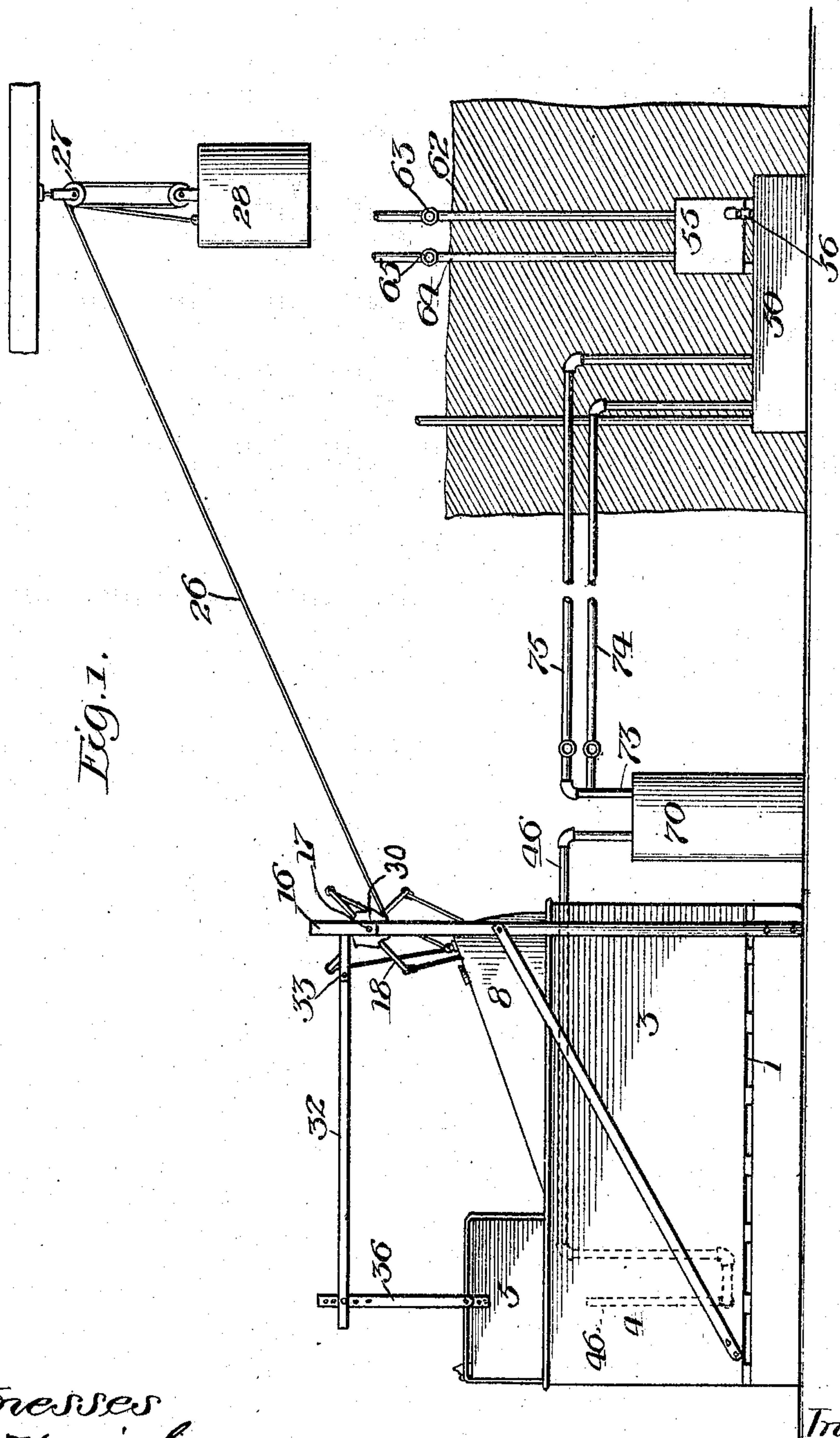


899,481.

F. M. CAMPBELL.
AIR PUMP FOR GAS MACHINES.
APPLICATION FILED NOV. 25, 1907.

Patented Sept. 22, 1908.

4 SHEETS—SHEET 1.



Witnesses
Chas. H. Hines
A. S. Phillips

by

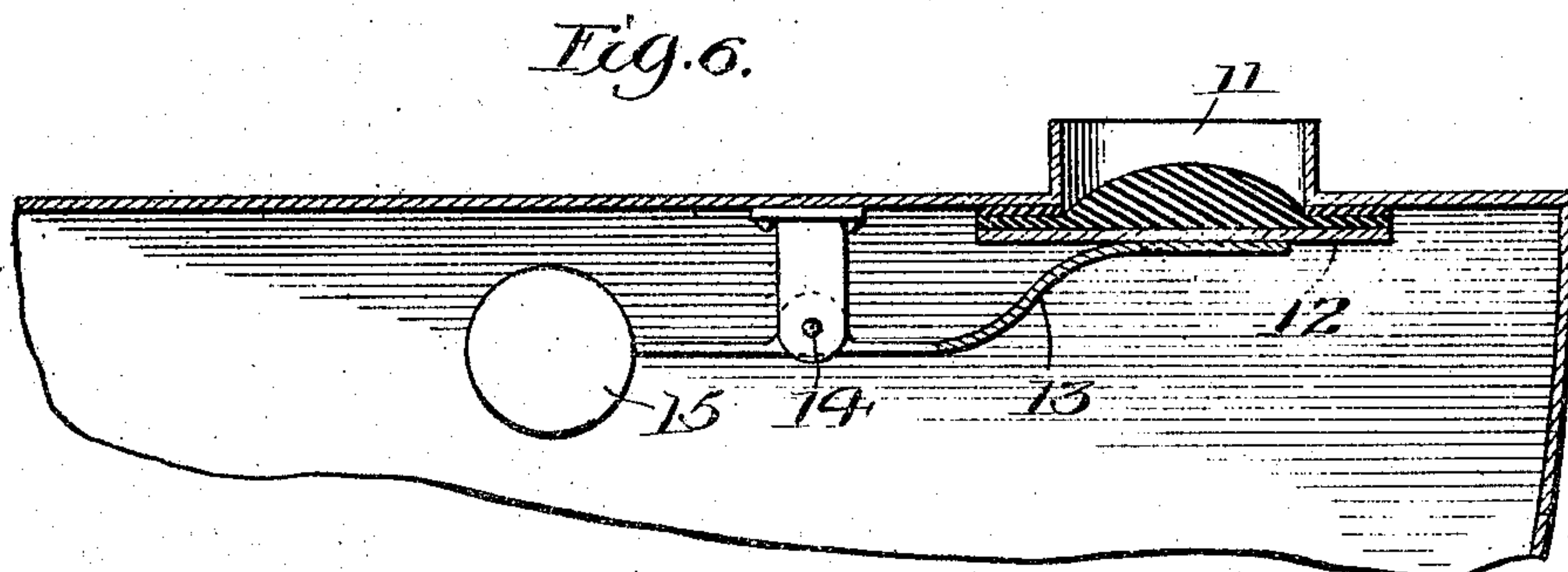
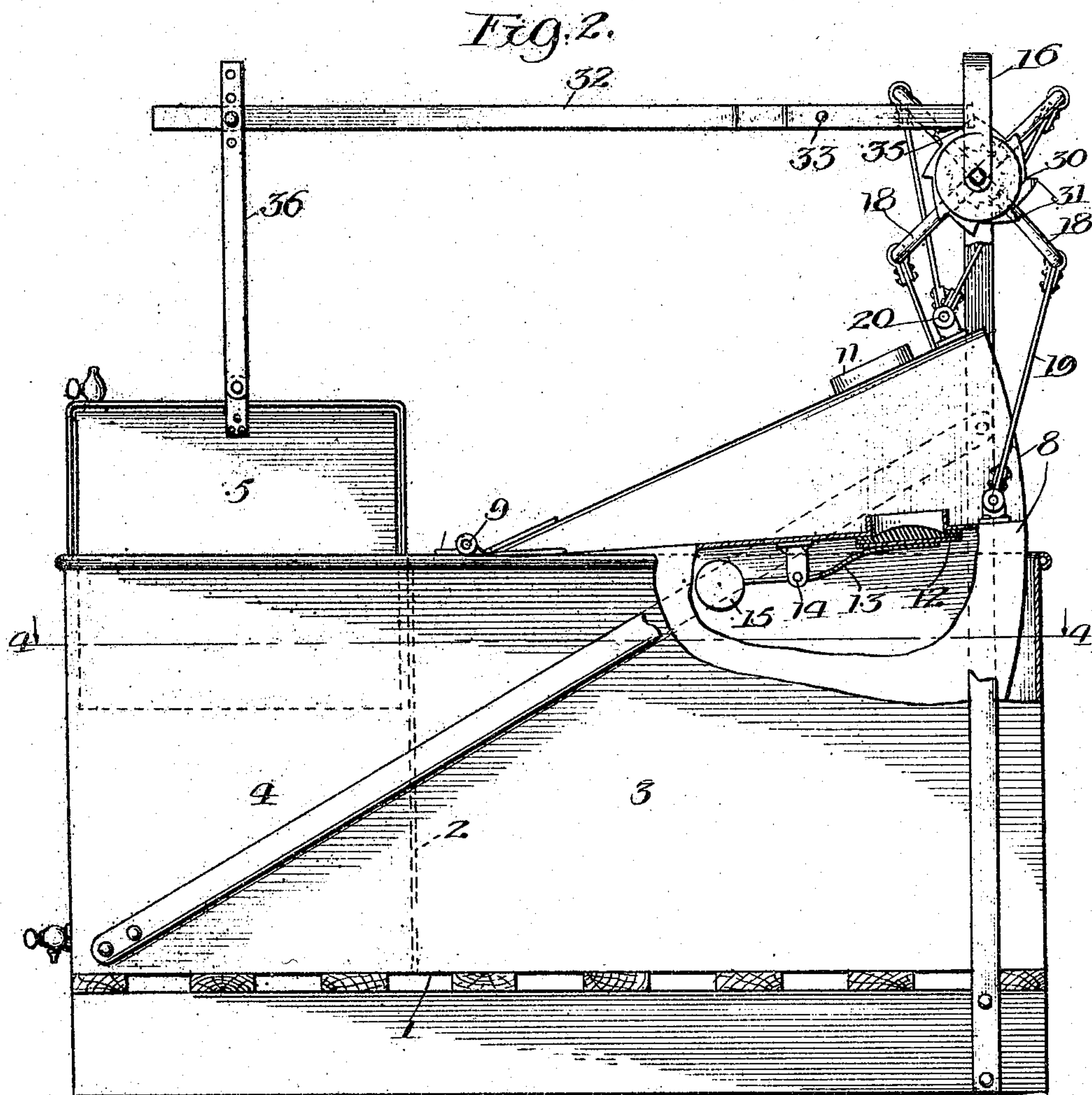
Frank M. Campbell
Attorney at Law

att'y

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4 SHEETS--SHEET 2.



Witnesses
C. M. Vermeil
A. S. Phillips

by

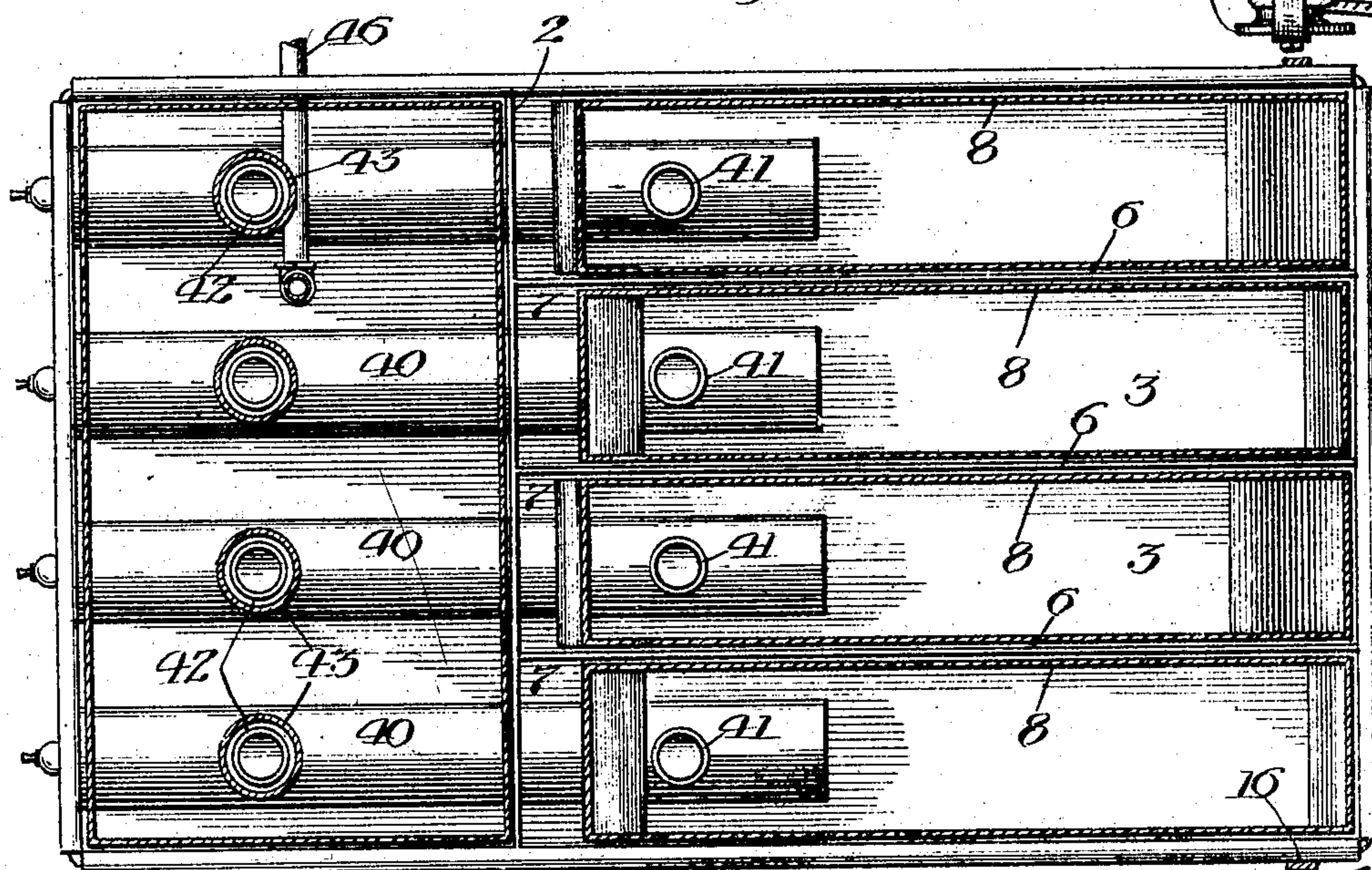
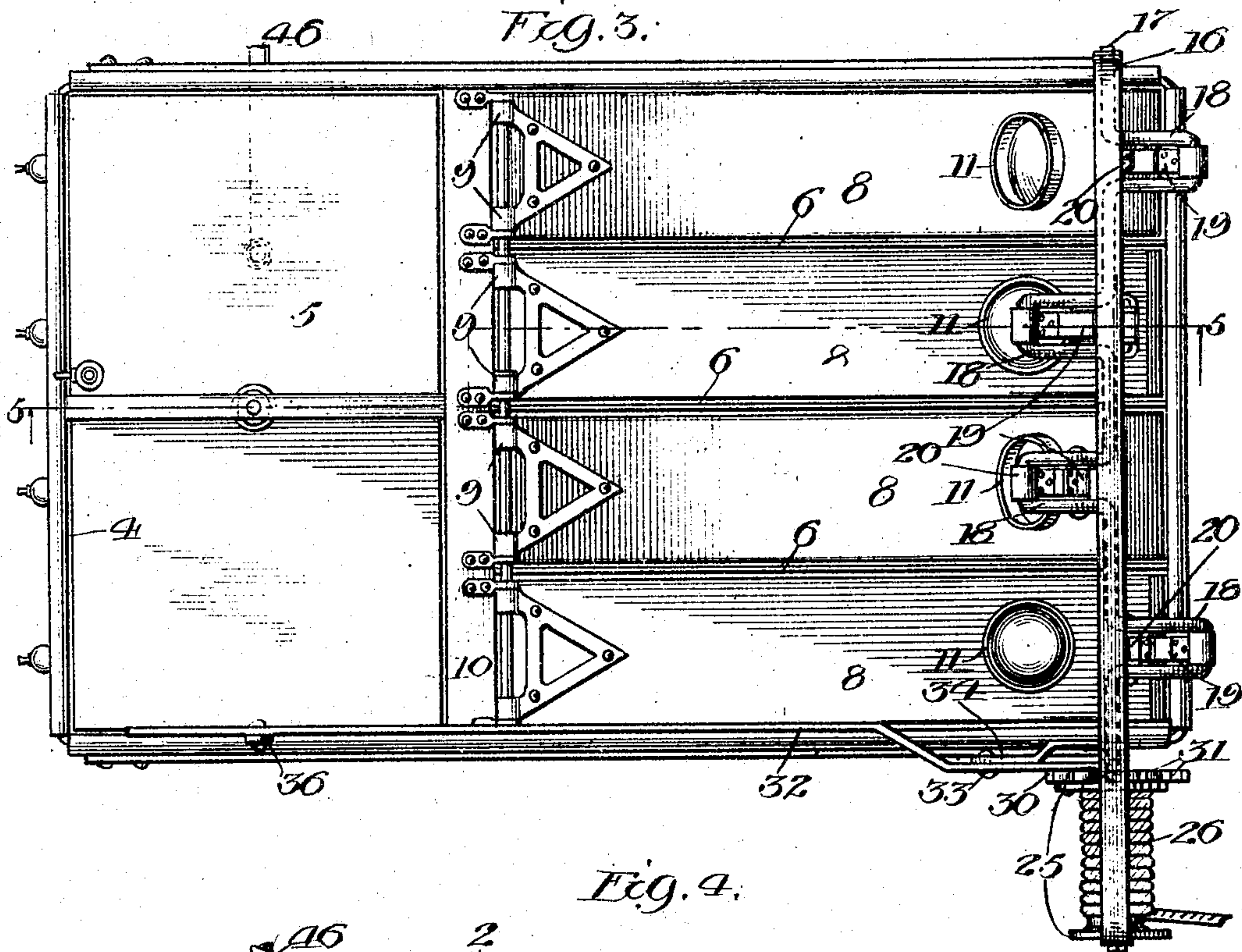
Frank M. Campbell
Inventor
Vermeil & Phillips
attys

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4 SHEETS—SHEET 3.

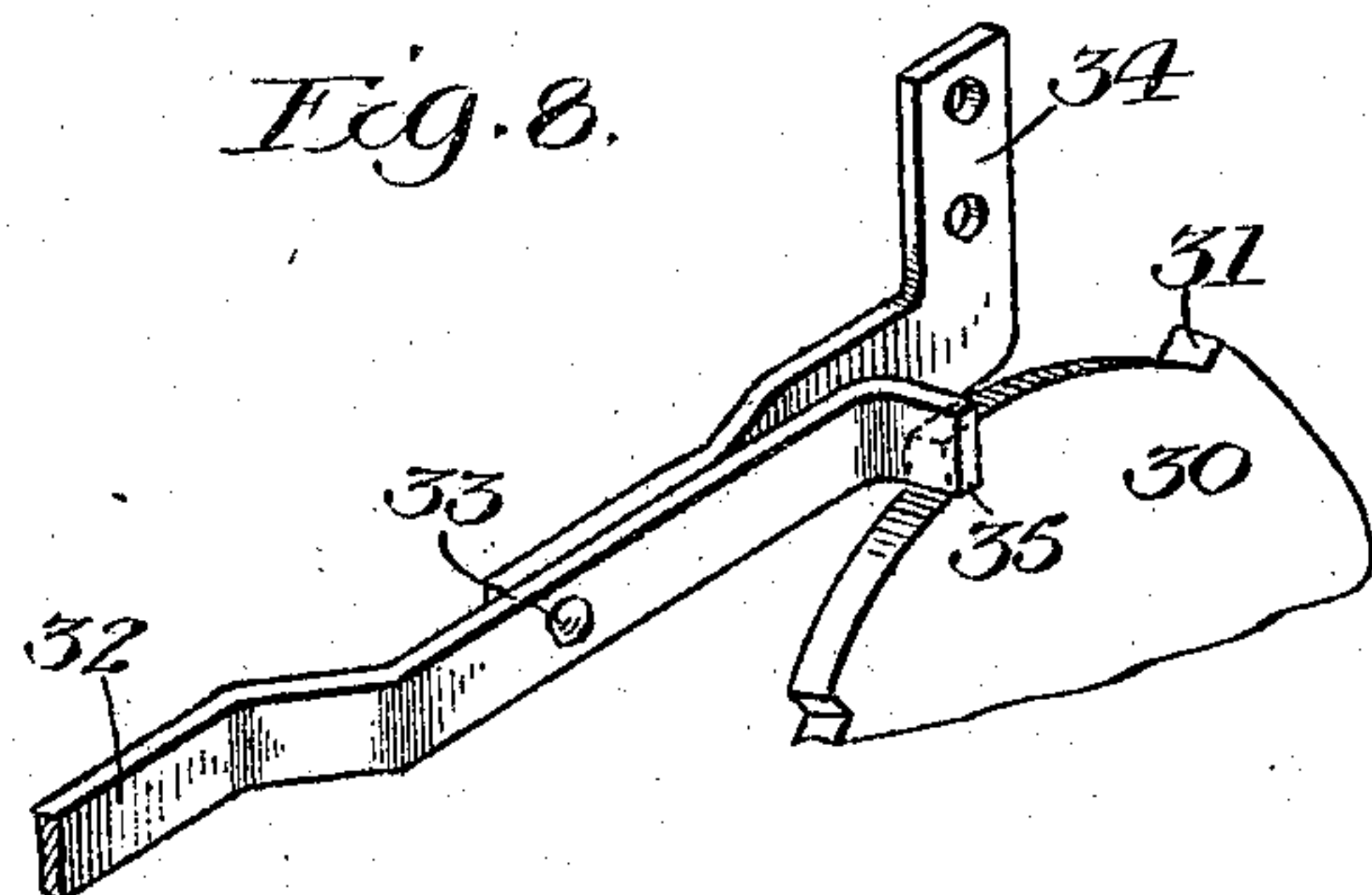
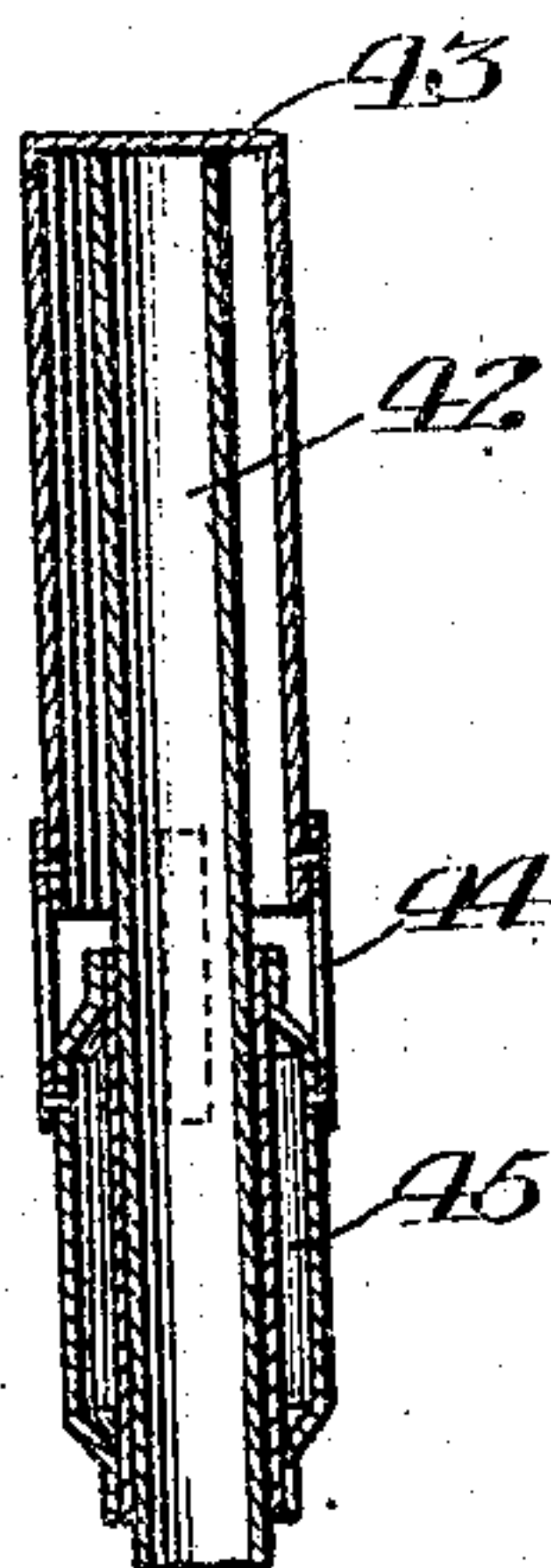


Witnesses
O. M. Dennis
A. S. Phillips

Inventor:
Frank M. Campbell
by *Walter W. Lamberton* atty.

899.481.

4 SHEETS—SHEET 4:



Inventor
Frank Mc Campbell
~~William Mc Campbell~~
Catty

UNITED STATES PATENT OFFICE.

FRANK M. CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO HOME GAS MACHINE MANUFACTURING COMPANY, A CORPORATION OF OKLAHOMA.

AIR-PUMP FOR GAS-MACHINES.

No. 899,481.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed November 25, 1907. Serial No. 403,684.

To all whom it may concern:

Be it known that I, FRANK M. CAMPBELL, a citizen of the United States, residing at the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Air-Pumps for Gas-Machines, of which the following is a specification.

My invention relates to devices for producing a combustible mixture of atmospheric air and the volatile hydrocarbons such as gasoline and alcohol.

The object of my invention is to provide a machine which will automatically produce the flow of air to a storage tank or receiver and that will pass the same through the carbureter to the burners at a positive uniform pressure.

The machine is absolutely safe in its operation and of such a character that it can be constructed of simple and inexpensive material, free from elaborate fittings or expensive machine work. The whole is simple in construction, easy to care for, and inexpensive to maintain.

The principles of my invention are illustrated in the drawings, in which—

Figure 1 shows a side elevation of a complete apparatus, somewhat diagrammatic in character; Fig. 2 is an enlarged side elevation of the air pump and storage tank; Fig. 3 is a top view of the same; Fig. 4 is a horizontal section of the same on the line 4—4 of Fig. 2; Fig. 5 is a section of the pumps and air storage tank on the line 5—5 of Fig. 3; Fig. 6 is a detail of the air inlet valve; Fig. 7 is a detail of the air receiver or storage tank valve. Fig. 8 is a detail of the axle stop.

Further describing my invention with reference to the drawings in which like characters of reference denote like parts throughout: 1 is a tank which is preferably divided by the partition 2 into the pump chamber 3 and the water receptacle 4, in the latter of which is placed the inverted air receiver 5.

The pump chamber may be divided by longitudinal partitions 6 to form separate tanks 7, each of which is provided with an inverted vessel 8 which is preferably fan-shaped and connected by the hinge 9 to the stationary support 10 above the pump chamber. The upper portion of said vessel is provided with an opening 11, on the underside of which is

formed a valve seat, against which the valve closure 12, supported by the arm 13, pivoted at 14, is held by the counterweight 15. On a frame work 16 is journaled the shaft 17, provided with cranks 18. The latter are connected by the pitmen 19 to the inverted receptacle 8 by the joint 20. A winding drum 25 is supported on the frame work of the machine and may be rigidly secured to the shaft 17, or, if it is desired to give more rapid motion thereto than would arise from such direct connection, it may be geared thereto in such a manner as to give the relative speeds desired. A cord 26 should be wound on the said drum and pass therefrom over a pulley 27, which may be supported in any convenient position and attached to the weight 28 in such a manner that the descent of the latter will cause the cord to be unwound from the drum and give motion thereto and to the shaft 17 to which it is attached or geared. A ratchet wheel 30 having the peripheral teeth 31 is mounted on the shaft 17. A lever 32 is pivotally attached at 33 to the bracket 34 Fig. 8 mounted on the frame work of the machine or secured thereto in any other convenient manner so that it will have pivotal motion and that the stop 35 on such lever may be engaged with the teeth 31 on the wheel 30. The other end of said lever 32 is adjustably secured to the upright 36 attached to the air receiver or receptacle 5, so that upward movement of the latter will cause the stop 35 to become engaged with the teeth 31 and downward movement of said receptacle will cause said stop to be disengaged therefrom. The several cranks 18 should be arranged at different angles on the shaft 17. As I prefer to construct the machine I provide it with four different hinged vessels each provided with its own operating crank, such cranks being placed quartering or at angles of 90 degrees from each other. The pump tank 7 and the air receiver tank should be filled with water to a point indicated by the line *a—a* in Fig. 5. A tube or chamber 40 may be passed through the partition 2 and a pipe or riser 41 should lead therefrom to a point above the water level within the pump tank 7. A similar tube or riser 42 should connect with the other end of said pipe 40 and the upper end thereof should reach above the water level within the

air receiver tank 4. As a protection against the backward flow of gas or water into said pipe 42 it is fitted with a cap 43 which passes loosely thereover, and the lower extremities 5 of which are connected by the strips 44 with the closed annular air chamber 45, which should be of such capacity as to normally float the cap 43 so that the inner face thereof will rest lightly upon the upper end of the 10 tube 42. When, therefore, the receiver 5 is in the depressed position within the tank 4, the stop 35 will be disengaged from the teeth 31 and the wheel 30 will turn under the impulse of the weight, 28 causing the inverted 15 vessels 8 to have successive up and down motion upon the hinges 9. As each one is raised the valve 12 will open, causing an ingress of atmospheric air. On the downward stroke the air is discharged through the pipes 20 41, 40 and 42 into the cap 43, which will thereby be raised, permitting the air to flow between such cap 43 and the riser 42 through the openings between the strips 44 and to pass through the water in the tank to the re- 25 ceiver 5. The latter will be gradually raised until it reaches a predetermined point, which may be fixed by the adjustment of the connecting rod 36 with the lever 32. The stop 35 will then be shifted in the path of the teeth 30 31 engage one of them and stop the further operation of the apparatus until, by drawing off the air from the receiver 5, the latter descends until such stop is again disengaged. The apparatus will then automatically begin 35 and continue its operation until stopped as previously described. An outlet pipe 46 passes through the side of the tank 4 and has an open end above the water line within the receiver 5. Through this the air is drawn 40 and passes to the other portions of the apparatus.

I claim:

1. In an air pump for gas machines the combination of a movable air receiver, a 45 liquid receptacle, an inverted vessel having one end hinged to and its other end extending in said receptacle, means for imparting reciprocating motion to said vessel, an air pipe having one end in said vessel above the 50 water level and leading into the air receiver, and means connected with said receiver and engaging with said means for imparting reciprocatory movement to said vessel for controlling the action of said inverted vessel.

55 2. In an air pump for gas machines comprising a liquid receptacle, an inverted vessel hinged thereto and provided with an air inlet valve, an air pipe having one end in said vessel above the water level and leading outside 60 the receptacle a rotating means arranged in operative relation with respect to said vessel, and means connected with said rotatable means for giving reciprocating motion to said vessel.

3. In a pump for gas machines comprising 65 a liquid receptacle, an inverted vessel hinged at one end thereto and provided with an air inlet valve, an air pipe having one end in said vessel above the water level and leading outside the receptacle, a shaft provided with a 70 crank and having the same connected to the inverted vessel to give reciprocating motion thereto, a toothed wheel carried by said shaft, an air receiver, and means operated from said air receiver and engaging with said 75 wheel for controlling the movement of said vessel.

4. In a pump for gas machines, the combination of a pump tank, an air receiver tank, an inverted receiver therein, inverted vessels 80 having one end secured in the pump tank by a pivotal connection, a tubular air connection between the interior of said receiver and said inverted vessels, a shaft provided with cranks uniformly spaced thereabout, pitman 85 rods to connect the cranks to said inverted vessels at the other end thereof, a ratchet wheel connected with said shaft, a movable stop to engage the ratchet wheel, and means to connect said stop with the air receiver 90 whereby the motion of the shaft is controlled.

5. In a pump for gas machines comprising a float tank, a vessel adapted for reciprocal motion therein, and an air inlet valve having 95 a seat, a closure therefor and a lever attached at one end to said closure and pivoted inside the vessel so as to over-balance the weight of said closure, an air receiver, means whereby said vessel will be reciprocated, longitudi- 10 nally extending conducting means arranged in the air receiver and the tank, and a pair of vertical pipes, said pipes disposed respectively in the tank and in the receiver.

6. In a pump for gas machines having a 10 tank, an inverted fan-shaped vessel adapted to reciprocate within said tank, a valve seat carried by said vessel, a valve arranged within said vessel, a closure for the valve, a lever pivoted inside the vessel for operating the 11 closure, a vertically extending pipe arranged within the vessel, a watersealed air receiver, an inlet valve for said receiver comprising a vertical pipe and a cap fitted thereover, said cap being balanced so as normally to float 1 with its inner face in contact with the end of said vertical pipe, and means for establishing communication between said pipes.

7. In a pump for gas machines having a tank, an inverted fan-shaped vessel adapted 1 to reciprocate within said tank, a valve seat carried by said vessel, a valve arranged within said vessel, a closure for the valve, a lever pivoted inside the vessel for operating the 1 closure, a vertically extending pipe arranged within the vessel, a watersealed air receiver, an inlet valve for said receiver comprising a vertical pipe and a cap fitted thereover, said

cap being provided with an annular float
embracing said pipe and adapted normally
to hold the inner face of said cap in contact
with the end of said vertical pipe, and means
5 for establishing communication between said
pipes.

In witness whereof, I have hereunto set

my hand, this 21st day of November A. D.
1907, in the presence of two subscribing wit-
nesses.

FRANK M. CAMPBELL.

Witnesses:

C. K. CHAMBERLAIN,
A. S. PHILLIPS.