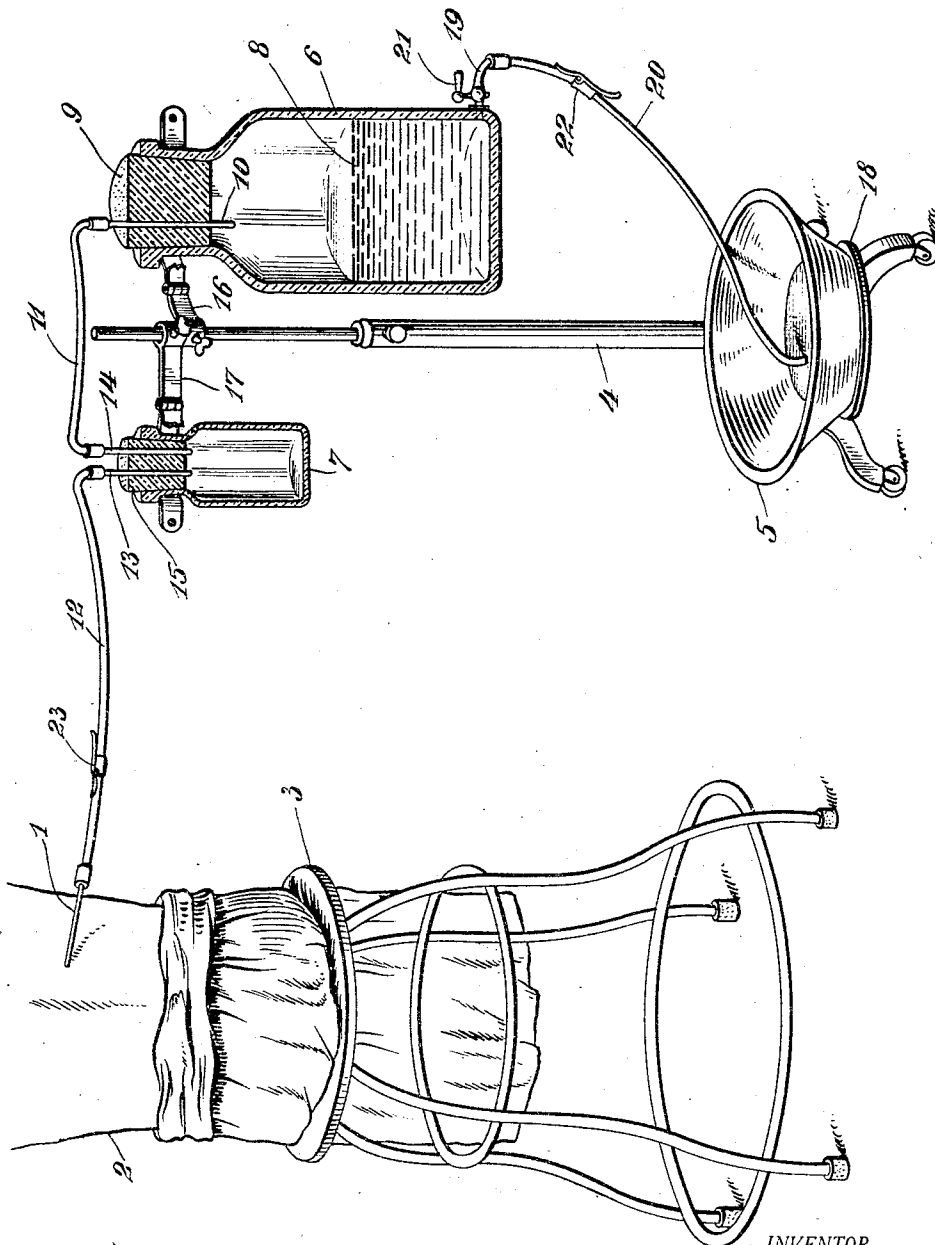


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 APPARATUS FOR THORACENTESIS.
 APPLICATION FILED DEC. 10, 1917.

1,284,630.

Patented Nov. 12, 1918.



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APPARATUS FOR THORACENTESIS.

1,284,630.

Specification of Letters Patent.

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Application filed December 10, 1917. Serial No. 206,358.

To all whom it may concern:

Be it known that I, JOSEPH FELSEN, a citizen of the United States, and a resident of New York city, county and State of New York, have invented certain new and useful Improvements in Apparatus for Thoracentesis, set forth in the following specification.

This invention relates to the practice of thoracentesis and other evacuations of cavities of the human body other than those of the thorax. Heretofore, in drawing off the accumulated fluid from the pleural region in cases of pleurisy, it has been customary to employ more or less complicated aspirating apparatus to produce a vacuum, for a trocar employed to penetrate the cavity in which fluid is accumulated.

The object of the present invention is to devise a simple apparatus capable of manipulation by a single operator and extremely simple in all respects.

The above and further detailed advantages of the invention will be apparent from the illustrative embodiment set forth in the accompanying specification, in connection with the accompanying drawings which form a part hereof.

In the drawings the single figure is a diagrammatic representation of an illustrative embodiment of suitable apparatus in practice.

The apparatus is shown suitably arranged for a thoracentesis operation. As is customary in the practice of this operation, the hollow needle or trocar 1 has been caused to enter the pleural cavity of the patient 2 through the lateral rear of the sixth intercostal space, while the patient and the cavity to be evacuated are suitably elevated as by positioning upon the support 3.

A standard 4 supports a discharge receptacle 5, a liquid-reservoir 6 and a sample bottle 7, so that the same may independently be adjusted as to their elevation relatively to the patient 2. The reservoir 6 contains any suitable heavy liquid 8, such as water, filling the same to a suitable extent, about one-half the capacity of the reservoir being satisfactory, and it being preferred that the capacity of the reservoir approximate one quart. The reservoir 6 may be opened and closed at will through means of the removable stopper 9, which forms an hermetical closure. Means in any suitable form, which may comprise the glass tube 10 and flexible

ducts 11 and 12, connect the interior of the reservoir 6 with the trocar 1. This connection may be direct, if desired, in which case the duct 12 directly connects with the glass tube 10, but it is preferred that the sample bottle 7 be connected between the trocar 1 and the reservoir 6, which may be accomplished through the medium of the glass tubes 13 and 14, entering the sample bottle 7 through the hermetically closing stopper 15. The reservoir 6 and the bottle 7 are shown adjustably supported by arms 16 and 17, adjustably gripping the standard 4. In a similar manner the discharge pan 5 may be mounted on a platform 18 adjustably secured to the standard 4 in any suitable manner as by a bracket mounted on the standard 4 as the arm 17 is mounted on the standard. In its preferred form the reservoir 6 has a discharge tap 19, below the level of the liquid 8, which is connected by means of a dependent duct 20 with the discharge pan 5. Discharge through the duct 20 may be controlled by the valve 21 or by a clamp 22 directly upon the flexible duct 20, as may be desired. In a similar manner more direct control of the vacuum applied to the trocar 1 may be had through the medium of a clamp such as the clamp 23.

Operation.

If desired, all the parts may be sterilized. It has been found actually necessary, however, to sterilize only the trocar and the parts leading to but not including the reservoir 6. The reservoir 6 is filled with liquid in sufficient quantity to insure its maintenance in the reservoir 6 until liquid evacuated from the human body shall commence to flow into this reservoir, after which time the liquid within the reservoir 6 is, of course, self-maintaining. The relative vertical positioning of the reservoir 6 and the discharge pan 5 determines the maximum degree of initial vacuum which may be applied to the trocar 1 and is of course equal to the weight of the column of water between the top of the liquid in the reservoir 1 and the liquid level in the pan 5. By adjusting the position of the reservoir 6 relatively to the human cavity to be evacuated, the effective operating vacuum may be made either greater or less than the initial vacuum available at the opening in the trocar. For example, if the mouth of the glass tube 10 is

below the human cavity to be evacuated, the initial vacuum is increased by the weight of the column of water in the duct between the mouth of the tube 10 and the operating
5 end of the trocar.

The capacity of the sample bottle 7 may be small or large, as desired. If small, part of the fluid, usually from one to three pints, is removed from the human body, passes
10 through the sample bottle 7 into the reservoir 6 and is therefore hydraulically employed to continue the production of the vacuum by discharge through the dependent duct 20. By controlling the rate of discharge
15 through the dependent duct 20 by manipulating the valve 21, any desired degree of vacuum may be maintained. In the event that an instantaneous cessation of the evacuation be necessary, this may be accomplished
20 by closing the pinch clamp 23. The empty space above the liquid in the reservoir 6 insures regularity in the operation of the apparatus through the elasticity of the air remaining therein, so that the operation of

the apparatus is uniform and, at the same 25 time, easily regulated.

What is claimed, and what is desired to be secured by United States Letters Patent is:—

Apparatus for removing fluid from cavities of the human body comprising a trocar; a hermetically closable liquid reservoir adapted to contain a partial filling of liquid and an air space above the level of said filling, a flexible duct connecting said trocar
30 with said reservoir above the level of said filling of liquid; means comprising a dependent duct of adjustable effective vertical extent for permitting the gravity discharge of liquid from said reservoir; and means
35 for adjusting the elevation of said reservoir relatively to the discharge end of said dependent duct and to the operating elevation of said trocar.

In testimony whereof I have signed my 45 name to this specification, this 8th day of November, 1917.

JOSEPH FELSEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."