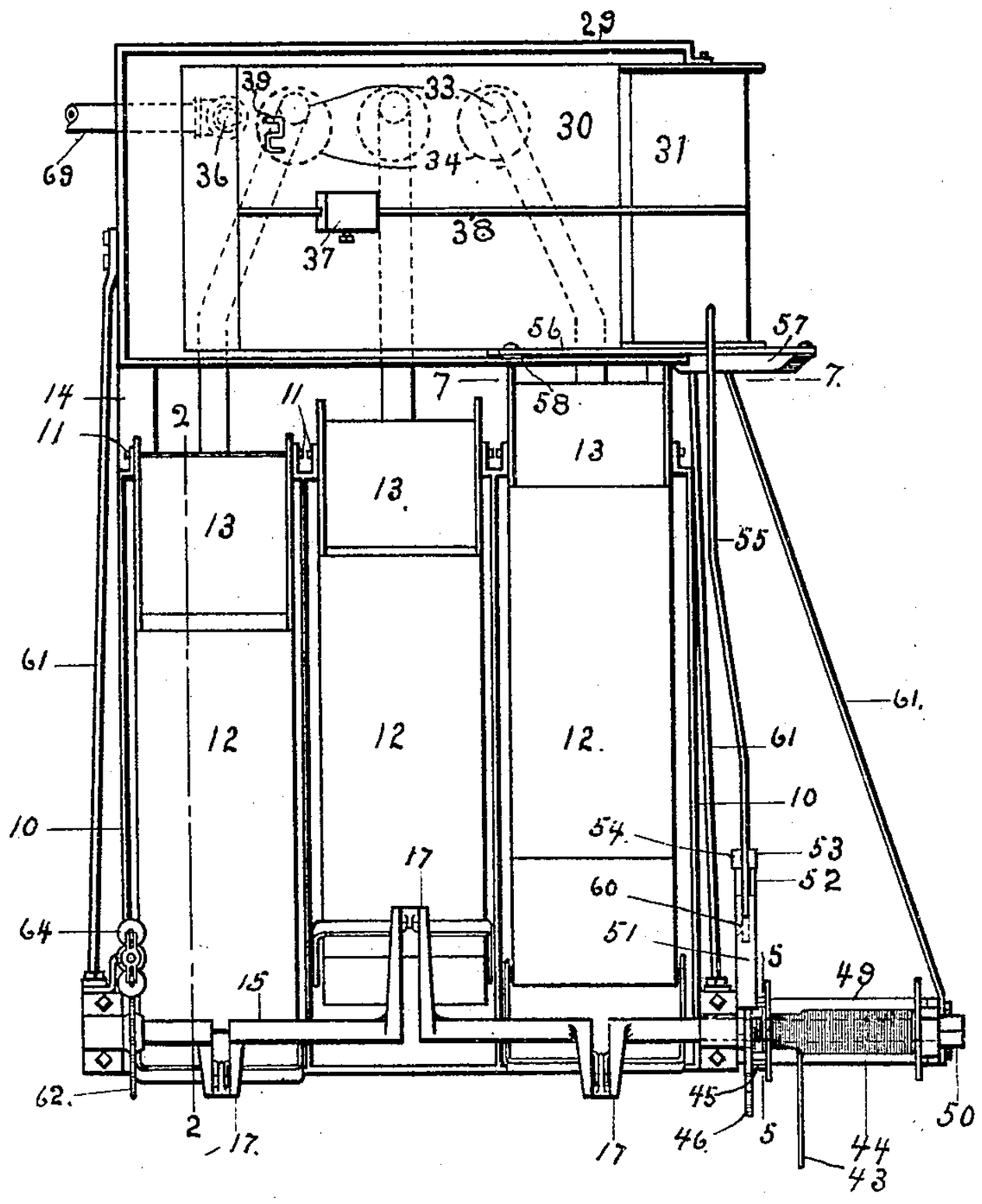
F. S. HEBDEN.

PUMPING APPARATUS.

APPLICATION FILED JULY 14, 1906. RENEWED OCT. 20, 1909.

948,278. Patented Feb. 1, 1910.

3 SHEETS—SHEET 1.



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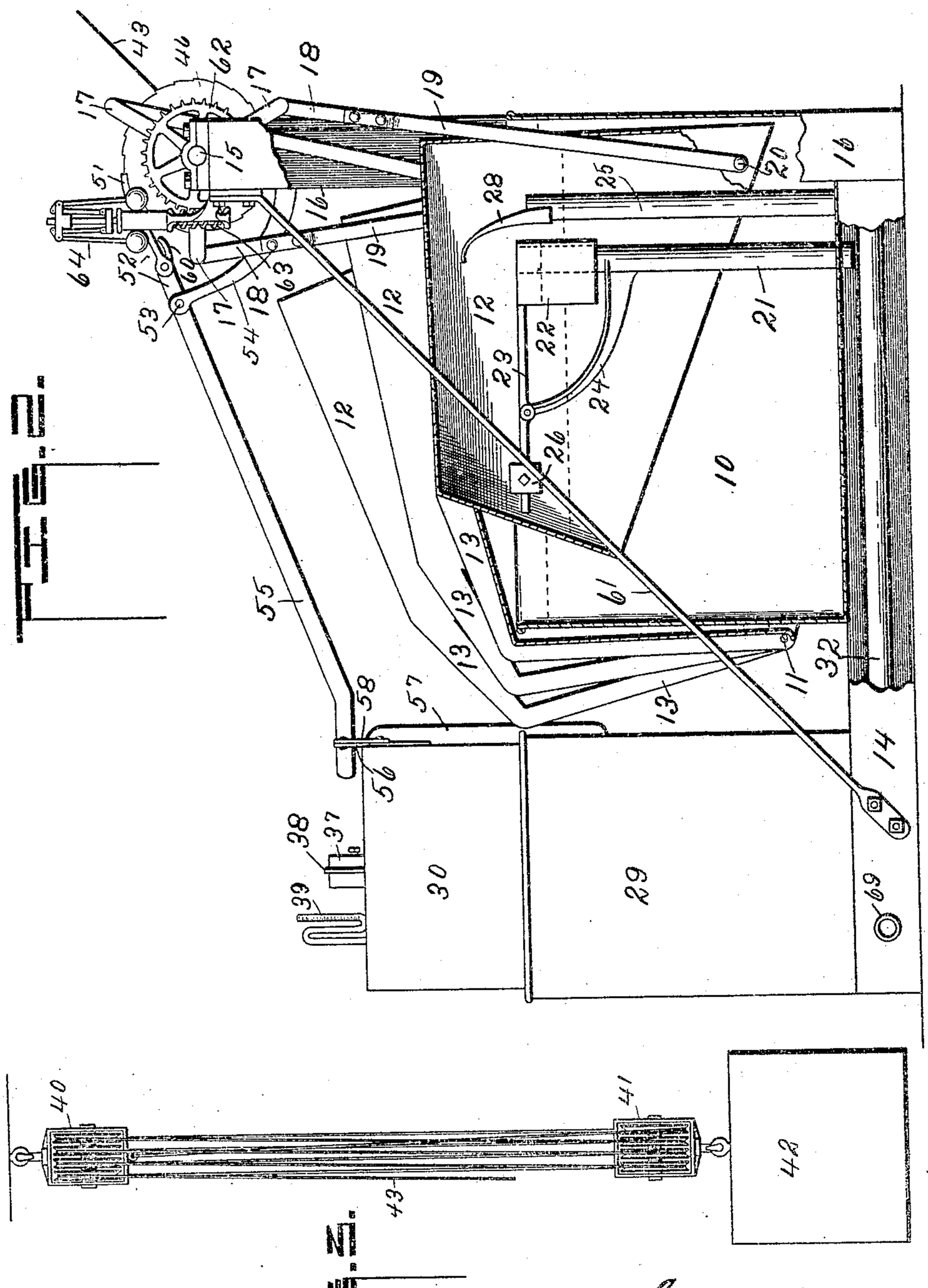

FIG. 2.

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3 SHEETS—SHEET 3.

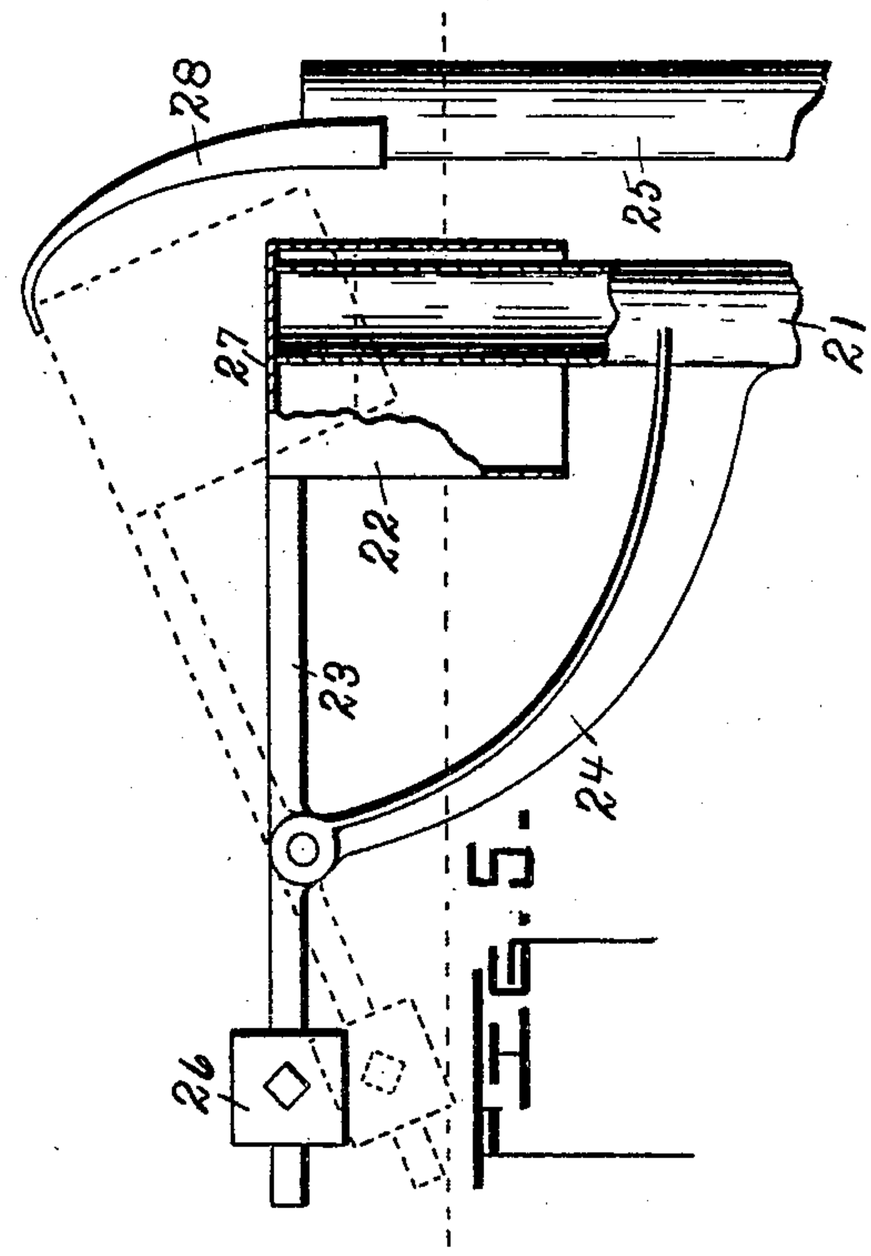

Fig. 5.

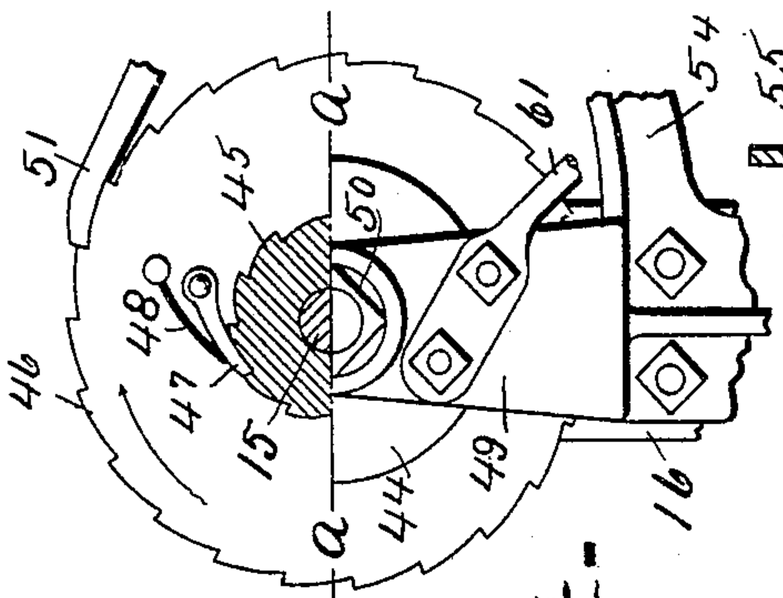

Fig. 4.

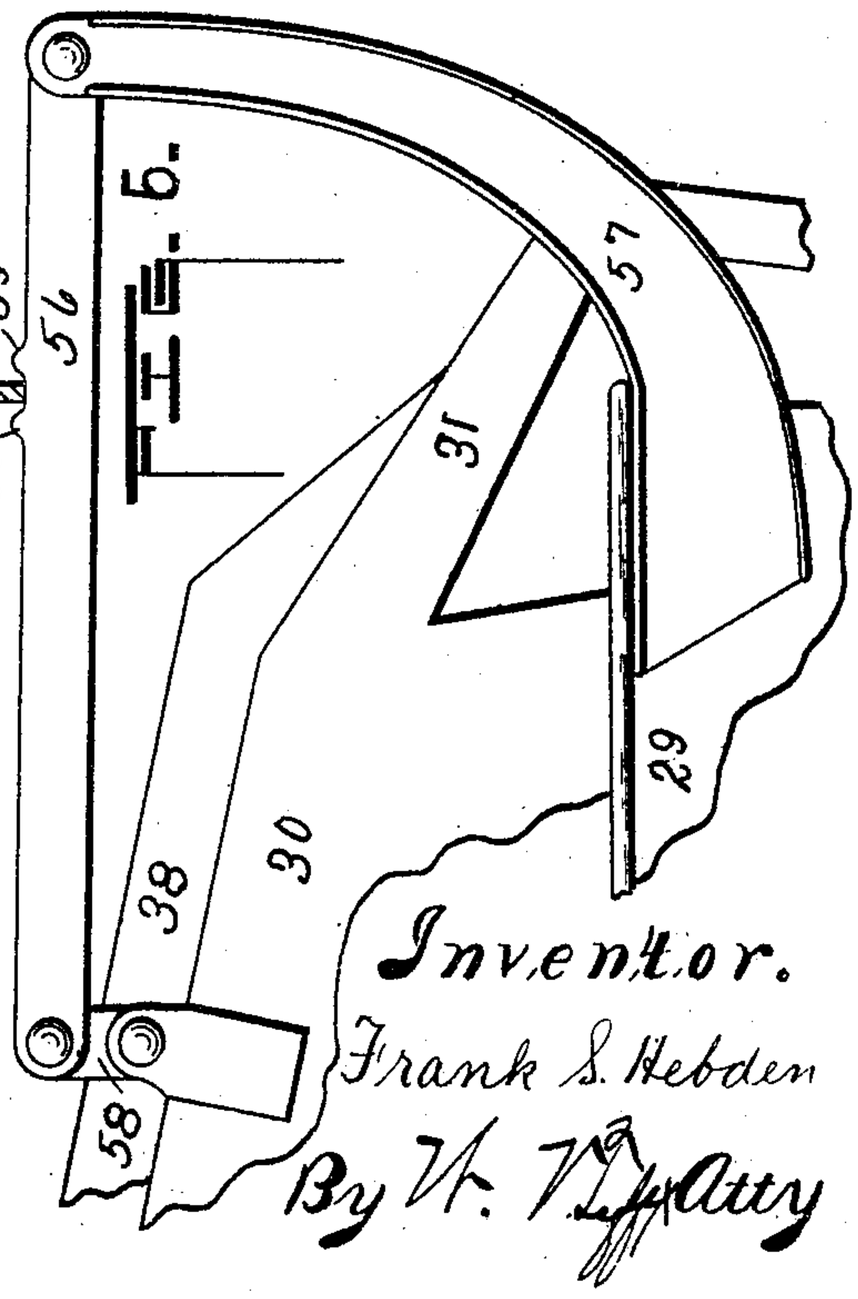

Fig. 6.

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UNITED STATES PATENT OFFICE.

FRANK S. HEBDEN, OF PEORIA, ILLINOIS.

PUMPING APPARATUS.

948,278. Specification of Letters Patent. **Patented Feb. 1, 1910.**

Application filed July 14, 1906, Serial No. 326,196. Renewed October 20, 1909. Serial No. 523,700.

To all whom it may concern:

Be it known that I, FRANK S. HEBDEN, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Pumping Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a pumping apparatus, and pertains more particularly to an apparatus of this type for use with gas machines for individual or private use and is designed to produce gas by what is known as the "cold" process.

The object of my invention is to provide a machine which is simple in construction and operation that requires little care and attention and produces a uniform quality of gas.

In the accompanying drawings, which illustrate my invention, Figure 1 is a plan view of the complete gas machine; Fig. 2 a side view of the air supplying apparatus showing a sectional view of the near pump on the line 2—2, of Fig. 1; Fig. 3 a view of the weight motor which is connected to the winding drum of the pumping apparatus for operating the pumps; Fig. 4 an enlarged view of the winding drum, the portion below the line *a*—*a* being an end view of the same and the portion above the line *a*—*a* being a vertical sectional view on the line 5—5 of Fig. 1; Fig. 5 an enlarged view of the air valve which I employ in the air pumps and air reservoir; and Fig. 6 an enlarged view on the line 7—7 of Fig. 1, showing the levers on the air reservoir for controlling the operation of the pumping device.

The machine is designed for producing gas from gasolene or other suitable hydrocarbon by what is known as the "cold" process, that is, by passing air in contact with the gasolene in its normal condition, and causing the air to take up sufficient vapor therefrom to form a burning gas,—and the machine comprises an air supplying apparatus, which is adapted to constantly supply air to the carbureter, wherein it is passed in contact with the gasolene so as to take up vapor and form a burning gas.

The air supplying apparatus consists of a series of pumps which communicate with an air reservoir, the said pumping device being controlled by the variation in the volume of air in the air reservoir so that the said air reservoir is automatically supplied. This pumping device consists of a series of tanks arranged side by side and provided with hollow covers 12 inverted in and hinged to said tanks as at 11 through the medium of the brackets 13 or otherwise mounted so as to rise and fall in the tanks 10, which are filled with some sealing liquid, and the sides of said covers are arranged to extend a considerable distance below the surface of the liquid in the tanks in all positions of the rise and fall thereof, so as to seal the interior of the covers against escape of air therefrom. These pumps are mounted on a suitable frame 14 and at the forward end of said frame 14 is the crank shaft 15 carried by standards 16 extending from said frame, the said crank shaft being arranged to extend transversely across the forward ends of said pumps and being provided with double cranks 17 thereon, one centrally arranged above the forward end of the cover 12 of each pumping member. These cranks are connected by means of the rods 18 to the yokes 19 which connect with the covers as at 20 near the bottom thereof and are adapted in the revolution of the shaft to cause the covers to rise and fall in the tanks 10 and the stroke of said cranks is just sufficient to lift the covers so that the sides thereof extend a short distance below the surface of the sealing liquid and to project the covers to within a short distance of the bottom of the tank.

For supplying air to the pumps, each of the tanks 10 is provided with a pipe 21 extending from beneath the bottom thereof a considerable distance above the surface of the sealing liquid contained therein, the lower end of said pipe being open to allow free admission of air and the upper end being provided with a balanced valve for closing the inlet during the operation of the pump. This balanced valve which is shown in Fig. 6 comprises a cover 22 which is closed at the top and inverted over the upper end of the said pipe 21, the said cover being of such length that when resting against the top of the pipe 21, as shown in Fig. 6, the sides extend a considerable distance below the surface of the sealing liquid, which is indicated by dotted lines in Figs. 2 and 6, and this cover is carried on the end of the rod 23

which is pivoted near the center to the bracket arm 24 on the pipe 21 or otherwise suitably mounted, so that said cover may move on its pivotal connection clear of the surface of the sealing liquid as shown by dotted lines in Fig. 6. The end of the rod 23 opposite from the cover 22 is provided with the adjustable weight 26 thereon, which may be moved to balance the cover 22 so that very slight variations in pressure will readily cause the valve to operate. A further feature which admits of the operation of this said valve by slight variations in pressure is the construction of the cover 22 with a large upper or top surface 27 which provides a very large surface whereon pressure inside the cover 12 of the pump and inside the cover 22 may act. Adjacent the pipe 21 in each of the pumps is an outlet pipe 25 which is open at the top and extends from a point a considerable distance above the surface of the sealing liquid through the sealing liquid and bottom of the tank and communicates with the air reservoir. The upper ends of the pipes 25 in the pumps may be provided with a stop 28 secured thereon and extending in the path of the cover 27 to limit the upward movement thereof.

The air reservoir which is located adjacent the pumps is constructed, similarly to the pumps, of a sealing liquid tank 29 provided with a cover 30 hinged to the tank through the medium of the bracket 31, the said cover being designed to have the lateral walls thereof extend below the surface of the sealing liquid in the tank in all positions of the rise and fall thereof. This air reservoir is constructed of larger proportions than the pumping device to accommodate the larger volume of air and is designed to be kept supplied with air from the pumping device. The pipes 32 which conduct the air from the pump to the air reservoir terminate in the vertical portions (shown by dotted lines at 33, Fig. 1) which extend from a point below the bottom of the tank 29 a considerable distance above the surface of the sealing liquid similar to the pipes 21 of the pumps. These vertical pipes 33 are provided with balanced valves indicated by dotted lines at 34 such as is shown in Fig. 6, and there is provided a vertical pipe 35 indicated by dotted lines at 36 which extends a considerable distance above the surface of the sealing liquid in the air reservoir and is open at the top to provide for free exhaust of air from the air reservoir to the carbureter. Stops similar to the stops 28 of the air pumps may be provided and suitably mounted for limiting the upward movement of the valves of the air reservoir. For the purpose of regulating the pressure in the air reservoir, a weight 37 is provided which is adjustable on the rib 38 of the cover 30, and the gage 39 may be provided for indicating the pressure therein. The gage 39 consists of a glass tube bent in the form shown in Fig. 2 and has a liquid in the lower bend thereof, which is forced by the pressure in the air reservoir up the outer length thereof, which said outer length is graduated as shown to indicate the pressure.

The pumping devices are operated by means of the weight motor shown in Fig. 3, which comprises the sheave block 40 which is suitably suspended and the sheave block 41 which carries the heavy weight 42. These sheave blocks are connected by means of a wire cable 43, one end of which is secured to one of the sheave blocks and passed alternately over the sheaves of both sheave blocks and connected from the upper sheave block to the winding drum 44, which is secured on the outer end of the crank shaft 15. This winding drum is loosely mounted on the outer end of the crank shaft and is provided on one end with the ratchet wheel 45 which lies adjacent the ratchet disk 46 fixed on the crank shaft 15 adjacent the standards 16, and said ratchet disk is adapted to be engaged by the pawl 47, which is held by the spring 48 to constantly engage the teeth of the ratchet wheel. The opposite end of the winding drum is provided with an extension which is journaled in the bracket 49 secured to the standard 16, and said extension of the winding drum terminates in a squared end 50, adapted to receive a crank or wrench whereby the cable may be wound on the drum for raising the weight of the weight motor for accumulating energy to operate the pumps. The ratchet wheel 45 and the pawl on the ratchet disk 46 engaging the same is arranged so that the tendency of the weight motor is to operate the ratchet disk 46 in the direction indicated by the arrow for the purpose of operating the pumps, the said ratchet disk being controlled by means of the pawl 51 which is operated by the rise and fall of the cover of the air reservoir so as to permit the crank shaft to rotate and the pumps to supply air to the air reservoir as it is exhausted therefrom. This pawl 51 which controls the revolution of the ratchet disk 46 and consequently the operation of the pumps, is pivotally connected to the lever 52, which is pivotally mounted as at 53 on the bracket 54 extending laterally from the bracket 49 and the long arm 55 of the lever 52, extends to the air reservoir and rests upon the rod 56 intermediate of its ends. This rod 56 is pivotally secured at one end to the bracket 57 mounted on the tank of the air reservoir and is connected at the other end by means of the link 58 with the cover of the air holder so that the said rod in the rise and fall of the cover of the air reservoir swings on its pivotal connection with the bracket 57. The rod

56 is provided at each side of the bearing point of the long arm of the lever 52 with lugs 59 which prevent shifting of said arm during the rise and fall of the rod 56, and the pawl 51 is pivotally connected with the short arm of lever 52 so that when the cover 30 of the air reservoir is raised to its elevated position, the said pawl moves on its pivotal connection with the lever 52 and remains in engagement with the ratchet disk 46. As the air reservoir cover depresses under the exhaust of air therefrom, the long arm 55 of the lever 52 is depressed and the finger 60 which extends from the short end of the lever 52 underneath the pawl 51 comes in contact therewith, moves the pawl from engagement with the teeth of the ratchet disk 46 and allows the weight motor to operate the pumps. As the cover of the air reservoir rises under the supply of air from the pumps, the lever 55 rises and the finger 60 moves from contact with the pawl 51 and the weight of the free end of said pawl causes it to engage one of the teeth of the ratchet disk 46 and check the operation of the pumps until they are again set in operation by the fall of the cover of the reservoir.

The standards 16 and bracket 49 are secured to withstand the pull from the weight motor by means of brace rods 61 secured thereto along the line of strain and secured to the base or frame which supports the air reservoir and pumps. Provision may be made to prevent rapid action of the pumps by providing the crank shaft 15 with the toothed wheel 62 which engages the worm 63 on the shaft of the governor 64, which said governor may be of any suitable construction, whereby the governor is operated by the revolution of the crank shaft and the shaft thereby retarded.

What I claim is:

1. In a pumping apparatus, an air reservoir embodying a tank and movable cover, a pumping device, means for operating said pumping device, and means to control the said means embodying a pivoted lever having a long and a short arm, a rod pivotally supported from said tank, a link pivoted to said rod and to said long arm of the lever seating on said rod, means on said rod to hold said long arm of the lever against lateral movement, and means carried by the short arm of the lever to engage said operating means.

2. In a pumping apparatus, an air reservoir including a tank and cover, means for pumping air to said tank, a bracket on the tank, a rod pivoted to the bracket, a link pivoted to the rod and cover, and means operated from said rod for controlling the operation of said pumping means.

3. In a pumping apparatus, an air reservoir including a tank and a movable cover, means to pump air to said tank including a ratchet wheel, a pivoted lever operated by the rise and fall of said cover having a rigid finger at one end thereof, and a pawl to engage said ratchet pivoted to said end of the lever so as to receive support from said finger in one position of the cover and be held free of engagement with said ratchet.

4. In a pumping apparatus, the combination with fluid delivering mechanism, of a pipe surrounded by a sealing liquid, a hollow cover carried on a rocking arm and adapted to dip into the sealing liquid to prevent the passage of fluid through said pipe, and an adjustable weight on the reverse end of the rocking arm.

5. In a pumping apparatus, the combination of a pump, an intake pipe for said pump surrounded by a sealing liquid, a cover carried on a rocking arm having its top seating on said pipe and having a depending flange adapted to dip into the sealing liquid to close said intake pipe, and an adjustable weight on the reverse end of the rocking arm.

6. In a pumping apparatus, the combination of fluid delivering devices, a fluid transmission pipe surrounded by a sealing liquid, a cover fixed to and carried by a rocking arm and having a depending portion adapted to dip into the sealing liquid for controlling said fluid transmission pipe, and a counterbalancing weight carried on the reverse end of the rocking arm.

7. In a pumping apparatus, the combination of a pump, a sealing liquid contained in said pump, an intake pipe extending above the surface of the sealing liquid in said pump, a cover of cup-like form inverted over the upper end of said intake pipe carried on a rocking arm and adapted to dip into the sealing liquid for controlling the passage of fluid through said pipe, and a counterbalancing weight on the reverse end of said rocking arm.

8. In a pumping apparatus, in combination with a pump containing a sealing liquid, an intake pipe extending above the surface of said liquid, an outlet pipe adjacent the inlet pipe, a counter-weighted arm pivotally supported intermediate its ends from said intake pipe, a hollow member having a closed bottom carried by said arm to seat on said intake pipe and to project at its base in said liquid, and a curved stop carried by the outlet pipe to engage said member and restrict its upward movement.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FRANK S. HEBDEN.

Witnesses:

MARY E. COMEGYS,

E. M. GILES.