, at the will of an operator, water and air, or either, may be discharged into the material which is used for treating fluid.

A further object of the invention is to provide a machine of the class described, which is adapted to handle treating material either in the form of a liquid or in a dry form.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Fig. 1 shows in top plan, a machine constructed in accordance with the invention, the view, strictly speaking, being a section on the line 1—1 of Fig. 2;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view illustrating the hopper and gate structure and attendant parts;

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

Fig. 5 is a perspective illustrating the silencing means, the feed pawl being in the position in which it will assume as it begins a return stroke;

Fig. 6 is a perspective showing a portion of the mechanism delineated in Fig. 5 as it will appear after the working stroke has been begun.

The frame of the machine comprises a base plate 1, on which is secured a prime mover 2, for instance an electric motor. On the base 1, a speed reduction gearing 4 is mounted. The initial shaft 5 of the speed reduction gearing is coupled to the shaft of the motor 2, the ultimate shaft 6 of the gearing being provided with a crank 7, the shafts 6 and 5 being arranged at right angles to each other.

Bearing posts 3 and 8 are mounted on the base plate 1, adjacent to one end thereof, and in the bearing posts, a driven shaft 9 is journaled for rotation, the shaft 9 being arranged parallel to the shaft 6 of the speed reduction gearing 4.

A radius arm or pawl carrier 10 is mounted to swing vertically on the driven shaft 9, adjacent one end thereof. One end of a pitman 11 is pivoted to the crank arm 7 on the shaft 6 of the speed reduction gearing 4, the opposite end of the pitman being pivoted to the intermediate portion of the radius arm 10. A pawl 12 is pivotally mounted on the radius arm 10 and is adapted to cooperate with a ratchet wheel 14, secured to the shaft 9.

For a purpose which will be made manifest hereinafter, a device for adjusting the extent of movement of the ratchet wheel 14 is provided. The said device includes a disk 15, disposed alongside of the ratchet wheel 14 and mounted for swinging movement, at the will of an operator, on the shaft 9. Throughout a portion of its circumference, the disk 15 is supplied with a smooth track or cam 16, projecting a little way beyond the periphery of the wheel 14, the track having a considerable extent, circumferentially of the ratchet wheel 14. Throughout the remainder of its circumference, the disk 15 is provided with a spur gear 17. A short post 18 is secured on the base plate 1. A horizontal stub shaft 19 is secured in the post 18, and retains upon the post, an angle bracket 20, having an index 21 (Fig. 1). On the stub shaft 19 is mounted a rotatable means 22, under the control of an operator, and cooperating with the spur gear 17 of the disk 15, to rotate the disk, and thereby to adjust the position

of the track 16, circumferentially considered. The rotatable means 22 cooperates with the index 21. The said means 22 need not be described in greater detail, since it is shown and explained in my Patent 2,237,851 of April 8, 1941, as is practically all of the mechanism hereinbefore described.

As the pawl 12 moves backwardly over the ratchet wheel 14, a noise is produced, in the absence of a silencing mechanism next to be described, the noise being regarded as objectionable by some users.

An extension 23 is saddled on the upper end of the post 3, and may be considered part thereof, the extension being held on the post by set screws 24, or in any other appropriate way. A cushion 25, made of rubber, leather or the like, is attached to one side of the post extension 23 by a retaining plate 26 and securing elements 27. An arcuate cam track 28 is disposed above the cushion 25. A short shaft 29 is secured to the intermediate portion of the cam track 28 and is held for rotation in the part 23. The shaft 29 does not divide the cam track 28 into arms of equal weight, the arm 30 being heavier than the other arm, so that the arm 30 tends to rest, by gravity, on the sound-deadening cushion 25, as shown in Fig. 5. The pawl 12 is provided with a lateral projection 31.

Noting Fig. 6, as the pawl 12 is advanced in the direction indicated by the arrow, the projection 31 on the pawl moves beneath the pivotally mounted cam track 28. As the pawl advances, the projection 31 raises the arm 30 of the track off the cushion 25. The projection 31, moving as indicated by the arrow, ultimately clears the end of the arm 30 of the cam track 28, and the arm 30 drops back noiselessly on the cushion 25. The arm 30 now is disposed below the projection 31 of the pawl, as shown in Fig. 5, and as the pawl moves in the direction indicated by the arrow in Fig. 5, the projection 31 rides over the upper surface of the cam track 28, the pawl 12 being lifted clear of the ratchet wheel 14, and no clicking noise being produced. Ultimately, the projection 31 clears the left hand end of the cam track 28 in Fig. 6, and the cam track tilts to the position of Fig. 6, into contact with the cushion 25, the cycle being repeated.

A crank arm 32 is secured to the inner end of the shaft 9 and carries an elongated wrist pin 33, whereon is pivoted a pitman 34, pivoted at 35 to the rod 36 of a piston 37 which is movable through a gland 38 carried by the cylinder 39 of a liquid pump mounted on the base 1. A supply tank 40 is supported from the base 1. A conduit 41 leads from the tank 40 to an outwardly closing check valve structure 42 on the cylinder 39, a port 43 leading from the check valve structure to the bore of the cylinder. A port 44 leads from the bore of the cylinder 39 to an inwardly closing check valve structure 431 on the cylinder 39, and from the check valve structure, a conduit 46 leads to a main 47 disposed below the base 1 and adapted to carry the fluid to be treated, for example water.

The wrist pin 33 carries a pitman 48, which is pivoted at 49 to a piston rod 50, working through a gland 51 in the end of an air pump cylinder 52, supported at 53 from the base 1, the piston of the air pump being marked by the numeral 54. The cylinder 52 is provided with an inwardly opening check valve 55. The cylinder 52 has an outlet passage 56, in which operates an outwardly opening check valve 57. An air conduit 58 leads from the passage 56 and includes branches 59 and 60. A valve 61 under the control of an operator is interposed in the branch 59, the branch 60 has a corresponding valve 62. The branches 59 and 60, and attendant structure, will be discussed hereinafter.

A hollow guide 63 is supported at 64 from the base 1 and has glands 65, through which the piston rod 50 works. The guide 63 is provided with a lower outlet pipe 66, leading to the main 47, the guide being provided with side closure plugs 67, making possible the use of additional outlets.

A rotary pump 68 is mounted on the base 1, and the pump shaft is coupled at 69 to the shaft of the prime mover or motor 2. The intake of the rotary pump 68 is marked by the numeral 70 and derives fluid from the main 47 before the fluid in the main has been treated by material derived either from the pipe 66 or from the conduit 46. The outlet member for the pump 68 is designated by the numeral 71, and discharges into the guide 66. A valve 72, under the control of an operator, is interposed in the pump outlet 71.

To the guide 63 is fixed an upright standard 73, carrying a horizontal stud 74, supporting a hopper bracket 75. The hopper bracket 75 carries a hopper 76, a spout 77 being mounted on the bracket 75, below the hopper 76. A receptacle 78 is detachably connected at 79 to the standard 73. In the bottom of the receptacle 78 is located a dispensing mechanism 80, which need not be described in detail, because it may be of any desired construction. Let it suffice to state that the dispensing mechanism 80 delivers a measured charge of material downwardly into the hopper 76, the dispensing mechanism including a rotary member 81, having outstanding fingers 82. The dispensing mechanism 80 is held for rotation within the receptacle 78, by means of a central post 83, the upper end of the post merging into a spiral agitator 84, disposed about the post. When the dispensing mechanism 80 is rotated, the agitator 84 is rotated also, and the contents of the receptacle 78 will be loosened, so that it may feed downwardly without difficulty.

For the operation of the dispensing mechanism 80, there is provided a means actuated by and mounted upon the pitman 48. The actuating mechanism comprises an upright 85, fixed at its lower end upon the pitman. In the upper part of the member 85, a hook-shaped arm 86 is held by a set screw 87, for longitudinal adjustment. The arm 86 is adapted to cooperate with the fingers 82 of the rotatable member 81, to actuate the dispensing mechanism 80.

In its lower portion, the hopper bracket 75 is provided with an opening 98a, in vertical alinement with the spout 77. Above the opening 98a, the hopper bracket 75 is supplied with a transverse slot 89, defining a stop 90, shown in Fig. 4.

A gate 91 is located in the slot 89 of the hopper bracket 75 and is mounted to swing on a pivot element 92, carried by the bracket. The gate 91 has an opening 93, adapted to come into and out of registration with the opening 98a in the bracket 75.

One end of a connecting rod 94 is mounted pivotally in the horizontally movable gate 91. The piston rod 50 has a laterally offset arm 95, through which the connecting rod 94 is slidable. Nuts 96 are threaded on the connecting rod 94, for adjustment, the nuts being positioned to make contact with the arm 95. One end of a pull spring 97 is connected to the rod 94, the opposite end of the spring being anchored on the hopper

bracket 75. When the arm 95 on the pitman 50 moves away from the nuts 96 on the rod 94, the spring 97 restores the gate 91 to the closed position of Fig. 4, in abutment with the stop 90, the opening 93 in the gate being disposed out of registration with the opening 98a in the bracket 75.

The piston rod 50 serves also as a feeding means for material passing downwardly through the opening 98a in the hopper bracket 75, and with that end in view, the piston rod is provided with a transverse opening 98 for the reception of the discharged material. The guide or casing 63 has a projecting pin 99, on which is mounted a guard 100 which extends under the piston rod 50 and prevents material from dropping out of the opening 98 in the piston rod.

Step by step rotation is imparted to the shaft 9 by a train of parts including the motor 2, the shafts 5 and 6 of the speed reduction gearing 4, the crank 7, the pitman 11, the pawl 12 and the ratchet wheel 14.

By means of the mechanism shown at 22 in Fig. 5 (and not new to this application) the operator can shift the track portion 16 of the disk 15 circumferentially with respect to the ratchet wheel 14, and with respect to the pawl 12. The pawl 12 is adapted to ride on the track 16, and the position of the track, considered relatively to the pawl, determines the number of impulses which the ratchet wheel 14 will receive, in any given time, from the pawl 12. The piston rod or feed slide 50, therefore, may be given any desired number of reciprocations per minute, as a time unit, and, noting the opening 98 in the slide 50, it will be understood that there will be a corresponding number of discharges of material as the slide 50 is reciprocated.

When the shaft 9 is rotated, motion is imparted to the piston rod 36 by parts including the crank arm 32 of the shaft 9, the wrist pin 33, and the pitman 34. The simple pump mechanism and the associated valve structure shown in the bottom portion of Fig. 1, requires no explanation. It will be clear that, when the piston 37 is reciprocated, liquid will be drawn from the tank 40 and be discharged by way of the pipe 46 into the main 47.

When the shaft 9 is rotated, the piston rod and feed slide 50 is reciprocated by way of the crank 32 and the pitman 48. Material located in the opening 98 of the feed slide 50 is advanced into the guide or casing 63 and enters the main 47 by way of the outlet pipe 66.

When the pitman 48 is operated, the hook-shaped arm 86 on the upright 85 engages the fingers 82 on the rotary member 81 of the dispensing mechanism 80, and the material in the receptacle 78 passes downwardly through the hopper 76, the tube 77 and the opening 98a of the hopper bracket 75, into the opening 98 of the slide 50, provided that the gate 91 is opened.

As the slide 50 is retracted, the arm 95 engages the nuts 96 and retracts the connecting rod 94, the gate 91 being swung on its pivotal mounting 92, to bring the opening 93 of the gate into axial alinement with the tube 77 and the opening 98a in the hopper bracket 75, an exit of the material from the hopper 76 into the opening 98 of the slide 50 thus being afforded. The material in the receptacle 78 may be pills, pellets or anything which the receptacle can handle, the receptacle being intended primarily, for holding material of dry constituency.

Sometimes the material discharged into the casing 63, for passage through the pipe 66 may need an addition of water or other liquid. Under such circumstances, the valve 72 is opened, the pump 68 draws liquid from the main 47, by way of the inlet 70, and the liquid is discharged into the casing 63, by way of the conduit 71. The pump 68 is a rotary pump and may be operated within reason if the valve 72 is closed, but it is possible to put the pump out of operation by slacking away the motor coupling 69.

The air pump 54—52 is operated by the slide or piston rod 50, and forces air through the conduit 58 and branch 59, the branch 59 discharging into the casing 63 when the valve 61 is opened. Thus, if the material proceeding downwardly from the casing 63 requires a mixture of air, air is supplied. If both air and water or other liquid are required, then the valves 61 and 72 are opened.

Air can be discharged through the branch 60 of the conduit 58, if the valve 62 is opened. The branch 60 preferably is free at one end, as shown in Fig. 1. The air proceeding through the branch 60 may be used for many purposes. The material discharged from the receptacle 78 may tend to collect moisture, and deposit moisture on the gate 91, but the gate can be kept dry, or be dried off, by air discharged from the branch 60. Moreover, by swinging the gate 91 until the hole 93 is outside of the hopper bracket 75, the hole can be blown clean.

There is an advantage in stopping the downward movement of the material by means of the gate 91. Owing to the fact that the material proceeding from the hopper 76 is held on the gate 91 until the opening 93 is brought into registration with the opening 98a, the material does not have far to fall (Fig. 3) before it enters the opening 98 of the slide 50. There is ample time, therefore, for a charge of material to drop into the opening 98 of the slide 50, and the opening 98 always receives a full charge. In connection with the foregoing explanation, it should be recalled that the slide 50 may be reciprocated at considerable speed.

The machine may be used for treating fluid of any kind, such as sewage, water, either potable or for delivery into a boiler, steam, or industrial waste. A fluid may be treated to render it sterile, or for the purpose of deodorization, and if the fluid is water, a softening operation may be accomplished. The uses mentioned are simply illustrative examples, and impose no restrictions on the use of the device.

Having thus described the invention, what is claimed is:

1. In a machine for treating fluids, a casing having an outlet for treating-material, a feed slide mounted for reciprocation in the casing and having a receiver external to the casing but entering the casing when the slide is reciprocated, a delivery member, means for so mounting the delivery member that it will discharge into the receiver when the slide is operated to dispose the receiver externally of the casing, a gate movably mounted on the delivery member and controlling the flow to the receiver, spring means associated with the gate for closing the gate, a connection assembled with the gate, a part on the slide which receives the connection slidably, and means on the connection wherewith said part of the slide engages, to open the gate, means for operating the feed slide, and means for passing

treating material into the fluid to be treated, as the slide is reciprocated.

2. In a machine for treating fluids, the combination with a guide having an outlet for directing treating material to the fluid to be treated, of means for holding treating material, said means having an outlet, a gate mounted for intermittent movement for releasing material through the outlet, reciprocating means for conducting released material intermittently to the guide, and separate means controlled by said reciprocating means for actuating the gate and for directing air under pressure against the gate, respectively.

3. In a machine for treating fluids, the combination with a guide having an outlet for directing treating material to the fluid to be treated, of a container for holding treating material, said container having an outlet, a gate mounted for intermittent movement across the outlet to intermittently release the treating material, a member mounted for reciprocation for conveying treating material from below the gate to the guide, and means controlled by said member for directing an air jet into the guide onto the treating material delivered thereto.

4. In a machine for treating fluids, the combination with a guide having an outlet for directing treating material to the fluid to be treated, of a container for holding treating material, said container having an outlet, a gate mounted for intermittent movement across the outlet to intermittently release the treating material, a member mounted for reciprocation for conveying treating material from below the gate to the guide, and means controlled by said member for directing an air jet into the guide and onto the treating material delivered thereto, and for delivering a second jet intermittently onto the gate to maintain the gate dry and clean.

CLAIR V. SWEARINGEN.