A. D. ELLIOTT.

CARBURETER.

APPLICATION FILED AUG. 4, 1908.

944,482. **Patented Dec. 28, 1909.**

3 SHEETS—SHEET 1.

Fig. 1.

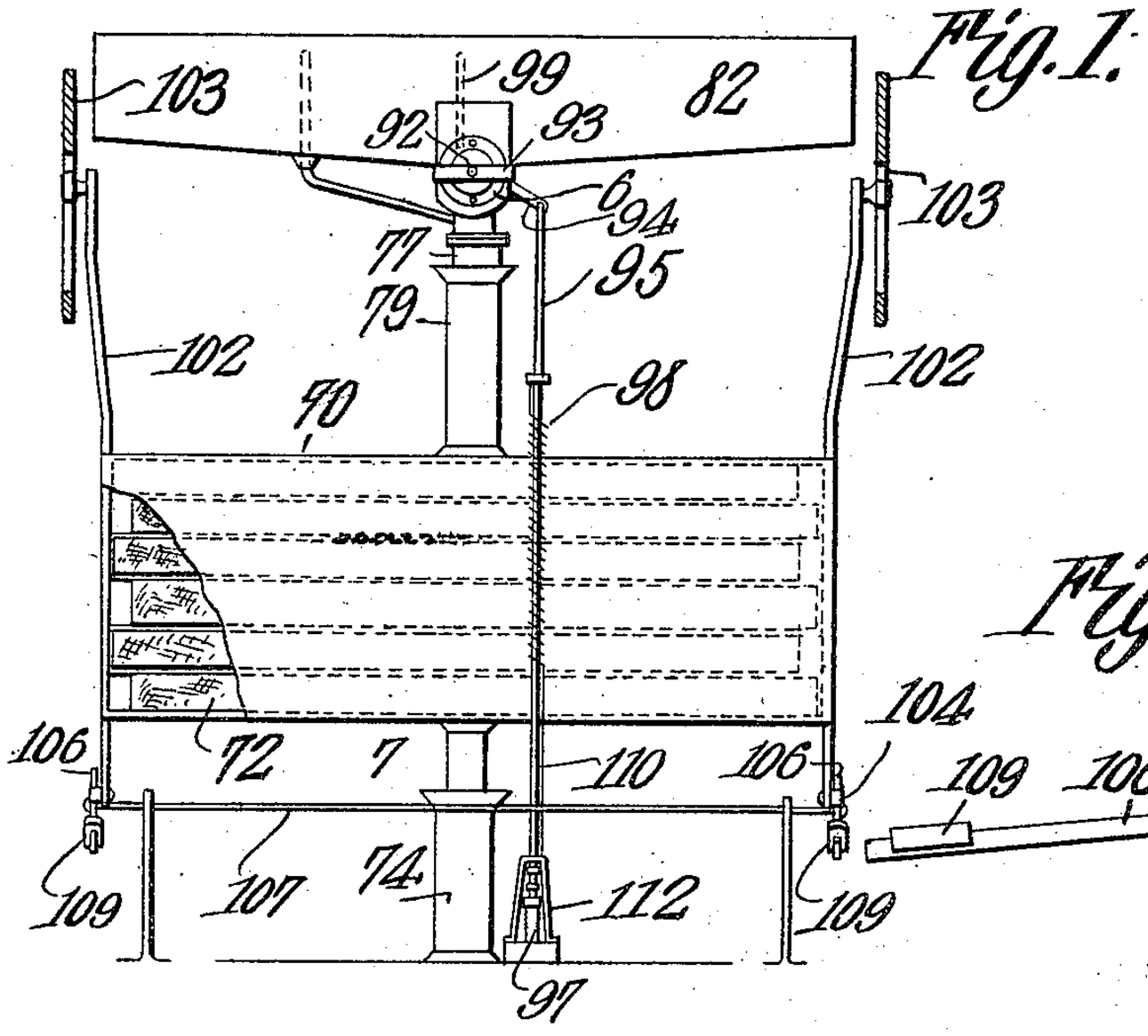


Fig. 2.

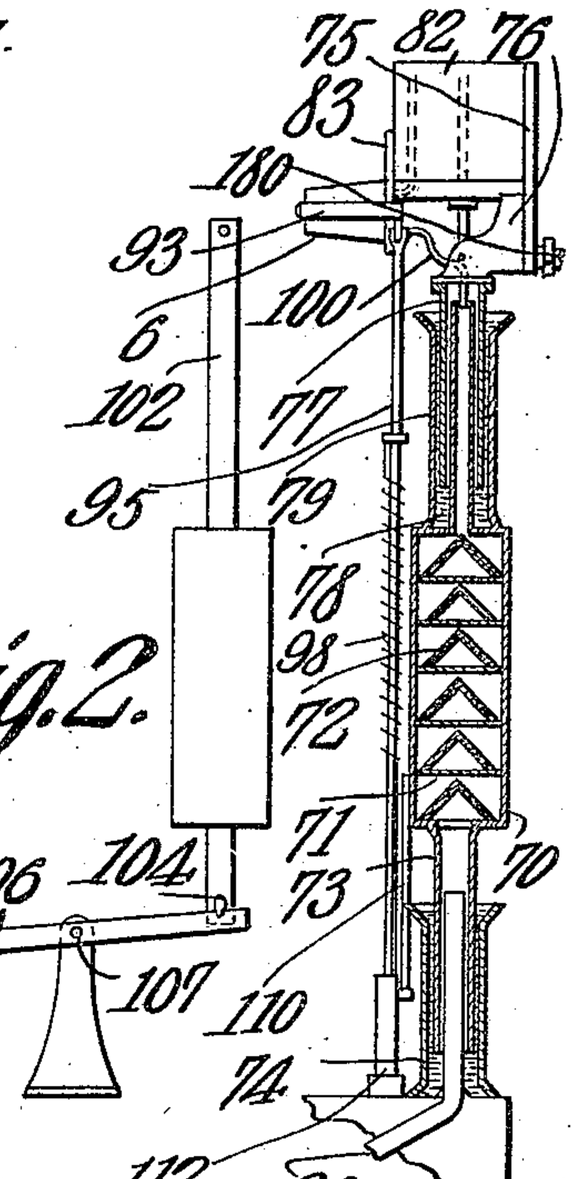


Fig. 4.

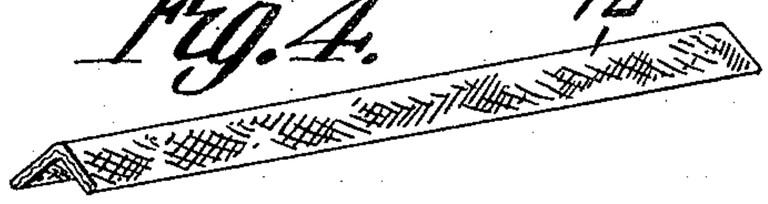


Fig. 3.

Fig. 5.

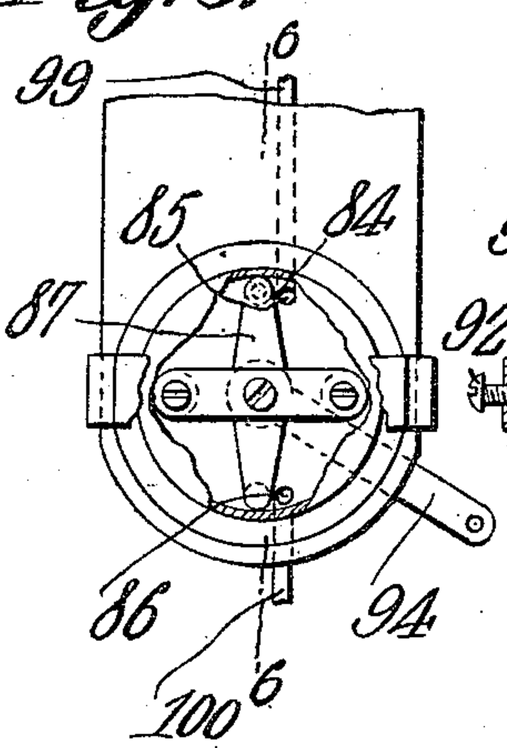


Fig. 6.

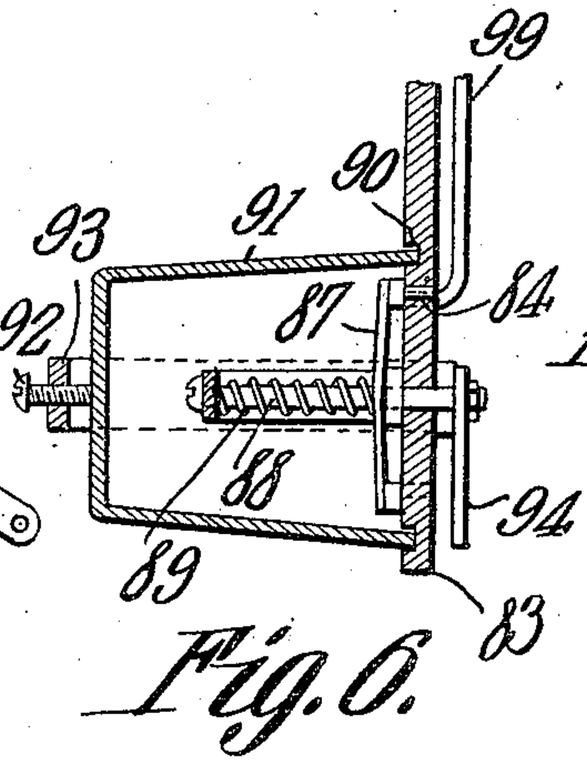


Fig. 7.

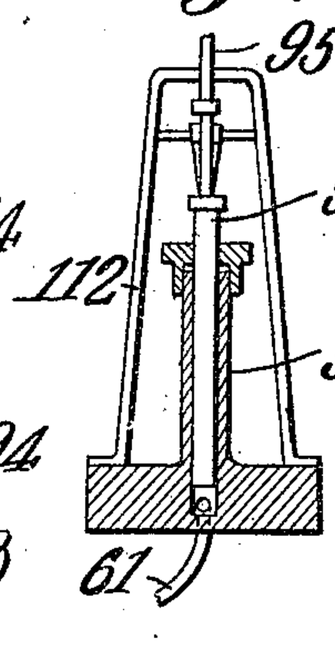
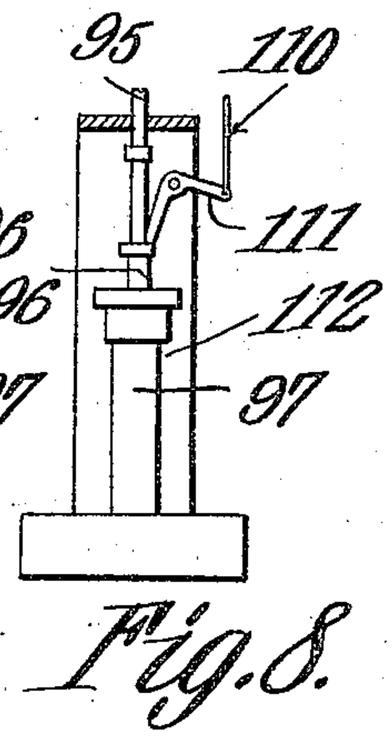


Fig. 8.



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3 SHEETS—SHEET 2.

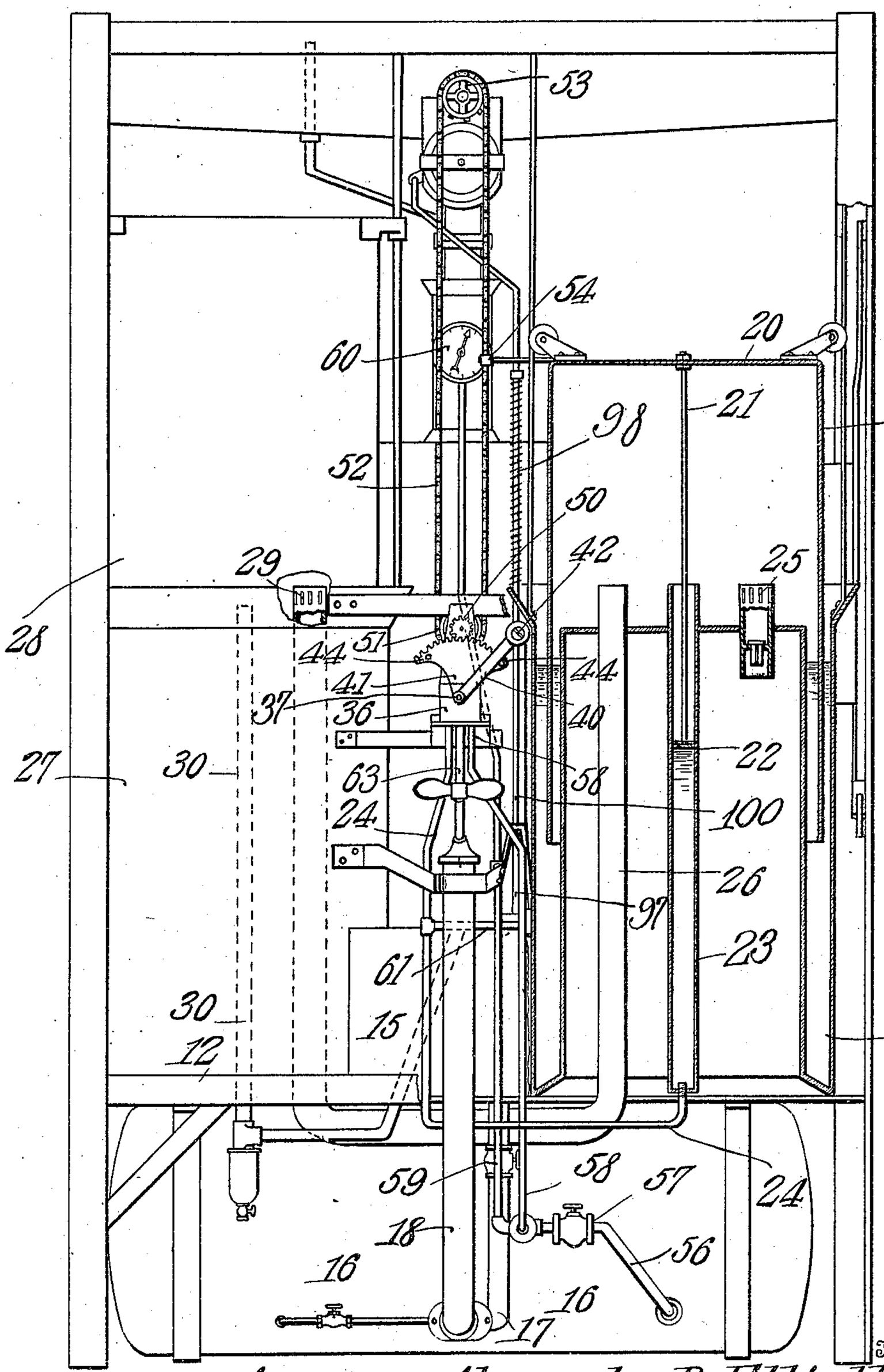

Fig. 9.

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3 SHEETS—SHEET 3.

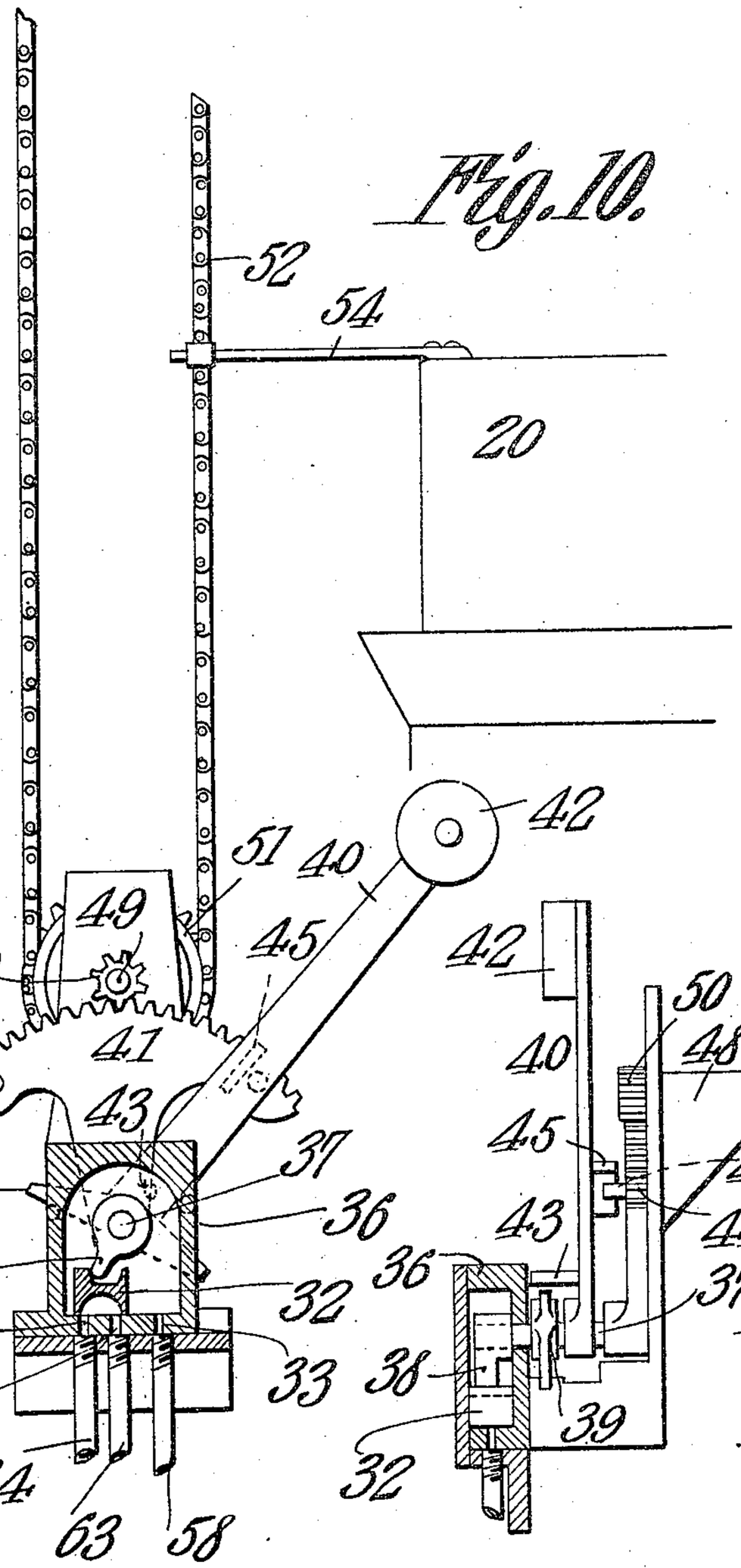

Fig. 10.

Fig. 11.

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UNITED STATES PATENT OFFICE.

ALEXANDER DAYTON ELLIOTT, OF VIOLA, ILLINOIS.

CARBURETER.

944,482. Specification of Letters Patent. **Patented Dec. 28, 1909.**

Original application filed December 21, 1907, Serial No. 408,750. Divided and this application filed August 4, 1908. Serial No. 446,991.

To all whom it may concern:

Be it known that I, ALEXANDER D. ELLIOTT, a citizen of the United States, residing at Viola, in the county of Mercer and State of Illinois, have invented a new and useful Carbureter, of which the following is a specification.

This invention relates to devices of that class employed for carbureting air and enriching gas, and has for its principal object to provide an improved form of carbureter to which measured quantities of gasolene or other hydro-carbon are fed at intervals determined by the rate of gas consumption, the supply of hydro-carbon being entirely automatic.

A further object of the invention is to provide an improved form of carbureter in which the carbureter casing is mounted on a scale beam and is so arranged that the supply of gasolene or other hydro-carbon is controlled by the variation in weight of the gasolene in the carbureter.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a front elevation of a carbureting apparatus constructed in accordance with the invention. Fig. 2 is a side elevation of a carbureter casing and a scale beam on which it is mounted. Fig. 3 is a vertical section through the carbureter. Fig. 4 is a detail perspective view of one of the absorbent portions of the carbureter detached. Fig. 5 is an elevation partly in section, of the valve mechanism which controls the flow of gasolene from the supply tank to the carbureter. Fig. 6 is a transverse section of the same on the line 6—6 of Fig. 5. Fig. 7 is a vertical section of the cylinder and plunger which control the movement of the gasolene supply valve. Fig. 8 is a side elevation of the same the plunger guide being shown in section. Fig. 9 is a view partly in elevation and partly in section of the complete carbureting apparatus including the air pump and the various pipe connections. Fig. 10 is a sectional elevation of the valve mechanism for controlling the movement of the air pump. Fig. 11 is a transverse sectional view of the same.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The present application is a division of an application for Letters Patent for air pumps for carbureters filed by me on December 21, 1907, Serial No. 408,750.

The bars 12 of the frame of the apparatus support an annular liquid tank 19, which forms a seal for the open lower end of the movable bell 20 of an air pump. To the central portion of the bell is secured a piston rod 21, extending from a piston 22 that is located in a vertical cylinder 23, to which the oil under pressure from a tank 16 is admitted by a pipe 24, and when the oil enters the lower portion of the cylinder, the piston will be forced up raising the bell 20, whereupon atmospheric air will flow in to the bell through a suction lift valve 25 of any ordinary construction. The bell is sufficiently weighted to descend and force the air outward from the bell through a pipe 26, and this pipe extends upward through a containing tank 27 of an aerometer having a movable bell 28, the upper portion of the pipe 26 being provided with a valve 29 which opens to admit the air to the aerometer 28, and closes when the pressure in the aerometer exceeds that in the bell 20 of the pump. Leading from the aerometer is a discharge pipe 30 through which the air passes to the carbureting chamber in the manner hereinafter described.

The flow of the oil or other fluid under pressure from the tank 16 to the cylinder 23 is under the control of a valve 32, see Figs. 10 and 11. The valve 32 is in the form of an ordinary D valve controlling three ports 33, 34 and 35, and is disposed within a suitable casing 36. Journaled in the upper portion of the casing is a rock shaft 37 to one end of which is connected an arm 38 that works loosely in a recess formed in the upper face of the valve 32. To this shaft is secured a two armed lever 39, and mounted loosely on the shaft is a lever 40 and a gear segment 41, the lever 40 being provided at

its free end with a weight 42 and carrying a projecting pin 43, adjacent its pivotal point, said pin being arranged to engage alternately with the arms of the lever 39. The gear segment 41 has a pair of projecting pins 44 which are arranged to engage with a lug 45 projecting from the rear face of the lever 40, and as the gear segment is moved in one direction or the other, one of the pins 44 will, by engagement with the lug 45, carry the lever 40 up to and across the vertical plane of the rock shaft 37, so that said lever may then continue its movement in the same direction by gravity, bringing the pin 43 of the lever into engagement with one or other of the arms of the lever 39, and thus quickly and positively shifting the position of the valve 32.

The valve mechanism is carried by a bracket 48 in the upper portion of which is journaled a shaft 49 carrying at one end a pinion 50 that meshes with a tooth of the gear segment 41, and at the opposite end of said shaft is a sprocket wheel 51, around which passes a link belt 52, the upper portion of the link belt being guided around an idler sprocket 53 at the upper portion of the frame.

Projecting from the link belt 52 is an arm 54 that is firmly secured to the movable bell 20 of the air pump, so that as said bell moves up and down, the link belt will be turned in one direction or the other for the purpose of shifting the valve 32.

Leading from the lower portion of the tank 16 is a pipe 56 having a controlling valve 57, and which is connected to two pipes 58 and 59, the pipe 59 leading upward and being connected to a pressure gage 60, while the pipe 58 leads upward and communicates with the port 33 of the valve casing 36. Leading from the port 35 of the valve casing 36 is the pipe 24, which communicates with the lower end of the cylinder 23, as previously described.

Leading from the central port 34 of the valve casing is a pipe 63 which forms the exhaust from the cylinder and leads into the tank 15.

In starting the machine into operation, tank 15 is filled with any suitable liquid, preferably a heavy oil, and below this tank is a second tank 16 into which the oil is forced from the tank 15 through a pipe 17, a pump 18 being preferably employed for this purpose. The pump 18 is further utilized as an air pump, so that after the entire contents of the tank 15 have been drained into the tank 16, air may be forced into said tank 16 in order to place the liquid under pressure.

The parts above described constitute no part of the present invention, but have merely been shown and described for the purpose of giving a better understanding of the operation of the carbureter hereinafter described. The operation of these parts is as follows:—With the valve 32 in the position shown in Fig. 10 the oil or other liquid under pressure will flow upward through the pipe 58 into the valve chamber, and acting on the upper face of the valve 32 will hold the latter firmly to its seat. During this time the bell 20 of the air pump is descending, and is forcing air into the bell 28 of the aerometer. As the bell 20 descends, it carries down the chain or belt 52 through the connecting arm 54, and this movement is transmitted to the sprocket wheel 51, thereby turning the pinion 50 and gear segment 41. As the segment 41 is moved to the left of Fig. 10, the pin 44 at the right of said segment will engage a lug 45 of the lever 40 and will carry the lever 40 up to and beyond the vertical plane of the axis of the shaft 37, whereupon the weight 42 of the lever will carry the same downward and the pin 43 of said lever will engage with one of the arms of the lever 39, shifting the valve 32 to such position as to uncover the port 35. The oil under pressure then flows from pipe 58 through the port 35, and pipe 24 to the cylinder 23, and the piston 22 will thereupon be forced up and will raise the bell 20 of the air pump, so that air will be sucked in through the valve 25, while the valve 29 at the discharge end of the pipe 26 will be closed by the pressure in the aerometer bell. As the bell 20 moves up, it will carry with it the link belt 52, and the valve mechanism will be thereupon moved in the reverse direction, shifting the valve 32 to the position shown in Fig. 10 and when this occurs the lower end of the cylinder 23 is placed in communication with the tank 15 through the pipe 24, port 35, the valve cavity, port 34, pipe 63. The weight of the bell then causes descending movement, and the liquid will be forced out of the cylinder 23 into the tank 15, from whence it may be afterward pumped into the pressure tank.

The carbureter constituting the present invention is shown at 70 in the form of an approximately rectangular casing within which are arranged a plurality of horizontally disposed partitions 71 on each of which rests a foraminous frame 72 of inverted V-shape in cross section. These partitions extend alternately from the ends of the casing so as to form a tortuous passage for the air to be carbureted, the air entering at the bottom and following the tortuous passage and escaping at the top of the casing. Each of the frames 72 is formed of foraminous material thoroughly wrapped with an absorbent formed of wicking or like material which will become thoroughly saturated with the gasolene or other enriching agent.

From the bottom of the carbureter casing

depends an open bottom inlet tube 73 that dips into a small annular tank 74 that is filled with oil or other liquid, and extending up into this inlet tube is the upper end of the air supply pipe 30. The top of the pipe 30 is disposed above the level of the liquid so that the latter will form a seal without interfering with free vertical movement of the carbureter casing.

At the upper portion of the main frame is secured a plate 75 to the inner face of which is fastened a hollow bracket or casing 76 from which depends an open bottom tube 77 that surrounds a discharge tube 78 leading from the top of the carbureter. The tube 77 is surrounded by a small annular tank 79 that is carried by the top of the carbureter casing, and is filled with oil or other heavy liquid so that the carbureter tank may move freely in a vertical direction without interfering with the flow of the air and gas. The gas passes upward through the tube 78 into the hollow casing 76 and thence outward through a service pipe 180 to the point of consumption.

Secured to the plate 75 or arranged at any other convenient point is a tank 82 containing gasolene or other hydro-carbon and from which the carbureter casing is supplied. At the front of the tank is a plate 83 having three ports 84, 85 and 86 which are under the control of a rocker valve 87 that is carried by a stem 88 and is pressed against its seat by a spring 89. The front of the plate has an annular groove 90 within which is seated the edge of a cup shaped casing 91 that preferably is formed of glass and is closed tightly in place by a screw 92 passing through a yoke 93 that projects from the plate. This casing 91 constitutes a measuring vessel which is filled with gasolene from the tank, and after being filled discharges its contents into the carbureter, the arrangement being such that only a single charge can be emptied into the carbureter at one operation, and danger of flooding the carbureter is, therefore, avoided.

The rear end of the valve stem 88 carries a rocker arm 94 which is connected by a rod 95 to a plunger 96 working within a cylinder 97 disposed below the carbureter. The lower end of the cylinder 97 communicates with the pipe 61 which is a branch of the pipe 24 and flow of liquid through the cylinder is under the control of the automatic mechanism heretofore described whereby there is always a supply of liquid under pressure in readiness to lift the plunger. The downward movement of the plunger to initial position is assisted by a tension spring 98 that surrounds the rod 95 one end of the spring being connected to the rod and the other end to a fixed lug on the bracket 112.

When the parts are in their normal position as shown in Figs. 1, 2, and 3 the port 84 is closed and the ports 85 and 86 are open (Fig. 5). The port 84 communicates with the lower portion of the gasolene supply tank, while leading from the port 85 is an air vent tube 99 leading to the upper portion of the gasolene tank. If the rocker arm 94 is moved upward by the admission of liquid under pressure to the lower portion of the cylinder 97, the valve will be rocked for the purpose of opening the port 84 and closing the port 86, this latter port communicating with the upper portion of the gas escape pipe 78 through a pipe 100. The gasolene will then flow in through port 84 from the tank, the air meantime escaping from the measuring vessel through the port 85 until the measuring vessel 91 is filled. If the liquid under pressure is then allowed by the action of valve 32 (Fig. 10) to escape from the lower end of the cylinder 97 the spring 98 will pull down the rod 95 and the port 84 will be closed and port 86 opened so that the measured quantity of liquid in the chamber 91 is free to flow into the carbureter, and this liquid will strike against the uppermost of the frames 72 and will be gradually distributed through the carbureter until complete saturation is effected.

When used in connection with the pumping and valve mechanisms hereinbefore described, the operation of pouring a measured quantity of gasolene into the carbureter will be accomplished each time the air pump is operated unless the carbureter contains a sufficient quantity of gasolene to render a fresh supply unnecessary.

To the opposite ends of the carbureter casing are secured metal strips 102, the upper ends of which flare outward and are slidably connected to stationary longitudinally slotted guides 103 which serve to maintain the carbureter casing in a practically constantly vertical plane. The lower ends of the arms 102 are provided with knife edge fulcrums 104 that rest in notches formed in scale beams 106 that are pivoted on a rod 107 which serves also as a means for connecting the scale beams to each other. The opposite arms of the scale beams are provided with poises 109 which may be adjusted toward and from the fulcrum point for the purpose of altering their effective force. Under normal conditions, the weight of gasolene, together with the weight of the carbureting chamber will more than counterbalance the poises, and that end of the scale beam which supports the carbureter will be moved down to the lowest position.

The carbureter carries a rod 110, the lower end of which is connected to a catch or trigger in the form of a bell crank lever 111 that is pivoted on the plunger rod guiding frame 112. This catch is arranged to engage with the enlarged head of the plunger

96, and hold the same from upward movement under the pressure of liquid entering the lower end of the cylinder 97, and the parts will remain in this position so long as the weight of gasolene in the carbureting tank is sufficient to keep the tank depressed. If, however, the gasolene is evaporated and carried away by the air to such an extent as to allow the carbureting tank to rise under the action of the counter-poises, the catch 111 will be released and the plunger will move upward for the purpose of opening the port 84 and allow gasolene to flow into the measuring vessel from which it is discharged when the plunger again descends as previously described. If the one charge is not sufficient to move down the scale beams against the action of the counter-poises the catch 111 will not be allowed to move to locking position and when the plunger is again elevated another charge will flow into the measuring vessel to be discharged into the carbureting chamber when the plunger again descends.

What is claimed is:—

1. In combination, a carbureter casing, a counter-balanced scale beam supporting the same, a gasolene supply valve, means for operating the same, and means under the control of the casing for locking the valve operating means.

2. In combination, a carbureter casing, a counter-balanced scale beam supporting the same, a gasolene supply valve, a piston and cylinder for actuating said valve, a catch for engaging and locking the piston from movement, and means connecting said catch to the carbureter casing.

3. In combination, a vertically movable carbureter casing, a counter-balanced scale beam supporting the same, a gasolene supply valve, a cylinder, a plunger or piston arranged therein, and operating said valve, a bell crank lever, one arm of which is arranged to engage with and lock the piston or plunger from movement, and a link connecting the opposite arm of said bell crank lever to the casing.

4. In combination, a carbureter, a gasolene supply tank, a measuring casing in communication with the tank and the carbureter, and a valve mechanism controlling the flow of gasolene from the tank to the casing and from the casing to the carbureter, said valve mechanism being controllable by the weight of gasolene in the carbureter.

5. In combination, a vertically movable carbureter, a counter-balancing means therefor, a gasolene supply tank, a measuring casing communicating with the tank, and a carbureter, a rock shaft, a valve carried thereby and controlling the inflow of gasolene to the casing and its discharge therefrom, a valve actuating member, and a valve locking device controllable by the vertical movement of the carbureter.

6. In combination, a vertically movable carbureter casing, a counter-balancing means therefor, a gasolene supply tank, a measuring casing having a pair of ports communicating one with the lower portion of the tank and the other with the upper portion thereof, a discharge port leading from the casing to the carbureter, a rock shaft or stem extending into the casing, a spring pressed valve carried by said shaft, a fluid pressure cylinder, a plunger disposed therein and connected to the rock shaft, a spring for moving the rock shaft in one direction, a bell crank lever engaging said plunger, and means for connecting said bell crank lever to the carbureter.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ALEXANDER DAYTON ELLIOTT.

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