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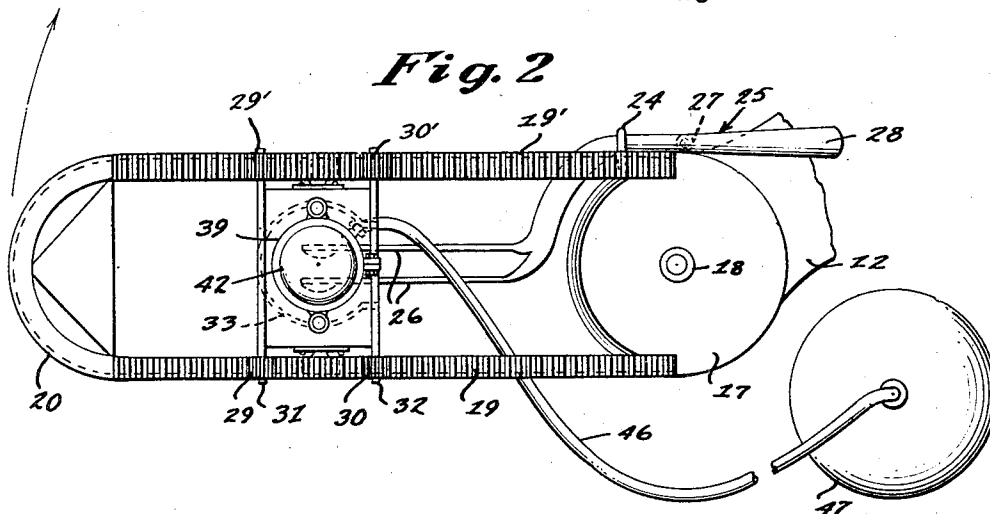
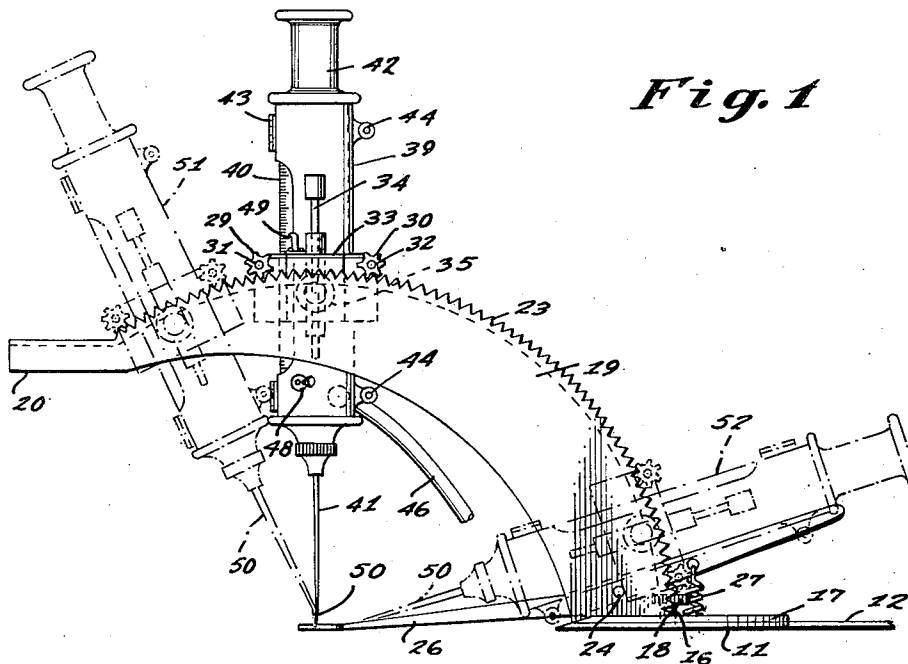
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2,451,183

BLOOD EXTRACTING APPARATUS

Filed July 22, 1947

2 Sheets-Sheet 1



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Fig. 4

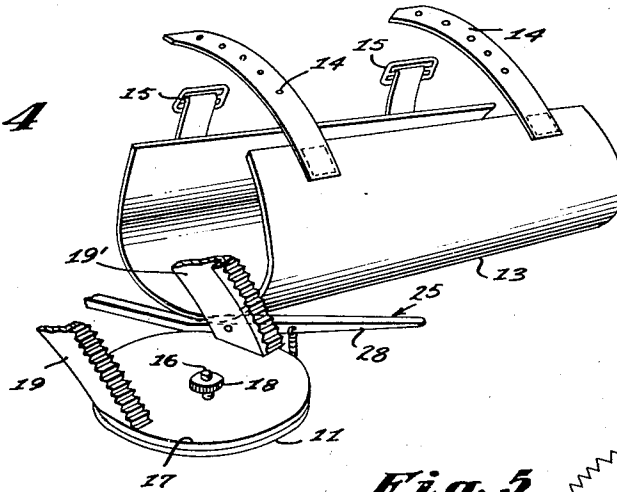


Fig. 5

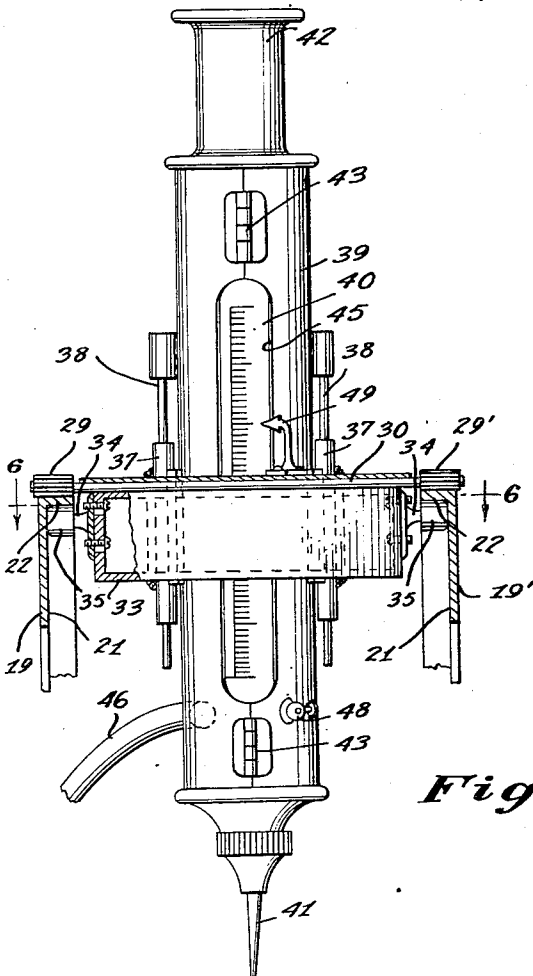
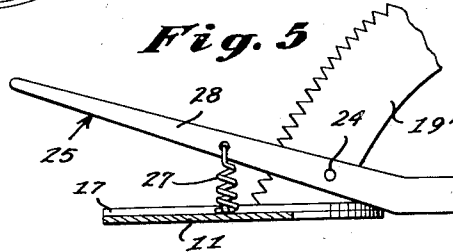


Fig. 3

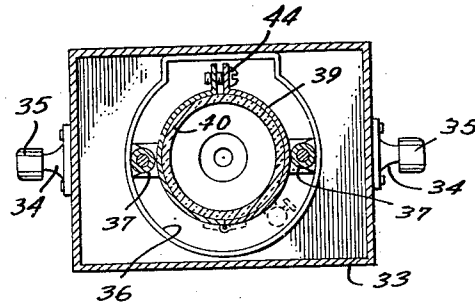


Fig. 6

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UNITED STATES PATENT OFFICE

2,451,183

BLOOD EXTRACTING APPARATUS

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Application July 22, 1947, Serial No. 762,566

5 Claims. (Cl. 128—133)

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This invention relates to blood extracting apparatus and more particularly to apparatus for extracting blood for performing blood tests, blood transfusions, and the like.

A main object of the invention is to provide a novel and improved blood extracting apparatus which is simple in construction, easy to use and efficient in operation.

A further object of the invention is to provide a novel and improved blood extracting apparatus which is constructed of relatively inexpensive parts, which is sturdy in construction and which is substantially painless to the subject on whom it is employed.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side elevational view of the main working portion of a blood extracting apparatus constructed in accordance with the present invention.

Figure 2 is a top plan view of the structure shown in Figure 1.

Figure 3 is an enlarged detail view, partly in cross-section, of the blood extracting cylinder and its supporting means as employed in the apparatus of Figure 1.

Figure 4 is a perspective view of the splint means for securing the blood extracting apparatus to the arm of a subject.

Figure 5 is an enlarged detailed view of the vein clamping lever employed in the blood extracting apparatus of Figure 1.

Figure 6 is a cross-sectional view taken on line 6—6 of Figure 3.

Referring to the drawings, 11 designates a disc-like bottom plate member provided with an outwardly extending arm portion 12 to which is secured a splint sleeve 13 in which the subject's arm is adapted to be clamped during the blood extracting process. Sleeve is preferably constructed of stiff material such as leather, or the like, and may be lined with cloth or other suitable material. The sleeve 13 is provided at one edge with straps 14, 14 adapted to be adjustably fastened to buckles 15, 15 carried on the opposite edge of the sleeve for securing the apparatus to the subject's arm during the blood extracting operation.

Carried by plate member 11 and projecting upwardly from its center is a threaded stud 16 and rotatably engaged therewith is an upper disc-like plate member 17. Stud 16 has threaded thereon a knurled nut 18 for clamping plate member 17 to plate member 11 in a desired position of adjustment with respect thereto.

Secured to upper plate member 17 at diametrically opposed locations at its periphery are a pair of parallel arcuate rack members 19, 19' in-

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tegrally connected at their outer ends by a generally semi-circular yoke element 20. Each rack member has a vertical web portion 21 and a top flange portion 22 on the top surface of which are formed the rack teeth 23. The flange portions 22, 22 are directed inwardly toward each other, as shown in Figure 3.

Pivotally secured to rack member 19' adjacent its connection to plate member 17 by a transverse pin member 24 is a lever 25. The forward portion of lever 25 is inwardly offset toward the mid-plane between rack members 19 and 19' and is formed with a pair of spaced parallel fingers 26, 26 terminating substantially at the axis of the cylinder defined by the spaced rack elements 19 and 19'.

The fingers 26, 26 act as pressure arms to depress the flesh on both sides of a vein, the vein being positioned between said fingers when the apparatus is used. A spring 27 is connected between the handle portion 28 of lever 25 and the sub-adjacent plate member 17, said spring normally biasing said handle portion 28 upwardly and causing the fingers 26, 26 to exert downward pressure when the apparatus is secured to a subject's arm as will be subsequently described. The downward pressure of fingers 26, 26 may be relieved by exerting downward pressure on the handle portion 28 of the lever 25.

Engaging the rack teeth 23 of the rack members 19 and 19' are pinions 29, 29' and 30, 30' rotatably carried on respective transverse shafts 31 and 32. Secured to the shafts 31 and 32 is a hollow block member 33 provided with a pair of oppositely projecting stub shafts 34, 34 carrying rollers 35, 35 engaging rotatably beneath the flanges 22 of the respective rack members 19 and 19', thereby preventing said block member 33 from being lifted off the rack members while allowing said block member to be rotated around the central axis of said rack members.

Block member 33 is formed with a central aperture 36 which is generally circular in shape, and projecting inwardly from the walls of said aperture in a transverse plane aligned with stub shafts 34, 34 are the apertured lugs 37, 37. Slidable in said lugs 37, 37 are the elongated pin members 38, 38 carried by a clamping sleeve 39, the pin members 38, 38 and the axis of sleeve 39 being radial with respect to the axis of the rack members 19 and 19'. Secured within the sleeve 39 is a glass syringe 40 having a depending hollow needle 41 and having a top plunger handle 42. As shown in Figures 3 and 6, the sleeve 39 comprises two segments hinged together at 43, 43 and fastened in clamping relation by securing bolts 44 securing together the edge portions of the segments opposite to the hinged portions thereof. The syringe 40 is conventionally calibrated, and the sleeve 39 is apertured at 45 so

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that the volume calibrating scale of the syringe is visible. Connected to the lower portion of the syringe chamber through an aperture in the sleeve 39 is a flexible tube 46 leading to a blood receiving vessel 47. Also connected through an aperture in sleeve 39 to said syringe lower portion is a manually controlled air vent valve 48.

Mounted on the top surface of block member 33 is an index pointer 49 arranged adjacent the exposed syringe scale so that it provides an indication of the relative position of the syringe with respect to said block member along its radial locus of movement defined by the apertured guide lugs 37, 37. Pointer 49 is employed to gauge the depth of penetration of the hollow needle 41 when an incision is being made.

As shown in Figure 1, the tip portion of the needle 41 is angled rearwardly with respect to the main portion thereof at a small angle, preferably an angle of approximately ten degrees.

In operation of the apparatus, the sleeve 13 is secured to the subject's arm with the approximate point of incision underlying the rack members 19 and 19' and the apparatus adjusted so that the vein at the point of incision is positioned between the fingers 26, 26 of the lever member 25.

Said fingers 26, 26 press the flesh adjacent the vein on each side downwardly, as previously described, and expose a substantial vein incision area. The block member 33, carrying the syringe 40 is then moved to its extreme left position, shown at 51 in Figure 1 and the syringe is moved downwardly, its motion being guided by pin members 38, 38 in guide lugs 37, 37, until the needle point engages the top of the vein contour. The scale graduation indicated by pointer 49 is then noted. The syringe is then moved downwardly by a small predetermined amount necessary to pierce the vein wall and the block member carrying the syringe is then moved to its extreme right position, shown at 52 in Figure 1, after which the syringe needle point is moved inwardly by another predetermined larger amount, the embedded angled tip 50 of the needle being in this position substantially parallel to the axis of the vein. The piston handle 42 is then retracted to operate the syringe in the usual manner.

When the desired amount of blood has been withdrawn, the syringe is retracted and the lever handle portion is pressed downwardly to relieve the pressure of the fingers 26, 26 adjacent the vein. The apparatus is then detached from the subject.

The rack members 19, 19' provide a range of rotation of the syringe sufficient to rotate the needle tip 50 from a substantially perpendicular position with respect to the vein to a position substantially aligned therewith, as shown in Figure 1.

While a specific embodiment of the blood extracting apparatus has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention other than as defined by the scope of the appended claims.

What is claimed is:

1. A blood extracting apparatus, comprising an arm splint, a support plate adjustably secured to said arm splint, a pair of parallel arcuate bars carried by said support plate, a block member, means movably securing said block member to

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said arcuate bars for movement along the arcuate surfaces thereof, a vein piercing syringe movably mounted on said block member and directed radially inwardly with respect to the axis of said arcuate bars, the syringe having its needle tip slightly angled with respect to the main portion of the needle, and means for guiding the syringe in a radial path with respect to said axis.

2. A blood extracting apparatus, comprising arm engaging means, a support plate adjustably secured to said arm engaging means, an arcuate guide member carried by said support plate, a carriage movably secured to said guide member for movement along its curved periphery, a syringe movably carried on said carriage and directed substantially radially inwardly with respect to said guide member, and means on said carriage constraining said syringe to radial movement with respect to said guide member.

3. A blood extracting apparatus, comprising means engaging and adapted to be secured to a member of the body, a support plate adjustably secured to said means, an arcuate guide member carried by said support plate, a carriage movably secured to said guide member for movement along its curved periphery, a vein-piercing syringe movably secured to said carriage and directed substantially radially inwardly with respect to said guide member, means on said carriage constraining said syringe to radial movement in the plane of said guide member, and means pivotally secured with respect to said guide member for exerting downward pressure at the regions adjacent the tip of the syringe.

4. A blood extracting apparatus, comprising splint means, a support plate adjustably secured to said splint means, an arcuate guide member carried by said support plate, a carriage mounted on said guide member, means restraining said carriage for movement along the curved periphery of said guide member, a vein-piercing syringe movably secured to said carriage and directed substantially radially inwardly in the plane of said guide member, means restraining said syringe to radial movement, means pivotally secured for movement in the plane of said guide member and adapted to exert downward pressure at the regions adjacent the tip of the syringe, and spring means biasing said pressure-exerting means downwardly.

5. In a blood extracting apparatus, sleeve-like splint means, a support plate, means adjustably securing said support plate to said splint means, an arcuate rack bar carried by said support plate, a carriage movably mounted on said rack bar and provided with means cooperating with said rack bar to constrain said carriage to movement along the arcuate periphery of the rack bar, a vein-piercing syringe secured to said carriage for radial movement with respect to said rack bar, said syringe being directed radially inwardly in the plane of said rack bar, the tip portion of the syringe needle being angled at approximately ten degrees with respect to the main portion of the needle, a lever member pivoted to the rack bar for rotation in the plane thereof, a pair of spaced fingers carried by said lever adapted to exert downward pressure at the regions laterally adjacent the needle tip, and spring means biasing said fingers downwardly.

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No references cited.