L. A. MAPEL.

FLUID REGULATING DEVICE.

APPLICATION FILED JUNE 11, 1914.

1,179,538.

Patented Apr. 18, 1916.

2 SHEETS—SHEET 1.

Fig. 3.

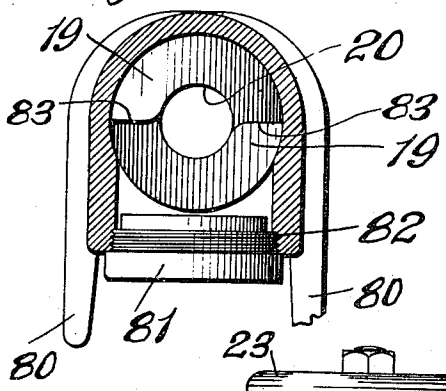
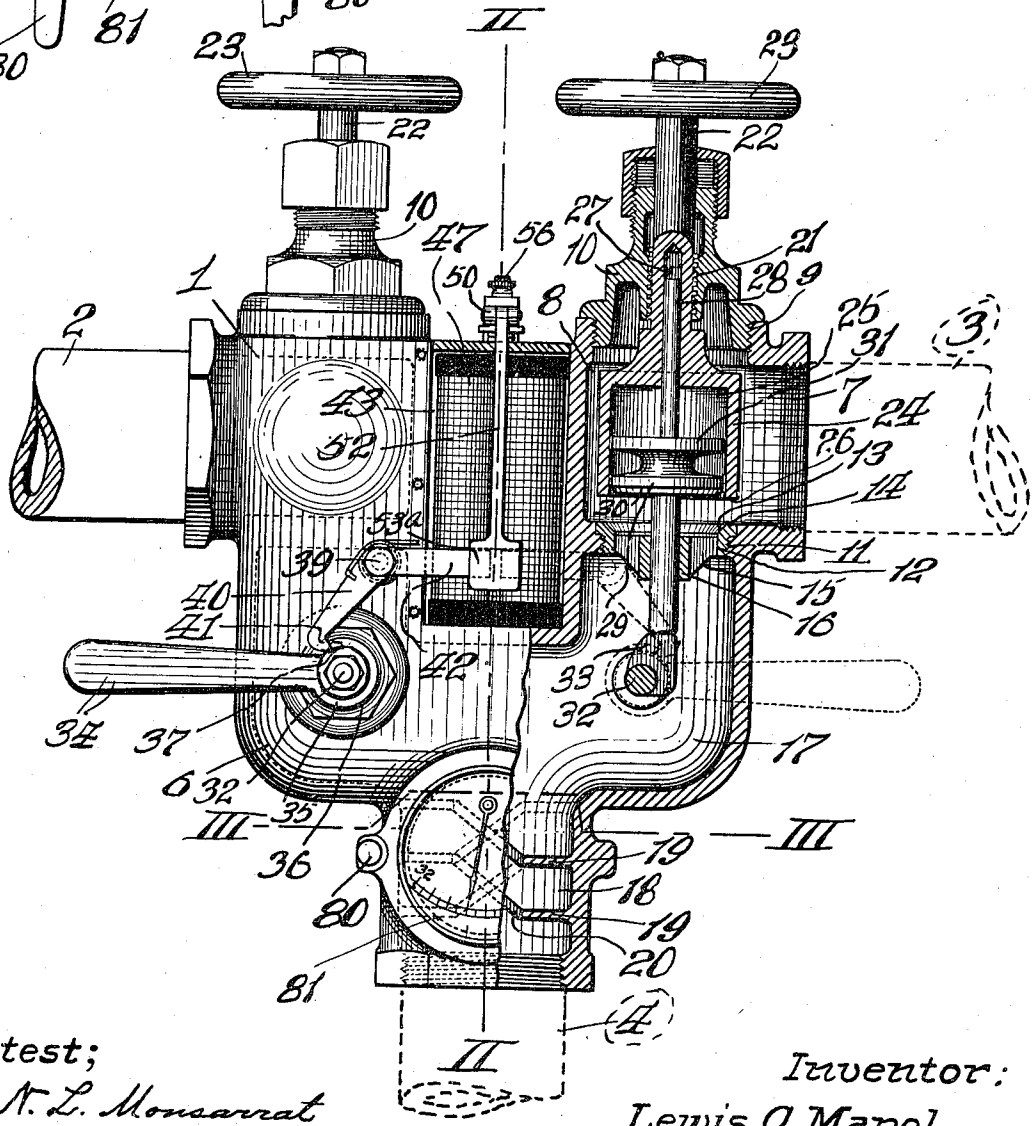


Fig 1



Attest;

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Inventor:

Lewis A Mapel.

By Knight Bros.

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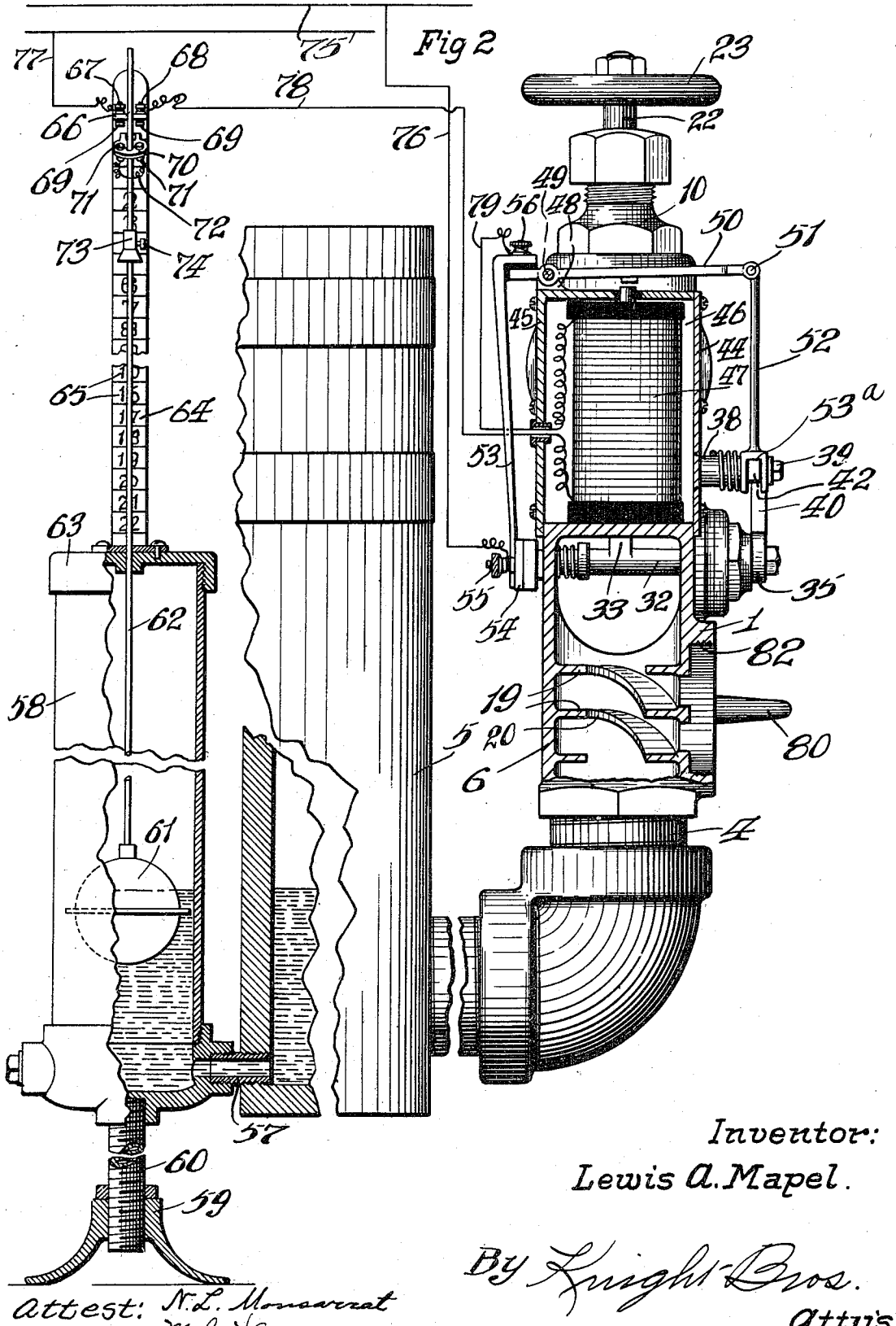
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2 SHEETS—SHEET 2.

Fig 2



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UNITED STATES PATENT OFFICE.

LEWIS A. MAPEL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE MAPEL MANUFACTURING CO., OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

FLUID-REGULATING DEVICE.

1,179,538. Specification of Letters Patent. Patented Apr. 18, 1916.

Application filed June 11, 1914. Serial No. 844,390.

To all whom it may concern:

Be it known that I, LEWIS A. MAPEL, a citizen of the United States of America, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Fluid-Regulating Devices, of which the following is a specification.

This invention relates more especially to that type of regulating devices which are used in connection with fluid supply pipes in which the valves thereof are mechanically opened to let a predetermined amount of fluid pass through the supply pipes to a receptacle; and when the requisite amount of fluid is obtained in the receptacle, the valves are electrically released from their opened positions.

Another object is to provide improved means is a device of this character whereby the valve housing is adapted to receive a plurality of supply pipes for fluid of different temperatures or kinds, there being improved means formed in the housing for mixing the fluid supplied from the plurality of supply pipes so a uniform temperature or grade of fluid can be established.

A further object is to provide improved means for regulating the amount of fluid to be passed by the valves.

Other and further objects will appear in the specification, and be specifically pointed out in the appended claims, reference being had to the accompanying drawings exemplifying the invention, and in which,

Figure 1 is a front elevation, partly in section, of this improved device. Fig. 2 is a vertical section taken on approximately line II—II, Fig. 1, but showing the device operably connected to a receptacle and an adjustable float. Fig. 3 is a horizontal section taken on the line III—III, Fig. 1.

Referring to the drawings: 1 designates this improved device, which, as shown in this instance, has two supply pipes 2 and 3 connected therewith. The pipe 2 is adapted to contain cold water, while the pipe 3 is adapted to contain hot water. Leading from the lower end of this improved device is a discharge pipe 4 which leads to a receptacle 5.

This improved device comprises a housing 6 in which is formed a pair of oppositely disposed inlet openings 7, one of said openings being for the reception of the pipe 2, the other opening being for the reception of pipe 3. Formed in the housing 6 adjacent the inlet opening 7 is a valve chamber 8. Leading from the top of said chamber is a threaded opening 9, each of said openings 9 having a gland 10 engaged therein. Formed in the housing 6, adjacent the lower end of each of the valve chambers 8, is a threaded opening 11 in which is mounted the valve seat 12. Each of said seats 12 has a bevel seating portion 13 and a horizontal seating portion 14.

Passageways 15 are formed in the spider 16 of each valve 12. Said passageways of each of said valves lead to discharge chambers 17. Said discharge chambers 17 lead to a vertically arranged discharge passageway 18. Formed on the inner walls of the vertically arranged passageways 18 are a pair of spirally arranged vanes 19, said vanes winding upon the vertically arranged opening 20.

Formed in each of the glands 10 is a threaded opening 21. Engaged in each of said openings is an adjustable valve stem 22, each of said valve stems having a hand wheel 23 secured to the upper end thereof.

Carried by the lower end of each valve stem 22 is a regulating valve 24. Formed in each of said valves is a chamber 25, and formed on the lower end of each of said valves is an annular seat engaging portion 26. Leading from the chamber 25 of each of said valves 24 is a valve stem guiding recess 27, each of said recesses 27 being for the reception of one end of a valve stem 28. The opposite end of each of said valve stems is reciprocably mounted in a central opening formed in the spiders 16. Carried by each of said valve stems 28 is a valve 29. Each of said valves has a beveled valve seat engaging portion 30 formed thereon and a vacuum producing portion 31.

Transversely mounted in each of the discharge chambers 17 is a rock shaft 32. Formed on each of said shafts is a cam 33, one end of each of said shafts 32 extending out beyond one side of the housing 6. Secured to the exposed end of each of said shafts is a handle 34, each of said handles having a hub portion 35, the periphery of each of said hubs forming a pawl riding surface 36. Formed in each of said hubs 35 is a tooth 37.

Formed on the outside of the housing 6

on a plane above the handles 34 are a pair of lugs 38, each of said lugs being for the reception of a screw 39. Mounted on each of said screws is a spring actuated pawl 40, each of said pawls having an engaging portion 41 and a disengaging portion 42.

Formed in the housing 6, between the valve chambers 8, is a recess 43, said recess being closed by a front plate 44 and a back and top plate 45, forming a chamber 46. Located in said chamber is a magnet 47. Formed on the plate 45 are a pair of ears 48. Pivotally mounted between said ears on the pivot 49 is a lever 50. Pivotally mounted to the forward end of said lever 50 by the pivot 51 is a depending knock-off bar 52, the lower end of said bar having a bifurcated end 53ª, said bifurcated end adapted to engage the disengaging ends 42 of the pawls 40. Secured to the rear end of said lever 50, and insulated therefrom, is a depending contact arm 53, the lower end of said arm adapted to engage a contact plate 54. Mounted on the contact plate 54 is a binding post 55. Mounted to the contact arm 53 at the upper end thereof is a binding post 56.

Connected to the receptacle 5 by a nipple 57 is a float cylinder 58, said cylinder being adjustably mounted to a stand 59 by the threaded pipe 60. Mounted in the float cylinder 58 is a float 61. Secured to the upper end of said float and extending vertically therefrom is a rod 62, said rod being reciprocably mounted in the cylinder head 63. Mounted on said cylinder head is a vertically arranged gage bar 64 bearing characters 65. Formed on the upper end of the gage bar 64 is a horizontally arranged portion 66. Secured to said horizontal portion are binding posts 67 and 68. The lower ends of said binding posts have contact points 69. Swingingly mounted to the gage bar 64, adjacent the under side of the horizontal portion 66, is a hinge member 70. Carried by said hinge member 70 are a pair of contact points 71 which are connected with each other by the wire 72. These contact points 71 are adapted to make contact with the contacts 69.

Adjustably mounted on the rod 62 of the float 61 is a lifting member 73, said lifting member adapted to be adjusted on said rod by the set screw 74. In connecting this improved device in circuit with the line wires 75, a wire 76 is led from one of said line wires to the binding posts 55, and a wire 77 is connected with the other said line wire and to the binding posts 67 of the gage bar 64. Leading from the binding post 68, adjacent the binding post 67, is a wire 78 which leads to the magnet 47. Leading from said magnet is a wire 79 which leads to the binding posts 56.

In the operation of this improved device, if a predetermined amount of water is to be obtained in the receptacle 5, the gage or lifting member 73 is set on the rod 62 in accordance with one of the characters of the gage bar 64. The valves 29 are then set in open position by lifting the handles 34 of the rock shafts 32 to a horizontal position. In this position, the handles will be engaged by the engaging portions 41 of the pawls 40. This movement of the handles 34 will also set the portions 42 of said pawls in a horizontal position against the bifurcated portion 53 of the knock-off bar 52. The lever 50 will then be disengaged from the magnet 47. Fluid will then pass through the supply pipes 2 and 3 and will be conducted through the vertical passageway 18 to the receptacle 5. As the fluid rises in the receptacle 5, an equal amount will be registered in the fluid cylinder 58, and the float 61 will be carried upwardly until the member 73, which is carried by the rod 62, will engage the under side of the hinge 70, thereby elevating said hinge. The contact 71 will engage the contacts 69 thereby closing the circuit and energizing the magnet 47. The lever 50 will then be moved downwardly, and the knock-off bar 52 will bear against the disengaging portions 42 of the pawls 40 thereby disengaging the ends 42 from the notches 37 of the handles 34. As the handles fall downwardly by their own weight, the cams 33 of the rock shafts 32 will become disengaged from beneath the lower end of the valve stems 28, thereby allowing the valves 29 to be returned to their valve seats. The instant the lever 50 engaged the magnet 47, the electric circuit just made was again broken by the swinging of the contact bar 53 from the contact plate 54. As the handles 34 move downwardly they will engage against the stop lugs 80 which are formed on the housing 6. The spring actuated pawls 40 are held out of engagement from the bifurcated portion 53ª of the knock-off bar 52 by reason of the portion 41 of said pawls riding on the riding faces 36 of the handles 34. When the valves 29 are elevated from their seats, they are moved into the chambers 25 of the regulating valves 24. When the valves are released, they will not come down with force on their respective seats on account of the vacuum producing portions 31 producing a vacuum in the chambers 25.

As shown in the drawings, in order to establish a proper temperature of fluid in the receptacle 5, a thermometer 81 is mounted in the opening 82 which is formed adjacent the spiral vanes 19. It might be necessary to regulate quickly the supply of hot fluid from the pipe 3 in accordance with the amount of fluid being discharged from the pipe 2 or vice versa. This is done by

manipulating the hand wheel 23 of either of the regulating valves 24, thereby lowering the valve toward its horizontal seating portion 14 of the valve seat 12. Attention is called to the fact that the valves 29 are elevated the same distance every operation in accordance with the height of lift given by the cams 33 of the rock shafts 32. Therefore, the amount of fluid discharged from the supply pipes is controlled by the regulating valves 24. As the discharged fluid engages the spirally arranged vanes 19, the different temperatures of the discharging fluid will be thoroughly mingled so the proper reading is given by the thermometer so the operator can readily judge how to regulate his regulating valves.

Attention is called to the upper end or starting point of the vanes 19 in which the starting portions 83 are in longitudinal alinement with the bottom of the discharge chamber 17. As there are two spirally arranged vanes 20, this position of the vanes provides means for portions of the fluid from each of said discharge chambers 17 to fall on one of the vanes 20, while other portions of the fluid will fall on the other vane 20. The portions from the chambers will unite, thereby providing for a thorough mixing of the fluid. In addition to the reciprocatory mounting of the inlet valves 29 in the chambers 25 of the regulating valves 24, which assembling causes a vacuum to be produced in the chambers 25, the valve 24 also serves to prevent fluid pressure on the top of the valves 29.

What I claim is:

1. In a fluid regulating device, a receiving chamber; an inlet passage opening into said chamber; an outlet passage from said chamber; and a valve for regulating the quantity of flow, comprising a valve seat supported between said receiving chamber and said outlet passage, a housing within said chamber, and a handle connected to said housing whereby said housing may be quickly placed in any desired adjustment in respect of said valve seat, in order to effect quick variation of the quantity of fluid passing said valve; in combination with a closure valve within said housing movable to and from said valve seat; a device for raising said closure valve from said valve seat; a guide for guiding said closure valve in its movements; and an element engaging said device to prevent said closure valve from moving to said valve seat.

2. In a fluid regulating device, a receiving chamber; an inlet passage opening into said chamber; an outlet passage from said chamber; and a valve for regulating the quantity of flow, comprising a valve seat mounted between said receiving chamber and said outlet passage, a housing supported within said chamber by one of the side walls thereof above said valve seat, and manually engageable connections for moving said housing toward and away from said valve seat independently of the supporting side wall; in combination with a closure valve operable within said housing to and from said valve seat; an actuator for moving said closure valve from said valve seat; a guide for guiding said closure valve in its movements; an element engaging said actuator to hold said closure valve away from said valve seat; a device for releasing said element from said actuator when a predetermined quantity of fluid has passed said closure valve; and means for varying the quantity of liquid required to pass said valve before said element will be disengaged from said actuator.

3. In a fluid regulating device, the combination with a receiving chamber; an inlet passage opening into said chamber; an outlet passage from said chamber; a removable closure at one side of said chamber; and a valve for regulating the quantity of flow, comprising a valve seat between said chamber and said outlet passage, a housing within said chamber adjustably supported by said removable closure, and a manually engageable device for operating said housing to various adjustments toward and away from said valve seat to vary the quantity of the fluid passing into said outlet chamber; of a closure valve within said housing movable to and from said valve seat to close and to open said outlet passage; means for moving said closure valve from said valve seat; a guide for guiding said valve in its movements; a device for holding said valve in open adjustment; a normally deënergized actuator for releasing said holding device; mechanism under control of the fluid that has passed said closure valve for energizing and enabling said actuator to release said holding device; and means for varying the quantity of fluid required to pass said closure valve before said holding device will be released by said actuator.

4. In a fluid regulating device, a receiving chamber; an inlet passage opening into said chamber; an outlet passage leading from said chamber; and a valve for regulating the quantity of flow, comprising a valve seat removably positioned in said outlet passage, a housing supported by one of said side walls of said chamber; and a manually engageable handle in permanent connection with said housing for moving said housing relatively to the supporting side wall and to said valve seat to effect quick variation of the quantity of fluid which may pass from said receiving chamber into said outlet passage; in combination with a closure valve reciprocating in said housing for opening and closing said outlet passage in any position of said housing; a device for holding

said closure valve in open position; a normally deënergized actuator under control of the fluid passing from said chamber for releasing said holding device; mechanism under control of a predetermined quantity of fluid that has passed from said housing for energizing and enabling said actuator to release said holding device; means for varying the quantity of fluid required to energize said actuator; and means for deënergizing said actuator as an incident to the movement thereof to release said holding device.

5. In a fluid regulating device, a receiving chamber, an inlet passage to said chamber, an outlet passage from said chamber, a housing within said chamber movable toward and away from the opening into said outlet passage to vary the quantity of fluid which may pass from said receiving chamber into said outlet passage, a handle in connection with said housing for actuating the same, a valve in said housing, a stem on said valve engaging with said housing to guide said valve in its movements with respect to said housing, a valve seat, a guide supported by said valve seat, a stem on said valve passing through said guide, an actuator engaging said last-named valve stem and operable to move said valve to open position, and a device movable into and out of engagement with said actuator to hold the same in position to retain said valve in open position.

6. In a fluid regulating device, a receiving chamber, an inlet passage to said chamber, an outlet passage from said chamber, an element supported within said chamber controlling the quantity of flow therefrom, a stem in connection with said element extending through one of the walls of said chamber, a manually engageable handle supported by said stem for operating the same, means for moving said element toward or away from said outlet passage when said stem is revolved, a valve operable to open and close said passage, means for moving said valve to open position, means for closing said valve, a guide for guiding said valve in its movements, a device to prevent said valve from closing, a normally deenergized actuator for releasing said device, optionally variable means under control of the fluid that has passed said valve for energizing said actuator after any desired quantity of fluid has passed said valve, and a part moved by said actuator as an incident to energization thereof to release said device and enable said valve to close.

7. In a fluid regulating device, a mixing chamber, oppositely disposed passages opening into said mixing chamber, independently adjustable devices for varying the quantity of fluid passing into said mixing chamber from each of said passages, manually engageable handles carried by said devices for operating them quickly to different relative positions whereby the relative quantity of fluid admitted through said passages may be quickly varied, independently operable valves for opening and closing said passages, handles for moving said valves to open position, devices for holding said valves open, a normally deënergized actuator, mechanism under control of optionally variable quantities of fluid passing from said mixing chamber for energizing said actuator, a part moved by said actuator as an incident to energization thereof to release said devices, and means for varying the quantity of fluid required to energize and enable said actuator to move said part to release said devices.

8. In a fluid regulating device, a mixing chamber, oppositely disposed passages opening into said chamber, a device in each of said passages for varying the quantity of fluid which may pass from said passages, manually engageable operating handles carried by said devices for adjusting them quickly and independently of each other whereby the relative quantity of fluid admitted through said passages may be quickly varied, independently adjustable valves controlling said passages, guides for guiding said valves in their movements, devices for holding said valves open, a normally deenergized actuator for releasing said devices, mechanism under control of fluid passing from said mixing chamber for energizing said actuator when a predetermined quantity of fluid has passed from said mixing chamber, means for varying the quantity of fluid required to energize said actuator, devices operated by said actuator after it has been energized as aforesaid for releasing said holding devices, and means for deenergizing said actuator as an incident to the operation thereof to release said holding devices.

9. In a fluid regulating device, a receptacle, a passage for delivering fluid to said receptacle, a valve seat in said passage, a valve element movable toward and away from said valve seat, a valve stem extending through and having engagement with one wall of said chamber, whereby said valve element will be supported in whatever position it may be placed, a manually engageable device affixed to said stem for revolving said stem to place said valve element quickly in selected positions in respect of said valve seat, a valve movable to and from said seat to close and to open said passage, a guide for guiding said valve in its movements, a holding device settable to hold said valve, a normally deënergized electric actuating device, mechanism under control of the fluid admitted to said receptacle for energizing said actuating device, a releasing device operated

by said actuating device when energized to release said holding device to enable said valve to close, and means for deënergizing said actuating device as an incident to the operation of said releasing device as aforesaid.

10. In a fluid regulating device, the combination with a mixing chamber and passages opening into said chamber, of independently adjustable devices in each of said passages, said devices comprising a regulating valve in each of said passages for regulating and varying the quantity of flow through said passages respectively, manipulative means in connection with said regulating valves for effecting the quick adjustment thereof relatively to each other, a closure valve reciprocating in each regulating valve and being operable to open and close said passages independently of said regulating valves, means for holding said closure valves in open adjustment, automatic means for releasing said holding means from said closure valves to enable said valves to close said passages, a normally open electric circuit for energizing said automatic means, mechanism controlled by the fluid that has passed said valve structures for closing said circuit, and an outlet passage from said mixing chamber.

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In the presence of—
H. G. FLETCHER,
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