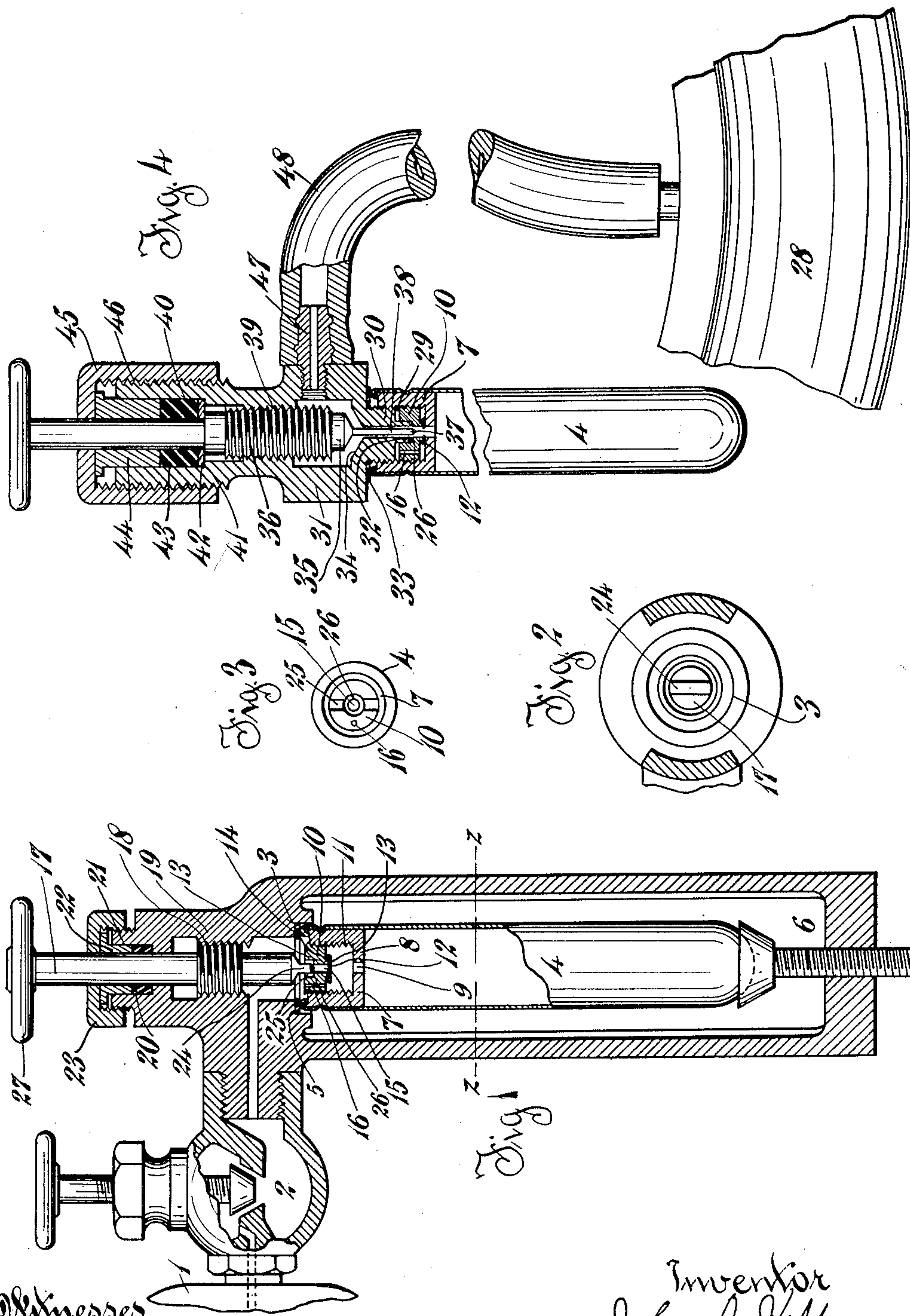


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 TRANSFERRING APPARATUS FOR FLUIDS UNDER HIGH PRESSURES.  
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Witnesses  
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# UNITED STATES PATENT OFFICE.

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## TRANSFERRING APPARATUS FOR FLUIDS UNDER HIGH PRESSURES.

No. 927,798.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, JOHN A. HOFF, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, whose post-office address is No. 2608 Bushnell avenue, Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Transferring Apparatus for Fluids Under High Pressures, of which the following is a specification.

Difficulty has been experienced heretofore in transferring fluids of this kind owing to the excess of leakage by reason of the high pressures under which the fluids are maintained. My invention is designed primarily for use with liquid carbonic acid gas and contemplates the employment of small tubes in which the liquid gas is contained and intended for use in filling automobile tires and for other purposes, and in my present exemplification I have illustrated a tube intended to contain a charge for filling one tire, providing a small and compact tube in which the charge may be readily transferred, there being preferably but a slight excess of liquid in the tube necessary to inflate a single tire. In filling tubes of this character with the liquid gas under such high pressure, being for example about one thousand pounds per square inch, and the capacity of the tube being intended for charging but a single tire, it is important that the pressure shall not decrease by leakage. For the purpose of preventing escape of pressure and for the purpose of economy, I have provided securing means for the tube so as to avoid the necessity of providing a valve for each tube. For the purpose of carrying out my invention I have provided novel transferring means for transferring the fluid under its high pressure from the filling tank to the automobile tire.

The invention will be further readily understood from the following description and claims, and from the drawing, in which latter: Figure 1 is a longitudinal axial section showing the means for transferring the fluid under its high pressure from the tank to the tube. Fig. 2 is a bottom view of the filling mouth, the tube-clamp being shown in section on the line *z-z* of Fig. 1. Fig. 3 is a plan view of the tube; and, Fig. 4 is a side elevation, partly broken away and partly in longitudinal axial section, showing the means for transferring the fluid under its high pressure from the tube to the device to which it is applied.

1 represents the container for the fluid under high pressure, which is shown broken away, and which may be any suitable storage tank for the liquid, or the compressor-tank in which the fluid is subjected to pressure.

2 is a valve which communicates with the container.

3 is a mouth for the valve and is adapted to receive the tube 4 to be filled, the end of which is arranged to be pressed against a gasket 5 in the mouth by means of a screw-clamp 6. The tube has a head 7 provided with a transverse web 8 having a passage 9 through which the fluid under high pressure passes into and out of the tube.

10 is a plug, the head being provided with screw-threads 11 with which the threads on the plug coact, the plug being provided with a disk 12 arranged to be pressed between the plug and the web 8. This disk is preferably secured about a protrusion 13 on the plug, the edges of the disk being bent about the wall of said protrusion and received in the annular recess 14 of said wall. The plug is provided with a passage 15 and a passage 16. The passage 15 serves preferably as an exit-port and the passage 16 as an inlet-port in manner presently to be described.

17 is a stem for turning the plug and has threaded connection 18 with the housing 19 of the mouth 3, and releasable key-connection with the plug 10. There is a gasket 20 in a socket 21 in said housing, the gasket being pressed about said stem by a gland 22, the gland being pressed by a cap 23 having threaded connection with said housing. The said key-connection is shown as comprising a key 24 received in a seat 25 in said plug, the key being preferably received above the passage 15, the outer end of which passage terminates in a seat 26.

In filling the tube the plug is raised away from the passage 9 so that the fluid under high pressure may pass from the container 1 through the valve 2, the mouth 3, and thence through the passage 16, which forms an inlet by-pass around the exit-port 15 in said plug, and the passage 9 into the tube. When the tube is full, the key 24 is turned by the handle 27 for clamping the disk 12 between the plug and the transverse web 8 so that the passages 9 and 15 may be separated by said disk, and form an all-metal closure for the tube. The disk is preferably of such metal that it may be punctured in manner to be



presently described and may also form a safety closure for the tube and may collapse outwardly upon excessive pressure in the inside of the tube, occasioned for instance by the heating of said tube when in filled condition. In transferring said fluid under high pressure from said tube to its point of application, shown as an automobile tire 28, the threaded socket 29 of the head of said tube is received about the threaded shank 30 of a valve 31 which has a seat 32 mating the seat 26 on said head of the tube, so that firm metallic connection may be made between said tube and valve. There may also be a compressible gasket 33 between said valve and tube. This construction permits the tube and valve to be firmly secured together for preventing leakage between the valve and tube, it being understood that said valve is preferably not attached to the tube until it is desired to use the contents of the tube, the same valve serving for an indefinite number of tubes.

The valve 31 comprises a valve-seat 34 adapted to be engaged by the valve proper 35 on the valve-stem 36, the end of said valve-stem being provided with a piercing point 37 between which and the valve proper 35 there is a piercing shank 38. Between the valve-casing and the valve-stem 36 there is a threaded connection 39 for longitudinally moving the valve-stem when said stem is turned. The valve casing is provided with a socket 40, the bottom of which forms an annular shoulder 41 against which a washer 42 is received, a packing 43 being placed about said valve-shank between said washer and a gland 44, a cap 45 having threaded connection 46 with the valve-casing, being arranged to press said gland against said packing. 47 is a thimble adapted to receive a flexible hose shown at 48 through which the fluid under high pressure from the tube may pass into the part arranged to receive the pressure, shown as the automobile tire 28. In attaching said valve to the tube, the piercing point 37 is first withdrawn into retracted position, or located substantially within the valve-casing. The connection with the part to receive the fluid under high pressure having been made, as through the hose 48, the valve-stem 36 is turned for causing the valve proper 35 thereon to approach the valve-seat 34. The piercing point 37 will first pierce the disk 12 for opening the passage between the interior of the tube and said valve 31, whereupon the valve proper 35 may be at once seated, or the charge inside the tube transferred to the tire, and when the tire is inflated, the valve proper 35 may be seated, so as to preserve the pressure of any remaining contents there may be in the tube.

It will be noted that in my improved device, after the tube has been filled, all the

closures therefor until again discharged are metal closures, thus avoiding the danger of leakage due to unequal expansion between metal and other materials.

My improved device also provides convenient means whereby the fluid under its high pressure may be transferred from the tank to the part to which the fluid is to be transferred, without danger of loss of pressure of the fluid and with the provision of means whereby the transference may take place with ease.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. In combination, a fluid-receptacle for transferring fluids under high pressures comprising a head, a sealing-plug having threaded connection therewith, said head and sealing-plug provided with fluid passages arranged end to end, a puncturable closure clamped between said passages by said sealing-plug, a valve separable from said receptacle without affecting the pressure in said receptacle prior to the puncturing of said puncturable closure and arranged to be attached to said head and comprising puncturing means for said puncturable closure and arranged for controlling the discharge from said receptacle after said puncturable closure has been punctured.

2. A transfer-receptacle for fluids under high pressures comprising a head, a plug therefor having threaded connection therewith, said plug and head provided with outer and inner fluid passages arranged end to end, and a puncturable closure clamped between said passages for obstructing said passages and arranged for being punctured by a piercing point from the outer one of said passages, said plug being formed for receiving turning means, and said head being provided with valve-securing means, for the purpose specified.

3. A transfer receptacle for fluids under high pressures comprising a head, a plug having threaded connection therewith, said plug and head provided with fluid passages arranged end to end, a puncturable closure arranged to be clamped between said passages by said plug, said plug having a by-pass therethrough, said head provided with valve-securing means, and said plug provided with means arranged to be engaged by turning mechanism for turning the same, substantially as described.

4. In combination, a transfer-receptacle for fluids under high pressures, comprising a tube, a head therefor, a plug for said head, said head and plug provided with fluid passages arranged end to end, and a puncturable closure arranged to be clamped between said plug and head for obstructing said passages, said plug having turning means thereon, and said head provided with securing means for



a separable valve, said valve comprising a valve-seat and a valve-stem having a piercing needle arranged to puncture said puncturable closure, said valve-stem, valve-seat, 5 needle, passages, plug, and puncturable closure located in coincident axial planes, substantially as described.

10 5. A transfer-receptacle for fluids under high pressures comprising a tube, a head, a plug having threaded connection with said head, said plug and head provided with fluid passages arranged end to end, and a puncturable closure secured to the inner face of said plug for closing said passage therein,

said puncturable closure arranged to be 15 clamped between said plug and head across said passages, said plug provided with a bypass, and said head provided with securing means for a detachable valve, substantially 20 as described.

In testimony whereof I have signed my name hereto in the presence of two subscribing witnesses.

JOHN A. HOFF.

Witnesses:

LILLIAN BURNETT,  
CONSTANT SOUTHWORTH.