

Sept. 14, 1926.

1,599,741

F. J. BILLINGS

BLOOD TRANSFUSIONS APPARATUS

Filed July 10, 1924

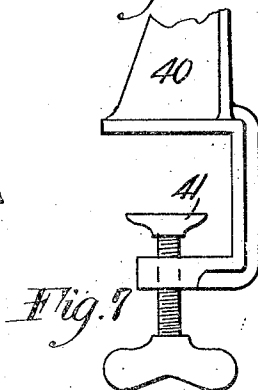
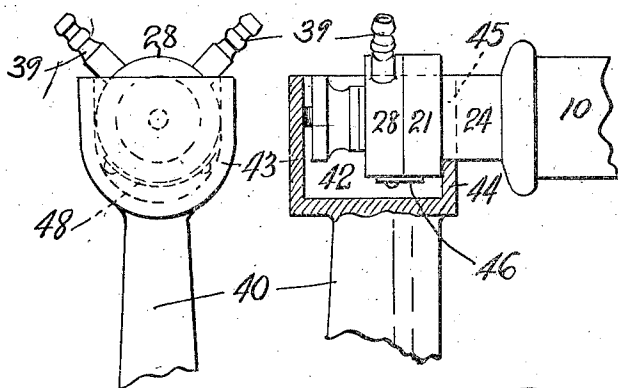
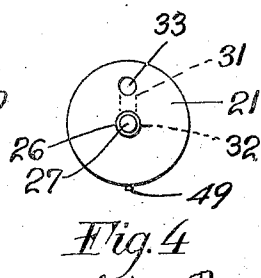
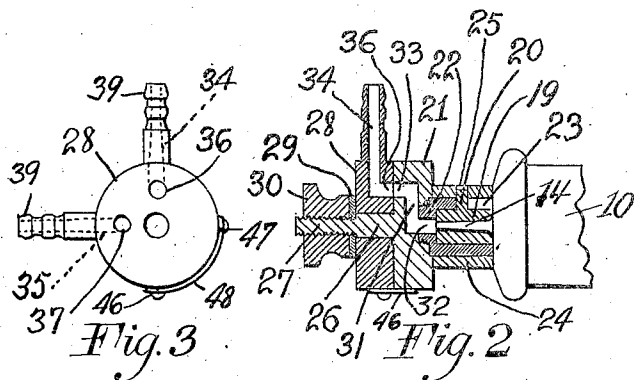
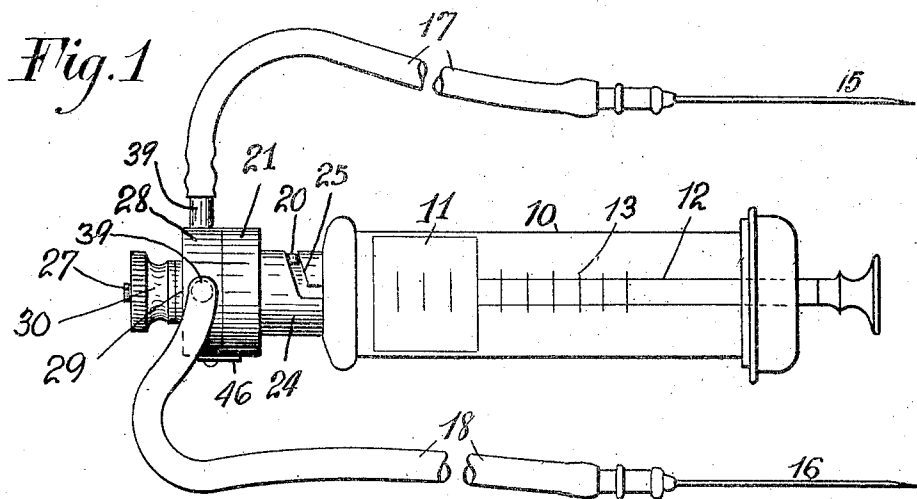


Fig. 6

Fig. 5

Inventor
Frederick J. Billings
 By his Attorney
Ivan E. G. Koenigsberg

UNITED STATES PATENT OFFICE.

FREDERICK J. BILLINGS, OF WHITESTONE, NEW YORK, ASSIGNOR TO E. LEITZ, INC., A CORPORATION OF NEW YORK.

BLOOD-TRANSFUSIONS APPARATUS.

Application filed July 10, 1924. Serial No. 725,114.

This invention relates to improvements in blood transfusions apparatus. The object of the invention is to provide a generally improved apparatus or device containing certain novel features designed to reduce the difficulties of instrumental manipulation to a minimum and to obviate the possibility of a reflux of blood from the recipient to the donor. Another object of the invention is to provide means for facilitating the operation and also to enable the physician to observe clearly all stages of the transfer of the blood from one patient to another. With the foregoing and other ancillary objects in view my invention is embodied in a blood transfusions apparatus designed and constructed as hereinafter set forth and as illustrated in the accompanying drawing in which—

Fig. 1 is a general outlined view of an apparatus embodying my invention with parts broken away.

Fig. 2 is a sectional detailed view of my improved valve shown in outline in Fig. 1.

Fig. 3 is an inside face view of the outer or distal valve disk shown in Fig. 2.

Fig. 4 is an inside face view of the inner or proximal valve disk shown in Fig. 2.

Fig. 5 is a detailed view showing how the apparatus may be supported in a suitable bracket shown in section.

Fig. 6 is a left end view of Fig. 5.

Fig. 7 is a detailed view of the said bracket.

Referring to the drawing the reference numeral 10 denotes an ordinary single action 20 c. c. Record syringe such as is usually employed in blood transfusions operations. 11 denotes the piston. 12 the piston stem and 13 the usual suitable gradation mark. The tip of the syringe is marked 14, see Fig. 2.

The numerals 15 and 16 denote the needles used in the operation and which are illustrated conventionally. 17 and 18 are the rubber tubes attached to the needles. Between the needles and the syringe is interposed an improved valve mechanism comprising the following:

Secured to the tip 14 of the syringe 10 is a locking sleeve 19 having a pin 20. The sleeve 19 may be attached to the tip in any suitable permanent manner, such for instance as by soldering. The valve mechanism proper comprises a proximal valve

disk 21 in which is firmly screwed a nipple 22 having a slot 23. Outside the nipple there is provided a locking sleeve 24 having an angular slot 25. The pin 20 and slot 25 constitute a bayonet joint connection between the syringe and the proximal valve disk 21 as will be understood. The valve disk 21 is further provided with a stem forming a bearing 26 and a threaded portion 27.

An outer or distal valve disk 28 is mounted to rotate upon the bearing 26 aforesaid and the two valve disks are held in close operative contact by means of a suitable spring washer 29 and a nut 30 for securing the two disks together.

The inner disk 21 is provided with a channel 31 having a central port 32 facing the syringe tip 14. The opposite end of said channel ends in a port 33 positioned a suitable distance away from the centre of the disk.

The outer valve disk 28 is provided with two channels 34 and 35, see Fig. 3. The channel 34 terminates in a port 36 and a channel 35 terminates in a port 37, both of said ports being adapted to register alternately with the aforesaid channel port 33 communicating with the syringe port 32. The two channels 34 and 35 in the outer disk are located at right angles to each other.

The outer valve disk is provided with nipples 39, 39 for the usual convenient attachment of the rubber hose leading to the needles as shown in Figure 1.

At the start of the operation the syringe contains normal saline solution, which is slowly injected into the vein of the recipient, for instance through the hose 17 and needle 15. In the meantime, the vein of the donor has been entered in the usual manner by the use of the needle 16. At this time the solution passes from the syringe through the channel 31 into channel 34 and to the needle 15 and the parts are in the position shown in Figures 2, 3, and 4.

Next the physician rotates one of the valve disks 90° thus bringing the inner channel 31 into communication with the outer, other, channel 35 and by the usual operation of the syringe withdraws from the donor a quantity of blood observable by the gradations of the syringe 10. The valve disks are again rotated 90° to bring the outlet channel 34, as it were, into regis-

ter with the inner or supply channel 31 and the blood, which has been previously withdrawn may now be expelled and supplied to the recipient by way of channels 31 and 34 as is obvious.

This operation is repeated as often as the particular case requires. In order to steady the apparatus there is provided a bracket 40 having convenient clamping means 41 for attaching it to a stand or table or the bedside of the patient and the upper end of said bracket is provided with a socket 42 adapted to receive and hold the valve mechanism of the apparatus. As seen in Fig. 5, the socket 42 has an end wall 43 which prevents longitudinal movement in one direction while a shorter wall 44 formed at the bottom of a cut out portion 45 prevents movement in the opposite direction and thus the valve mechanism aforesaid is securely held in the said socket.

In order to provide for automatic register of the ports 36 and 37 in the outer valve disk with the outlet port 33 in the inner valve disk, the latter is provided with a stop 49, see Fig. 4, and the outer valve disk is provided with two stops 46 and 47 formed of a strip of material 48 secured to the said disk. In assembling the apparatus the stop 49 is positioned between the stops 46 and 47 which are 90° apart. It will be noted that stop 49 is conveniently located diametrically opposite port 33, and the stops 46 and 47 similarly located with respect to ports 36 and 37. Hence, a movement in either direction of one valve disk upon the other until the stop 49 touches either of the stops 46 and 47 automatically registers the ports as aforesaid.

Preferably the device is placed in the bracket 40 as shown in Fig. 6 where it will be observed that axial movement of the outer valve disk is prevented by the position of the nipples 39, and the rotation required

to register the ports is done by rotating the syringe and the inner valve disk, to which the syringe is securely locked by the bayonet joint connection described above. The syringe with its attaching nipple 19 may be disassembled from the valve by rotating the outer sleeve 22 and bringing the slots 23 and 25 into register as is obvious. A movement in the opposite direction locks the syringe to the valve.

The foregoing is thought to fully explain the construction and operation of the apparatus, which possesses the advantages of simplicity of construction and surety of operation in that besides the usual operation of the syringe all that is required is for the physician to rotate the valve disks one upon another between each transfer. The parts may be easily disassembled for cleaning purposes. While I have shown my invention in its preferred form, it will be understood that changes may be made without departing from its principle and within the scope of the appended claim.

I claim:—

The combination with a single action syringe and a plurality of injection needles for blood transfusion purposes, of a valve mechanism therefor, means for attaching said valve mechanism to the tip of the said syringe, connections between the valve mechanism and the said needles, means in the valve mechanism operable upon a rotative movement of the said syringe to an extent of ninety degrees in either direction for alternately establishing communication between the syringe and only one of said needles, a supporting bracket having a socket for the reception of said valve mechanism and means in said bracket for holding said valve mechanism immovable during the rotative movement of the syringe as aforesaid.

FREDERICK J. BILLINGS.