

[54] DISPOSABLE BLOOD PRESSURE MONITOR

[72] Inventor: Maynard Ramsey, III, Durham, N.C.

[73] Assignee: Ramtech, Inc., Tampa, Fla.

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[51] Int. Cl. A61b 5/02

[58] Field of Search 128/2.05 D, 2.05 E; 215/82, 215/94; 73/402, 406, 409

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Primary Examiner—Kyle L. Howell

Attorney—J. Gipple, M. Fleit, H. B. Jacobson, Jr., R. D. Cohn, J. S. Hale, D. A. Kettlestrings and D. Price

[57] ABSTRACT

A disposable blood pressure monitor comprising an elongated tubular structure having means on one end of the tubular structure adapted to place the interior of the tubular structure in direct communication with the blood system to be monitored and a one-hole tubular stopper frictionally engaging the other end of the tubular structure. A flexible sacklike membrane is received in the same end of the tubular structure as the one-hole tubular stopper and positioned therein separating the tubular structure into first and second chambers so that the one-hole tubular stopper engages the end of the tubular structure with the peripheral edge of the membrane sealingly positioned between the internal surface of the tubular structure and the external surface of the stopper. A flexible retaining means is sealed over the top of the stopper and is affixed to the external surface of the structure to prevent accidental dislodging of the stopper. Pressure indicating means are attachably and sealably received within the hole of the one-hole stopper.

5 Claims, 3 Drawing Figures

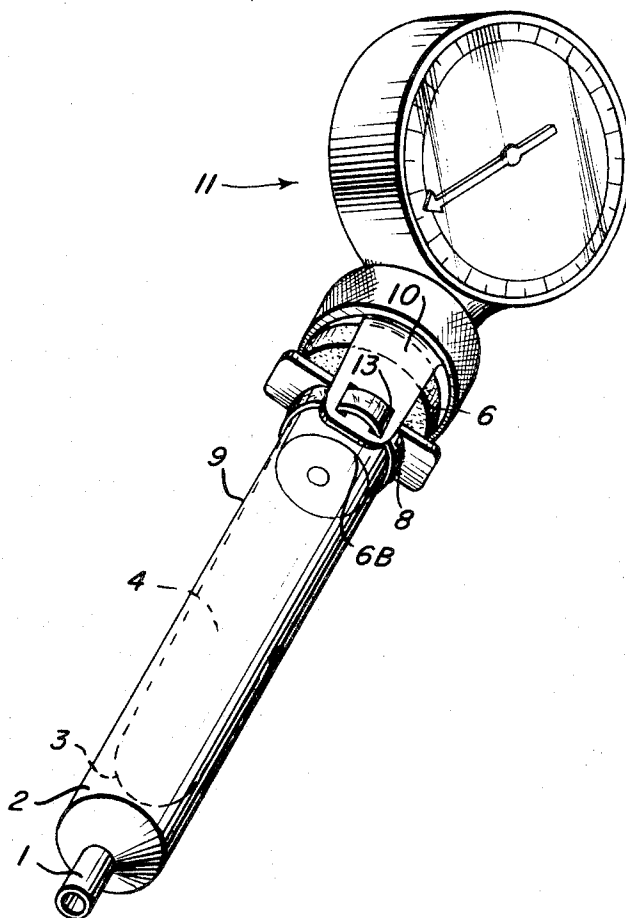


Fig. 1

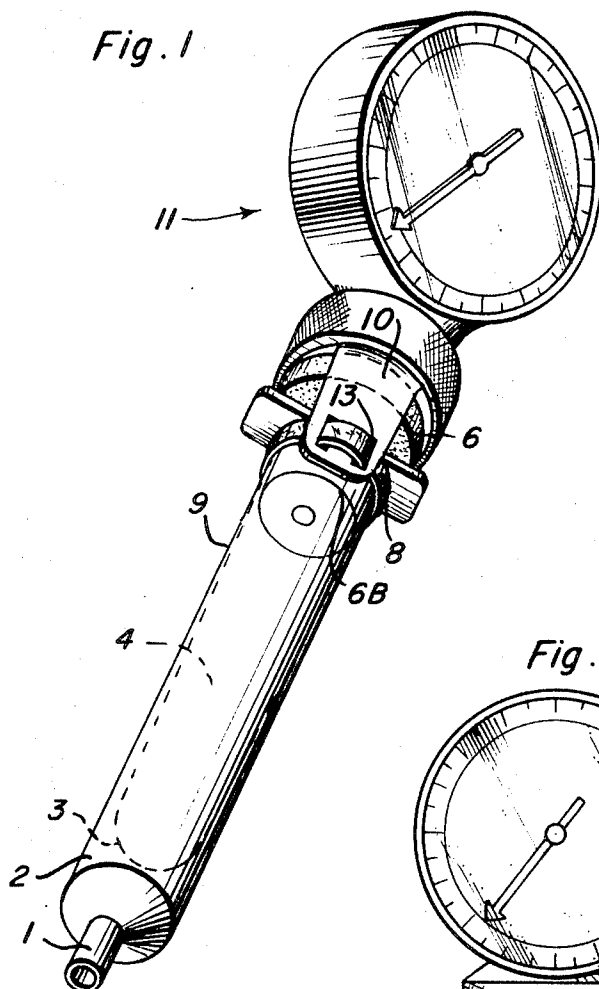


Fig. 2

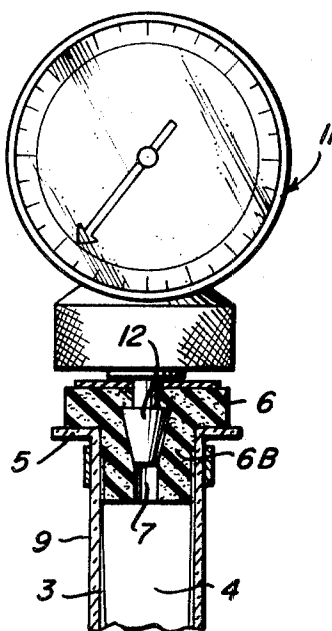
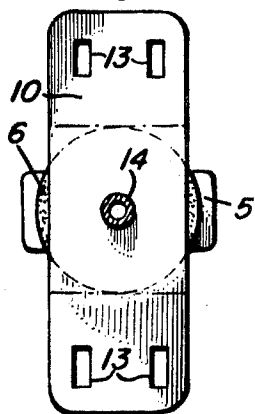


Fig. 3



Maynard Ramsey III

INVENTOR

BY *Fleit, Sipple & Jacobson*
ATTORNEY

DISPOSABLE BLOOD PRESSURE MONITOR

The present invention relates to an improved blood pressure monitor for monitoring intra-arterial blood pressure. The improvement represented by this blood pressure monitor over prior art is such that the blood pressure monitor is simply constructed and is disposable after use.

Blood pressure is an important parameter in many surgical and medical procedures, both clinical and experimental, and many means are available for its measurement. The accuracy, expense, cleaning and ease of operation of these instruments vary considerably. The ideal instrument would be inexpensive, disposable, accurate, and easily used. At present intra-arterial blood pressure is normally monitored by means of electronic monitoring equipment costing many hundreds of dollars. In one attempt to alleviate this cost problem associated with intra-arterial blood pressure monitoring a new blood pressure monitor was produced. The design of this new blood pressure monitor is such that its construction requires screw fittings and close tolerances. This type of construction produces an expensive apparatus which is not disposable and must be reused. Thus the present art consists only of expensive blood pressure monitors which must be hand disassembled, cleaned, reassembled and sterilized. Because both the device and its maintenance are expensive, intra-arterial blood pressure is quite often not monitored when it would be advantageous for the patient to have it monitored.

The present invention by suitable innovative modifications to existing blood pressure monitors arrives at a simple design which is both accurate and easily constructed, allowing it to be sold for a price which enables it to be disposed of after use, thus saving maintenance and sterilization costs. Another novelty of the present invention is that the aneroid manometer or pressure indicating means which is the indicating portion of the blood pressure monitor is supplied by the user. This supply of the aneroid pressure sensing means by the user represents no difficulty in that the aneroid pressure sensing means is a standard item in the hospital and is generally ubiquitous. Prior to using the blood pressure monitor the user inserts the hollow stem of the aneroid pressure sensing means into the hole in the top of the present invention. After use, the aneroid pressure sensing means and the blood pressure monitor are separated simply by pulling them apart and the monitor itself is discarded. The aneroid pressure sensing means is, of course, saved for future use. In summary, the invention resides in the simple design of a blood pressure monitor which allows the user to employ his own gauge and to dispose of the monitor after use.

In the drawings which illustrate the preferred construction and organization of the invention,

FIG. 1 is a perspective view of the transparent plastic blood pressure monitor assembled with the aneroid pressure sensing means.

FIG. 2 is a front partial view of the invention with a partial sectional view of the blood pressure monitor.

FIG. 3 is a top plan view of the invention in a partially assembled form with the stopper securing rectangle.

As illustrated in FIGS. 1 and 2, the invention comprises a tubular structure constructed of transparent plastic so that one may view the contents at all times. The lower end of the tubular structure is drawn to a smaller diameter 1 and it is to this smaller diameter that the cannula from within the patient's artery is connected. An elongated flexible membrane 3 is inserted in the inside of the tubular structure 9, and is held tightly in place at the upper end of the tubular structure by means of a one-hole rubber stopper 6 having a portion 6B which is in the barrel of the device. Thus, the flexible membrane 3 is prevented from dislodging by having the outside diameter of the one-hole stopper portion 6B slightly larger than the inside diameter of the tube 9. The membrane thus divides the tube into two distinct and separate chambers 2 and 4. Thus, when the smaller diameter end 1 is connected to the source of pressure, that is, the patient's arterial or venous blood system, there will be equal pressures in chambers 2 and 4 although they will be kept separate by the flexible mem-

brane 3. Since in operation there will be a pressure within the tubular structure, some means other than the friction of the one-hole stopper portion 6B on the sides of the membrane 3 and tubular structure 9 must be employed in order to prevent ejection of the stopper. This retaining function is accomplished by the flexible plastic rectangle 10 illustrated in FIGS. 1 and 3. The plastic rectangle 10 is aligned so that its center hole 14 and the hole in the stopper 7 are in register and the rectangle 10 is then folded at each end along the sides of the tubular structure 9 and suitably affixed to the tubular structure 9 by a self-locking plastic tie 8 looped through the two holes 13 on each end. Thus, when the tie 8 is snugged tight around the barrel the flexible rectangle 10 will be affixed to the barrel and prevent the ejection of the stopper. The flange portion 5 of the blood pressure monitor extending from the sides of the tube is integral with the tubular structure 9 and thus serves to prevent the tie 8 from slipping off the top of the tubular structure. Prior to use the aneroid pressure sensing means 11 is inserted into the hole in the stopper 7. The aneroid pressure sensing means is prevented from dislodgement during use by having the hole in the stopper 7 slightly smaller than the stem 12 of the aneroid pressure sensing means which will thus be retained in place by friction. As a safety measure, the center hole 14 in the flexible rectangular piece 10 which retains the stopper is made the size of the stem of the aneroid pressure sensing means at its smallest diameter. Since the majority of aneroid pressure sensing means have a stem 12 which is constructed as in FIG. 2, when the aneroid pressure sensing means is inserted it will "pup" through the center hole 14 of flexible rectangular piece 10 and will be locked in place by this self-retaining mechanism should the aneroid pressure sensing means be inadvertently jarred or partially dislodged.

The system thus assembled when connected to the arterial or venous blood supply of the patient will accurately indicate the pressure within the vascular channel that is cannulated. After use the aneroid is removed by forcefully pulling it off the tubular structure and the tubular structure is then discarded. Since this forceful removal of the aneroid will partially destroy the monitor it will thus be impossible to mistake a new unused blood pressure monitor with one which had been used and hence is contaminated. This obvious identification of a used device would prevent possible infection through use of a contaminated device.

It is readily apparent from the foregoing that the simplicity of use and its disposability make the present invention in many ways more desirable than present art.

What is claimed is:

1. A disposable blood pressure monitor comprising an elongated tubular structure; means on one end of said tubular structure adapted to place the interior of said tubular structure in direct communication with the blood system to be monitored; a flexible sacklike membrane received within the other end of said tubular structure, said membrane separating said tubular structure into first and second chambers; a one-hole tubular stopper frictionally engaging said other end of said tubular structure with the peripheral edge of said membrane sealingly positioned between the internal surface of said tubular structure and the external surface of said stopper; a flexible plastic retaining means folded over the top of said stopper and affixed to the external surface of said tubular structure to prevent accidental dislodging of said stopper; and pressure indicating means detachably and sealingly received within the hole of said one-hole stopper.

2. A disposable blood pressure monitor as claimed in claim 1, wherein said one-hole stopper has a diameter greater than the inside diameter of said tubular structure.

3. A disposable blood pressure monitor as claimed in claim 1, wherein said stopper is rubber.

4. A disposable blood pressure monitor as claimed in claim 1, wherein said flexible plastic retaining means is rectangular and defines a plurality of holes therein.

5. A disposable blood pressure monitor as claimed in claim 4, wherein said rectangular plastic retaining means includes a plastic tie.