Dec. 19, 1933. C. WILSON 1,939,938

APPARATUS FOR DOSING LIQUIDS

Filed Dec. 22, 1930 2 Sheets-Sheet 1

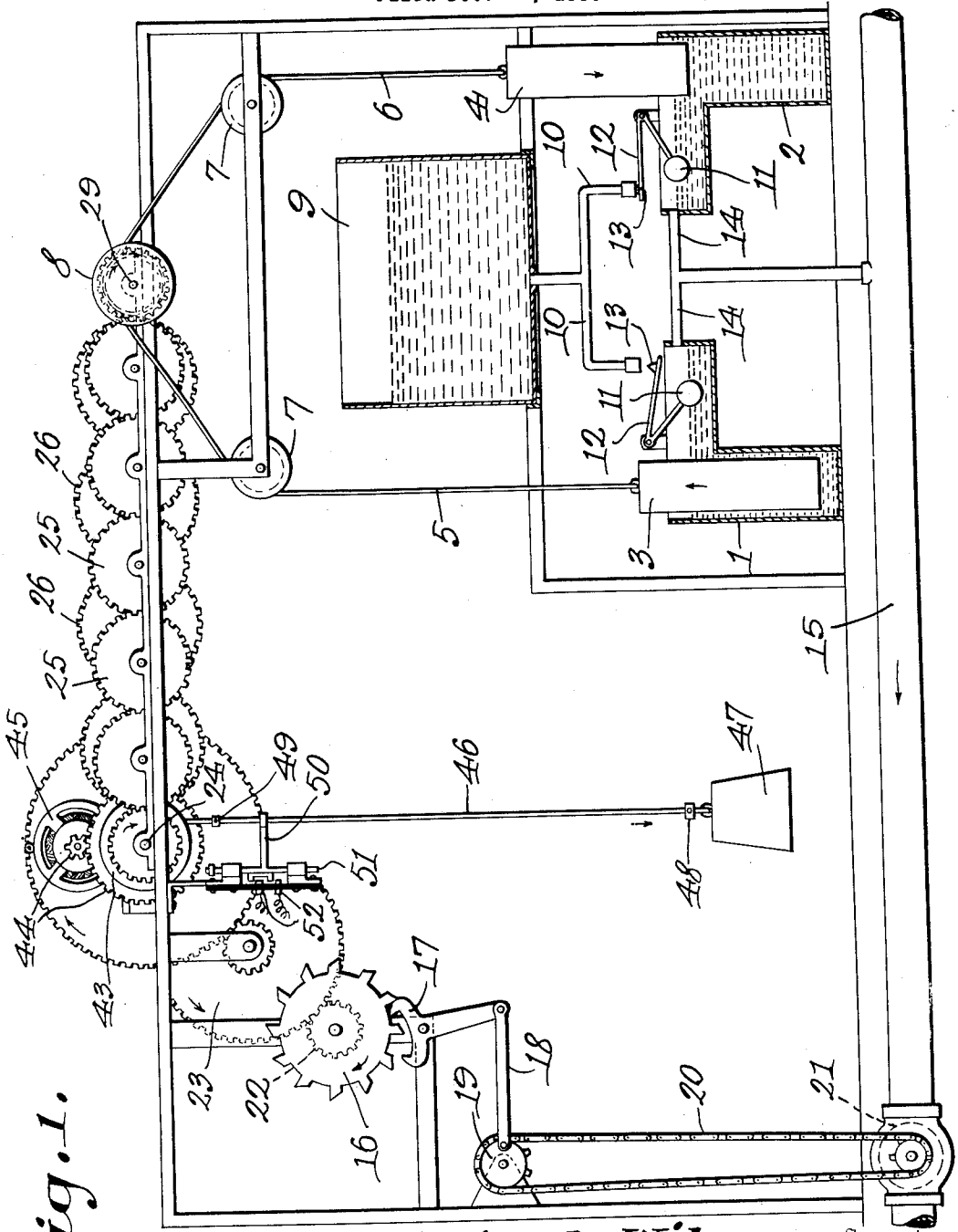


Fig. 1.

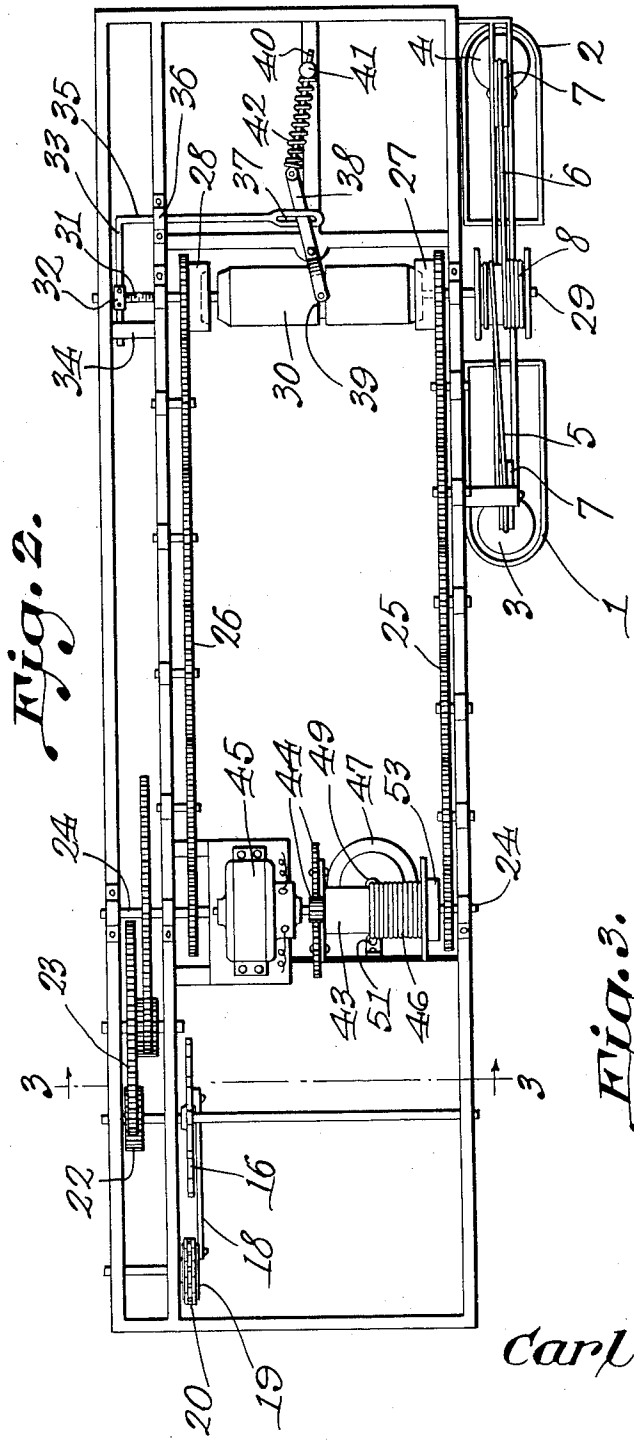
Carl Wilson Inventor

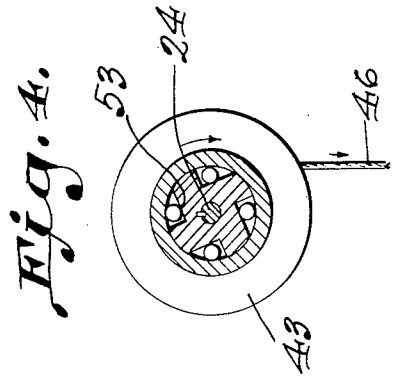
By C. A. Snow & Co.
Attorneys.

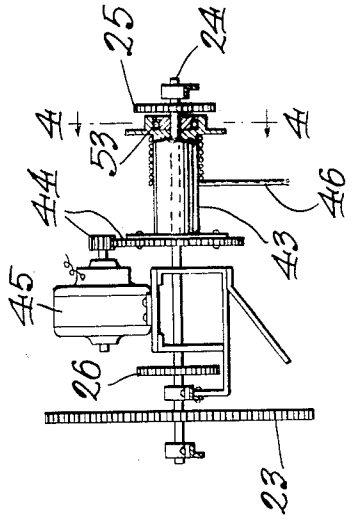
Dec. 19, 1933. C. WILSON 1,939,938

APPARATUS FOR DOSING LIQUIDS

Filed Dec. 22, 1930 2 Sheets-Sheet 2







Carl Wilson Inventor

By Cashow & Co.
Attorneys

Patented Dec. 19, 1933 1,939,938

UNITED STATES PATENT OFFICE

1,939,938

APPARATUS FOR DOSING LIQUIDS

Carl Wilson, Los Angeles, Calif.

Application December 22, 1930
Serial No. 504,140

5 Claims. (Cl. 210—21)

This invention relates to apparatus for feeding chemicals to water, sewage, or other liquid flowing in a fluctuating volume through a pipe, conduit, chamber, treatment plant or the like, one of the objects being to provide means whereby, under all conditions, the chemical delivered to the liquid will be strictly proportioned to the volume of flow thereof.

Another object is to provide an apparatus which will discontinue operation should the flow of liquid cease from any source, the operation being automatically and instantly commenced when the flow of the liquid is resumed.

A still further object is to provide automatically operating apparatus by means of which solutions of one or more chemicals such as chlorine, hypochlorite, ferric chloride, coagulants, softening preparations and the like can be fed at predetermined rates of dosage.

Another object is to provide dosage apparatus of this character which will operate efficiently and automatically under all conditions to maintain the proper proportion of chemicals and liquid under treatment.

With the foregoing 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, the preferred form of the invention has been shown.

In said drawings:

Figure 1 is a side elevation, more or less in diagram, showing the complete apparatus.

Figure 2 is a similar view showing the apparatus in plan.

Figure 3 is a section taken substantially through a portion of the apparatus on line 3—3, Figure 2, showing the winding motor and parts adjacent thereto.

Figure 4 is an enlarged section on line 4—4, Figure 3.

Referring to the figures by characters of reference, 1 and 2 designate displacement chambers which can be of any desired shape and size. Within the chamber 1 is supported a displacement plunger 3 and another displacement plunger 4 is movably supported in the chamber 2. These plungers are supported by cables or other flexible elements 5 and 6 respectively which can be extended over suitable guide sheaves 7 and secured to a drum 8 on which they are adapted to be wound in opposite directions as shown particularly in Figure 2.

A supply tank 9 or other suitable source of treatment liquid is located wherever desired and has means such as pipes 10 for delivering the treatment liquid to the respective displacement chambers. Each of the displacement chambers may be provided with a float 11 connected to a lever 12 carrying a valve 13 so that when the level of the treatment liquid in either chamber falls below a certain point the valve 13 will open to admit a supply of treatment liquid sufficient to raise the float, close the valve and cut off the supply. The parts working in the displacement chambers can all be made of any suitable material capable of resisting the action of the chemicals used for treatment purposes.

Obviously the displacement chambers can be located at any point desired and while they have been shown of the same size, they can be of different sizes and can be provided with separate sources of supply. Each of the displacement chambers has an outlet 14 leading to a pipe, conduit, chamber, treatment plant or the like indicated generally at 15 and through which the liquid to be treated is adapted to flow.

In the operation of this apparatus it is designed gradually to lower one of the plungers into its displacement chamber so as to cause the treatment liquid in said chamber to flow to the outlet 14 in predetermined volume and thence to the liquid conductor 15. One displacement plunger alone can be used for this purpose or two of them can be employed as shown.

It is essential that the displacement of the treatment liquid be proportioned to the volume of flow of liquid to be treated. For this reason some means must be employed under control of the flowing liquid under treatment whereby the operation of the displacement plunger or plungers will be under constant automatic control. Various means may be provided for this purpose. In the present instance there has been shown an escapement wheel 16 the rotation of which is controlled by a pallet 17 adapted to be oscillated by a pitman 18 connected to a rotatable element 19.

The element 19 is driven by chain and sprocket mechanism 20 or other suitable means from a motor indicated at 21 which is to be propelled by the liquid in the conductor 15. This motor can be in the form of a turbine, propeller, pad-

dle wheel or the like capable of being operated by a current of liquid.

A gear 22 rotates with the escapement wheel 16 and transmits motion by any suitable means, such as a train of reduction gears 23 to a shaft 24. This shaft, in turn, transmits motion through trains of gears 25 and 26 to opposed clutch members 27 and 28 respectively which are mounted for rotation on the shaft 29 of drum 8. The gears of one train, 25, act to rotate clutch member 27 in a clockwise direction while the train 26 rotates clutch member 28 in a counter-clockwise direction.

Shaft 29 has a double clutch member 30 feathered on it so as to rotate with the shaft but be capable of sliding thereon. This shiftable clutch member is adapted to engage either of the clutch members 27 and 28 for the purpose of coupling it to shaft 29. One end portion of shaft 29 is screw-threaded as shown at 31. This threaded portion engages and actuates feed nut 32 carried by an arm 33 one end of which slidably engages a guide 34. Arm 33 is extended from a rod 35 which can also be mounted in a guide 36. This rod has a slot 37 through which extends one arm of a shifting lever 38 the other arm of which engages in an annular groove 39 formed in the shiftable clutch member 30.

A rod 40 is pivotally connected to lever 38 and is slidable and mounted to oscillate in a post 41. A coiled spring 42 is mounted on this rod and bears at one end against post 41 and at its other end against lever 30. Thus the spring acts on the lever to hold it in either of two extreme positions.

Mounted for rotation on the shaft 24 is a power drum 43 connected by gears 44 to the shaft of an electric motor 45. A cable or other flexible element 46 is secured to and adapted to be wound on the power drum 43 and supports an operating weight 47. On this cable at points suitably spaced are adjustable collars 48 and 49. The cable 46 works freely within an arm 50 extended between the collars 48 and 49 and projecting from a slidable switch 51. This switch is so constructed that when weight 47 moves downwardly to one extreme position, collar 49 will engage and shift arm 50 and cause the switch 51 to move against contacts 52 so as to close a circuit to the motor 45. Thus motion will be transmitted from the motor through gears 44 to drum 43 which will be rotated on shaft 24 to wind the cable or other flexible connection 46 on the drum. As the weight 47 is brought to the upper limit of its movement the collar 48 will come against arm 50 and shaft 51 to break the circuit to the motor and thereby stop further winding action. The weight can now descend by gravity and will cause the drum 43 to revolve. This drum is connected to the shaft by a ball clutch 53 or the like such as shown for example in Figure 4 so that rotation of the drum under the action of the weight will cause the shaft 24 to rotate and will also transmit motion positively to the escapement wheel 16 and the drum 8.

Obviously the pallet 17 limits the speed of rotation of the escapement wheel and, consequently, the speed of descent of weight 47 and of one of the displacement plungers. This escapement wheel can only rotate at a speed dependent on the speed of oscillation of the pallet and this action, in turn, is controlled by the speed of the motor 21. Thus the parts can be so timed with respect to the volume of flow of liquid within the conductor 15 as to insure delivery to said liquid of one or more chemicals in proper proportion to the volume of liquid flow. As one displacement plunger is descending and its supporting connection 5 or 6 is being unwound, the other plunger will be elevated. At the same time the feed nut 32 will be moved longitudinally of the shaft 29 until the end of slot 37 comes against lever 39 and pushes it past its dead center. Immediately thereafter the spring 42, which has been placed under compression, will act to snap lever 38 to the other limit of its movement and throw the shiftable clutch member 30 into engagement with the other clutch member 28 or 27. Consequently the direction of rotation of shaft 29 will be reversed, the movement of the displacement plungers will be reversed, and the feed nut will start back in the opposite direction. After a predetermined period of movement the same action will take place to again reverse the movement of the parts.

During all of the foregoing operations the weight 47 is pulling steadily on drum 43, causing it to rotate intermittently at the speed permitted by the escapement mechanism which, in turn, is controlled by the liquid flow in conductor 15. Should the flow of liquid slow down or accelerate, the speed of movement of the controlled mechanism will correspondingly slow down or accelerate. Should the flow of treated liquid cease, the movement of the pallet would cease and all of the mechanism would stop operating. However, when the flow again starts the mechanism controlled thereby will also begin to move and the dosing of the liquid will begin.

When weight 47 reaches the lower limit of its movement, its flexible support 46 will be rewound and the weight elevated as has already been explained. This can be done very quickly and will interfere little if any with the correct proportional dosage of the treated liquid.

It is to be understood that the illustrations herewith presented are more or less in diagram and the mechanism used can be widely varied without departing from the invention as claimed. Instead of utilizing two displacement chambers, each with a displacement plunger, one or several such chambers can be employed and, instead of supplying one or more chambers with the same chemical preparation, each can be furnished with a dosage material differing from the others.

What is claimed is:

1. Apparatus for dosing liquid including a displacement chamber for holding treating material, displacement means movable into said chamber, a motor for receiving power solely from a source independent of the liquid under treatment, said motor constituting means for driving the displacement means, means for conducting displaced material from said chamber to the liquid under treatment, and means operated by said liquid for controlling the speed of operation of the motor.

2. Liquid treatment apparatus including a displacement chamber having an outlet to flowing liquid under treatment, means for supplying treating material to the chamber, means for shutting off the supply when the treating material is brought to a predetermined level, displacement means for ejecting material from the chamber to the outlet, a motor for receiving power solely from a source independent of the liquid under treatment, said motor constituting means for driving the displacement means, and

means actuated by the liquid under treatment for controlling the speed of operation of the motor and displacement means.

3. Liquid treatment apparatus including a displacement chamber having an outlet to flowing liquid under treatment, means for supplying treating material to the chamber, means for shutting off the supply when the treating material is brought to a predetermined level, displacement means for ejecting material from the chamber to the outlet, and means actuated by the liquid under treatment for controlling the operation of the displacement means, to supply treatment material to the liquid in constant proportion to the volume of flow of said liquid, said means including a power driven mechanism for operating the displacement means, an escapement actuated by said mechanism, and a motor driven by the treated liquid for controlling the escapement.

4. Liquid treatment apparatus including a displacement chamber having an outlet to a conductor for flowing liquid, a displacement plunger in the chamber, power driven mechanism for raising and lowering the plunger, means operated by the actuation of the plunger for reversing the power driven mechanism, an escapement operated by said mechanism, and means controlled by the flowing liquid for regulating the operation of said mechanism.

5. Liquid treatment apparatus including displacement chambers for holding treating material, said chambers having outlets for delivering material to liquid to be treated, plungers mounted in the respective chambers, power driven reversing mechanism for raising and lowering the plungers alternately, means controlled by the liquid under treatment for controlling the speed of said mechanism, means including an escapement mechanism operatively connected to the power driven mechanism and a motor operatively connected to the escapement mechanism for actuation by the liquid under treatment.

CARL WILSON.