

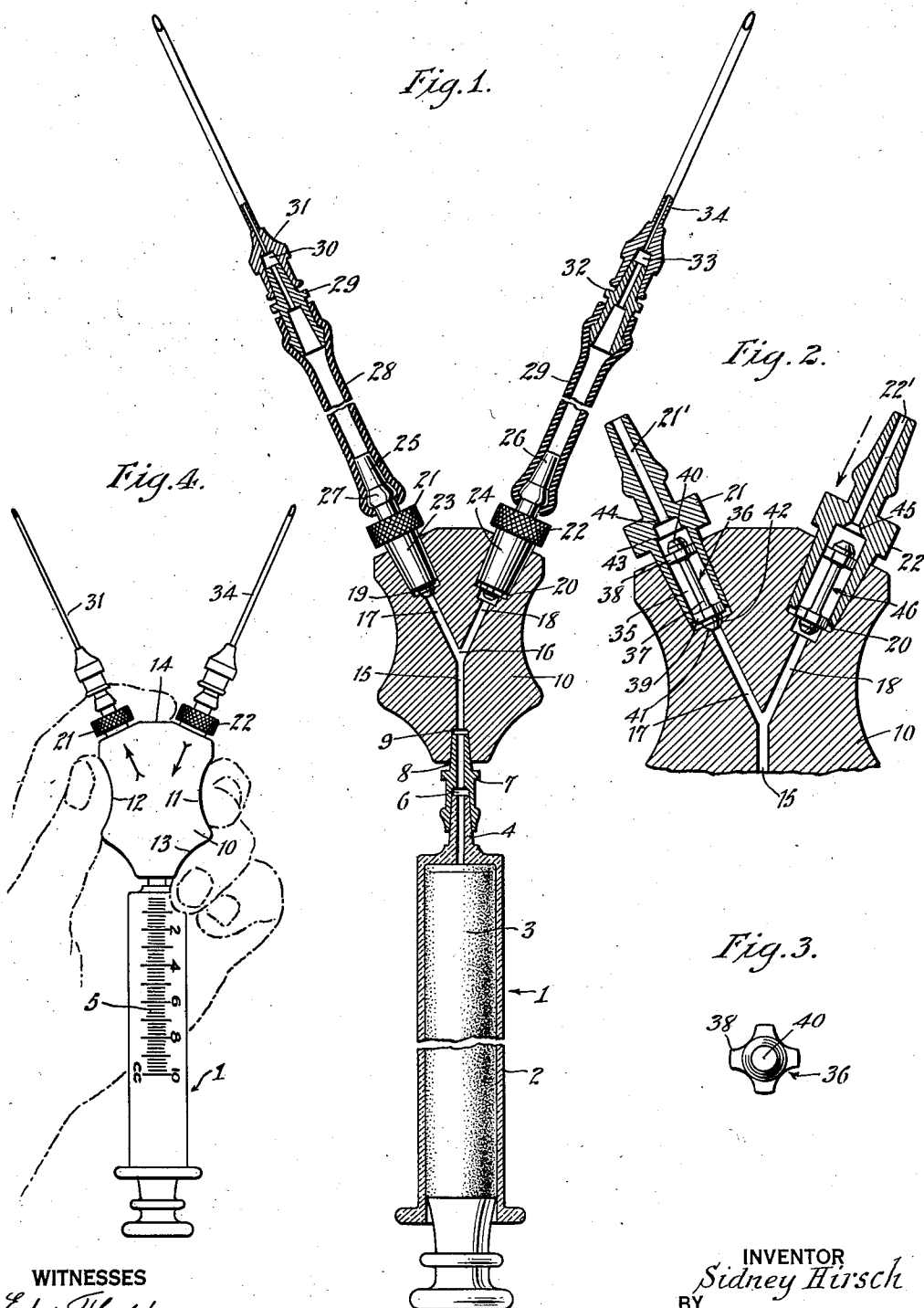
March 5, 1935.

S. HIRSCH

1,993,664

BIVALVE ADAPTER

Filed Aug. 15, 1934



WITNESSES
Edw. Thorpe
A. L. Fitchin.

INVENTOR
Sidney Hirsch
 BY
Munn, Anderson & Riddy.
 ATTORNEY

UNITED STATES PATENT OFFICE

1,993,664

BIVALVE ADAPTER

Sidney Hirsch, Cedarhurst, N. Y.

Application August 15, 1934, Serial No. 740,016

2 Claims. (Cl. 128—214)

This invention relates to instruments for transferring fluid either in the form of liquid or gas from one point to another, the same involving an arrangement of valves which may be termed

5 a bi-valve adapter as the construction permits a pair of valves to adapt themselves to the inflow and outflow of fluid.

An object of the present invention is to provide an improved instrument for transferring fluid

10 from one point to another quickly and in measured quantities.

A further object of the invention is to provide an instrument which is adapted to transfer fluid as, for instance, blood, from one person to another

15 sufficiently quickly not to allow any appreciable cooling of the blood, while at the same time providing means to actually gauge the amount of blood flowing from one person to another.

A still further object, more specifically, is to provide an instrument utilizing a pump, valve members and associated parts, whereby the fluid

20 may be drawn into the pump upon one stroke and then ejected from the pump out through a different path on the return stroke.

25 In the accompanying drawing—

Figure 1 is a sectional view through an instrument disclosing an embodiment of the invention, the needles being shown partly in elevation;

30 Figure 2 is an enlarged sectional view similar to the center part of the showing in Fig. 1, but with the valve members in section and illustrating how one valve is seated while the other is unseated;

35 Figure 3 is an end view on an enlarged scale of one of the valve members shown in Fig. 2;

40 Figure 4 is an elevation of the structure shown in Fig. 1, the same being on a reduced scale and illustrating how the device may be held in the hand, and also how the device measures the quantity of fluid which is being transferred.

Referring to the accompanying drawing by numeral, 1 indicates a pump which may be of any preferred or usual kind, the same being provided with a barrel 2, a plunger 3, and a tapering nozzle

45 4. On the barrel 2 there is provided graduation 5 indicating the volume of fluid drawn into the barrel 2. It will be understood that the pump 1 acts in the usual capacity, and that the plunger 3 is merely slid back and forth during the operation of the device. As the plunger moves outwardly, suction will be produced, and as it is

50 moved inwardly compression will be secured. The nozzle 4 fits into the socket 6 of the adapted 7, which adapter is provided with a nozzle 8 fitting

55 into the socket 9 of the body 10. It will be under-

stood that the nozzle 4 has a passageway extending entirely therethrough as is the case also with the adapter 7, said passageways being of substantially the same size. The body 10 may be of metal or other desired material having an outside configuration which may be easily grasped by the hand. As illustrated in Fig. 4, the body 10 is provided with concave sides 11 and 12 for receiving the thumb and second finger, the concave portion 13 for receiving the third finger and a flat portion 14 for receiving the first finger. While this shape is desirable as will be readily noted from Fig. 4, it is not essential and the exterior outline of the base can be formed of some other shape, if desired. However, interiorly there is provided a passageway 15 opening into the socket 9, said passageway dividing at point 16 into auxiliary passageways 17 and 18 which discharge into sockets 19 and 20. These sockets are of different sizes and the fittings 21 and 22 have bases 23 and 24 of different sizes so that they can never be interchanged. This is very desirable in many cases as, for instance, where there is a transfusion of blood. In a case of this kind the blood passes from the donor through the fitting 22 and passes out through the fitting 21 to the patient. These fittings are provided with a nozzle 25 and a nozzle 26 of identical construction, said nozzles being each provided with a raised portion or bead 27 so as to retain the respective rubber hose or tube 28 in place.

The hose 28 is provided with an adapter 29 which is identical with adapter 7. The adapter 29 accommodates the socket 30 of the needle 31, and likewise the rubber tube 28 is provided with an adapter 32 identical with adapter 7 and is positioned so as to accommodate the socket 33 of the needle 34.

From the above description it will be noted that the parts are in the position shown in Fig. 1 when the device is set for operation, and, upon outward movement of the plunger 3, fluid will be drawn in through the needle 34, tube 24, auxiliary passageway 18, passageway 15 and thence into the barrel 2. As long as the plunger 3 is moving outwardly the fluid will flow in the path just described. The moment that the plunger 3 is reversed, the fluid will stop flowing in the path just mentioned and will flow in a reverse direction from barrel 2, passageway 15, auxiliary passageway 17, fitting 21, tube 28 and thence out through the needle 31. In order to secure this action the valve members are arranged in the fittings 21 and 22 as clearly shown in Fig. 2. The fitting 21 is provided with a cylindrical bore 35 in which

valve member 36 is mounted, said valve member having a small stem 37 connecting two spiders 38 and 39. On the outer faces of the respective spiders are arranged valve heads 40 and 41. Head 41 is shown in Fig. 2 as resting against the seat 42 whereby the auxiliary passageway 17 is closed. The heads 40 and 41 are identical and so are the spiders 38 and 39, so that when the valve member 36 is inserted into bore 35 it is immaterial which end is inserted first. It will be observed also that there is provided a shoulder 43 whereby when the valve member 36 is moved outwardly it will strike shoulder 43 but the head 40 will be held out of contact with shoulder 44 whereby the fluid may freely pass from bore 35 out through the bore 21'. The fitting 22 is of a structure identical with fitting 21 except that it is larger so that there can be no mistake in placing it in the correct socket in body 10.

The valve seat 45 is next to passageway 22' instead of being next to passageway 18. By reason of this construction, when suction is produced by the pump 1, the valve member 46, which is identical with valve member 36, will move away from its seat as shown in Fig. 2, and valve member 36 will move against its seat. When pump 1 produces pressure in the auxiliary passageways 17 and 18, valve member 46 will quickly move against the seat 45 and valve member 36 will move away from its seat so as to allow the fluid to pass out through fitting 21. These valve members in a full sized device are very small and comparatively light, though they are preferably made from metal. By reason of this fact they will quickly move from one position to the other as the plunger 3 shifts its direction of movement, and, consequently, when the device is used for the transfusion of blood the blood may be quickly drawn from one person and quickly ejected into the other person.

When the device is used for removing pus from the lungs or for any other purpose, the action is the same, namely, the matter being shifted from one point to another is drawn in through needle 34 and discharged out through needle 31.

It will be evident that under certain circumstances the tubes 28 and 29 could be eliminated and the needles applied directly to the fittings 21 and 22, as shown in Fig. 4. Also, if desired, the tubes could be used and the needles eliminated according to the particular use to which the device is put. However, in all of these different adjustments or different uses the parts function in the same manner. It is also to be noted that the fittings 7, 29 and 32 may be interchanged as they are all of the same size and the same construction. It will also be noted that the valve members 36 in both valves are formed identical in size and

shape so that they may be readily interchanged at any time. By reason of this structure either valve member may be placed in either of the valves with either end innermost, thus obviating the possibility of a mistake being made.

I claim:—

1. An instrument of the character described, comprising a solid body having a main passageway extending inwardly from one end for part of the length of the body, a pair of auxiliary passageways extending from the other end of said main passageway, said auxiliary passageways merging into sockets, and a valve structure removably mounted in each of said sockets, each of said valve structures having an annular thumb grip and a tapering portion, said tapering portion fitting into said socket, said socket being of a size and shape to receive said tapering portion of the valve structure, said valve structure having a bore extending from one end inwardly and a reciprocating valve member arranged in each bore, said valve structures being formed to present check valves positioned so that one prevents the entrance of anything into one of said auxiliary passageways but allows fluid matter to be expelled therefrom, while the other acts in an opposite manner, and a pump connected to said main passageway for drawing fluid through one of said valve structures and expelling the same through the other valve structure.

2. An instrument of the character described, comprising a body having a main passageway extending inwardly from one end, a pair of auxiliary passageways extending from the inner end of said main passageway, a socket merging into each of said auxiliary passageways, said sockets being of different sizes, a valve structure removably mounted in each of said sockets, each of said valve structures having a tapered portion fitting into said socket, said socket being of a size and shape to receive said tapered portion of the valve structure, said valve structure having a bore extending from one end inwardly, and a reciprocating valve member arranged in each bore, said valve members being formed to present check valves positioned so that one prevents the entrance of anything into one of said auxiliary passageways but allows fluid matter to be expelled therefrom, while the other acts in an opposite manner, said valve structures being of different sizes so as to respectively fit into the different sockets with the same valve always fitting into the same socket whereby the valve structure acting as an outlet check valve cannot be fitted into the socket intended for the valve structure acting as an inlet valve.

SIDNEY HIRSCH.