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W. W. LEE

2,509,570

DEVICE FOR SUPPLYING BRAKE FLUID

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Fig. 1.

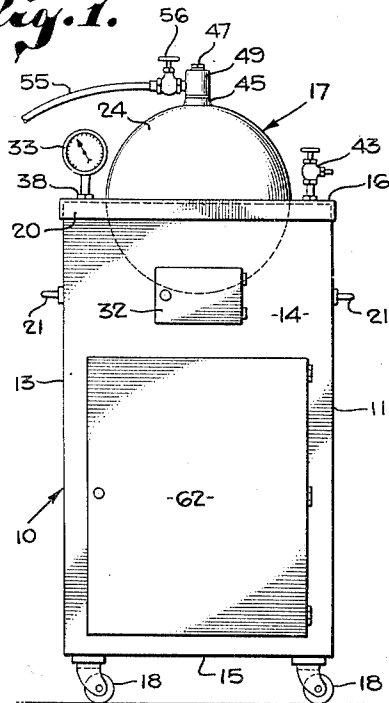


Fig. 2.

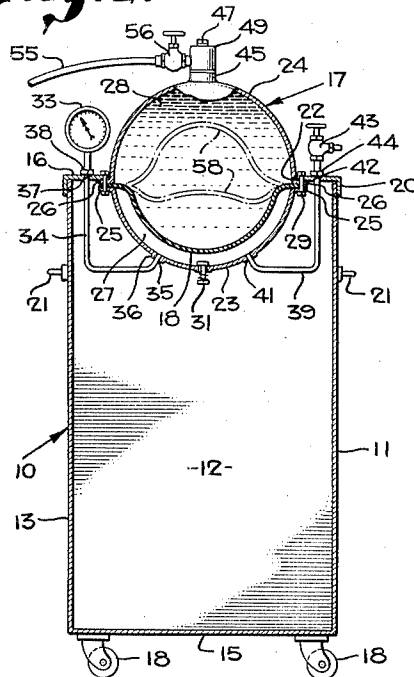


Fig. 3.

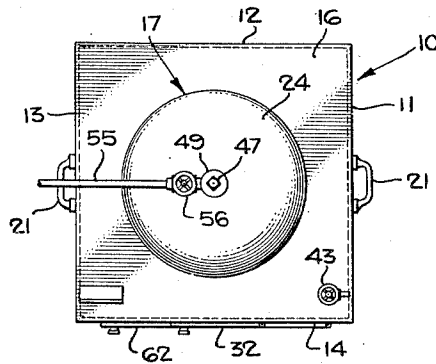
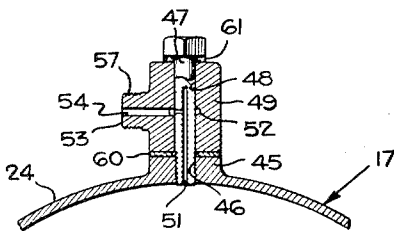


Fig. 4.



William Warden Lee
INVENTOR.

BY *C. Q. Liddell*

ATTORNEY

UNITED STATES PATENT OFFICE

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DEVICE FOR SUPPLYING BRAKE FLUID

William Warden Lee, Corona, Calif.

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3 Claims. (Cl. 222—386.5)

1

This invention relates to a portable device for injecting oil or hydraulic brake fluid into braking systems of vehicles. Such device may be termed a fluid pressure accumulator.

It is desirable to eliminate air from the pressure fluid medium supplied to a hydraulic system because air bubbles in the fluid medium affect the smoothness of the operation of the system, and compressed air contains moisture which, when it contacts the cylinders of a hydraulic system, causes the cylinders to rust readily. The present device is particularly adapted for servicing hydraulic systems, such as hydraulic systems used in connection with hydraulically operated automobile brakes.

Various kinds of accumulators have heretofore been proposed for storing power for forcing oil or other pressure fluid medium into the system and for bleeding the system without contacting the medium with compressed air. However, all of these accumulators known to me are undesirable in one way or another. In the first place, the accumulator is stationary, and the work must be brought to the accumulator. Air pressure is usually employed for exerting flow-power to the medium, and no accurate means is provided for determining and regulating the flow-power of the medium. Also, these prior devices do not provide means for quickly and positively releasing the air from the power chamber in order that the accumulator may be readily and quickly replenished with pressure medium. Furthermore, these prior devices are complicated and so expensive as to prohibit their use in the smaller shops and garages.

It is a primary object of this invention to provide a portable accumulator for supplying pressure medium to hydraulic systems that will be simple in structure, comparatively light in weight, durable and composed of a relatively small number of parts whereby the device may be produced cheaply and distributed to many shops and garages which cannot invest heavily in equipment.

Another object is to provide an accumulator including a hollow, spherical member divided into two chambers by a flexible diaphragm and means for supplying air to one chamber, which chamber is equipped with a gauge for indicating the air pressure within the chamber and a valve means for readily releasing air therefrom.

A further object is to provide a portable accumulator arranged to be charged with air from any of the usually available air hoses in shops, garages and the like.

2

A still further object is to provide an accumulator having the above characteristics wherein the fluid pressure medium is precluded from contact with the air supplying flow-power to the medium.

Further objects and advantages of the invention will appear more fully from the following description, particularly when taken in conjunction with the accompanying drawings, wherein like reference characters refer to like parts. The drawings are not a definition of the invention but illustrate a manner in which the invention may be effectuated. The invention is defined by the appended claims.

In the drawings:

Fig. 1 is a side elevational view of a fluid pressure accumulator embodying the invention.

Fig. 2 is a vertical sectional view taken through Fig. 1.

Fig. 3 is a top plan view of Fig. 1.

Fig. 4 is a sectional view illustrating a detail embodied in this invention.

Referring to the drawings, there is provided a cabinet represented in its entirety by the numeral 10. The cabinet is provided with four sides, 11, 12, 13 and 14, a bottom 15 and a cover 16 arranged to support an accumulator represented in its entirety by 17. For the purpose of easily moving about the device, there are provided four casters or rollers 18, suitably fixed to the bottom of the cabinet 10 as clearly shown by the drawings. Handles 21 are provided on opposite sides of the cabinet 10 for use by the operator for moving the device from one place to the other. The cover 16 is adapted to rest upon and be supported by the upper end of the cabinet 10. The outer edges of the cover 16 terminate in downwardly extending flanges 20, adapted to engage and lie against the opposing outer surfaces of the cabinet 10. The cover 16 is provided with a centrally located, circular opening 22. The opening 22 is substantially the diameter of the spherical accumulator 17.

The spherical accumulator 17 consists of two hemispherical portions 23 and 24. These portions are oppositely disposed in position to form the sphere 17. The edges of the hemisphere 23 and hemisphere 24 terminate in outwardly extending flanges 25 and 26, respectively. Within the sphere 17 is provided a diaphragm 18 of a suitable flexible material, such as artificial rubber, which is resistant and impervious to hydrocarbon oils. The diameter of the diaphragm 18 is greater than the diameter of the sphere 17, and the peripheral edge of the diaphragm 18

extends between the flanges 25 and 26 of the members 23 and 24, respectively, and operates as a gasket for connecting the members 23 and 24 and dividing the sphere into an air compartment 27 and an oil or pressure fluid medium compartment 28. Spaced openings are provided in the cover 16 about the opening 22, which openings are adapted to register and cooperate with similar openings provided through the flanges 25 and 26 and the cooperating portions of the diaphragm 13. By this construction I am able to connect the hemispherical portions 23 and 24 in sealing relation with the diaphragm 17 and in supporting relation to the cover 16 by means of a single set of bolts indicated at 29. This construction provides a simple, inexpensive, but durable, structure and which may be readily disassembled for inspection, repair, cleaning, etc.

For the purpose of supplying air to the compartment 27 there is provided in the bottom of the hemispherical member 23, and preferably centrally thereof, an air valve or disconnect coupling 31. Access is had to the coupling 31 by way of an opening in the side wall 14, which opening may be provided with a door or cover 32. For indicating the air pressure in the chamber 27 there is provided a gauge 33, the latter being connected with the chamber 27 by way of tube 34, the lower end of the tube 34 extending into an opening in the side wall of the member 23, as indicated at 35. The side wall 23 may be embossed, as shown at 36, for increasing the strength of this portion and providing a larger contact surface for engaging the lower end of the tube 34. The gauge 33 and the tube 34, the latter extending through an opening 37 in the cover 16, may be supported by a flange or threaded member 38, the latter adapted to rest upon the top of the cover 16 adjacent the opening 37.

Means is provided for readily and easily releasing the air pressure in the chamber 27. This means consists of a tube 39 having its lower end connected with the interior of the chamber 27, as shown at 41. This connection 41 may be similar to that described in connection with the connection 35. The tube 39 extends upwardly through an opening 42 in the cover 16 and has provided on its upper end a valve 43. The valve 43 and tube 39 may be supported by a flange or threaded member 44 carried by the tube 39 and adapted to rest upon the top of the cover 16 in the same manner as that described in connection with the supporting member 38.

An outlet is provided for the pressure medium in the chamber 28, which outlet is preferably disposed centrally and at the top of the spherical member 24. This means may consist of a centrally located embossed or raised portion 45, having a threaded opening 46 therein adapted to receive a retaining bolt 47. The retaining bolt 47 extends through a vertical opening 48 in a swivel member 49. The lower end of the bolt 47 is threaded for engagement with the threaded opening 46, as clearly shown by Fig. 4. The bolt 47 is tubular, providing a passageway 51, which connects with an annular recess 52, registering with the opening 48 in the swivel member 49. The swivel member is preferably provided with a horizontally extending boss 53, the latter having a bore 54 extending longitudinally through the boss 53 and connecting with the annular groove 52. Suitable packing 60 is provided between the swivel member 49 and embossed portion 45 and packing 61 may be provided between

the head of the bolt 47 and the upper end of the swivel member 49. Any suitable hose 55, having a valve 56, may be provided for connection to the boss 53 on the swivel member 49. The boss 53 is threaded as shown at 57 for the purpose of receiving the cooperating threaded member on the valve 56.

In the embodiment shown, the diaphragm in solid lines indicates its position when the device is fully charged, that is to say, when the oil has been supplied through the opening 46 to fill the sphere and the desired air pressure has been supplied to the chamber 27, as indicated by the gauge 33. Various positions are shown at 58 in dotted lines that the diaphragm 17 may assume during the depletion of the oil in the chamber 24.

Accordingly, there is provided a portable accumulator that is simple in structure, durable, comparatively cheap to manufacture and which may be easily serviced and moved from place to place for servicing or bleeding hydraulic systems, such as those employed in the brake systems of automobiles and the like. After the chamber 28 is completely filled with pressure fluid, such as brake fluid, the air pressure supply hose (which is available in every garage) is plugged into coupling 31, placing chamber 27 under a pressure indicated by gauge 33. A small quantity of pressure fluid may be discharged through line 55 by opening valve 56 briefly, this cleaning out the line. The appropriate fitting on the end of line 55 is then connected to the cylinder or other portion of the system and valve 56 opened, permitting pressure fluid to charge the system. The device is made of comparatively few parts and can be produced for sale at a cost sufficiently low as not to prohibit its use in small shops, garages and the like. A door 62 may be provided in one of the side walls, and the compartment defined by the side walls may be employed for tools, air hose, pressure medium supply, cleaning rags and the like, and such other implements as may be required during the use of the device. While I have illustrated and described an exemplary form of the present invention, it will now be apparent to those skilled in the art that certain changes, substitutions, omissions and additions may be made in the single form shown without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A portable fluid pressure accumulator including: a cabinet movably mounted on casters, said cabinet having a cover with a centrally located opening therein, a hollow sphere mounted in said opening and supported by said cover, said sphere including oppositely disposed hemispherical members separated by a flexible diaphragm, said hemispherical members having complementary flanges between which the said diaphragm is supported, means securing said diaphragm tightly between said flanges and said members to said cover, said diaphragm serving as a gasket and dividing said sphere into two separate chambers, air intake means, air exhaust means and pressure indicating means associated with one of said chambers and carried by said cover, fluid intake means associated with the other of said chambers, said fluid intake means including a swivel member having an outlet means, the said diaphragm being resistant and impervious to hydrocarbon fluids.

2. A fluid pressure accumulator including: a spherical member, flexible means for dividing

5

said sphere into two separate chambers, one of said chambers adapted to contain a fluid, the other of said chambers adapted to contain a fluid under pressure for exerting pressure on the first said fluid, the other of said chambers having associated therewith an intake means, an exhaust means and a pressure indicating means, and means including a cabinet having a cover for supporting said spherical member and said pressure indicating means, and means for securing said spherical member to said cover and said flexible means to said member, the other of said chambers having an intake means including an outlet means, the said outlet means including a swivel means.

3. A portable fluid pressure accumulator comprising: a movably mounted cabinet having a wall with an opening therein; a pair of oppositely disposed hemispherical members forming a hollow sphere and having complementary adjacent flanges extending beyond edges of said wall opening; means securing said flanges together and to said wall; a flexible diaphragm dividing said sphere into two separate chambers and having edge portions interposed between said flanges to afford a seal therebetween as said securing means are drawn tight; actuating fluid

6

intake means on one of said chambers; means communicating with said last-mentioned chamber and carried by said wall for regulating pressure of actuating fluid supplied to said chamber including pressure-indicating means and controllable exhaust means; and means communicating with the other chamber for supplying and controlling a discharge of dispensable fluid therefrom, said means including a swivel member having a conduit adapted to be operably connected with said last-mentioned chamber, said actuating fluid under pressure exerting a force against said flexible diaphragm for discharging said dispensable fluid from its chamber.

WILLIAM WARDEN LEE.

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