T. NAGEL.

AUTOMATIC REGULATING SWITCH.

APPLICATION FILED FEB. 6, 1911.

1,042,950.

Patented Oct. 29, 1912.

2 SHEETS—SHEET 1.

Fig. 2.

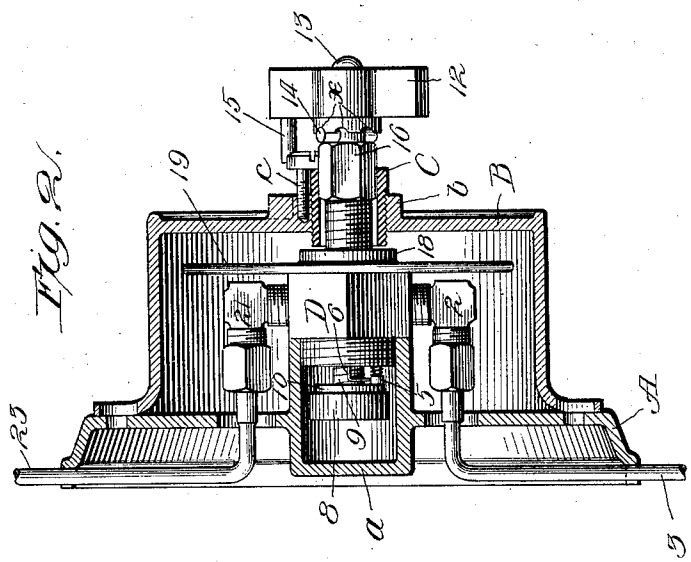
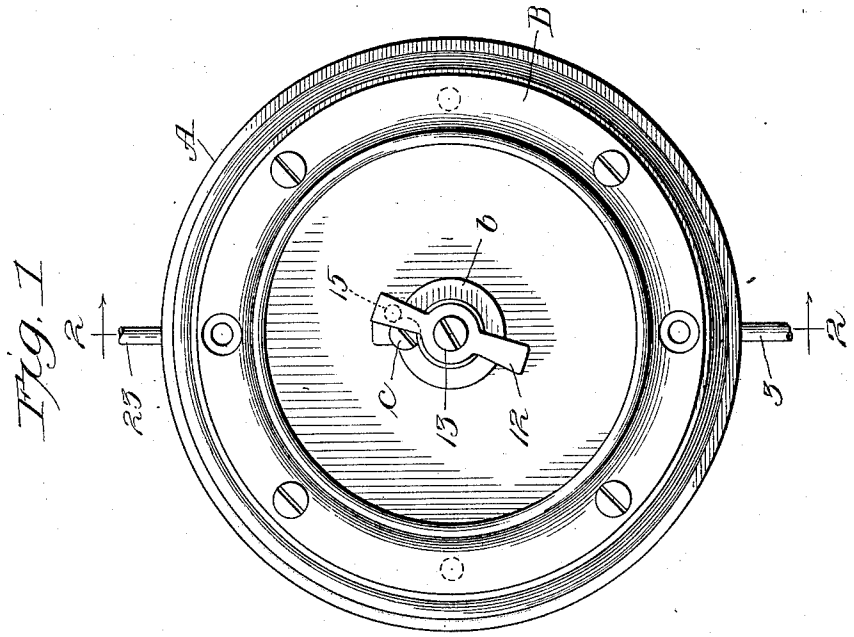


Fig. 1.



WITNESSES

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Fig. 3.

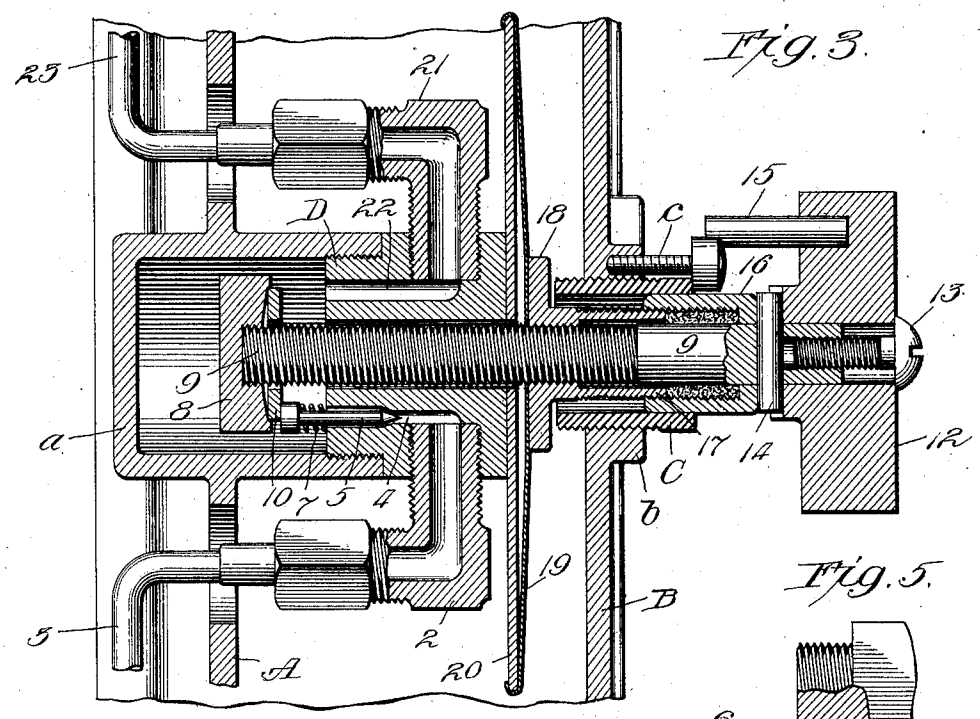

Fig. 5.

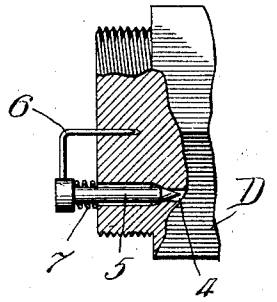

Fig. 4.

WITNESSES

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THEODORE NAGEL, OF CHICAGO, ILLINOIS.

AUTOMATIC REGULATING-SWITCH.

1,042,950. Specification of Letters Patent. Patented Oct. 29, 1912.

Application filed February 6, 1911. Serial No. 606,951.

To all whom it may concern:

Be it known that I, THEODORE NAGEL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Automatic Regulating-Switches, of which the following is a full, clear, and exact description.

My invention relates to gasolene lighting systems and particularly to the means for controlling the flow of the gasolene.

The object of my invention is to automatically regulate the flow of the gasolene from the tank to the lamps, so that the pressure will be maintained at the degree at which it has been set.

Another object is to enable the operator to obtain a high or low flame from the burner according to the illumination desired.

Yet another object is to enable this regulation of the pressure and high or low illumination by simple means that can be attached to the walls of a room and manipulated in the same manner and with the same ease as an electric switch.

Yet another object is the adjustment of the switch button so as to get the desired pilot light. And yet another object is to avoid the necessity of both, a pressure tank and a gasolene tank.

This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings: Figure 1 is a front view of the wall switch embodying the features of my invention. Fig. 2 is a vertical central section of the case of the same showing the inclosed parts in elevation. Figs. 3 and 4 are transverse central sections of the central broken away portion of said wall switch, drawn to a much larger scale and showing, respectively, the open and closed positions of the automatic gasolene controlling mechanism therein. Fig. 5 is a section of a fragment of the same illustrating the needle-valve used therein.

In the drawings, A represents a wall-plate the edges of which are flanged so that it stands out from the wall to which it is designed to be attached in any suitable manner, by screws or otherwise. This plate is, preferably, circular, and at its center is provided with a cylindrical barrel *a*, the end of which next to the wall is closed and the opposite open end interiorly threaded. A cup-shaped case B is mounted concentrically upon and is secured to this wall-plate A, by means of screws threaded through its outwardly flanged edges into the same, and at points diametrically opposite each other, said flanged edges are provided with perforations to permit heads of the screws used to secure the wall-plate to the wall, to pass. The center of the outer end of the case is provided with a screw-threaded opening and the edge *b* of this opening is flanged outward slightly. A gage-sleeve C is screwed into this opening, and a screw *c* is tapped into the outer edge of said flanged edge *b* in such position as to serve as a stop for the switch-button, as will hereinafter be more fully described, and as a lock for sleeve C.

The reduced end of a head D is screwed into the outer end of the central barrel *a* of the wall-plate, and this head has the elbow 2 of the intake pipe 3 screwed into it from below, the bore of which communicates with a horizontal passage 4 of less diameter which leads to and discharges into the interior chamber of barrel *a*. The portion of passage 4 nearest said interior chamber is made slightly greater in diameter, and the shoulder made by so increasing the diameter is beveled to provide a seat for the correspondingly pointed end of the needle-valve 5. This needle-valve is of less diameter than the rear portion of the passage 4, which it traverses, and its rear end extends into said interior chamber and is headed and provided with an L-shaped arm 6, the outer portion of which is made parallel to the needle-valve and enters and has sliding engagement in an opening in the adjacent end of head D. The arm 6, is designed to direct the vibrations of the needle-valve and prevent its rotation, and thereby enable it to maintain its relative position to its seat and prevent leakage past the same when the valve is closed.

Valve 5 is surrounded by a coil-spring 7, between its head and the adjacent mouth of passage 4, and its outer headed end is kept thereby in engagement with the cap 8 on the inner end of a vibratory spindle 9, or against an interposed washer 10, as desired.

Spindle 9 extends horizontally outward from cap 8, concentric to the barrel *a* and case B and its outer end extends out through the central opening in the outer end of said case and has a switch-button 12, removably secured to its outer end by means of a screw 13. A pin 14 is passed through a suitable opening in said spindle near its outer end

whose ends project slightly beyond the sides of the spindle, and the adjacent end of the boss of button 12 is provided with diametric grooves or notches *x*, so that the button can be arranged in any relative radial position desired to said spindle, and when screw 13 is tightened, maintained in the same. As shown in the drawings, button 12 is provided with two wings. From the inner surface of one of these, a stop-pin 15 projects parallel to the spindle, and is adapted to engage the gage-sleeve C.

The barrel of spindle 9, next pin 14 passes through a suitable gland nut 16, the inner end of which is screwed onto the sleeve 17, which latter forms a part and is made in one piece with an arbor 18, that is screwed onto the screw-threaded portion of spindle 9. The flanged edge of this arbor has a bellows-diaphragm secured to the inner surface thereof, which latter comprises a disk of flexible metal, preferably bronze 25, the outer circular edges of which are seamed around and embrace the circumferential edge of a non-flexible plate 20, that is secured to the outer end of head D.

Diametrically opposite elbow 2, a corresponding elbow 21 is tapped into head D, and the bore of this elbow communicates with a passage 22, made in head D parallel with spindle 9, which leads to and communicates with the interior chamber of barrel *a*. This elbow is connected to the discharge pipe 23, that leads to and supplies the lamps of the system, to which my improvements may be applied with gasolene.

In operation, the oil from one tank flows through the intake-pipe and elbow 2, through passage 4, around the side of the needle-valve into the barrel *a* under pressure. The oil fills the discharge pipe and feeds the lamps, and also flows up around the threaded sides of spindle 9, and the smooth sides of the bore of the opening in head D through which said spindle passes, and into the space between the diaphragm 19 and the plate 20. The oil, according to its pressure expands the diaphragm out slightly and through the medium of the arbor 18, moves spindle 9 out slightly, and this movement of the spindle is imparted to the needle-valve through the medium of the cap on its inner end to increase or decrease the distance between the pointed end of the needle-valve and its seat according to the pressure of the oil. The greater the pressure, the smaller the space between the valve and its seat, and the smaller the pressure, the greater will be the space between these parts.

When the needle-valve is closed the position of the spindle 9 would be such that the stop-pin projecting from the switch-button will engage with screw *c*. In this position only gasolene enough to burn a pilot light will flow between the pointed end of the needle-valve and its seat. When the spindle is turned by grasping the switch-button the spindle will screw into and through arbor 18, and the cap on its inner end will move away from the valve, and the expansion of coil-spring 7, will move the valve 6 farther off of its seat and allow the gasolene to flow past the same in larger quantities, according to the distance the spindle has been rotated, and it will be noticed in this connection that the vibratory action of the spindle, due to the pressure of the gasolene between the plates of the diaphragm will be just the same and will operate to control the flow by automatically adjusting the longitudinal positions of the needle-valve always according to the pressure of the gasolene.

The gage-sleeve C is tapped into the central opening of the outer end of the case B so that its inner end enters the interior of said case and until it is in such position to limit the outward movement of the diaphragm and arbor to a predetermined extent, according as the judgment of the operator may deem best.

What I claim as new is:

1. In a gasolene lighting system, a supply pipe consisting of a plurality of sections, and means for automatically controlling the flow of the fluid through the same comprising a suitable chamber having intake and outlet passages connecting it to the adjacent ends of said sections, a vibratory spindle, a bellows-diaphragm actuated by the pressure of the fluid from said chamber, to one side of which said spindle is connected, and a needle-valve in the intake passage of said chamber having a laterally extending L-shaped arm for guiding the movement thereof, the movement of which toward its seat is controlled by the movement of said spindle.

2. In a gasolene lighting system, a supply pipe consisting of a plurality of sections, and means for automatically controlling the flow of the fluid through the same, comprising a suitable chamber, a head closing the outer end thereof having an intake-passage and a discharge-passage connecting said chamber with adjacent ends of the sections of said supply pipe, a needle-valve controlling the opening of the intake-passage into said chamber, a bellows-diaphragm secured to the outer end of said head, actuated by the pressure of the fluid from said chamber, adjustable means for limiting the movement of the diaphragm, an arbor secured to the outer flexible side of said diaphragm, and a rotatable spindle having threaded engagement with said arbor, and a cap on the inner end of said spindle adapted to engage said needle-valve.

3. In a gasolene lighting system, a means for controlling the flow of gasolene comprising a supply pipe, a suitable chamber con-

necting sections of said supply pipe, a valve controlling the intake of the same, a head closing one end of said chamber having a suitable opening therethrough, a bellows-diaphragm secured to the outer end of said head actuated by the pressure of the liquid in said chamber, adjustable means for limiting the movement of the diaphragm and, a threaded-spindle traversing said opening in said head and engaging the arbor of the outer member of said diaphragm, and adapted to move said valve toward its seat.

4. In a gasolene lighting system a means for controlling the flow of gasolene comprising a supply pipe, a suitable chamber connecting sections of said supply pipe, a valve controlling the intake of the same, a head closing one end of said chamber having a suitable opening therethrough, a bellows-diaphragm secured to the outer end of said head actuated by the pressure of the liquid in said chamber, adjustable means for limiting the movement of the diaphragm and, a threaded-spindle traversing said opening in said head and engaging the arbor of the outer member of said diaphragm, and a cap on the inner end of said spindle adapted to move said valve toward its seat.

5. A wall-switch for gasolene lighting system comprising a wall-plate having a barrel made integral therewith, a case mounted upon said plate having an opening in the outer closed side thereof, the center of which alines with the axis of said barrel, a supply pipe a head closing the outer end of said barrel having passages therein connecting sections of said supply pipe to the inner chamber of said barrel, a valve controlling the discharge of the intake-pipe into said chamber, a vibratory rotatable spindle extending from said chamber out through a suitable opening in said head and out through the opening in the outer end of the case, and a switch-button removably secured to the outer end of said spindle having a series of radial grooves in the inner face of its central boss, and provided with means for limiting the rotation thereof, and a transverse pin in said spindle engaging said grooves.

6. In a gasolene lighting system means for controlling the flow of gasolene comprising, in combination, a supply pipe, a wall-plate having a barrel made integral therewith, a cup-shaped case mounted upon said plate and having an opening in its outer closed side which alines with the inner chamber of said barrel, a head closing the outer end of said chamber having passages therein connecting the divisions of the supply-pipe to the chamber, a bellows-diaphragm actuated by the pressure of the fluid from the chamber, adjustable means for limiting the movement of the diaphragm and means extending out through the opening in the case which is controlled by said diaphragm for moving said valve nearer its seat.

7. In a gasolene lighting system means for controlling the flow of gasolene comprising, in combination, a supply-pipe, a wall-plate having a barrel made integral therewith, a cup-shaped case mounted upon said plate and having an opening in its outer closed side which alines with the inner chamber of said barrel, a head closing the outer end of said chamber having passages therein connecting the divisions of the supply-pipe to the chamber, a bellows-diaphragm actuated by the pressure of the fluid from the chamber, adjustable means for limiting the movement of the diaphragm and longitudinally adjustable means extending out through the opening in the case which is controlled by said diaphragm for moving said valve nearer its seat.

8. In a gasolene lighting system means for controlling the flow of gasolene comprising, in combination, a supply pipe, a wall-plate having a barrel made integral therewith, a cup-shaped case mounted upon said plate and having an opening in its outer closed side which alines with the inner chamber of said barrel, a head closing the outer end of said chamber having passages therein connecting the divisions of the supply-pipe to the chamber, a bellows-diaphragm actuated by the pressure of the fluid from the chamber, adjustable means for limiting the movement of the diaphragm, a longitudinally adjustable threaded sleeve in the case for limiting the movement of said diaphragm, and means extending out through said sleeve controlled by said diaphragm for moving said valve nearer its seat.

9. In a gasolene lighting system means for controlling the flow of gasolene comprising, in combination, a supply pipe, a wall-plate having a barrel made integral therewith, a cup-shaped case mounted upon said plate and having an opening in its outer closed side which alines with the inner chamber of said barrel, a head closing the outer end of said chamber having passages therein connecting the divisions of the supply-pipe to the chamber, a bellows-diaphragm actuated by the pressure of the fluid from the chamber, a longitudinally adjustable spindle extending from said chamber out through said head and engaging the outer member of said diaphragm, and from thence extending out of the opening in said case, and a threaded sleeve adjustable in the opening in the case for limiting the expansion of said diaphragm.

10. In a gasolene lighting system means for controlling the flow of gasolene comprising, in combination, a supply-pipe, a wall-plate having a barrel made integral

therewith, a cup-shaped case mounted upon said plate and having an inner chamber of said barrel, a head closing the outer end of said chamber having passages therein connecting the divisions of the supply-pipe to the chamber, a bellows-diaphragm actuated by the pressure of the fluid from the chamber, a rotatable threaded spindle extending from said chamber out through said head and engaging the outer member of said diaphragm, and from thence extending out of the opening in said case, a switch-button secured to the outer end of said spindle, a threaded sleeve adjustable in the opening in the case for limiting the expansion of said diaphragm, and a screw that locks said sleeve and limits the rotative movement of said button and spindle.

In witness whereof I have hereunto set my hand this 2nd day of February 1911.

THEODORE NAGEL.

Witnesses:
FRANK D. THOMASON,
E. K. LUNDY.