

**No. 687,726.**

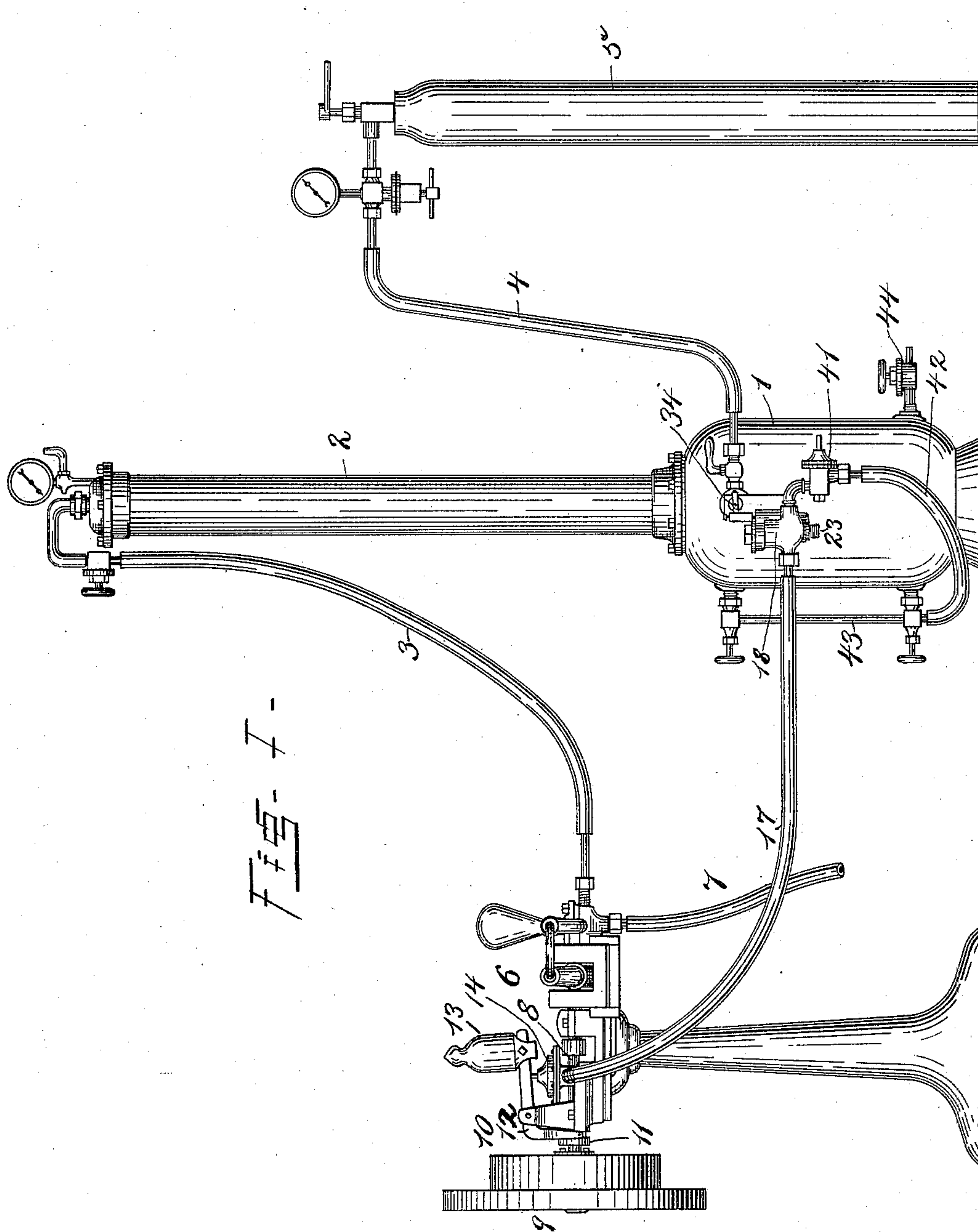
**Patented Dec. 3, 1901.**

**J. H. CHAMP.**  
**LIQUID CARBONATING APPARATUS.**

(Application filed Jan. 25, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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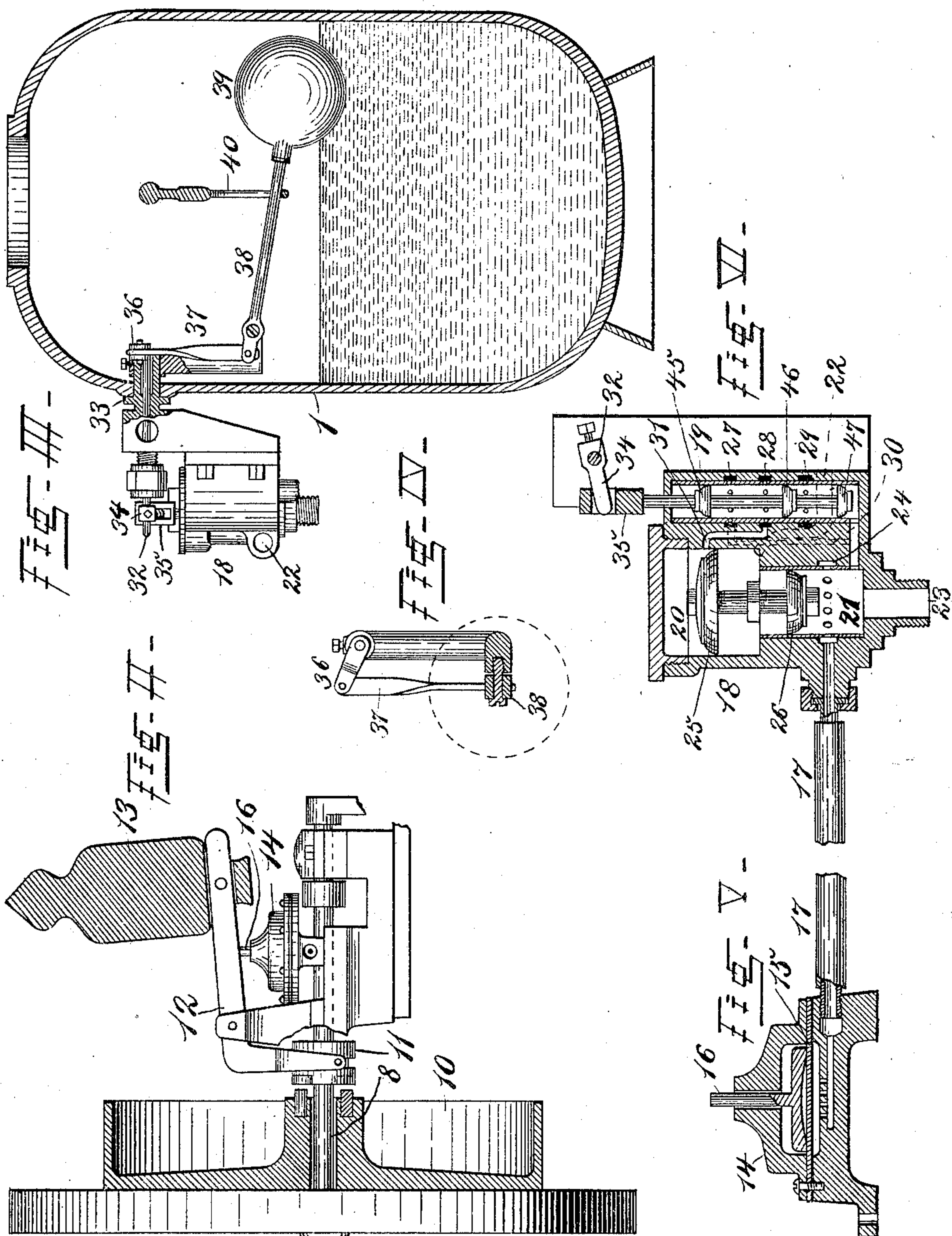
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# UNITED STATES PATENT OFFICE.

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## LIQUID-CARBONATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 687,726, dated December 3, 1901.

Application filed January 25, 1901. Serial No. 44,687. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH H. CHAMP, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Liquid-Carbonating Apparatus, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure I represents a view of my improved carbonating apparatus; Fig. II, a detail view of the clutch-operating mechanism; Fig. III, an axial section of the lower portion of the carbonator; Fig. IV, a detail view of a part of the connection between the float and the valve mechanism controlling the clutch-shifting fluid; Fig. V, an axial section of the diaphragm-casing for the clutch-shifting mechanism, and Fig. VI a section of the valve mechanism controlling the clutch-shifting fluid.

In apparatus for carbonating liquids of the character illustrated in the drawings and in which water is forced into a closed vessel and subdivided to be exposed to the carbonic-acid gas forced or conveyed under pressure into the vessel it is necessary to force the water by means of a pump or similar apparatus, and it is desirable to provide means for automatically stopping and starting the pumping mechanism as the water accumulates within or is drawn off from the vessel. In the carbonating apparatus disclosed in Patent No. 580,450, granted to me on April 13, 1897, a float within the reservoir of the carbonating-chamber closed and opened a valve in the water-supply pipe as the water rose or fell in said reservoir. This will act satisfactorily where the pressure upon the supply-water is constant and the requirements for the supply are not too great and varied or, in brief, where the supply-water can be drawn more or less direct from the hydrant-supply. Where, however, power-driven pumps have

to be employed to provide the necessary volume and pressure, it is not sufficient alone to shut off the water-inlet, but it is necessary to disconnect or stop the pumping device, so that the discharge-channel from the pump into the carbonator shall not be exposed to too great a strain. Attempts to accomplish this have been made, but as far as I know without practical success. I have constructed and practically employed the hereinafter-described apparatus.

The carbonator has a reservoir 1 at its bottom and a mixing-chamber 2 above said reservoir. The water-supply pipe 3 enters the top of said mixing-chamber, and the gas-supply pipe 4, leading from a gas-tank 5, is connected in suitable manner to convey gas into the carbonator. A force-pump 6 of any suitable or preferred construction is connected to deliver into the water-supply pipe and has a feed-pipe 7 or suction-pipe connected to a suitable supply. The pump has a drive-shaft 8, upon one end of which a loose fly-wheel 9 and a pulley or driver 10 are arranged. The hub of said pulley is formed with one half of a clutch which may be engaged by the end of a clutch-sleeve 11, fitted to rotate with and longitudinally slide upon the shaft. A circumferential groove upon said sleeve is engaged by the short forked arm of a rectangular lever 12, fulcrumed above the shaft and having a weight 13, which forces the long arm of the lever down and throws the clutch-sleeve into engagement. A diaphragm-chamber 14 is supported beneath the lever and has a diaphragm 15 and a plunger 16, supported upon the diaphragm and bearing from beneath against the weighted shifting lever. A pipe 17 for the actuating fluid enters the chamber beneath the diaphragm. Inlet and exhaust of the actuating fluid are controlled by a valve mechanism preferably supported upon the reservoir of the carbonator and having a main-valve chamber 18 and a primary-valve chamber 19. The main-valve chamber has a large bore 20 and a small bore 21. An inlet-channel 22 for the actuating fluid enters at the junction of the two bores. A waste-outlet 23 is at the bottom of the small bore, and an annular port 24, surrounding the lower portion of the small bore, leads to the actuating-fluid pipe 17. A valve having a large



piston 25 and a small piston 26 slides in the valve-chamber, and the small piston plays above and below the annular distributing-port 24. The primary-valve chamber has  
 5 three annular ports 27, 28, and 29. The upper port 27 communicates with the waste-outlet through a channel 30. The middle port 28, which is a distributing-port, communicates with the upper end of the valve-chamber through a channel 31, and the lower port  
 10 29 communicates with the inlet-channel 22. The primary valve, which plays in the primary-valve chamber, has a piston 45, which is permanently above the upper port, a piston 46, which is alternately above or below the middle distributing-port, and a piston 47, which is permanently below the lower or inlet port. The construction and operation of this valve mechanism are substantially the  
 20 same as the valve mechanism employed in the hydraulic air-compressor for which Patent No. 570,540 was granted to me November 3, 1896. When the primary valve is raised, pressure is exerted from above upon the main  
 25 valve, and the latter is depressed, admitting the pressure fluid to the distributing-pipe and to the diaphragm. When the primary valve is depressed, the pressure from above upon the main valve is released and the  
 30 valve is raised, placing the distributing-pipe and the diaphragm in connection with the waste-outlet, and the pressure-fluid is exhausted. A rock-shaft 32 is journaled to rock in a gland or tight packing 33 in the  
 35 side of the reservoir of the carbonator, and said shaft has an arm 34 secured upon its outer end, which arm engages a stirrup 35 at the upper end of the stem of the primary valve. An arm 36 is secured upon the inner  
 40 end of the rock-shaft, and a connecting-rod 37 is pivoted to the end of said arm and is pivoted at its lower end to the short arm of a lever 38, fulcrumed within the reservoir and having a float 39 at the end of its long  
 45 arm. Said long arm is guided in a vertical guideloop or slot 40, supported from the wall of the reservoir. The arm upon the inner end of the rock-shaft projects diametrically opposite to the arm upon the outer end, so that  
 50 the valve will be depressed when the inner arm is tilted up, and vice versa. A fluid-pressure regulator 41 of any suitable or desired construction is placed upon the pipe 42, which supplies the actuating fluid for the  
 55 valve and shifting mechanism. Said pipe is in the present instance connected to the reservoir of the carbonator at the lower end of the gage-glass 43 of the same; but actuating fluid for this mechanism may be derived from  
 60 any source of liquid under pressure, such as the water-supply pipe or hydrant or any other source. The carbonated liquid is drawn off from the reservoir through a cock 44.

In practice we will assume that the reservoir is filled with carbonated liquid to the highest level, that the driver or loose pulley is revolved from a suitable power source, that

carbonic-acid gas is admitted to the carbonator, and the pressure fluid for the clutch-operating device is admitted. The float is then  
 70 in such position that it holds the primary valve in its raised position, causing the pressure fluid to pass from the inlet-port in the primary-valve chamber to the distributing-port in the same, and thence to the large bore  
 75 of the main-valve chamber, where it will counteract by its downward pressure the upward pressure of the fluid against the large main-valve piston and allow the downward pressure of the fluid upon the small main-valve  
 80 piston to depress the latter so as to place the main-valve-chamber inlet in communication with the distributing-port in the small bore and admit the pressure fluid to the supply-pipe and beneath the diaphragm, where it  
 85 will raise the diaphragm and hold it so, thus keeping the weighted lever raised and the clutch disengaged. If now a sufficiency of carbonated liquid is drawn off from the reservoir to admit of the float falling with the  
 90 liquid-level in the same the connection between the float and the primary valve will depress the latter. The pressure fluid is now cut off from above the large main-valve piston and communication made there with the  
 95 waste, which will cause the upward pressure of the pressure fluid upon the large piston to raise the valve, and thus bring the diaphragm in communication with the waste. The weight will depress the diaphragm and throw the  
 100 clutch in engagement, starting the pump, which will again force liquid into the carbonator, where it will be carbonated and will collect in the reservoir, raising the float and again actuating the valve to admit pressure  
 105 fluid beneath the diaphragm, throwing the clutch out of engagement and stopping the pump. The supply of liquid to be carbonated will thus be automatically gaged in accordance with the amounts of carbonated  
 110 liquid drawn off.

The pressure-regulator upon the supply or inlet pipe for the valve mechanism will insure an even pressure of the pressure fluid to throw the clutch out of engagement and  
 115 hold it so. The diaphragm-chamber and diaphragm may be substituted by a cylinder and plunger or similar device, which equivalents are understood under the terms "diaphragm-chamber" and "diaphragm." Other valve  
 120 mechanism may be substituted for the mechanism disclosed, although it is preferable to have a mechanism in which the pressure fluid is controlled by a main valve actuated by pressure fluid controlled by a primary  
 125 valve operated by the water-level in the reservoir, so that the valve controlling the fluid for the diaphragm will be fully thrown at the change of level in the reservoir and will not be held in any intermediate positions. A  
 130 spring or other similar constant-pressure device may be employed instead of the clutch-shifting weight.

The guide-loop for the float-lever is pro-



vided to hold the lever and float in position during shipment or moving of the apparatus as well as to guide the lever in its movement, following the liquid-level.

5 By means of this appliance water may be continuously carbonated, and the supply of water to be carbonated may be regulated in accordance with the quantity of carbonated water which is withdrawn. The power source  
10 from which power is derived to force the water into the carbonator against the gas-pressure is continuously acting and may be thrown into or out of connection to drive the force-pump as the level of the carbonated  
15 water falls or rises. The starting and stopping of the force-pump is positive and is controlled and regulated by the carbonated-water level, so that such level cannot be deviated from and the carbonator be either over-  
20 filled or run empty, as long as power is present and the several connections are maintained.

This apparatus is especially useful for use in bottling carbonated beverages where the  
25 draft upon the carbonator is considerable, although of course it may be employed in connection with an ordinary fountain.

Other modes of applying the principle of my invention may be employed for the mode  
30 herein explained. Change may therefore be made as regards the mechanism thus disclosed, provided the principles of construction set forth respectively in the following claims are employed.

35 I therefore particularly point out and distinctly claim as my invention—

1. In carbonating apparatus, the combination of a carbonator, means for conveying gas into the same, a pump for forcing the liquid to be carbonated into the carbonator, a  
40 continuously-revolving driver, a clutch between such driver and the pump-driving shaft, a fluid-pressure device for actuating said clutch, means for evenly maintaining the  
45 pressure of the actuating fluid for said device, valve mechanism controlling the fluid for the pressure device, and a float within the carbonator and connected to the valve mechanism to operate the same, whereby the  
50 pump is started or stopped respectively by a drop or a rise in the liquid-level, substantially as set forth.

2. In carbonating apparatus, the combination of a carbonator, means for conveying gas  
55 into the same, a continuously-revolving driver, a pump for forcing the liquid to be carbonated into the carbonator, a clutch between said driver and the pump-driving shaft, a device exerting continuous pressure to force  
60 said clutch into one of its operative positions, a fluid-pressure device actuating the clutch in the opposite position against the continuous pressure, valve mechanism controlling the admission and exhaust of the fluid into and  
65 out of the fluid-pressure-actuating device, a pressure-regulating device for maintaining an even pressure of the actuating fluid for

said devices, and a device actuated by the level of the liquid in the carbonator and connected to operate said valve mechanism, 70 whereby the clutch is operated and the pump started or stopped by a drop or rise in the liquid-level in the carbonator, substantially as set forth.

3. In carbonating apparatus, the combination of a carbonator, means for conveying gas into the same, a pump for forcing the liquid to be carbonated into the carbonator and provided with a drive-shaft, a pulley loose upon said shaft and having means for continuously  
80 revolving it, a clutch secured to the shaft to slide upon the same and constructed to engage the pulley, a weighted lever engaging the clutch to force it into such engagement, a diaphragm structure having its plunger-  
85 stem bearing against said lever to raise the same and disengage the clutch by fluid-pressure beneath its diaphragm, valve mechanism controlling admission and exhaust of the actuating fluid for said diaphragm, a pressure-  
90 regulator for maintaining an even pressure of the actuating fluid for the diaphragm, and a float within the carbonator and connected to operate said valve mechanism to admit or exhaust the actuating pressure fluid by the  
95 rise or fall of the liquid-level within the carbonator, substantially as set forth.

4. In carbonating apparatus, the combination with a fluid-pressure power-shifting device having the operating fluid-pressure acting against a constant pressure, and a valve mechanism controlling the admission and exhaust of the pressure fluid and operated by change in the liquid-level of the carbonator, of a fluid-pressure regulator on the supply for  
105 the actuating pressure fluid and maintaining an even pressure of the latter equal to overcome the opposed constant pressure, substantially as set forth.

5. In carbonating apparatus, the combination of a carbonator, means for conveying gas into the same, a pump for forcing the liquid to be carbonated into the carbonator, a continuously-revolving driver, a clutch between such driver and the pump-driving shaft, a  
115 fluid-pressure device for actuating said clutch, a fluid-actuated main valve controlling the fluid for such pressure device, a primary valve controlling the actuating fluid for the main valve, a fluid-pressure regulator  
120 on the supply for the actuating fluid and maintaining an even pressure of the same, and a float within the carbonator and connected to the primary valve to operate the same, whereby the pump is started or stopped  
125 respectively by a drop or a rise in the liquid-level, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 12th day of January, A. D. 1901.

JOSEPH H. CHAMP.

Witnesses:

WM. SECHER,  
JNO. M. SCHIELY.