June 20, 1933. A. H. DOWNS 1,915,123

LEVER CONTROL HEAD

Filed April 21, 1931 3 Sheets-Sheet 1

Fig. 1.

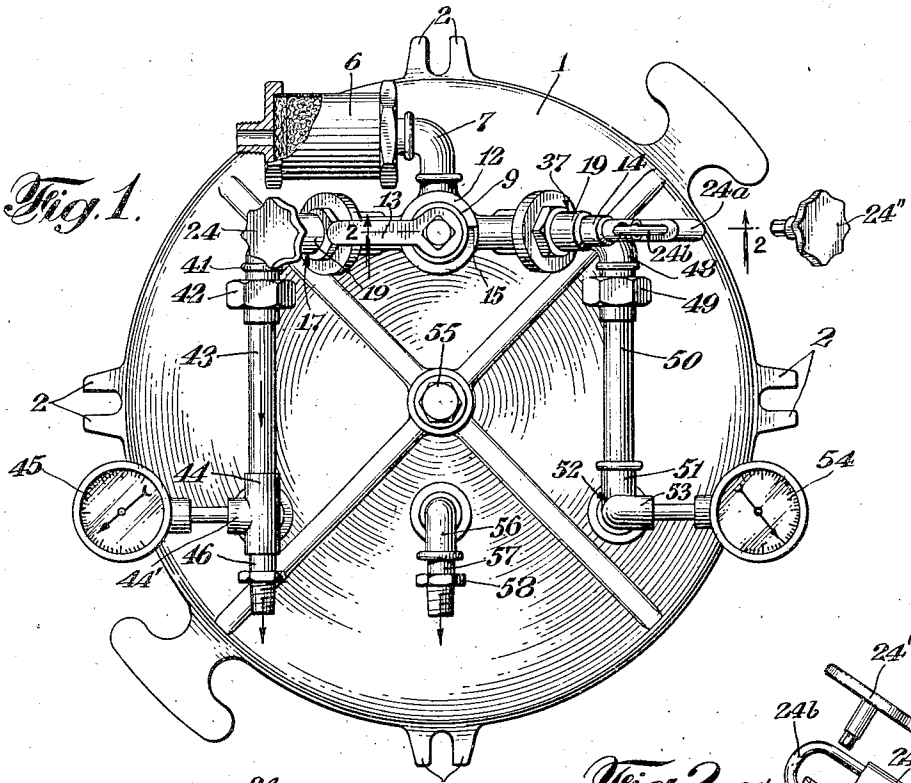


Fig. 2.

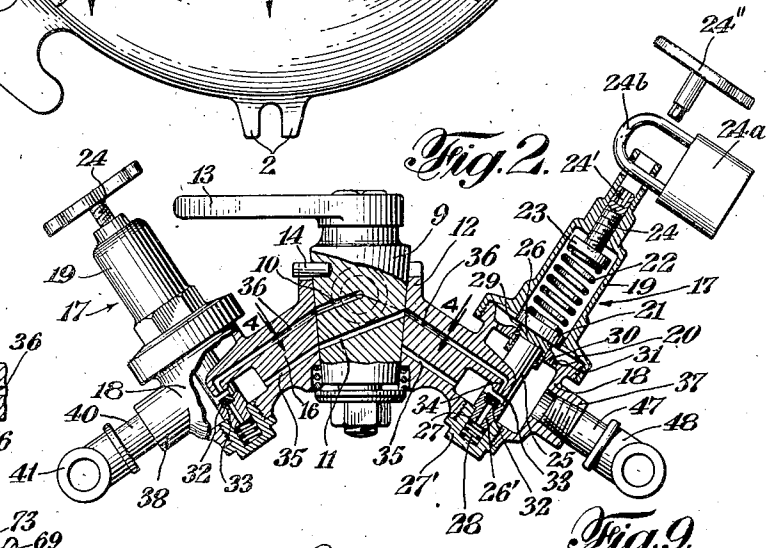


Fig. 4.

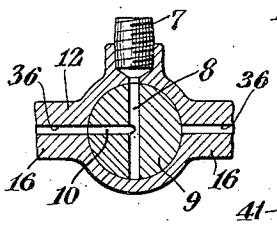


Fig. 10.

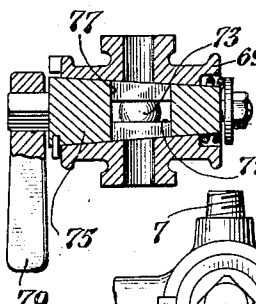


Fig. 5.

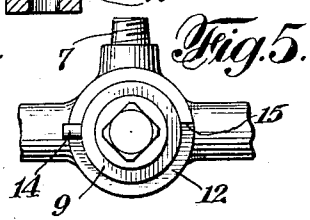


Fig. 3.

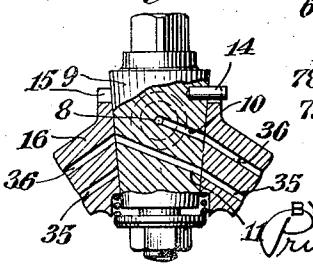
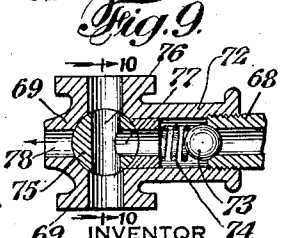


Fig. 9.



INVENTOR
Austin H. Downs
BY
Prindle, Bean & Mann
ATTORNEYS

June 20, 1933. A. H. DOWNS 1,915,123

LEVER CONTROL HEAD

Filed April 21, 1931 3 Sheets-Sheet 2

Fig. 6

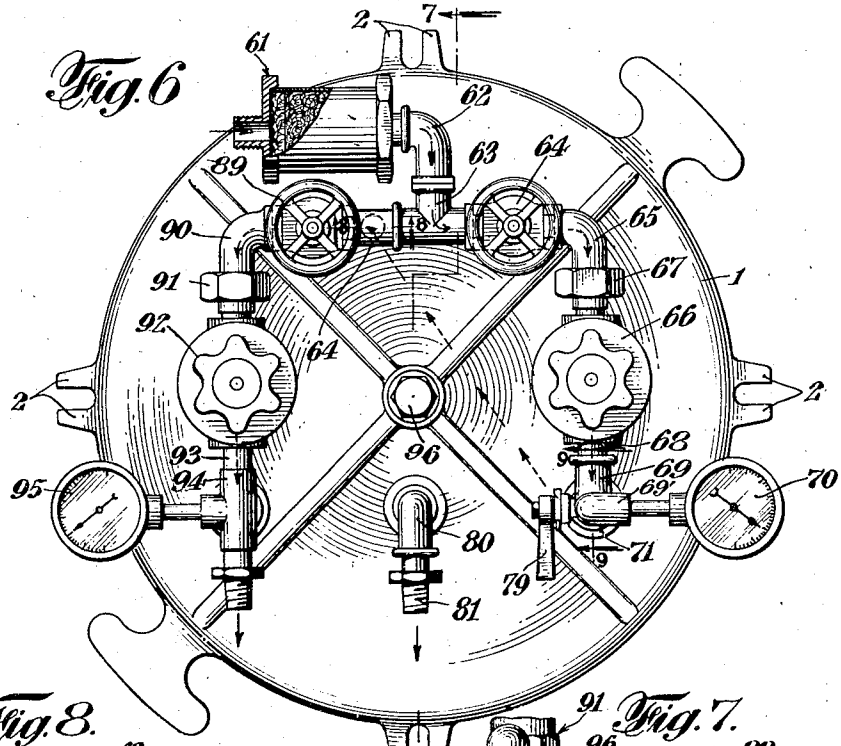


Fig. 8.

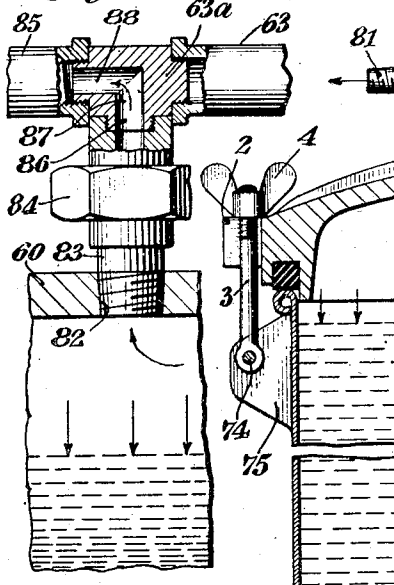
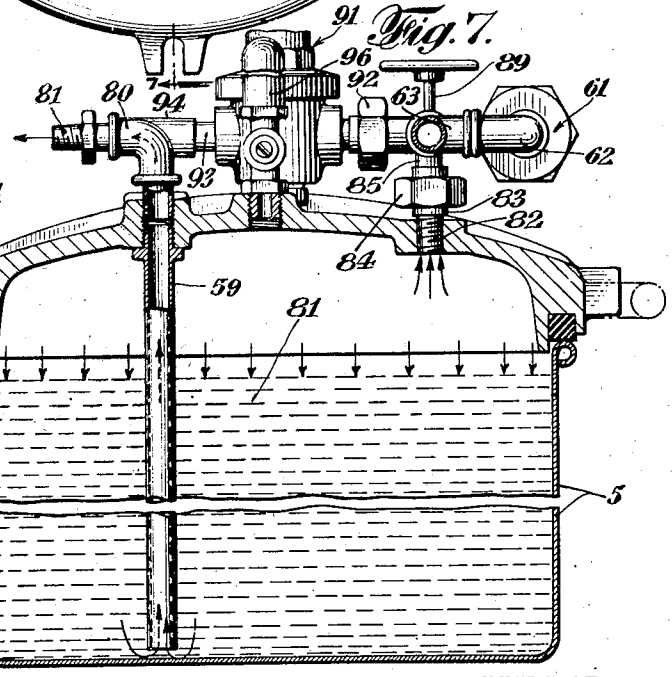


Fig. 7.



INVENTOR
Austin H. Downs
BY
Prindle Bean & Mann
ATTORNEY

June 20, 1933. A. H. DOWNS 1,915,123

LEVER CONTROL HEAD

Filed April 21, 1931 3 Sheets-Sheet 3

Fig. 11

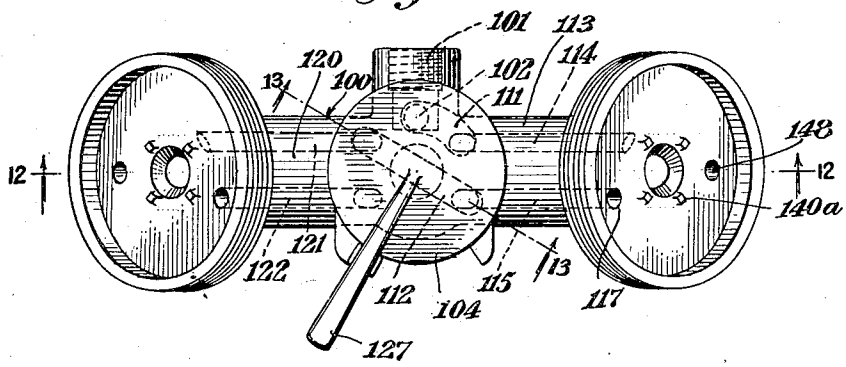


Fig. 12.

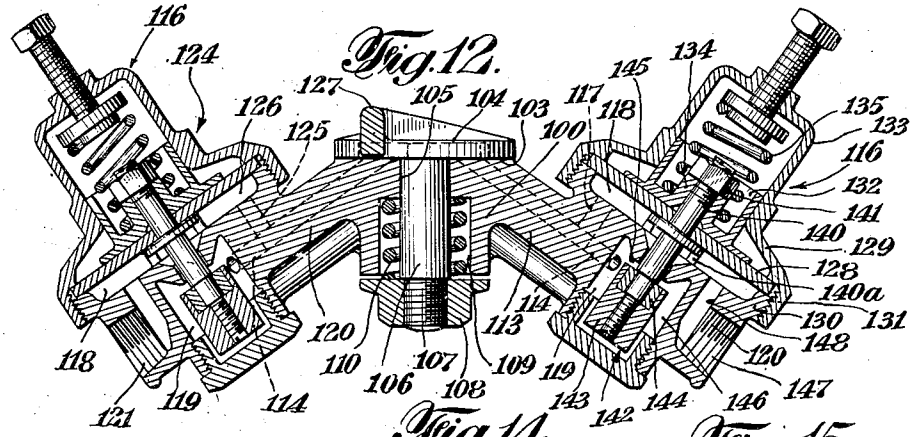


Fig. 13.

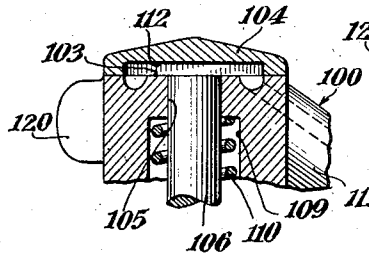


Fig. 14.

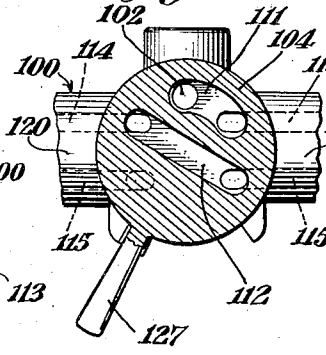
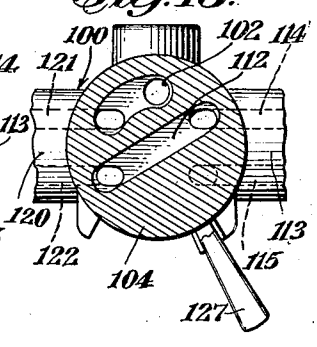


Fig. 15.



INVENTOR
Austin H. Downs
BY
Prindle, Bean & Mann
ATTORNEY

Patented June 20, 1933 1,915,123

UNITED STATES PATENT OFFICE

AUSTIN H. DOWNS, OF NEWARK, NEW JERSEY, ASSIGNOR TO ECLIPSE AIR BRUSH COMPANY, INC., OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY

LEVER CONTROL HEAD

Application filed April 21, 1931. Serial No. 531,839.

This invention relates to improvements in apparatus for the regulation and control of pressures for the discharge and application of liquids such as paints, lacquers and the like. In such apparatus the liquid is fed or forced to the paint gun or other discharging or dispensing device under pressure and fluid under pressure such as air is also delivered to said paint gun and the like to atomize the liquid and to apply it to the surface being treated. This fluid pressure and pressure on the liquid being discharged must be regulated in accordance with various factors. One important factor is the character of the liquid being applied. Another important factor is the type of paint gun or other discharging or dispensing device used. By way of example, certain paint guns are known as the inside mix type, that is, where the liquid is broken up and atomized within the nozzle and before being discharged from the nozzle. Another type is called the outside mix type, in which the paint is discharged from the nozzle and then broken up and atomized by streams of air under pressure. The former type is also called the low pressure type because much less air pressure is necessary to atomize the liquid inside of the nozzle.

This invention is adaptable for use in connection with paint guns of both types as well as other kinds and types of discharging and dispensing devices and also with liquids having a wide variety of characteristics.

A material part of the invention comprehends a single main control valve and a plurality of adjustable and automatic pressure regulating and reducing valves which intercommunicate each other and to and through the main valve. One of the reducing valves is preferably located in a conduit leading to the interior of a tank or container adapted to serve as a reservoir of the liquid to be discharged, dispensed or applied. Of course the tank or container has a discharge connection for conveying the liquid under pressure to the paint gun or other discharging or dispensing device. The other reducing valve is interposed in the conduit between the main valve and the paint gun or other discharging or dispensing device and is adapted to regulate and adjust the pressure of the pressure fluid such as air, passing into the gun. The first mentioned reducing valve is, of course, for the purpose of regulating and adjusting the pressure upon the liquid in the tank or container. The main valve is preferably mounted so as to be moved to two positions, in one position air under pressure is first passed through one reducing valve and thence to the paint gun or other discharging device, part of the air, however, being diverted through the other reducing valve to the interior of the tank or container. Under these conditions the air pressure in the paint gun must always be greater than the air pressure upon the liquid, and of course greater than the pressure under which the liquid is discharged from the gun. This is for the reason that the pressure fluid in its path to the tank or container passes through both reducing valves in series, and therefore the air pressure in the tank or container can never be greater than the air pressure passing directly to the paint gun, but must always be less due to practical operating conditions.

In the other position of the main valve the pressure fluid passes to the reducing valve controlling the pressure of air in the tank or container, part of the compressed air being diverted from this reducing valve back to the other reducing valve which controls the pressure of the air to the paint gun. Under these conditions the pressure of the air in the tank or container must always be greater than the pressure of the atomized air delivered to the paint gun, as this part of the compressed air passes through both reducing valves in series.

For convenience sake, the various parts and connections embodied in my invention may be mounted upon a lid or cover, called a pressure head, for a tank or container and thus provide a simple way of embodying this invention for practical use. The disclosure is of a construction of that type, but it is to be expressly understood that the combination of structural elements may be used for various other purposes than paint spraying and the like, and in various other ways.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, this invention consists in the construction, combination and arrangement of parts hereinafter described and then sought to be defined in the appended claims, reference being had to the accompanying drawings forming a part hereof and which show, merely for the purpose of illustrative disclosure, several embodiments of my invention, it being expressly understood, however, that various changes may be made in practice within the scope of the claims without digressing from my inventive idea.

In the drawings—

Figure 1 represents a top plan view of a lid for a pressure tank constructed to embody my invention and including connections for delivering liquid, such as paint, and fluid, such as air, under pressure to a spray gun or similar device, the gauges being shown in horizontal instead of vertical position to facilitate the disclosure;

Figure 2 is a vertical cross section taken substantially on line 2—2 of Figure 1;

Figure 3 is a vertical cross section through the main control valve adjusted at an angle of 180° opposite the adjustment shown in Figure 2;

Figure 4 is a cross section taken substantially on line 4—4 of Figure 2;

Figure 5 is a top plan view of the main operating valve with the operating handle removed;

Figure 6 is a top plan view of a lid or cover for a pressure tank similar to Figure 1 but showing a modified construction, the gauges being shown in horizontal position instead of vertical to facilitate the disclosure;

Figure 7 is a vertical cross section taken substantially on line 7—7 of Figure 6 of a pressure tank with the lid or cover applied thereto;

Figure 8 is an enlarged partial vertical section taken on line 8—8 of Figure 6;

Figure 9 represents a vertical transverse sectional view taken substantially on line 9—9 of Figure 6;

Figure 10 represents a vertical sectional view taken substantially on line 10—10 of Figure 9;

Figure 11 represents a top plan view of a modified form of main operating valve and reducing valve assembly designed as an alternative for the construction shown in Figure 2, parts of the diaphragm reducing valves being omitted to facilitate the disclosure;

Figure 12 represents a vertical longitudinal section taken substantially on line 12—12 of Figure 11;

Figure 13 is a vertical section of a portion of the main operating valve taken substantially on line 13—13 of Figure 11;

Figure 14 represents a horizontal section through the main operating valve shown in one position; and

Figure 15 is a similar view with the main operating valve shown in another adjusted position.

Referring to the drawings, the numeral 1 designates a lid or cover for what is termed a "pressure tank" for holding a suitable quantity of liquid or fluid adapted to be applied or dispensed under pressure. This lid or cover is provided with a plurality of ears or lugs 2 whereby it is adapted to be connected by any suitable means such as the pivoted bolt 3 and wing nut 4 to the tank or container 5, as shown in detail in connection with Figure 7.

The various connections and fittings for supplying a fluid under pressure to the interior of the tank or container so as to place the liquid therein under pressure and for supplying fluid to a discharge or applying member, such as a paint spray brush or the like, are all mounted upon said lid or cover 1. Several arrangements are shown in this application and attention will first be directed to that shown in Figures 1 to 5 inclusive. The fluid under pressure customarily used is compressed air which is obtained from any suitable source and passes through a filter 6 to a conduit 7 which communicates with a transverse port or passage 8 provided in the tapered body 9 of the main operating valve, which transverse port or passage 8 communicates with the radial port or passage 10 extending at right angles from the approximate middle thereof, see Figures 2, 3 and 4 particularly. The valve body 9 is also provided with an inclined diametrical port or passage 11 which is preferably located below the port or passage 10 and in vertical alinement therewith, the port or passage 10 being preferably inclined, see Figure 2 particularly. The valve body 9 is rotatably mounted in a suitable casing 12 and provided preferably on its top end with the operating handle or lever 13 and also provided with a stud or suitable projection 14 adapted to engage suitable shoulders or abutments 15 provided on said valve casing 12, see Figures 1, 2 and 5. The cooperation of this stud or projection 14 with the shoulders 15 limits the movement of the valve body or member within its casing and insures accurate positioning of the same in its two adjusted positions so as to insure the alinement of the ports or passages 10 and 11 with the proper ports or passages to be described hereinafter.

The valve casing 12 has its body portion extended laterally on each side thereof as at 16 and each extension 16 is provided at or near its end with a reducing valve construction 17. These reducing valve constructions are preferably standard and include a body portion 18 and a tubular or cylindrical housing 19 secured thereon with a flexible dia-

phragm 20 held between the body 18 and the housing 19. A block or abutment member 21 rests on top of the diaphragm 20 and pressure is applied thereagainst by means of spring 22, the other end of which engages the block or abutment member 23 against which a regulated pressure is applied by means of the screw member 24, thus affording means for adjusting the tension of the spring 22 and also the pressure upon the diaphragm 20.

The screw member 24 extends up within the bored end of the casing 19 and is provided in its end with the squared socket 24′ which is adapted to receive a complementarily shaped end on the handle or adjusting member 24″. This handle or adjusting member is removable at will as its fit in the square socket 24 is merely a tight sliding fit.

In the event that difficulty is anticipated or encountered in maintaining the tension of the spring 22 and the pressure on the diaphragm 20 at the desired figure, due to attempted readjustment or unnecessary manipulation of the parts, it may be at times desirable to adjust these reducing valves in a fixed position either before the apparatus leaves the factory or when in use, the adjustment of course being made by competent and experienced men conversant with the proper adjustment to give best results under the operating conditions. In order to take care of this condition I provide the lock 24ª, the bail 24ᵇ of which may be passed through suitable openings in the extended end of casing 19 of the reducing valve. Of course this lock is applied after proper adjustment is made. The lock has been shown on the right hand reducing valve of Figures 1 and 2 only, but it is to be understood that it is applicable to the left hand reducing valve as well.

The valve assembly in the reducing valve construction preferably includes a yoke member 25 the upper end 26 of which bears against the under side of the diaphragm 20. The lower end 26′ of the yoke is reduced and slidably positioned in a recess 27 formed in the removable bottom cap 27′, a spring 28 being positioned in said recess and bearing against said lower end 26′ of the yoke so as to maintain the yoke member in contact with the diaphragm. The upper part of the yoke member 25 has a slidable engagement with the sides of the opening 29 formed in the partition 30, this partition being provided with a plurality of openings 31 to establish communication between the under side of the diaphragm and the interior of the body of the reducing valve as a whole. A valve disc 32 is mounted in proper position in the lower part of the yoke member 25 and adapted to close the valve seat 33 formed on the depending end of a projection 34 extending within the reducing valve body as a whole.

Each of said lateral extensions 16 is provided with a plurality of ports or passages 35 and 36, the latter being positioned in substantial alinement with the former and above the same and in proper spaced relation so as to register with the ports or passages 10 and 11 in the main valve body. In the position of that valve shown in Figures 1, 2 and 4, the two ports or passages 35 and 36 to the left communicate respectively with the ports or passages 11 and 10 of the valve. In this position the port or passage 11 establishes a connection between the port or passage 35 in the left hand extension 16 and the port or passage 36 in the right hand extension 16. When the valve body is turned substantially 180° to the right as shown in Figure 3, the port or passage 10 of the valve body communicates with the port or passage 36 of the right hand extension 16 and the port or passage 11 of the valve body establishes communication between the port or passage 35 of the right hand extension and the port or passage 36 of the left hand extension 16.

The body portion 18 of each reducing valve 17 is of course provided with a suitable outlet, the one to the right being designated 37 and the one to the left being designated 38, the former being for the purpose of receiving a pipe or conduit to supply fluid under pressure to the interior of the tank or container and upon the liquid therein and is therefore termed the liquid connection, and later being for the purpose of receiving a pipe or conduit to supply fluid under pressure to the discharge or dispensing device and therefore termed the air connection. It is therefore seen that the main operating valve 9 may be adjusted to two operating positions and that in each position the pressure fluid passes in series through each of the two reducing valves. In the one case, that is, where the handle is in the left hand position shown in Figures 1, 2 and 4, the fluid pressure passes first through the reducing valve 17 to the left which of course is adjusted to give the desired air pressure to the paint gun or other discharge or dispensing device. Part of this fluid under pressure passes through the left hand port or passage 35, the port or passage 11 in the valve 9 and the right hand port or passage 36 to the right hand reducing valve 17. This is of course adjusted so as to give the desired pressure upon the liquid in the container. In this position the pressure upon the liquid in the container must always be less than the fluid pressure being delivered to the gun or other discharge or dispensing device. It can never be greater because it has to pass through the two reducing valves in series.

When the valve 9 is adjusted in its other position as shown in Figure 3, the reverse condition exists. The fluid pressure is first conducted to the right hand reducing valve which is adjusted at the pressure desired for the liquid in the tank or container. Part of the fluid pressure then passes to the left hand

reducing valve which is adjusted in accordance with the lower pressure desired for the paint gun or other dispensing or discharge device. In this position this last mentioned pressure can never exceed the pressure upon the liquid in the tank or container. In both positions it is seen that the fluid pressure passes through both reducing valves in series and that there is never any independence but always a dependant relation between these two valves and the adjustment of the air discharge and liquid discharge pressures respectively.

The detailed connections for supplying the fluid pressure to the paint gun or other discharge or dispensing device include a nipple 40 connected to the left hand discharge outlet 38, an elbow 41, a coupling 42, pipe or conduit 43, and a four-way coupling 44 having a vertical member rigidly secured to the top of the lid or cover for supporting purposes. The other vertical member 44′ is adapted to receive a pressure gauge 45, and 46 designates a connection for the fluid pressure conduit leading to the paint gun or other discharge or dispensing device.

Fluid pressure is supplied to the interior of the tank or container from the outlet 37 on the right hand by means of nipple 47, elbow 48, coupling 49, and pipe or conduit 50, one end of which connects with the horizontal arm 51 of a T member 52, the lower vertical arm of which passes through the top of the lid or cover to supply pressure fluid to the interior of the tank or container, the upper vertical member 53 being adapted to receive the pressure gauge 54. A safety valve is connected at 55 to avoid excess pressures within the interior of the tank or container. The lid or cover 1 is tapped in another place to receive the elbow nipple 56 which is provided with a coupling 57 having a threaded member 58 to be connected to a pipe, conduit or hose for conducting the liquid material under pressure from the tank or container to the liquid conduit of the paint gun or other discharge or dispensing device. The tank or container is preferably provided with a pipe 59 (see Figure 7) which extends from a point near the bottom thereof to the tapped opening communicating with the elbow nipple 56.

The modified structure shown in Figures 6, 7 and 8 will now be described. The lid or cover, tank or container and means for securing the former to the latter are the same as previously described. Fluid such as air under pressure is supplied through filter or strainer 61 through elbow 62 to the T member 63. This T member has one of its lateral ends closed by means of plug member 63*a*, see Figure 8, so that the pressure fluid is permitted to pass in one direction only through valve 64, conduit 65 which leads to a pressure reducing valve 66 through a coupling 67. This pressure reducing valve is of standard make and will not be described in detail. It is understood that the pressure passed by the valve may be varied by means of adjustment and maintained constant. The outlet side of the pressure reducing valve 66 is connected to the nipple 68 which is attached to a four-way member 69, see Figures 9 and 10 for details. The vertical top arm of member 69′ is provided with a gauge 70 and the downwardly extending vertical arm communicates with the interior of the tank by means of a connection passing through opening 71 in the lid or cover. In Figures 9 and 10 the horizontal arm of the four-way member 69 is designated 72 and receives the ball check valve 73 normally held in place against the end of nipple 68 by means of spring 74. A three-way valve 75 is mounted within said four-way member 69 and provided with a diametrical port or passage 76 and a radial port or passage 77 extending at right angles therefrom. In addition to the ports or passages leading respectively to the source of fluid pressure supply, the gauge 70, and the opening 71 into the tank, the four-way member 69 has the fourth port or passage 78 leading to the atmosphere. The valve 75 has the handle or lever 79 for operating the same. When the parts are in the position shown in Figure 9, air will be supplied through the connection 68 to the interior of the tank or container and also to the gauge. When the supply of air under pressure is shut off and it is desired to stop operation, the valve 75 may be turned 180° which will place the interior of the tank or container in communication with the atmosphere and permit the surplus pressure to be thus dispersed. In this position, of course, the check valve prevents the return of pressure back into the reducing valve 66. Furthermore, when the tank is under atmospheric pressure the paint line may be cleared out by closing the nozzle opening of the paint gun by means of a finger or otherwise and admitting air pressure thereto which forces any remaining paint back into the tank.

The lid or cover is tapped at a suitable place to receive an elbow nipple 80 which is provided with a suitable connecting member 81 adapted to be connected to a pipe, hose or other conduit leading to the liquid discharge passages of the paint gun or other discharge or dispensing apparatus. The liquid tube 59 is connected to the same opening in the lid or cover as clearly shown in Figure 7 and previously described, so as to supply liquid under pressure to said nipple 80 and connection 81 to the gun.

I have described the fittings extending to the right from the T member 63 (referring to Figure 6), and I will now describe those extending to the left of the T member 63. The lid or cover is also tapped to provide an opening 82 to receive a nipple 83 which

is connected to the plug 63*a* by means of the coupling 84. The plug 63*a* is connected to the air conduit 85 and is provided with an angular port or passageway 86, the vertical part 87 of which communicates with the coupling 84, the upper horizontal branch or part 88 leading to the air conduit 85. In this conduit a shut-off valve 89 is provided as well as the elbow 90 and coupling 91 leading to a pressure reducing or regulating valve 92 which is also of a standard make and need not be described in detail. The discharge or outlet side of the pressure reducing valve 92 is connected by means of a nipple 93 to a four-way member 94, the horizontal arms of which form part of the air conduit for supplying air under pressure to the paint gun or other discharge device. The upper vertical arm of the four-way member 94 is adapted to receive a suitable pressure gauge 95 while the lower or downwardly extending vertical arm is secured to the top of the lid or cover to serve merely as a support. A safety valve 96 may be mounted on top of the cover to avoid excessive pressures.

The operation of this construction is simple and readily understood. Air under pressure regulated by the reducing valve 66 is admitted to the interior of the tank or container and operates to force the liquid out through the liquid tube 59 and connections 80 and 81 to the paint gun or other discharge device. The upper part of the tank or container constitutes a reservoir for the pressure fluid and supplies the same through connections 83, 84, 86, 87, 88, 85, 89, 90 and 91 to the reducing or regulating valve 92 and thence to the paint gun or other discharge device. Of course, in this construction the air or fluid pressure upon the liquid must always be greater than the air or fluid pressure delivered to the paint gun and the reducing valves operate in series, at all times.

Figures 11 to 15 inclusive, show a modified construction of the main operating valve and reducing valve assembly. The main body of the assembly is designated 100 and is provided with the inlet connection 101 to receive air or other fluid under pressure. This inlet communicates with a vertical port or passage 102 which extends to the flat surface of the valve body 103. This surface receives the valve head 104 which is of circular or disc shape to entirely cover the same. The assembly body 100 is centrally bored as at 105 to receive the shaft or rod 106 upon which the valve head 104 is mounted. The lower end of shaft 106 is threaded at 107 to receive the nut 108. An enlarged opening or recess 109 is provided in the under side of the body 100 to receive the spring 110 which abuts against the nut 108 to hold the valve head 104 in tight contact with the upper surface 103 of the valve body.

On its under side the valve head 104 is provided with an arcuate groove or depression 111 and is also provided with a longer and substantially straight diametrical groove or depression 112. Of course, both of these grooves or depressions terminate short of the edge of the valve head and cooperate with ports and passages to be presently described to properly conduct the air or other pressure fluid.

The main body 100 of the assembly is provided with a pair of lateral and angular extensions 113 each of which is provided with a pair of parallel inclined ports or passageways 114, 115 which lead to a pressure reducing or regulating valve 116. Each passageway 115 has its end portion extending upwardly at an angle as at 117 so as to lead to the chamber or compartment 118 within the reducing or regulating valve 116. Each port or passageway 114 leads to a lower chamber or compartment 119 in the reducing or regulating valves 116. As these parts are duplicated upon each side, a detailed description of one will suffice for both. When the parts are in the position as shown in Figure 14, the diametric depression 112 in the valve head affords communication between the port or passage 115 in the right hand angular extension of the assembly and the port or passageway 114 in the left hand extension of the assembly body. In this position, air under pressure is admitted through the port or passage 114 of the right hand extension of the valve assembly into the lower chamber or compartment 119 passing into the upper chamber or compartment 118 and thence through the discharge outlet 120 to the interior of the tank or container so that pressure is applied on the liquid contained therein. This air pressure passes back through the port or passage 117 and 115 of the right hand angular extension of the valve assembly and thence by means of the diametrical groove or depression 112 in the valve head to the port or passage 114 in the left hand extension of the assembly body and into the lower chamber or compartment 119 of the left hand reducing valve and thence to the upper chamber or compartment 118 thereof to the discharge outlet 121 and thence through a suitable pipe, hose or other conduit to the air gun or other discharge device. When the valve head is moved to its other position as shown in Figure 15, the course of the air or fluid pressure is just the reverse, it passes first through the left hand reducing valve to the right hand reducing valve. In the first position of the valve head greater pressure may be placed upon the liquid within the tank or container than is delivered to the air ports or passages of the paint gun. This air pressure must always be less than that on the liquid with the valve head in this position (Figure 14). In the position shown in Figure 15 the air pressure to the paint gun must always be greater than that on the liquid in

the tank or container. Of course it is to be understood that in each instance the reducing or regulating valves may be adjusted so as to give the desired pressure for each purpose but that in each position or adjustment of the valve head, the two reducing or regulating valves are arranged in series and are never independent of each other.

It is to be understood that while I have shown gauges to register the pressures being used, that the outlets to the gauges may be provided with ordinary check valves such as used in connection with tires, and that the ordinary air pressure gauges used for determining pressures in tires may be used to ascertain air pressures in this apparatus.

It is to be noted that the two reducing valves are preferably combined with the main operating valve in one valve assembly and that neither one of said reducing valves can be removed, and also that both of said reducing valves must operate whenever the apparatus is used. Furthermore, regardless of whether the apparatus is being used for an internal mix (low pressure), or external mix gun, one of the reducing valves is dependent upon and subordinate to the other reducing valve. When used for the inside mix, the air pressure to the gun can never be greater than the liquid pressure. When used with the outside mix gun, the pressure of the liquid can never be greater than the pressure of the air. In each instance, the lower pressure is subject to the regulation of both reducing valves operating in series.

As the main valve is operated by one lever or handle, the operation of this apparatus is materially simplified as no time is lost in opening and closing valves, a movement to either one or the other operating position being sufficient to start the operation of the apparatus. Of course in an intermediate position, the main line pressure is entirely shut off. Air leaking and valve packing are eliminated, and the release valve empties the air rapidly from the tank and prevents the flow of air into the tank besides facilitating cleaning of the apparatus.

Unauthorized experimentation with air and paint pressures and unnecessary adjustments of the reducing valves resulting in loss of materials, excessive fog, brittle coatings, wasted power and other disadvantages that necessarily follow the employment of high spraying pressures in large volumes, are positively prevented by the locking of the reducing valves against unauthorized adjustment and also by the dependence of the reducing valves one upon the other regardless of the operating position being used.

What is claimed,

1. In combination, a tank for containing a fluid, a head therefor and a pressure controlling and regulating valve assembly on said head, including a main valve, a plurality of reducing and regulating valves having intercommunicating conduits with and through said valve, connections from said regulating and reducing valves leading to the interior of the tank and also to a discharge or dispensing device, and another connection leading from the interior of the tank to the discharge or dispensing device, and an inlet connection to the main valve for fluid under pressure, said main valve being adapted to be operated to cause the pressure fluid to pass through both of said reducing and regulating valves whereby said reducing and regulating valves always function in series with respect to said pressure fluid.

2. A pressure tank head adapted to form the lid or cover for a tank for containing and discharging a liquid under pressure to a discharge or dispensing device, such as a paint gun and the like, a main valve mounted upon said head and adapted to have communication with a source of supply of fluid under pressure, a pair of reducing and regulating valves interconnected with each other and to said main valve by means of conduits, a connection from one reducing valve extending through the head to afford a conduit for the pressure fluid to the interior of the tank or container, a connection from the other reducing valve for providing a conduit to the discharge or dispensing device, and another connection through said head to provide a conduit from the interior of the tank or container to the discharge or dispensing device, said main valve being operable to direct the pressure fluid through either reducing and regulating valve first and thence through the other pressure reducing and regulating valve and vice-versa, so that either the pressure fluid to the discharge or dispensing device or the fluid which is under pressure in the tank or container and is to be discharged to the dispensing or discharge device, is under the influence of both reducing and regulating valve in series depending upon the adjustment of the main valve.

3. A paint spraying apparatus, including, in combination, a spray gun, a tank or container for containing liquid under pressure, a main valve mounted upon the tank or container and having a connection communicating with a source of supply of pressure fluid, a pressure reducing and regulating valve positioned on each side of said main valve and having conduits providing intercommunication between said pressure reducing and regulating valves and to and through said main valve, one pressure reducing and regulating valve controlling the pressure fluid passing to the spray gun and the other reducing and regulating valve controlling the fluid pressure upon the contents of the tank or container, said main valve being operable to two positions and in each position causing part of said pressure fluid to pass through both of

said reducing and regulating valves in series.

4. In combination, in an apparatus of the character described, a pair of adjustable reducing and regulating valves for regulating fluid under pressure to be discharged through two outlets, a main valve adapted to have communication with a source of supply of fluid pressure, said reducing and regulating valves intercommunicating with each other and to and through said main valve whereby when said main valve is moved to one position, the pressure fluid passes first to one reducing valve to one discharge outlet, part of said pressure fluid being diverted to the other reducing valve to the other discharge outlet.

5. In combination, in an apparatus of the character described, a pair of adjustable reducing and regulating valves for regulating fluid under pressure to be discharged through two outlets, a main valve adapted to have communication with a source of supply of fluid pressure, said reducing and regulating valves intercommunicating with each other and to and through said main valve whereby when said main valve is moved to one position, the pressure fluid passes first to one reducing valve to one discharge outlet, part of said pressure fluid being diverted to the other reducing valve to the other discharge outlet, and when the main valve is moved to another position the pressure fluid passes to and through the reducing valves to the discharge outlets in the reverse order.

6. A controlling and regulating valve assembly for fluid pressure tank operation including a main controlling and operating shut-off valve, a plurality of adjustable reducing and regulating valves each regulating fluid pressure to a discharge outlet, said reducing valves having communication with each other to and through said main valve whereby fluid pressure admitted by the main valve passes first to and through one reducing valve and part of the pressure fluid is discharged therefrom through a discharge outlet while a portion of the remainder of the pressure fluid is diverted and passed to and through another reducing valve to its discharge outlet so that said reducing valves operate in series with respect to said diverted portion of the pressure fluid.

7. A controlling and regulating valve assembly for fluid pressure tank operation including a main controlling and operating shut-off valve, a plurality of adjustable reducing and regulating valves each regulating fluid pressure to a discharge outlet, said reducing valves having communication with each other to and through said main valve whereby fluid pressure admitted by the main valve passes first to and through one reducing valve and part of the pressure fluid is discharged therefrom through a discharge outlet while the remainder of the pressure fluid is diverted and passed to and through another reducing valve to its discharge outlet so that said reducing valves operate in series with respect to said diverted portion of the pressure fluid, said main valve being movable to various positions so as to cause the pressure fluid to first pass through another reducing valve when in another adjusted position.

8. In combination, a tank for containing a fluid adapted to be forced therefrom to a discharge or dispensing device, a head for said tank and a controlling and pressure regulating valve assembly thereon, including a main valve having a connection to a suitable source of fluid pressure, a plurality of adjustable reducing and regulating valves having communication with each other and one regulating valve having communication with the interior of the tank and the other regulating valve having communication directly with the discharge or dispensing device, said main valve being interposed in the communication between the said regulating valves and being adapted to be moved into two positions to cause the pressure fluid to pass first to either one of said regulating valves, the communications between the valves being so arranged that part of the pressure fluid is diverted from one regulating valve to the other in either adjustment of said main valve so that said regulating valves always operate in series.

9. In combination in a device of the character described, a tank or container, means for delivering pressure fluid to said tank or container, a discharge or dispensing device, means for delivering liquid under pressure from said tank or container to said device and also for delivering pressure fluid direct to said device to mix with said liquid, a main valve for controlling the admission of pressure fluid and a plurality of adjustable reducing and regulating valves one being positioned so as to regulate the fluid pressure on the tank or container and the other being positioned so as to regulate the fluid pressure directed to the discharge or dispensing device, said reducing valves being interconnected to and through said main valve so that they operate in series.

10. A pressure controlling and regulating valve assembly, including a body having a main valve mounted therein and adapted to be connected to a source of supply of pressure fluid, a pair of adjustable regulating and reducing valves mounted in and forming part of said body, said regulating and reducing valves being in communication, each reducing valve having a discharge outlet, said main valve having a plurality of control ports or passages, said body having a plurality of ports or passages leading to each reducing valve and adapted to register and communicate with said control ports or passages whereby when the main valve is in one

position fluid pressure will be directed first to one reducing valve and to its outlet and part thereof diverted to the other reducing valve and to its outlet and vice versa, when the valve is adjusted in another position.

11. A pressure controlling and regulating valve assembly, including a body having a main valve mounted therein and adapted to be connected to a source of supply of pressure fluid, a pair of adjustable regulating and reducing valves mounted in and forming part of said body, said regulating and reducing valves being in communication, each reducing valve having a discharge outlet, said main valve having a plurality of control ports or passages, said body having a plurality of ports or passages leading to each reducing valve and adapted to register with and communicate with said control ports or passages whereby when the main valve is in one position fluid pressure will be directed first to one reducing valve and to its outlet and part thereof diverted and passed back through said main valve and to the other reducing valve and to its outlet and vice versa when the main valve is in another adjusted position.

12. A controlling and regulating valve assembly for pressure tank operation, including a two position main control valve adapted to be connected to a source of pressure fluid, a pair of adjustable regulating and reducing valves each having an outlet and each having a plurality of connections leading to said main valve, said regulating and reducing valves being in communication, said main valve having a plurality of ports and passages so arranged that when the main valve is in one position, pressure fluid will pass first to and through one reducing valve to its outlet, part of the pressure fluid being diverted back to and through said main valve to the other reducing valve and to its outlet.

13. A controlling and regulating valve assembly for pressure tank operation, including a two position main control valve adapted to be connected to a source of pressure fluid, a pair of adjustable regulating and reducing valves each having an outlet and each having a plurality of connections leading to said main valve, said regulating and reducing valves being in communication, said main valve having a plurality of ports and passages so arranged that when the main valve is in one position, pressure fluid will pass first to and through one reducing valve to its outlet, part of the pressure fluid being diverted back to and through said main valve to the other reducing valve to its outlet, and means for locking said reducing valves in their adjusted positions.

14. A controlling and regulating valve assembly for pressure tank operation, including a two position main control valve adapted to be connected to a source of pressure fluid, a pair of adjustable regulating and reducing valves each having an outlet and each having a plurality of connections leading to said main valve, said regulating and reducing valves being in communication, said main valve having a plurality of ports and passages so arranged that when the main valve is in one position, pressure fluid will pass first to and through one reducing valve to its outlet, part of the pressure fluid being diverted back to and through said main valve to the other reducing valve to its outlet, and valve means associated with the tank for permitting the blowing back into the tank of the liquid in the liquid line.

15. A controlling and regulating valve assembly for pressure tank operation, including a body, a main control and operating valve mounted therein and adapted to be connected to a source of fluid pressure supply, said valve being provided with control ports or passages, a pair of adjustable reducing and regulating valves, part of each of which is formed as an integral part of said body, said body having a plurality of ports or passages leading from each reducing valve to said main valve, said main valve with its control ports or passages controlling the passage of pressure fluid direct to said reducing valves and also the passage of pressure fluid from one reducing valve to the other.

16. A controlling and regulating valve assembly for pressure tank operation, including a body, a main control and operating valve mounted therein and adapted to be connected to a source of fluid pressure supply, said valve being provided with control ports or passages, said body having a plurality of integral arms or extensions each of which is provided with a plurality of ports or passages leading from the end thereof to said main valve, an adjustable reducing and regulating valve for each arm or extension, part of which extension forms an integral part of its reducing valve, said ports or passages providing communication between said reducing valves and said main valve.

17. A controlling and regulating valve assembly for pressure tank operation including a body, a main control and operating valve mounted therein and adapted to be connected to a source of fluid pressure supply, said body having a plurality of integral arms or extensions each of which is provided with a plurality of ports or passages leading from the end thereof to said main valve, an adjustable reducing and regulating valve for each arm or extension part of which extension forms an integral part of its reducing valve, said ports or passages providing communication between said reducing valves and said main valve, said main valve having a plurality of ports or passages therethrough to provide intercommunication between said reducing valves through said main valve.

18. A controlling and regulating valve assembly for pressure tank operation including a body, a main control and operating valve mounted therein and adapted to be connected to a source of fluid pressure supply, said body having a plurality of integral arms or extensions each of which is provided with a plurality of ports or passages leading from the end thereof to said main valve, an adjustable reducing and regulating valve for each arm or extension part of which extension forms an integral part of its reducing valve, said ports or passages providing communication between said reducing valves and said main valve, said main valve having a plurality of ports or passages therethrough to provide intercommunication between said reducing valves through said main valve, said communication being so arranged that the reduced or low pressure side of one reducing valve is in communication with the high pressure side of the other valve.

19. A pressure controlling and regulating valve assembly, including a body having a main valve mounted therein and adapted to be connected to a source of supply of pressure fluid, a pair of adjustable regulating and reducing valves mounted in and forming part of said body, each reducing valve having a discharge outlet, said main valve having a plurality of control ports or passages, said body having a plurality of ports or passages leading to each reducing valve and adapted to register and communicate with said control ports or passages of said main valve whereby when the main valve is in one position fluid pressure will be directed first to one reducing valve and to its outlet and part thereof diverted to the other reducing valve and to its outlet and vice versa, when the valve is adjusted in another position, said ports and passages being so arranged that the reduced or low pressure side of one reducing valve is in communication with the high pressure side of the other valve.

20. A pressure head for a liquid containing pressure tank and the like, including means for reducing and regulating fluid pressure to the interior of the tank and means for reducing and regulating fluid pressure to a direct outlet, means for controlling the admission of fluid pressure to each of said reducing means, said reducing means being in communication with said control means and through said control means with each other, whereby part of the pressure fluid is passed directly through one reducing means to said tank or outlet and the remainder of the pressure fluid under reduced pressure is diverted back to and through the other reducing means in series.

21. A device of the character described, including a body adapted to be connected to a source of supply of pressure fluid, valve means in said body for controlling the admission of pressure fluid to said body, a plurality of regulating and reducing valves mounted in said body, said regulating and reducing valves being in communication, each reducing valve having a discharge outlet, said valve means having a plurality of control ports or passages, and said body having a plurality of ports or passages leading to each reducing valve and adapted to register with and communicate with said control ports or passages, whereby when the valve means is in one position fluid pressure will be directed first to one reducing valve and to its outlet and part thereof diverted and passed back through said valve means and to another of said reducing valves and to its outlet and vice versa when the valve means is in another adjusted position.

22. A device of the character described, including a body adapted to be connected to a source of supply of pressure fluid, means mounted in said body and adapted to control the admission of pressure fluid to said body, a plurality of regulating and reducing valves mounted adjacent said body, said reducing valves being in communication and each reducing valve having a discharge outlet, said means in said body being provided with a plurality of control ports or passages, said body having a plurality of ports or passages leading to each reducing valve and adapted to register with and communicate with said control ports or passages whereby when said means is in one position fluid pressure will be directed first to one reducing valve and its outlet and a part thereof diverted and passed back through said means and to the other reducing valve and to its outlet.

23. A device of the character described, including a body adapted to be connected to a source of supply of pressure fluid, means in said body adapted to control the admission of pressure fluid to said body, a plurality of regulating and reducing valves mounted in said body, said reducing valves being in communication and each reducing valve having a discharge outlet, said body having a plurality of ports or passages leading to each reducing valve and adapted to be controlled by said means in said body whereby when said control means in said body is in one position fluid pressure will be directed first to one reducing valve and to its outlet and part thereof diverted and passed back to another of said reducing valves and to its outlet.

24. A device of the character described, including a body adapted to communicate with a source of supply of pressure fluid, valve means in said body for controlling the admission of pressure fluid to said body, said valve means including a 3-way valve, means connecting said valve means with a tank to

place the contents thereof under pressure, regulating and reducing valve means for regulating the pressure fluid conducted to the tank, conduit means adapted to communicate with the tank and conduct the pressure fluid from the tank and regulating and reducing valve means in said conduit means in series with said first mentioned regulating and reducing valve means so that the fluid pressure leaving said second mentioned regulating and reducing valve means is less than the fluid pressure leaving said first mentioned regulating and reducing valve means.

25. A device of the character described, including a tank, a cover therefor, conduit means on said cover for conducting fluid under pressure to said tank, a regulating and reducing valve in said conduit means, a valve in said conduit means beyond said regulating and reducing valve for controlling the admission of pressure fluid to said tank, second conduit means communicating with said tank to receive pressure fluid therefrom, a second regulating and reducing valve in said second conduit means, said regulating and reducing valves being in series so that fluid pressure delivered from said second regulating and reducing valve is less than fluid pressure delivered from said first regulating and reducing valve.

In testimony that I claim the foregoing, I have hereunto set my hand this 17th day of April, 1931.

AUSTIN H. DOWNS.