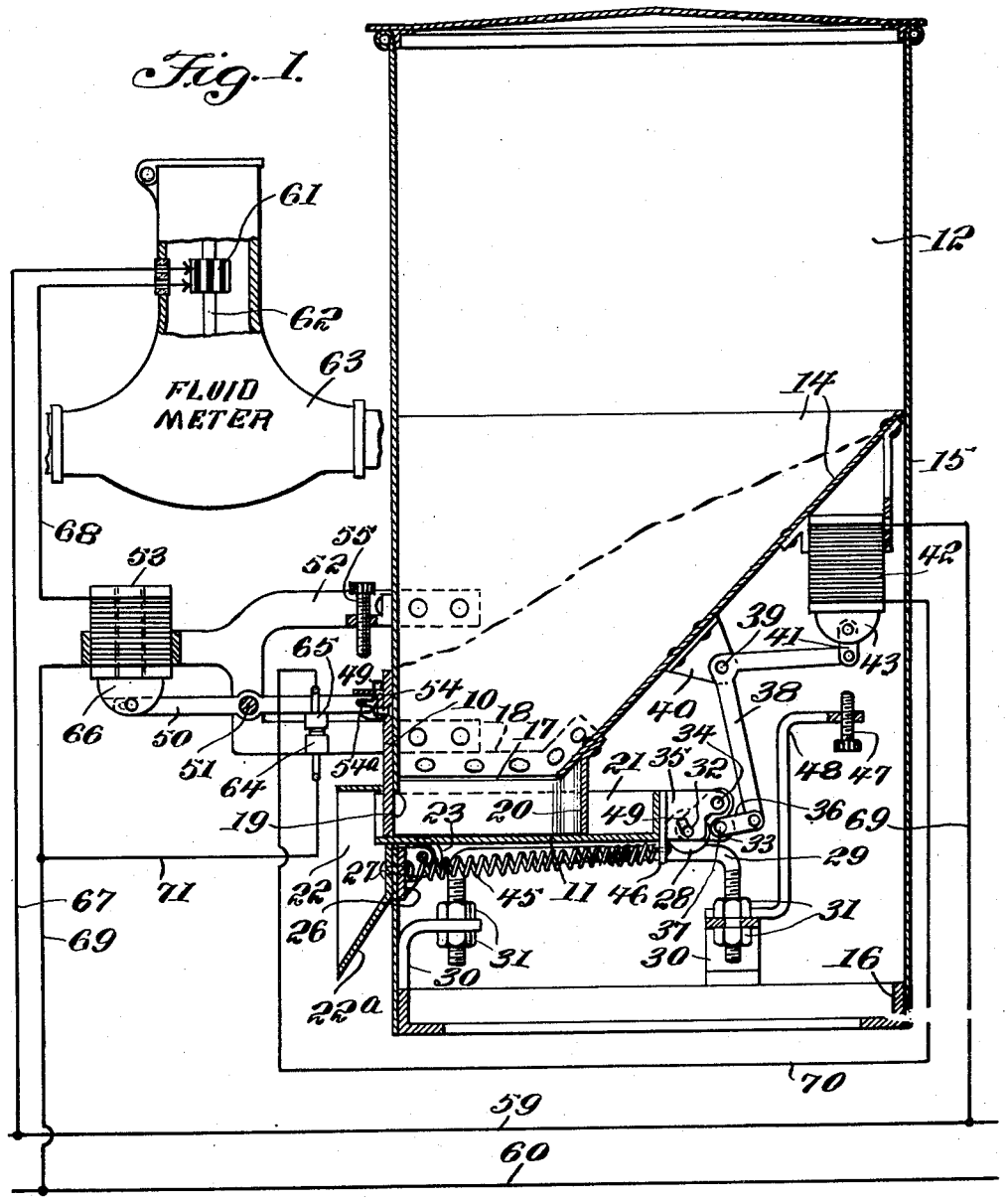
June 23, 1936. J. B. WADE 2,045,502

PROPORTIONATE FEEDING DEVICE

Filed June 18, 1934 3 Sheets-Sheet 1

Fig. 1.



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PROPORTIONATE FEEDING DEVICE

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Fig. 2.

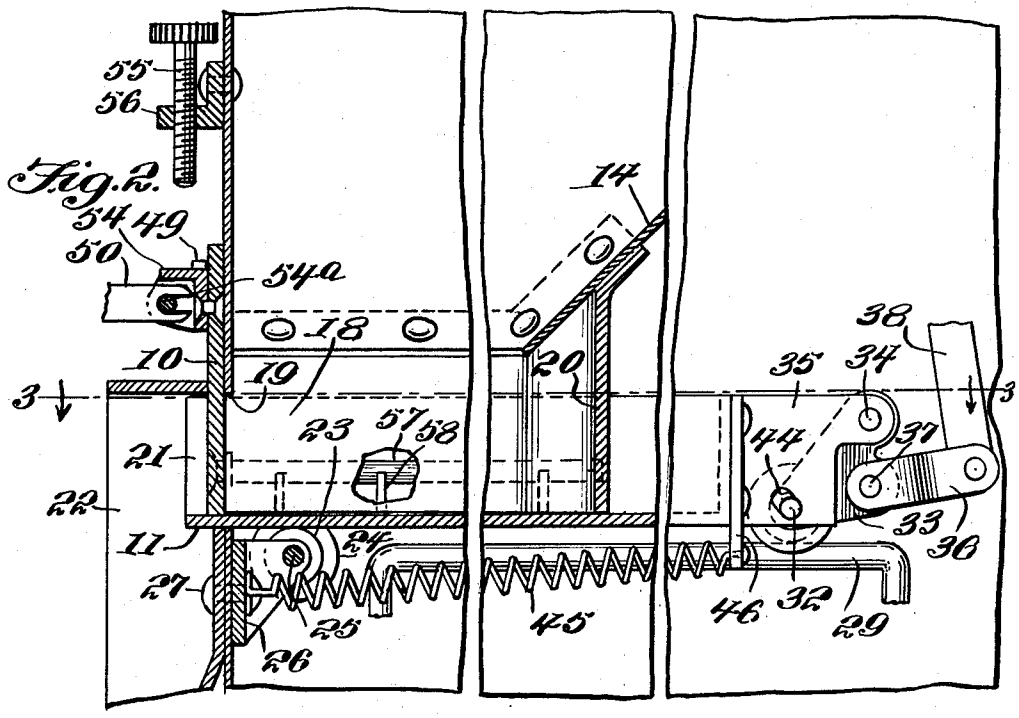
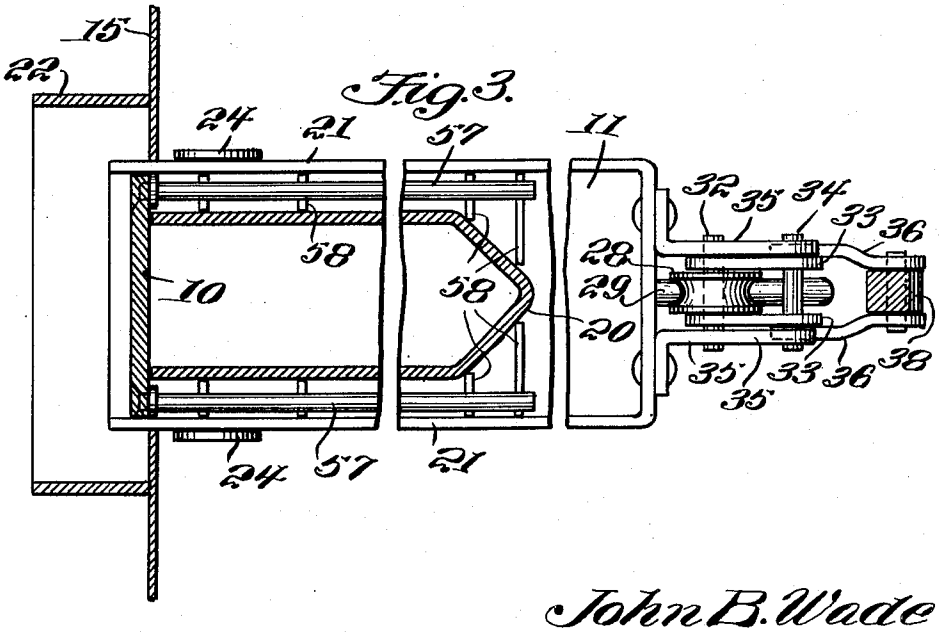


Fig. 3.



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Fig. 4.

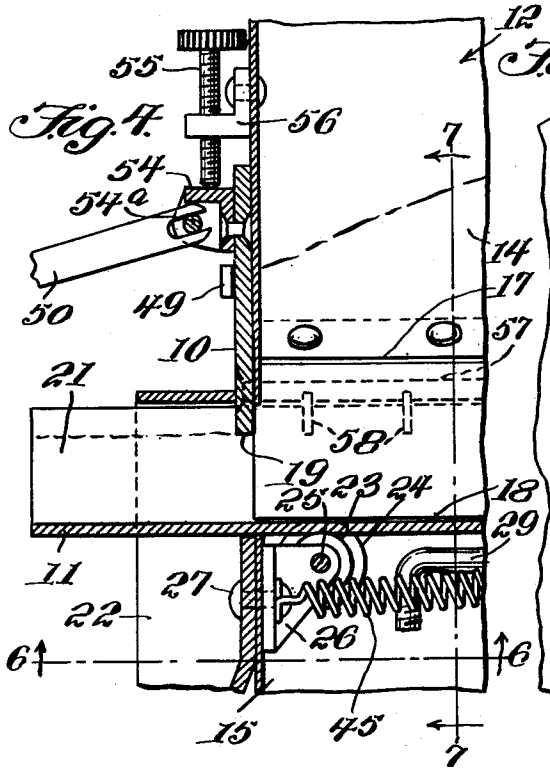


Fig. 5.

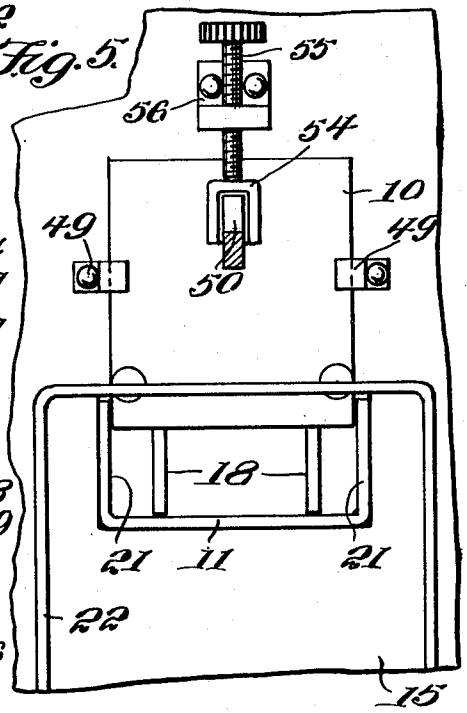
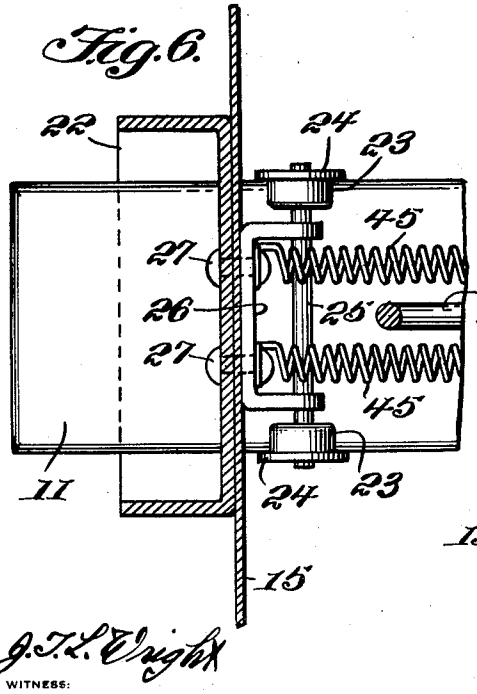
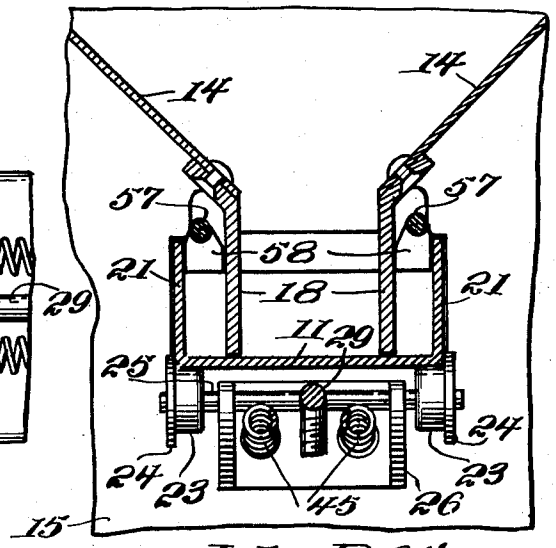


Fig. 7.

Fig. 6.





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UNITED STATES PATENT OFFICE

2,045,502

PROPORTIONATE FEEDING DEVICE

John B. Wade, Los Angeles, Calif., assignor of one-half to Henry J. McKenzie, San Marino, Calif.

Application June 18, 1934, Serial No. 731,150

7 Claims. (Cl. 221—126)

The object of the invention is to provide a means for automatically effecting the charging of water systems with an amorphous chemical substance, so that a prescribed amount may be injected and that in accordance with the rate of movement of the water; to provide a device of the kind indicated in which adjustment is provided to quickly secure a setting for the desired quantity to be injected in each operation; to provide an automatic chemical injector whose operation is controlled from a water meter or other device operated in timed relation to the movement of the water; and generally to provide a device of the kind mentioned which is of simple form, susceptible of cheap manufacture and of a character to readily permit its installation without particular skill on the part of the person making the installation.

With this object in view, the invention consists in a construction and combination of parts of which a preferred embodiment is illustrated in the accompanying drawings, wherein:

Figure 1 is a central vertical sectional view through the invention.

Figure 2 is an enlarged detail sectional view of the hopper discharge mouth and associated ejector pan.

Figure 3 is a sectional view on the plane indicated by the line 3—3 of Figure 2.

Figure 4 is a detail sectional view similar to Figure 2 but showing the extended position of the chemical ejecting pan.

Figure 5 is a detail front elevational view of the chemical retaining hopper in the region of the gate controlling the discharge.

Figures 6 and 7 are sectional views on the planes indicated by the lines 6—6 and 7—7 of Figure 4.

The operation of the invention is controlled by the coordinated action of the gate 10 and pan 11, the latter being at the lower end of the discharge mouth of the hopper 12 formed by the application of inclined plates 14 within the tank 15 at an intermediate point in the height of the latter. The space above the plates 14 constitutes the hopper while the walls of the tank below the plates constitute the supporting means for the hopper and these walls at their lower ends are reinforced with the angle bars 16, so that appropriate means may be provided for disposing the tank on a foundation or connecting it with legs or whatever means of support are desired.

The plates 14 are arranged at a downward inclination and in converging planes, their lower edges together with the front wall of the tank defining a discharge opening 17 rectangular in shape and which is bounded with a pendent flange 18, except on the forward end, where the wall of the tank is formed with a rectangular opening 19. The flange 18 is extended back of the rear edge of the opening 17 and thereat is arranged on converging lines, as indicated at 20.

The pan 11 is of considerably greater area than the opening 17 and the space bounded by the flange 18, exceeding said space both in length and width. The flange 21 which bounds the pan is omitted from the front end of the latter, so that when the pan, having received a charge of material through the discharge opening 17, may, when moved forward, carry that material through the opening 19 when the gate 10 is elevated and have the material swept off in the return movement, after the gate shall have been returned to its lowered position.

The tank on the front and in bounding relation to the opening 19 is provided with a flange 22, the lower section 22a of which is inclined downwardly to provide a means for directing the discharged material away from the front wall of the tank and into the main, or pool, into which it is desired the material shall be deposited. The gate 10 moves through an appropriate clearance opening in the top section of the flange 22.

The pan 11, at its forward end is supported on the rollers 23, flanged on their outer sides as indicated at 24, so as to bear against the sides of the pan and thus prevent lateral movement of the latter. The rollers are mounted on a shaft 25 journaled in the angular ends of a bracket 26 secured by fasteners 27 to the front wall of the tank below the hopper section 12. At the rear, the pan is supported on a roller 28 peripherally grooved, so as to ride on the rail 29, the latter being horizontally arranged with its extremities downturned to enter brackets 30 disposed just above the angle bars 16. Lock nuts 31 arranged above and below the brackets and threadingly engaged with the downturned ends of the rail secure the latter in position and provide for vertical adjustment of the rail.

The roller 28 is not directly connected with the pan but is journaled on a pin 32 spanning the angular plates 33 adjacent one corner of the same, these plates being connected at another corner with a pin 34 which is journaled in the remote ends of angular brackets 35 secured to the rear section of the flange 21. The brackets 35 are cut away below the point where the pin 33 is journaled in them to provide a clearance space for the links 36 which are disposed on opposite sides of the assembled plates 33 and connected with the pin 37 which has a pivotal mounting in the plates. The links are connected with the extremity of a bell crank lever 38 fulcrumed at 39 on a bracket 40 on the under side of the rearwardly inclined plate 14. The force arm of the lever 38 is connected by a link 41 with the core of a solenoid 42, the head of the core being enlarged as indicated at 43 to provide weight to insure dropping of the core when the solenoid is de-energized. The sole-

noid is appropriately supported on brackets on the rear plate 14.

The pin 32 on which the roller 28 is mounted extends through arcuate slots 44 in the angular brackets 36. This construction provides relative movement between the pan and the roller 28. When the pin 32 is in the lower ends of the slots 44, the pan is elevated until the bottom wipes the lower edge of the flange 20. When the pin is in the top ends of the slots, the pan drops out of contact with the edge of said flange. The relative disposition of the pins 34 and 32 provides for moving the pin towards the lower ends of the slots when the pan is moved outwardly, so that its bottom is swept by the edge of the flange 20 in this operation. In the reverse movement, the tendency of the pin 32 is to move towards the upper ends of the slots, when the pan drops out of contact with the lower edge of the flange 20.

The forward movement is imparted to the pan through the instrumentality of the tension springs 45 anchored one end to the fasteners 27 and the other ends to pendent extremities 46 of the angular brackets 36. The return movement or retraction of the pan is effected through energizing the magnet 42 which, upon attracting its core, will effect an upward pull on the force arm of the bell crank lever 38, creating an inward pull on the resistance arm.

The extent to which the pan may be projected in its forward movement is determined by the setting of the adjustment screw 47 which is threaded through the extremity of a bracket arm 48 mounted on one of the brackets 30, the upper end of this screw being in the path of movement of the lower end of the link 41. Thus the setting of the screw will determine the point to which the extremity of the force arm of the lever 38 may be lowered and thereby determine the extent to which the pan may be projected.

The gate 10 is mounted behind guides 49 secured to the front of the tank, these guides together with the slot in the upper section of the flange 22 maintaining the gate in a vertical plane during its opening and closing movements. The gate is either opened or closed by imparting rocking movement to the lever 50, fulcrumed, as at 51, on a bracket 52, the latter also serving as a support for the solenoid 53. The extremity of the resistance arm of the lever has a pin and slot connection 54a in the lug 54 secured to the gate. The gate is normally elevated to open position by the gravital tendency of the force arm of the lever but is moved to closed position by the pull applied to said force arm through the medium of the solenoid 53. The extent of opening movement to be imparted to the gate is determined by the adjustment of the screw 55 threaded through an angular bracket 56 mounted on the front of the tank, the lower end of the screw being so disposed that the lug 54 will abut it. Both the screws 47 and 55 are provided with milled heads so that they may be manually adjusted.

The gate 10 has secured to it the inwardly extending rods 57 which are disposed between the flange 20 and the side sections of the flange 21. These rods 57 carry the spaced plates 58 which bear on the bottom of the pan when the gate is in closed position. The function of these plates is to preclude any accumulation in the back of the pan of the material or chemical being dispensed or ejected. Particles of the material are bound to pass under the lower edge of the flange 20 and find their way onto the bottom of the pan outside of the flange and this material would gradually accumulate in the back of the pan, thus precluding its continued operation. With the plates 58, however, this material is prevented, after having moved to points outside of the flange 20, from moving in the direction of the movement of the pan. That is, they are held stationary relative to the flange 20 on the backward movement of the pan, so that when the gate is elevated these piles of excess material are carried forward with the pan and wiped off by the gate after it is lowered and followed with the return of the pan to its retracted position.

The magnets 42 and 53 are energized from any appropriate source over conductors 59 and 60, the circuit on the magnet 53 being controlled by a commutator 61 mounted on the recording shaft 62 of a fluid meter 63. The commutator is composed of alternate conducting and non-conducting segments and parallel brushes are in superficial contact with it, the commutator and brushes being in series with the magnet 53. The circuit of the magnet 42 is controlled by a circuit closer actuated by the lever 50, this circuit closer consisting of a fixed contact 64 mounted on the bracket 52 and a movable contact 65 mounted on the lever 50.

The core of the magnet 53 is enlarged as indicated at 66 to provide sufficient weight to depress the lever when the magnet is de-energized and effect elevation of the gate 10. By this arrangement, the magnets 53 and 42 are coordinated, so that there will follow energizing of the magnet 53 by reason of the brushes passing on a conducting segment of the commutator 61, being followed with the energization of the magnet 42 by the engagement of the contacts 65 and 64.

The invention operates in the following manner. Let it be assumed that a swimming pool or the like is to be charged with a chemical conventionally used. The hopper 12 is charged with a supply of chemical and the fluid meter is inserted at a point where it will indicate the intake of water. Normally the gate 10 is open and the pan 11 is retracted. Part of the contents of the hopper will find its way onto the pan through the opening 17 and as the indicating shaft 62 of the meter rotates, the brushes bearing on the commutator will be bridged by a segment of conducting material, whereupon current will flow, say, from the conductor 59, over the conductor 67 to the commutator, thence over the conductor 68 to the magnet 53 and thence over the conductor 69 to the conductor 60. The magnet 53 will thus be energized and the resistance arm of the lever 50 will be depressed, so that the gate will remain closed. But in this position of the lever 50, the contacts 64 and 65 will be engaged and the magnet 42 will thus be energized, current flowing, say, over the conductor 59 to the magnet 42, thence over the conductor 70 to the contact 65, thence from the contact 64 to the conductor 71, to the conductor 69 and thence back to the conductor 60. When the commutator 61 has advanced to the point where the brushes are brought onto an insulating segment, the circuit on the magnet 53 will be broken and the core of the magnet 53 will drop, its weighted head portion 66 depressing the force arm of the lever 50 and thereby elevating the resistance arm and with it the gate 10. But this operation is attended with the separation of the contacts 65 and 64, so that the circuit on the magnet 42 will be broken, when the springs 45 will be free to act and will project the pan 11, the gate 10 being then out of obstructing position. The material will thus be held on the pan projected from the front wall of the tank until

the shaft 62 shall have advanced to the point where a conducting segment is brought, the brushes bearing on the commutator 61. Then the circuit will be re-established on the magnet 53 and its core will be elevated, the lever 50 being rocked in the reverse direction, so that the gate 10 may be dropped by gravity. But the pan at this time will still be projected. When the gate 10 reaches its lowered position, it separates the material on the projected portion of the pan from the remainder of the material on the pan, but at this instant, the pan is retracted, for the elevation of the core of the magnet 53, the contacts 65 and 64 are brought into engagement re-establishing the circuit on the magnet 42 which, elevating its core, will rock the bell crank lever 38 and withdraw the pan, thus causing the material on the projecting portion of the pan to be swept off and deposited in the water to be treated with the chemical. This cycle of operations is repeated in accordance with the rate of movement of the shaft 62 of the meter. When the amount of the charge is to be varied, either the screw 55 or the screw 47 is adjusted to vary the opening movement imparted to the gate 10 or the projecting movement to be imparted to the pan 11. Or both may be adjusted, so that both the projecting movement of the pan and the opening movement of the door are effected, thereby providing for a wide variation of adjustment in the amount of the chemical to be deposited in each charging operation.

The solenoids 42 and 53 being supported on the tank, their intermittent operation results in vibrations being imparted to the tank which effects the dislodging of the material carried in the tank, thus preventing a packing of such material.

While the commutator is shown as a part of the meter by reason of being mounted on the recording shaft thereof, it will be, in portable installation, operatively connected with the recording shaft in any acceptable manner and will comprise the desired number of segments to accomplish the desired number of operations to be carried out in a specified time.

The invention having been described, what is claimed as new and useful is:

1. An appliance for the purpose indicated comprising a hopper having a discharge opening at its lower end, a movable pan under the discharge opening, a gate closing a lateral opening in the hopper and entering the pan, means to elevate the gate, means to thereafter project the pan, means to effect release of the gate to permit its movement to closed position, and means for thereafter retracting the pan, whereby the material carried forward by the pan on its projecting movement will be swept from the latter.

2. An appliance for the purpose indicated comprising a hopper having a discharge opening at its lower end, a movable pan under the discharge opening, rollers on which said pan is mounted, a gate closing a lateral opening in the hopper and entering the pan, means to elevate the gate, means to thereafter project the pan, means to effect release of the gate to permit its movement to closed position, and means for thereafter retracting the pan, whereby the material carried forward by the pan on its projecting movement will be swept from the latter.

3. An appliance for the purpose indicated comprising a hopper having a discharge opening at its lower end, a movable pan under the discharge opening, a gate closing a lateral opening in the hopper and entering the pan, the hopper having a pendent flange bounding the discharge opening and contacting with the bottom of the pan but being omitted adjacent the lateral opening, rollers on which the pan is mounted, means to elevate the gate, means to thereafter project the pan, means to effect release of the gate to permit its movement to closed position, means for thereafter retracting the pan, and a mounting means for one of the pan rollers tending to elevate the pan in the projecting movement and to lower the latter in the retraction movement.

4. An appliance for the purpose indicated comprising a hopper having a discharge opening at its lower end, a movable pan under the discharge opening, a duality of rollers on which the pan is supported at its forward end, a single roller mounted at the rear of the pan, a track traversed by the rear roller, and means for projecting and retracting the pan, the hopper having a pendent flange bounding the discharge opening and having its lower edge in the plane of the bottom of the pan, and the rear roller being provided with means for elevating the pan into contact with said flange in the projecting movement and for lowering it out of engagement with said flange in the retracting movement.

5. An appliance for the purpose indicated comprising a hopper having a discharge opening at its lower end, a movable pan under the discharge opening, a gate closing a lateral opening in the hopper and entering the pan, means for elevating the gate, tension springs for projecting the pan, and retracting means for the pan comprising a rockable member and a magnet for actuating the same, and a circuit closer controlling the circuit of said magnet and actuated by the gate elevating means.

6. An appliance for the purpose indicated comprising a hopper having a discharge opening at its lower end, a movable pan under the discharge opening, a gate closing a lateral opening in the hopper and entering the pan, means for elevating the gate, tension springs for projecting the pan, and retracting means for the pan comprising a rockable member and a magnet for actuating the same, and a circuit closer controlling the circuit of said magnet and actuated by the gate elevating means, the gate elevating means comprising a magnet operatively connected with the gate and a circuit closer controlling the circuit of the first said magnet.

7. An appliance for the purpose indicated comprising a hopper having a discharge opening at its lower end, a movable pan under the discharge opening, a gate closing a lateral opening in the hopper and entering the pan, coordinated means for elevating and lowering the gate and projecting and retracting the pan, whereby gate opening movement will precede pan projecting movement and gate closing movement precede pan retracting movement, the discharge opening at the lower end of the hopper being of substantially less area than the pan, and the latter being provided with means to preclude the accumulation of discharge material in the pan without the boundary of the discharge opening.

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