March 15, 1955 D. M. CLARK 2,704,065

SLOW LEAK VALVE CONTROL FOR SPHYGMOMANOMETER

Filed Feb. 12, 1954

FIG. 4

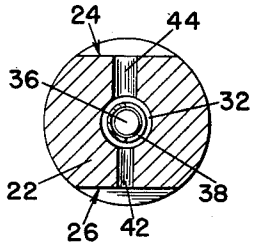


FIG. 1

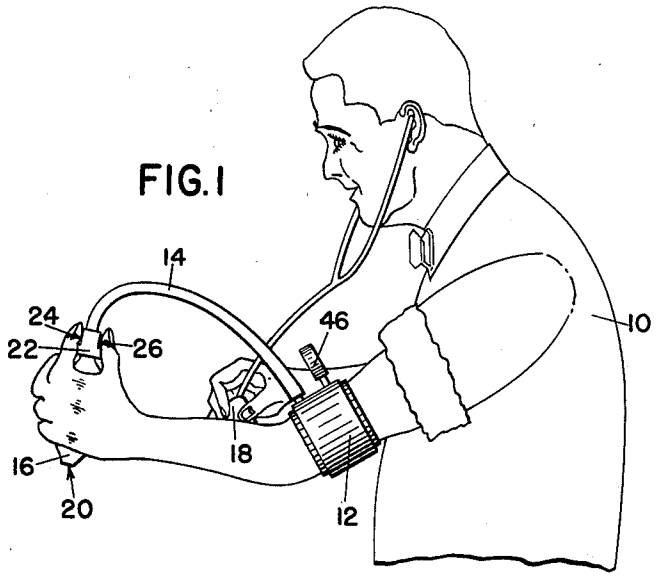


FIG. 2

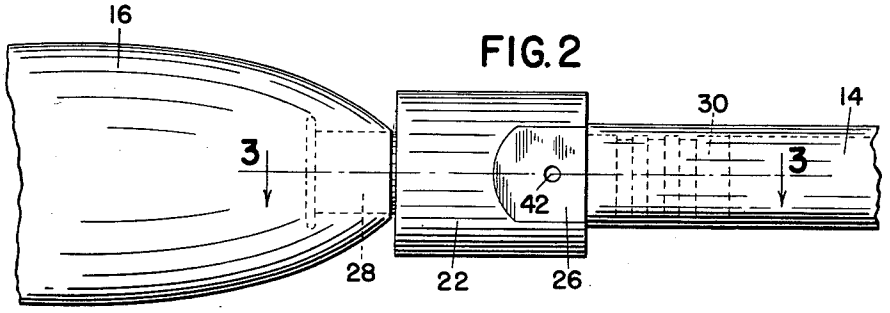
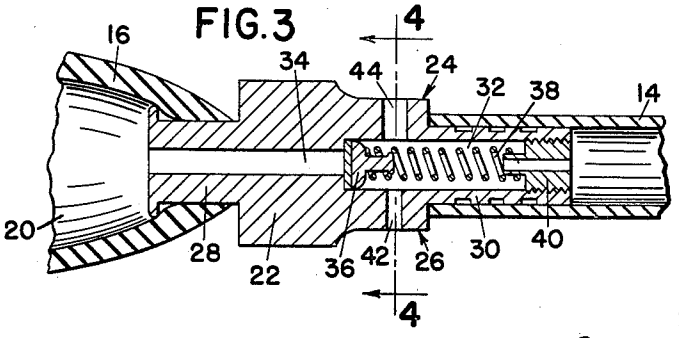


FIG. 3



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SLOW LEAK VALVE CONTROL FOR SPHYGMOMANOMETER

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Application February 12, 1954, Serial No. 409,953

4 Claims. (Cl. 128—2.05)

This invention relates to a new and improved slow leak valve control for the bulbs used for applying pressure in sphygmomanometers, and the principal object of the invention resides in the provision of a simpler and easier-to-use valve construction which is positive in actuation and which cannot become jammed and which is easy to control with the operator determining and instantly controlling the degree of escape of pressure for obtaining readings.

Further objects of the invention include the provision of a sphygmomanometer particularly adapted for self use so that a person may take his own blood pressure at any time, in combination with a new and improved slow leak valve pressure release means for the bulb of the self-applied sphygmomanometer, whereby the person taking his blood pressure may apply the device to his arm, pump up the pressure easily and quickly, using a stethoscope at the same time, the operator easily releasing the pressure and controlling the rate of release thereof to as fine a degree as desired, this combination of elements all tending toward quick, easy and accurate self-predetermination of blood pressure by anyone.

Another object of the invention resides in the provision of a slow leak valve control for a pressure bulb comprising a fitting for the hose leading to the object being inflated and said fitting transmitting air to said object and providing a pair of diametrically located holes therein for release of the air pressure, said holes being particularly positioned for the natural application thereto of the thumb and forefinger of the operator, the bulb being squeezed by the fingers, with the thumb and forefinger closing said holes to inflate the object, and one of said holes being released or partly released by the thumb, so as to slowly release pressure according to the desires of the operator, both holes being uncovered when quick release of the entire pressure is desired.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a view in elevation illustrating the device in use;

Fig. 2 is an elevation on a larger scale showing the bulb and the slow leak valve connection;

Fig. 3 is a longitudinal section, taken on line 3—3 through the bulb connection illustrating both of the release holes therein; and

Fig. 4 is a detail vertical section taken on line 4—4.

As shown in Fig. 1, the operator **10** applies a cuff-type of sphygmomanometer indicated at **12** to his left arm above the elbow. This sphygmomanometer is completely disclosed and described in copending application Serial No. 342,628 filed March 16, 1953, now Patent No. 2,678,040.

This cuff sphygmomanometer is particularly adapted for self application and is in the form of an annulus which may be pumped up through a hose **14** by means of a bulb **16** held in the left-hand of the operator, i. e. by the same hand of the arm on which the sphygmomanometer is positioned.

The right-hand of the operator may then hold the stethoscope **18** at the proper position to determine the point of cessation or starting of the blood flow.

The bulb **16** may be of the common variety well known in the art which takes air in at a port at **20** and delivers it to the hose **14**. The bulb is connected to the hose by a connector fitting generally at **22** and this comprises a cylindrical member having a pair of flats at the forward

end thereof as at **24, 26**. These flats are at diametrically opposite positions with respect to the bulb, and when the hand of the operator grasps the bulb, the thumb naturally lies on one flat, say that at **26**, and the forefinger lies upon the other flat at **24**.

The connector fitting **22** is also provided with an extension **28** to be received within the bulb and an extension **30** to be received within the hose **14**. There is also a through passage **34** having a shoulder against which a valve body **36** is pressed by a spring **38** held in position by a nut **40**, so that air may be forced into the hose but cannot escape in a reverse direction into the bulb.

Therefore it is seen that all of the air in the sphygmomanometer must escape through holes indicated at **42** and **44, 44** being in the flat **24** and being larger than the hole **42** which is located to intersect flat **26**.

These holes enter the passage **32** and provide for escape of pressure from the sphygmomanometer but only when the fingers of the operator are released; and it is intended that the thumb of the operator shall be positioned to close smaller hole **42** and the forefinger at the opposite side of the connector is positioned to close the larger hole **44**. The cuff type of sphygmomanometer is provided with a gauge at **46** which is in position to be easily read by the operator having a dial which faces him.

In the operation of the device, the cuff-type of sphygmomanometer is positioned as stated, the user applies the stethoscope with the right-hand while holding the bulb in the left-hand with the thumb covering the smaller hole **42** and the forefinger covering the larger hole **44**. The user then squeezes the bulb sufficiently to stop the flow of blood in the arm and then uncovers the smaller hole **42** by a simple relaxing of the thumb to retract it from this hole. This allows a metered exhaust of air, but may be stopped instantly merely by re-applying the thumb to the hole, and also the degree of exhaust of air is easily controlled as fast or as slow as the user desires merely by the pressure of the thumb.

It is of course well known in the art that the air exhaust must be slow so that the stethoscope may indicate to the user instantly the exact point of re-circulation of the blood flow so that the blood pressure may be exactly determined. Once the blood pressure is so determined, both thumb and forefinger may be removed or relaxed and the pressure in the sphygmomanometer may be quickly and easily removed from the arm.

It will be seen that this invention provides for a very simple and much easier controlled slow leak valve for a device of the nature described. There are no valve parts to turn and it is merely a question of covering the holes or relaxing the fingers to build up the pressure or to release it.

A very fine control is available by this invention because of the fact that the finger hole is used to meter the exhaust of pressure, and this of course is an operation which is made instantly upon the desire of the user. If the user should happen to faint with the blood pressure cut off and the pressure in the sphygmomanometer up, the relaxation of the fingers will provide for instant release of the pressure and no injury to the user is possible. This beneficial effect is also present when a second person is using the apparatus to determine the blood pressure of someone else.

With the devices of the prior art, it is not nearly so convenient or easy for a person to take his own blood pressure, since the usual valve has to be turned between the thumb and forefinger between open and closed positions, and the valves which must be turned are not instantly responsive to changes as desired by the operator for either closing or opening or metering the pressure.

Having thus described the invention and the advantages thereof, it will be understood that the invention is not to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what is claimed is:

1. The combination with a sphygmomanometer of the cuff type which is easily self-applied and including a hose connection and a pumping bulb therefor, of a connection between the hose and the bulb, said connection comprising a single unitary member having a through passage therein leading from the bulb to the hose, a one-way valve in the passage preventing escape of air under pres-

sure from the hose to the bulb but allowing for air to be led from the bulb to the hose and to the sphygmomanometer, a pair of diametrically opposed holes in said connection leading from the passage to exterior surfaces thereof, said holes intersecting the passage at the side of the valve toward the hose and said holes being covered by the thumb and forefinger of the operator to provide for pressure in the sphygmomanometer, and said holes being controlled by relaxing of the fingers to provide for selective slow or fast exhaust of pressure from the sphygmomanometer.

2. The combination of claim 1 wherein the holes are of different size so that a fine hole is used to meter escape of pressure while the larger hole is still closed by the other finger.

3. A device of the class described comprising a bulb for creating pressure and a connection from the bulb for a hose or the like leading to the container for the pressure,

said connection comprising an elongated solid unitary member having a passage centrally and longitudinally therethrough to lead from the bulb to the hose, a restriction in said passage forming a shoulder, a spring, a valve held to said shoulder by said spring and preventing reduction of pressure from the hose to the bulb, a pair of diametrically opposed holes in said connector leading from the exterior surface thereof into the passage and intersecting said passage at a point between the valve member and the hose, said holes providing the sole escape of gas from the container and being adapted to be quickly and easily covered by the fingers of the operator to prevent reduction of pressure or to meter the reduction of pressure by relaxing of one of the fingers.

4. The device of claim 3 wherein said holes are of different sizes providing a smaller metering hole and a larger hole for quick and complete pressure release.

No references cited.