(No Model.)

5 Sheets—Sheet 1.

H. G. BALKAM.

CARBURETER.

No. 592,579. Patented Oct. 26, 1897.

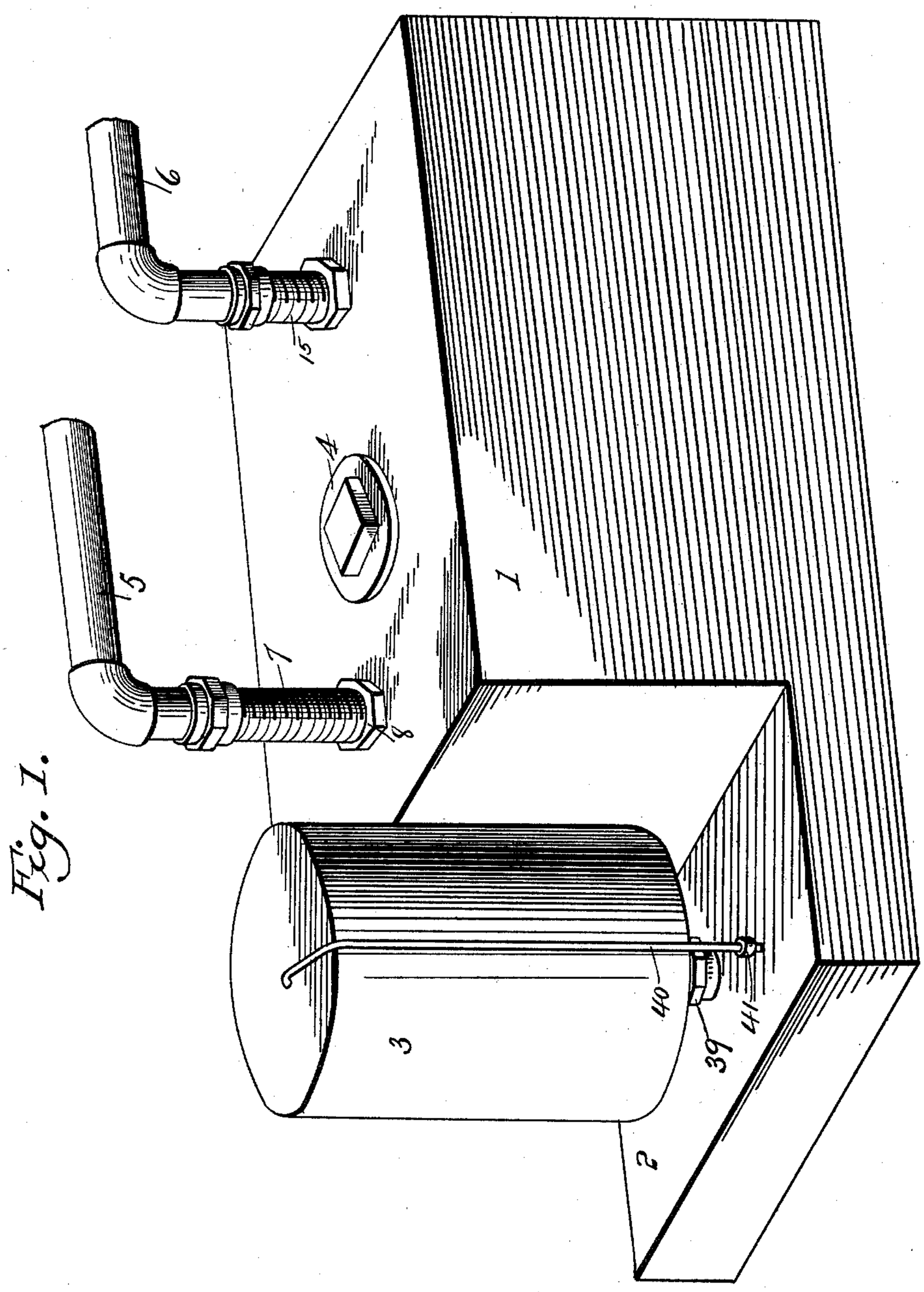

Fig. 1.

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(No Model.) 5 Sheets—Sheet 2.

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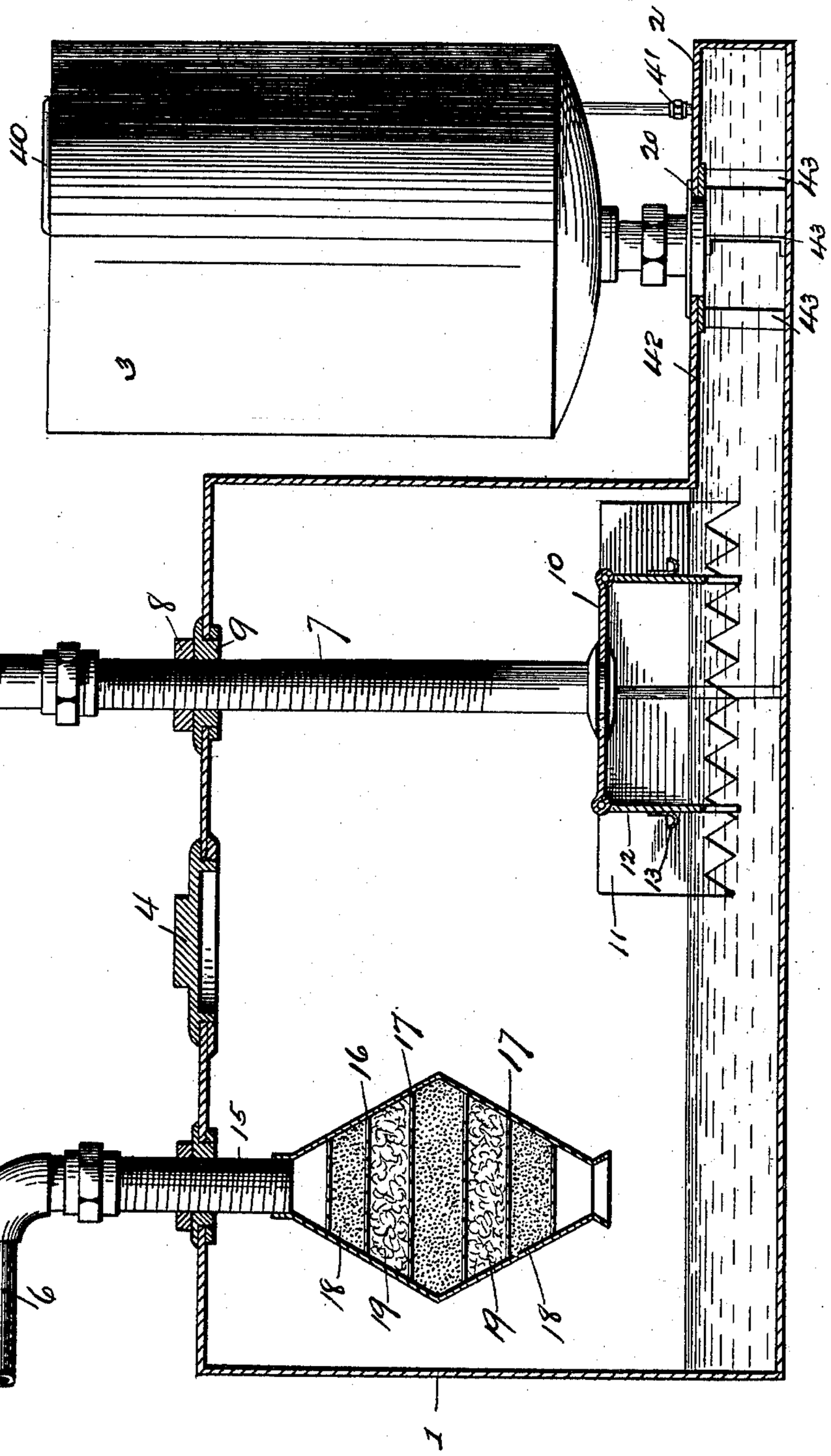
CARBURETER.

No. 592,579. Patented Oct. 26, 1897.

Fig. 2.



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(No Model.) 5 Sheets—Sheet 3.

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No. 592,579. Patented Oct. 26, 1897.

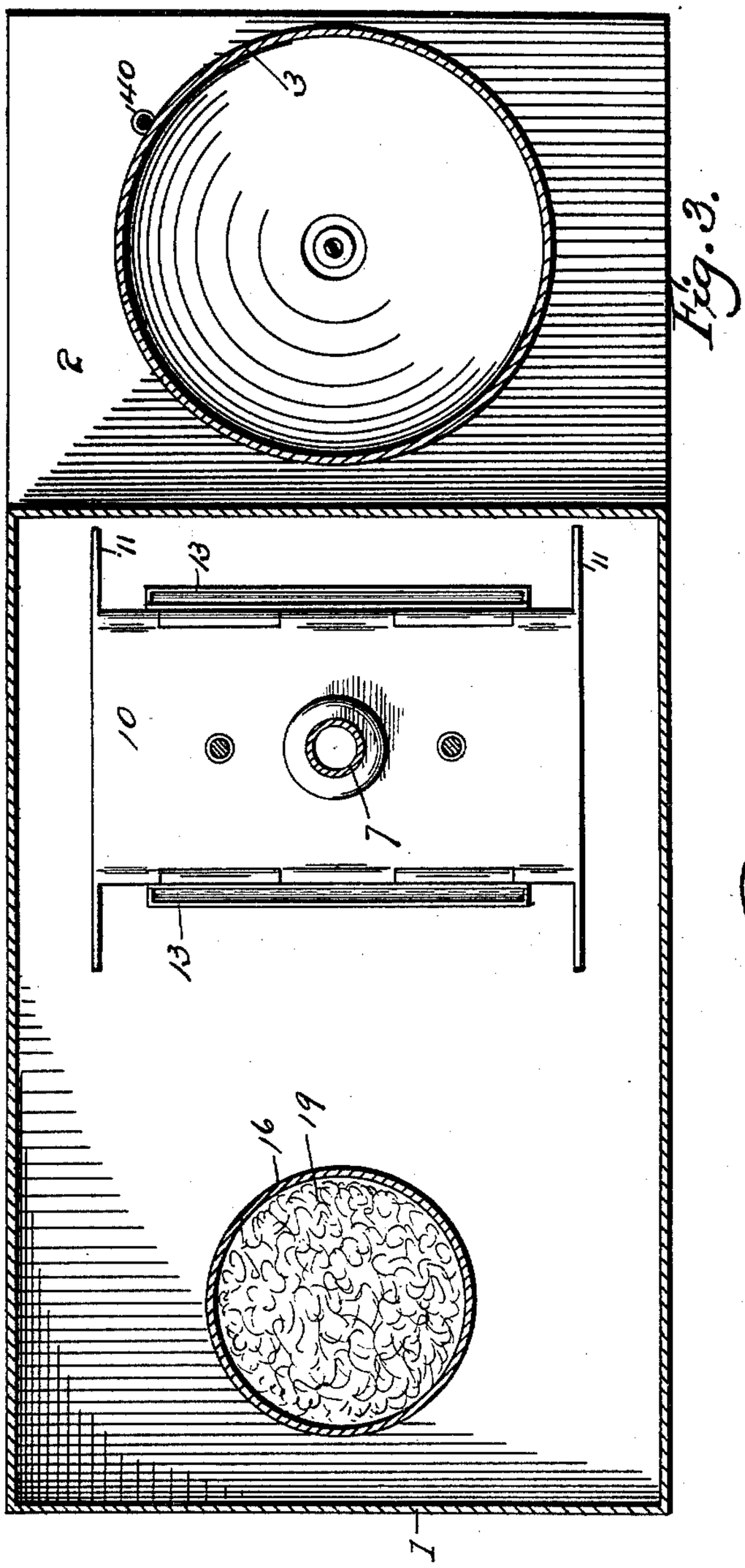

Fig. 3.

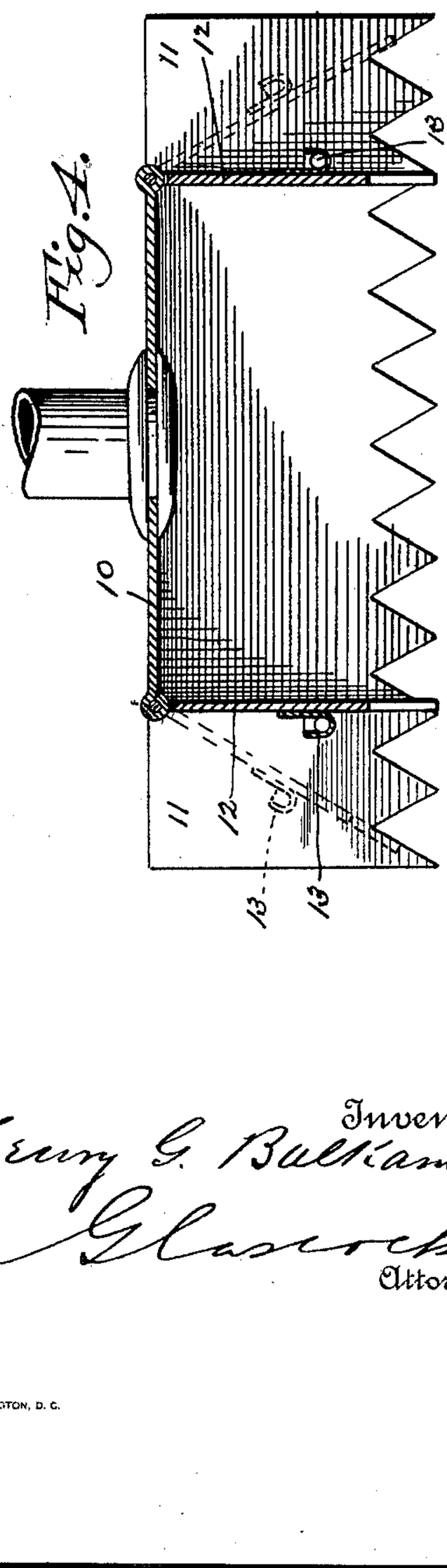

Fig. 4.

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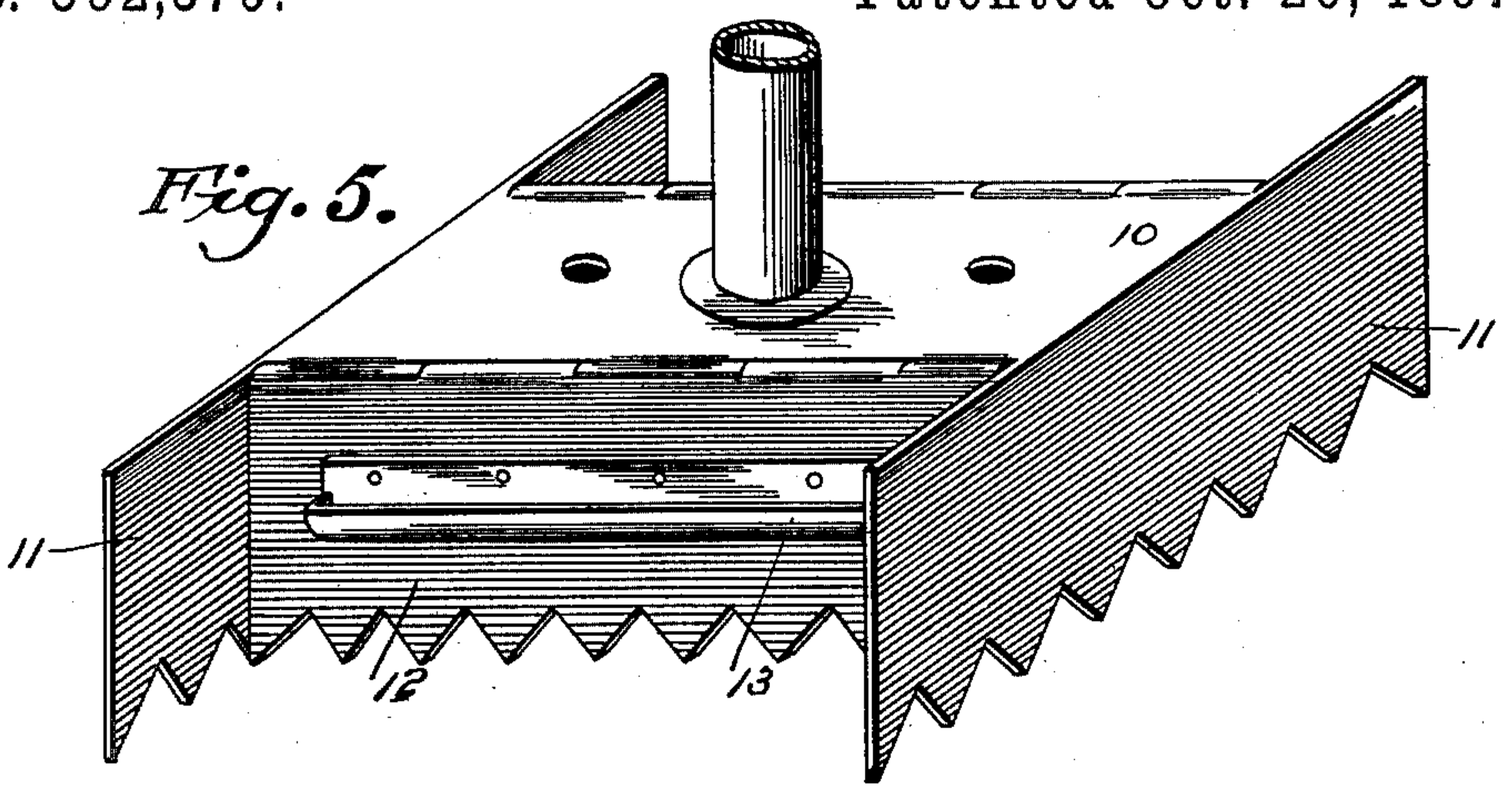
CARBURETER.

No. 592,579. Patented Oct. 26, 1897.

Fig. 5.



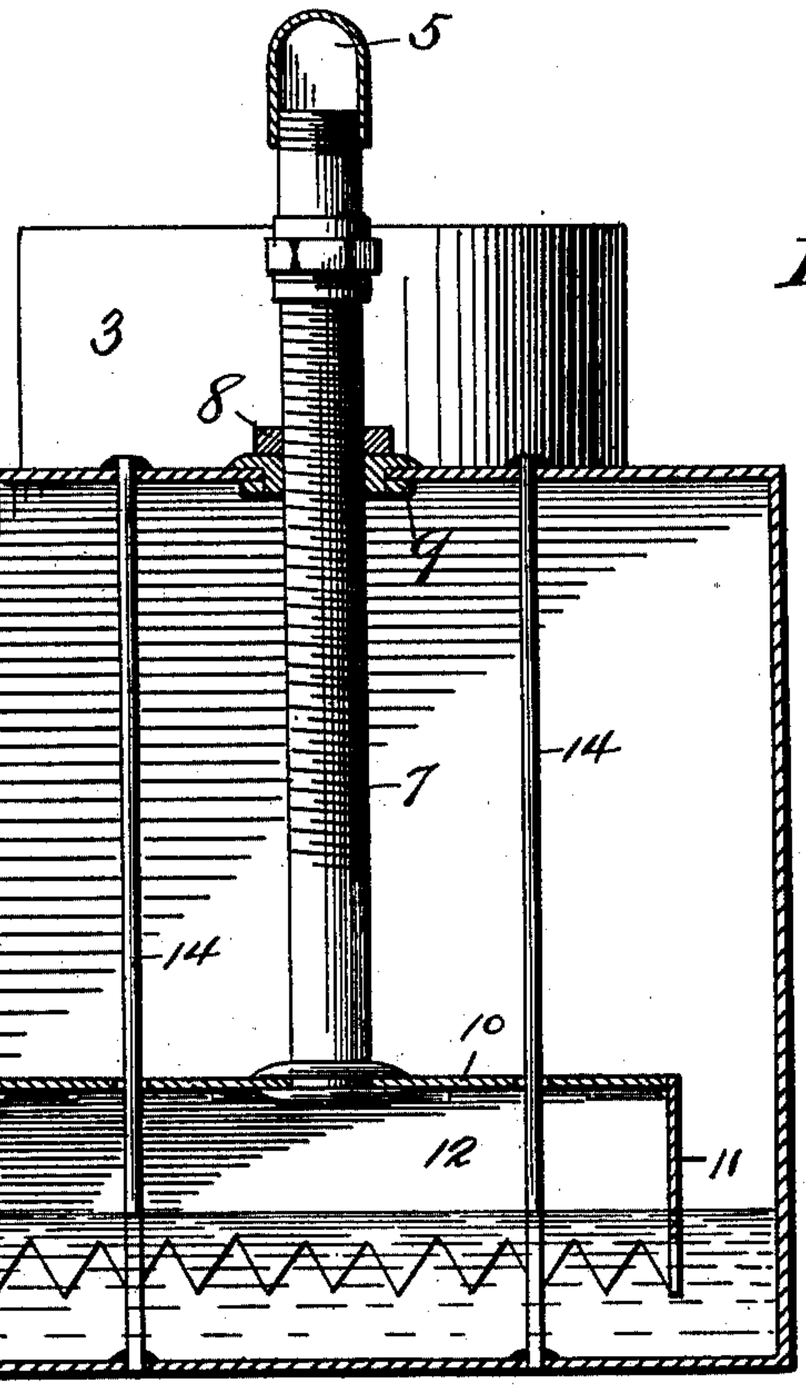


Fig. 6.

Witnesses
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(No Model.) 5 Sheets—Sheet 5.

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CARBURETER.

No. 592,579. Patented Oct. 26, 1897.

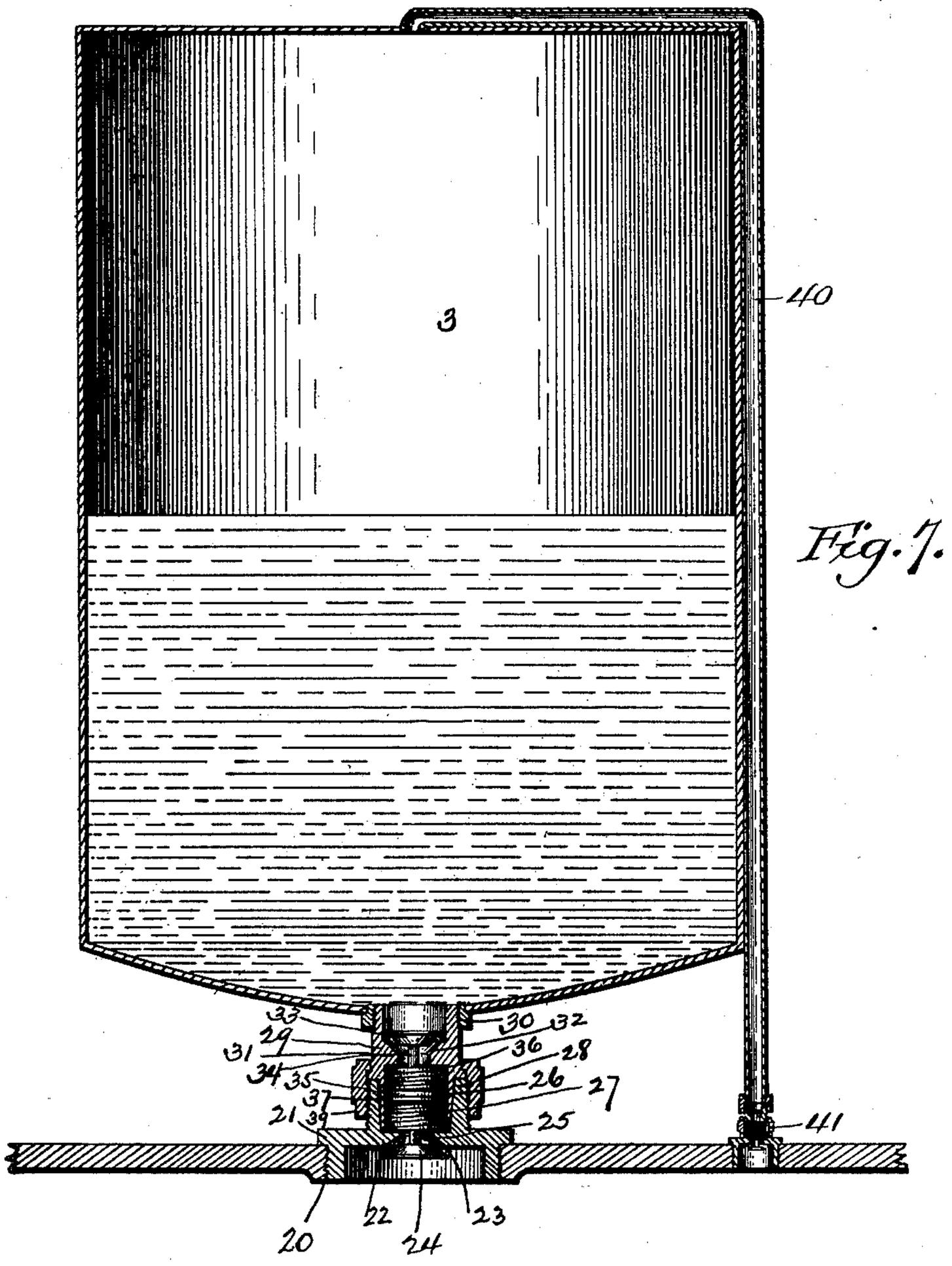

Fig. 1.

Witnesses
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UNITED STATES PATENT OFFICE.

HENRY G. BALKAM, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO WILLIAM A. EASTERDAY, OF SAME PLACE.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 592,579, dated October 26, 1897.

Application filed April 20, 1897. Serial No. 633,040. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. BALKAM, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a certain new, useful, and valuable Improvement in a Combined Gas-Enricher and Pressure-Regulator, of which the following is a full, clear, and exact description.

My invention has relation to combined gas-enrichers and pressure-regulators; and it consists in the novel construction and arrangements of its parts, as hereinafter described.

The object of my invention is to provide a combined enricher and pressure-regulator which is effective in operation and adapted to safely carburet all uncarbonized elements in the gas and to regulate the pressure of the gas in the service-pipes of the house.

A further object of my invention is to provide a removable can for the enricher, said can adapted to be connected to the enricher and having a vent adapted to lead the gas from the enricher into the can, and thereby equalize the pressure in the enricher and in the can and permit the oil to pass freely from the can into the enricher, assuring safety in recharging the enricher with oil by avoiding the necessity of turning off the gas at the meter, and consequently turning out lights or fires in use throughout the building without attendants and then turning them on, causing danger of explosion by accumulated gas, and the danger of igniting the oil while being removed to and from buildings for the purpose of supplying the enrichers, it being a well-known fact that vapors created by the filling of vessels with oil within buildings remain by settling near floors until effective ventilation or ignition occurs by reason of the differences in specific gravity, being especially dangerous in high temperatures when oil-vapors become invisible accumulative elements.

My invention is especially designed to avoid the dangers incident to the methods of handling oil in buildings required by the enrichers now generally in use and to provide a device that is effective in operation.

A further object of my invention is to provide a means for deflecting the gas beneath the surface of the oil, said means adapted to be perpendicularly adjusted to suit the degree of enrichment desired, making it applicable to the various gas appliances for illuminating and fuel purposes.

The further object of my invention is to provide the removable can with suitable valves, said valves adapted to open automatically when connected to the enricher, and adapted to close automatically when disconnected from the enricher, and thereby at all times incase the contents of the enricher or removable can.

A further object of my invention is to construct an enricher of such form as will permit the oil to assume a certain maximum depth in the enricher and not to exceed that depth.

A further object of my invention is to provide an enricher with a suitable means for removing the superfluous hydrocarbon from the enriched gas, and also remove all impurities.

In the accompanying drawings, Figure 1 is a perspective view of the enricher, showing the oil-can connected thereto. Fig. 2 is a longitudinal sectional view of the enricher, showing the oil-can connected thereto. Fig. 3 is a horizontal sectional view of the enricher and oil-can. Fig. 4 is a transverse sectional view of the deflector and pressure-regulator. Fig. 5 is a perspective view of the deflector and pressure-regulator. Fig. 6 is a transverse sectional view of the enricher. Fig. 7 is a sectional view of the oil-can, showing the construction of the valves connected to the can-outlet and the vent.

The enricher consists of the receptacle 1. Said receptacle may be rectangular or any other suitable form. At one end of the receptacle is located the extension 2, said extension extending from the lower edge of the receptacle 1. The top side of the extension is closed, and the oil-can 3 is adapted to be supported on the side of the extension 2, as hereinafter explained.

The receptacle 1 is provided in its top with a suitable perforation, forming a hand-hole, said perforation being closed by the cap 4. The gas-inlet pipe 5 is adapted to introduce gas into the enricher at one end thereof, and the gas-outlet pipe 6 is adapted to conduct the enriched gas from the enricher at the opposite end. The inlet-pipe 5 is connected to the perpendicular pipe 7, said pipe 7 being

threaded on its interior surface and passing through the top of the receptacle 1, the threaded collar 8 and the threaded washer 9 surrounding the pipe 7 at the point where the said pipe enters the receptacle 1, said collar and washer being arranged as shown in Fig. 2, and effectually prevent the escapement of any gas at the point where the pipe 7 enters the receptacle 1. The top 10 of the deflector and pressure-regulator is journaled to the lower end of the pipe 7, as shown in Fig. 2. The stationary sides 11 11 are located at opposite ends of the top 10. The said sides extend down perpendicularly and are serrated at their lower edges. The said sides 11 extend for some distance beyond the lateral edges of the plate of the top 10, as shown in Fig. 5. The flaps 12 12 are hinged to the longitudinal edges of the top 1. The ends of the flaps 12 12 come in close proximity to the extended ends of the sides 11, the said sides thus closing the ends of the flaps 12. The flaps 12 12 are also serrated at their lower edges, and the said flaps may be provided with the pockets 13, adapted to carry suitable weights. The perpendicular rods 14 14 extend from the top to the bottom of the receptacle 1, said rods passing through suitable perforations in the top 10 of the deflector. Said rods prevent the deflector and pressure-regulator from revolving within the receptacle 1.

The perpendicular position of the deflector and pressure-regulator may be varied by disconnecting the pipe 5 from the pipe 7 and by revolving the pipe 7 within the collar and washer 9. Thus the deflector at the lower end of the pipe 7 will be elevated or depressed, as the case may be, in a perpendicular line.

The normal position of the deflector and pressure-regulator at the lower end of the pipe 7 is about that as shown in Fig. 2—that is, the lower edges of the sides of the flaps 3 are submerged beneath the surface of the oil in the receptacle 1, and thus as the gas is introduced from the pipe 7 beneath the said deflector the said gas is forced beneath the surface of the oil, and by means of the serrated edges of the sides 12 and the flaps 13 the said gas is thus broken up in fine particles and passed through the oil. Thus the entire molecular expenditure of the gas is brought in direct contact with the oil and all uncarbonized elements in the gas are thoroughly carbureted, and if the pressure of the gas in the supply-pipe 5 be abnormal the flaps 13 13 will swing out, as indicated by the dotted lines in Fig. 4, and thus the gas within the enricher and within the service-pipes of the house can be maintained at a desired pressure. The swinging of the flaps 12 12 may be limited by placing shot or bars of lead or other heavy objects in the pockets 13.

The service-pipe 6 is connected to the upper end of the pipe 15, said pipe 15 being threaded on its exterior surface. The said pipe 15, passing through a collar and washer, is made similar to the collar 8 and washer 9 of the pipe 7. The lenticular bulb 16 is fixed to the lower end of the pipe 15. Said bulb 16 is opened at its lower end, and the bulb maintains the perpendicular position within the receptacle 1. The interior of the bulb 16 is divided by the horizontal perforated partitions 17 17 into a number of horizontal compartments. Said compartments are alternately filled with a chemical 18 and sponge 19. The perpendicular position of the bulb 16 may be varied by disconnecting the pipe 6 from the pipe 15 and manipulating the pipe 15 in a manner similar to that described for pipe 7.

The enriched gas in passing from the receptacle 1 passes through the contents of the bulb 16, the chemicals and the sponges removing all impurities from the gas, the shape of the bulb being such that should any condensation of oil take place within the bulb the said oil is conveyed back into the enricher, and thus such condensation is not permitted to pass into the surface of the pipes of the house.

The top extension 2 is provided with a perforation 20, which is adapted to receive the valve-casing 21. Said casing is provided with a horizontal diaphragm 22, having a perforation 23, forming a valve-seat. The valve 24 is adapted to close against said seat. The valve-stem 25 extends perpendicularly from the valve 24, and the washer 26 is fixed at or near the upper end of the stem 25. The spiral spring 27 is interposed between the washer 26 and the upper surface of the diaphragm 22. The washer 26 is provided with suitable perforations adapted to permit the oil from the can 3 to pass from the can into the extension 2. The flange 28 extends perpendicularly from the casing 21, said can being threaded on its exterior surface. The valve-casing 29 is provided at its upper end with a suitable thread serrated and adapted to engage the external thread at the lower surface of the collar 30, said collar 30 being permanently secured in the oil-outlet of the can 3. The valve-casing 29 is provided with the diaphragm 31, said diaphragm having a central perforation and a valve-seat 32. The valve 33 is adapted to close against the seat 32. The stem 34 extends perpendicularly down from the valve 33, and the perforated washer 35 is fixed at or near the lower end of the stem 34. The spiral spring 36 is interposed between the washer 35 and the lower surface of the diaphragm 31. The outer surface of the extension 37 is beveled and corresponds with the inner beveled surface of the extension 28. The collar 39 is journaled on the valve-casing 29. Said collar is internally threaded and is adapted to engage the thread of the flange 28, and thus the valve-casings 29 and 21 are held together, as shown in Fig. 7.

When the can 3 is connected to the extension 2, the ends of the valve-stems 34 and 25 come in contact with each other, and the flaps

are opened, as indicated in Fig. 7. When the can 3 is disconnected from the extension 2, the coiled springs 27 and 36 cause the flaps 24 and 33 to close. Thus the outlet-can 3 and the inlet to the extension are both automatically closed when the can is disconnected from the said extension. The vent 40 is connected to the upper end of the can 3. Said vent passes perpendicularly along the side of the can 3, and the said vent is connected by suitable valves at 41 with the interior of the extension 2. The construction of the valves at 41 is substantially similar to that of the flaps within the casing 21 and 29, with the exception that the flaps at 41 are made on a much smaller scale. The flaps at 41 are adapted to open automatically when the vent 40 is connected to the extension 2, and the said flaps are adapted to close automatically when the said vent 40 is disconnected from the extension 2.

When the receptacle 1 is empty and the filled can 3 is connected to the extension 2, the oil passes from the can 3 into the extension 2 and into the receptacle 1. At the same time the gas passes up the vent 40 and enters the can 3 above the surface of the oil therein, and thus the same pressure is maintained within the can 3 that is within the receptacle 1, and there is no interference with the free passage of the oil from the can 3 into the enricher. When the surface of the oil within the enricher comes in contact with the top 42 of the extension 2, the passage of the gas through the vent 40 is cut off, and thus as there is no element permitted to pass within the can 3, above the surface of the oil contained therein, the said oil immediately stops flowing into the receptacle 1, and thus the oil in the receptacle 1 cannot assume a greater depth than about that shown in Fig. 2. As the oil in the receptacle 1 is evaporated or absorbed by the gas passing therethrough a bubble of gas is permitted to pass through the vent 40, and thus more oil is let into the receptacle 1 from the can 3, and thus the enricher is provided with an automatic oil-feed adapted to maintain the oil within the enricher at a certain predetermined depth. The top 42 of the extension 2 is supported, as shown in Fig. 2, by the reinforcing-strips 43, which connect the top and the bottom of the extension 2 and prevent the weight of the can 3 and its contents from concaving the said top 42.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a gas-enricher, a gas-inlet pipe leading into the enricher, a deflector and pressure-regulator located at the lower end of said pipe, two of the opposite sides of said deflector being permanently secured to the deflector, each side having extending ends, the remaining opposite sides of the deflector being formed of hinged flaps, the ends of said flaps terminating in close proximity to the extended ends of the fixed sides of the deflector.

2. In a gas-enricher, an inlet-pipe leading into said enricher, a deflector attached to the lower end of said pipe, flaps hinged to said deflector and forming sides thereof, said flaps having suitable pockets adapted to receive weights.

3. In a gas-enricher, an inlet-pipe leading into the enricher, a deflector journaled to the lower end of said pipe, said deflector adapted to force the gas beneath the surface of the oil, the inlet-pipe being externally screw-threaded and passing through an externally-threaded collar at the point of entrance to the enricher, said pipe adapted to be brought in or out by being revolved, the perpendicular rods secured at their ends to the top and bottom of the enricher, said rods passing through suitable perforations in the top of the deflector, said rods adapted to prevent said deflector from revolving when the inlet-pipe is revolved.

4. In a gas-enricher having a suitable gas inlet and outlet, a horizontal extension protruding from the lower edge of the enricher, the top of the said extension being closed, a valve-casing located on the top of the extension and said casing adapted to be connected with the oil-outlet of a removable can.

5. In a gas-enricher having a suitable gas inlet and outlet, the horizontal extension protruding from the lower edge of the enricher, the top of said extension being closed, a valve-casing located in said top and adapted to be connected to the valve-casing of a removable can, reinforcing-strips connecting the top and the bottom of the extension in the oil-inlet and adapted to prevent the top of the extension in the oil-inlet from concaving from the weight of the can and its contents.

6. In a gas-enricher having a suitable gas inlet and outlet, an extension protruding from the lower edge of the enricher, the top of said extension being closed, a valve-casing located in said top and adapted to be connected to the valve-casing of a removable can, the removable can having an air-vent passing above the surface of the oil contained in the can, a valve connection located in the top of the extension, the last said extension adapted to be connected with the valve connection of the vent.

7. In a gas-enricher having a suitable gas inlet and outlet, a valve-casing having a port leading into the enricher, a removable can having a valved oil-outlet adapted to be connected to the enricher valve-casing, said casing, when connected, adapted to open automatically and permit the oil in the can to pass through the said casings, a vent leading from the top of the can, an independent valve-casing located at the lower end of said vent, an independent valve-casing leading into the enricher, the valves in the said independent casings adapted to be automatically opened when

the said casings are connected, the valves in all the casings adapted to automatically close when the can is disconnected from the enricher.

8. In a gas-enricher having a suitable gas-inlet and a gas-outlet, a removable can having an oil-outlet connected to the enricher, a vent leading from the top of the can and being connected to the enricher, the oil-inlet to the enricher and the vent-exit from the enricher being at substantially the same level, the flow of oil from the can adapted to be automatically stopped when the oil in the enricher assumes the height of the oil-inlet and the vent-outlet.

9. In a gas-enricher having a suitable gas-inlet and gas-outlet, a valved oil-outlet leading into the enricher, a valved vent leading from the enricher, a removable can having a valved outlet, and a valved vent, said vent leading above the surface, of the oil in the can, the valved outlet of the can adapted to be connected to the valved oil-inlet of the enricher, the valved vent of the can adapted to be connected to the valved vent of the enricher, said valves adapted to act in conjunction with each other, the valves of the can opening the valves in the enricher, and the valves in the enricher opening the valves in the can, said valves adapted to close automatically when the can is disconnected from the enricher.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY G. BALKAM.

Witnesses:

RALPH W. LEE,

WALTER W. DARRELL.