(No Model.) 2 Sheets—Sheet 1.

E. E. ALLEN.

INSTRUMENT FOR TRANSFUSION OF BLOOD.

No. 365,327. Patented June 21, 1887.

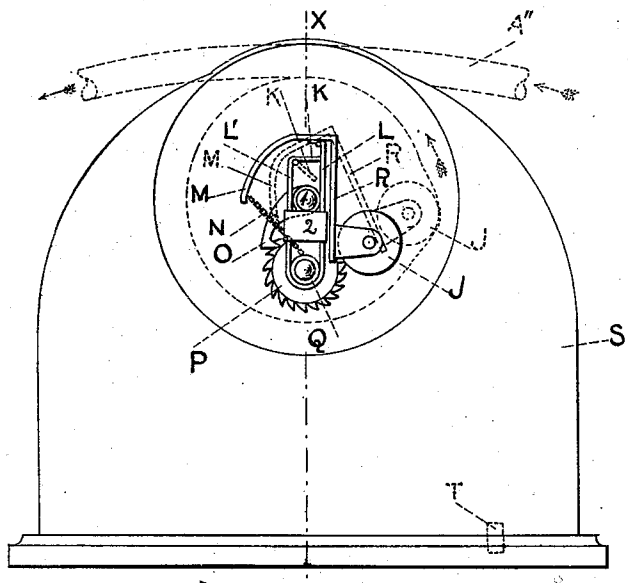


FIG. 1.

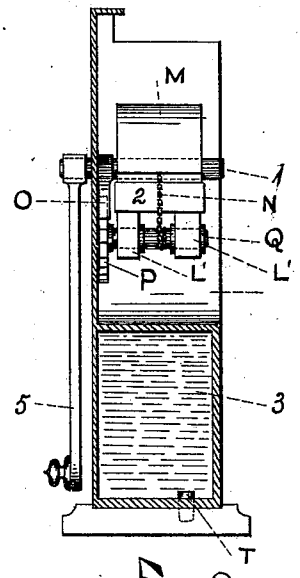


FIG. 2.

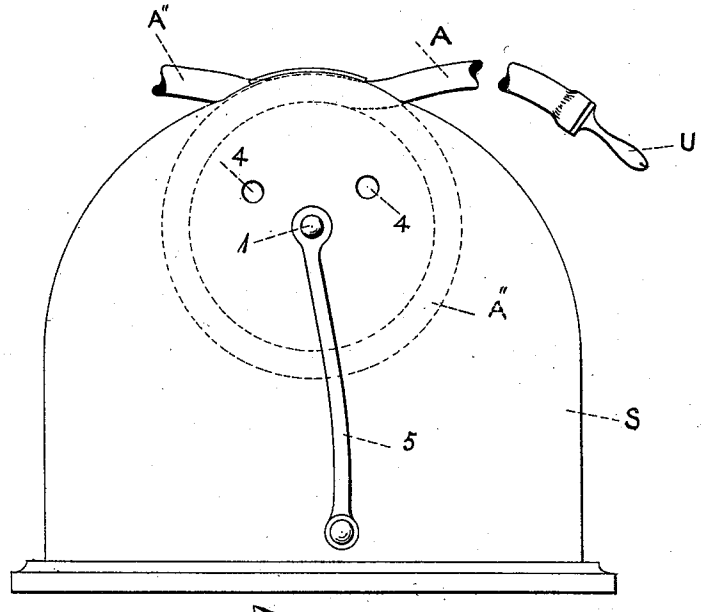


FIG. 3.

Witnesses
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Edward B. Escott

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(No Model.) 2 Sheets—Sheet 2.

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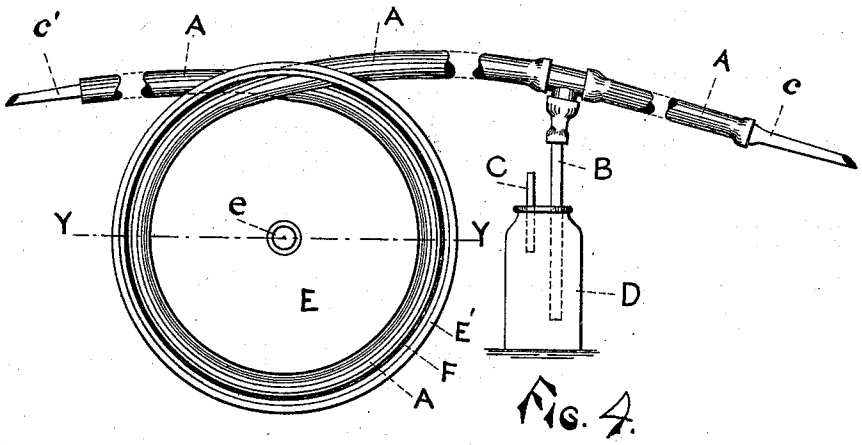


Fig. 4.

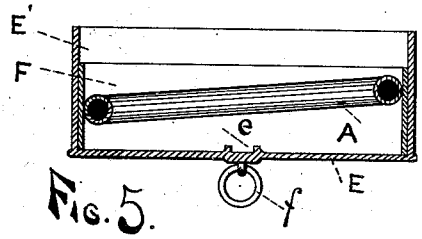


Fig. 5.

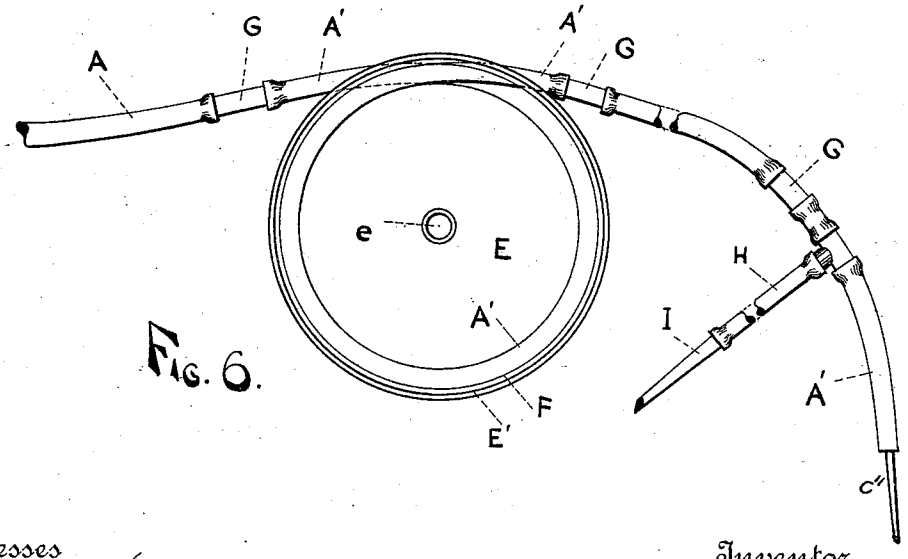


Fig. 6.

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UNITED STATES PATENT OFFICE.

EUGENE E. ALLEN, OF GRAND RAPIDS, MICHIGAN.

INSTRUMENT FOR TRANSFUSION OF BLOOD.

SPECIFICATION forming part of Letters Patent No. 365,327, dated June 21, 1887.

Application filed April 29, 1886. Serial No. 200,617. (No model.)

To all whom it may concern:

Be it known that I, EUGENE E. ALLEN, a citizen of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Instruments for the Transfusion of Blood and other Purposes, hereinafter fully set forth.

My invention relates to certain improvements on the device patented to me by Letters Patent dated November 8, 1881, and numbered 249,285; and it consists of an elastic tube arranged within a cylindrical case, in combination with suitable mechanism to cause a continuous and uninterrupted flow of fluid or liquid through such tube in either direction, said device being adapted to the transfusion of blood, also to use as an aspirator or stomach-pump, as fully described herein.

The objects of my invention are accomplished by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a rear view of the case with the cap removed, in order to show the working parts of the device. Fig. 2 is a vertical sectional view of the case on line *x x* of Fig. 1, showing a side view of the actuating mechanism in position within the case. Fig. 3 is a front view of the case closed. Fig. 4 is an elevation of the cylindrical cap with the elastic tube in place within it. Fig. 5 is a sectional view of the cap on line *y y* of Fig. 4, and Fig. 6 is also an elevation of the cylindrical cap with elastic aspirator-tube in place.

Similar letters refer to similar parts throughout the several views.

The construction of this device when used as a blood-transfuser, an aspirator, or a stomach-pump is the same, excepting larger tubes are used as an aspirator or a pump.

A is the small elastic tube used when my device is in operation in transfusing blood; A′, the elastic tube used in connection with my device as an aspirator, and A″ the tube used in connection with my device as a stomach-pump.

B is a branch tube used in connection with the device, connecting the main tube with the receiver when my device is in operation as a blood-transfuser.

C is a vent in the receiver D.

E is the outer face or disk of the cylindrical cap; E′, the cylindrical side of the cap; F, a leather or other coating for the inner surface of the cylinder E′, to which the elastic tube is firmly attached. The cap used by me is made of metal, and the inner lining is leather; but the material of the cap is immaterial, as long as it is of a substance suitable for holding the tube securely in place. In the aspirator-tube I use short glass connecting-tubes G G, in order to examine the motion of the material or substance which passes through the tube.

H is a branch tube on the aspirator, which I use in connection with a liquid-receiver for cleansing the tube.

I is a cannula for insertion into a fluid, and is used in connection with the aspirator-tube A′. The elastic tube is placed within the cap in the form shown in the drawings and securely attached therein, so that it may be operated upon by the rollers or roller, as hereinafter set forth. The roller J is attached to an arm on one end of the bent lever R M, so as to turn freely. The bent lever is fulcrumed upon the upper end of spring L, as shown in Fig. 1.

L and L′ are springs for holding the roller in contact with the elastic tube when the device is in operation.

K is a brace hinged to the upper end of L′, so as to be raised to the position shown by the solid line in Fig. 1, and to be lowered to the position shown by dotted lines in the same figure. The springs L and L′ may be bound together by the clasp 2, as shown.

1 is a standard, one end of which is journaled in the front of the case, and the other end in the journal-box *e* of the cap. The springs L and L′ are rigidly attached to this shaft, and together with the other connected parts are revolved with it.

P is a ratchet-wheel rigidly attached to the axle Q, and O is a dog which engages with the notches on the ratchet-wheel.

N is a chain or cord attached to the end of the bent lever R M and to the axle Q. The function of the chain N and ratchet-wheel axle and dog is to adjust the roller J to and from the elastic tube.

S is a case and hot-water reservoir, which supports the cylindrical cap and nearly surrounds it, as shown in Fig. 1.

3 in Fig. 2 shows the water in the case. At

the bottom of the case is an opening provided with a cork, T. The object of this reservoir is to receive hot water, in order to prevent the blood in the tube from becoming cool while passing from the person supplying the blood to the patient.

4 4 are the key-holes for the key that winds the chain N upon the axle Q; and 5 is the crank for operating the roller J. When a moderate pressure is required upon the tube, the brace K is turned down, as shown by dotted lines in Fig. 1, when the roller receives the strength of the spring L alone; but when greater pressure is required the brace K is raised so that it is in contact with the spring L, when the roller receives through the bent lever the strength of both the springs L L'. In using the smaller tubes the pressure exerted by one of the springs is sufficient; but in using the larger tubes the pressure of both springs is required.

As the elastic tubes are attached to the cylindrical tube for convenience, I have a cap for each separate tube and place the cap with the tube into the case for use. *c c'* are cannulas on blood-transfuser tube, and C″ a cannula on the aspirator-tube.

The operation of my invention, when used as a blood-transfuser, is as follows: First, fill the reservoir with water at a temperature of about 110° Fahrenheit. Place the cap, with the elastic tube in position, within the case and fill the tube with a weak solution of salt-water and the receiver half-full of the same solution. Bring the roller to bear upon the tube, so as to give it sufficient pressure. Place a clamp over the main tube below bifurcation. Insert cannula *c* in the vein of the patient, and cannula *c'* in the vein of the subject (furnishing healthy blood) without removing clamp from main tube. Turn crank until pure blood flows into receiver. Then transfer clamp to the branch tube without arresting motion of crank. The blood now passes into the vein of the patient at the rate of one ounce for every twenty revolutions of the crank, being measured with mathematical accuracy.

In using my invention as an aspirator the cannula C″ is inserted into the pus-sack, a clamp put upon branch tube H and the contents of the sack drawn out. The glass connecting-tubes G G allow the operator to see the motion of the matter removed. After the removal of the pus place the clamp on the main tube between the branch tube H and the cannula C″ and thoroughly rinse the tube with water. Then change the clamp to the branch tube and wash out the pus-sack. After this shall have been done the tube can again be cleaned and medicated fluid introduced into the sack. The use of my device as a stomach-pump will be obvious to any person familiar with the use of pumps, and need not be described.

Having thus described my invention, what I claim to have invented, and desire to secure by Letters Patent, is—

1. A cylindrical cap, with an elastic tube coiled within the said cap, a roller to produce moving pressure upon said tube, and mechanism for operating said roller, substantially as described.

2. In an instrument for the transfusion of blood, the cylindrical cap, the elastic tube coiled within the cap, the roll adapted to press upon the tube and give a continuous forward pressure, and the lever M R, with suitable mechanism for adjusting the roller for greater or less pressure upon the elastic tube, substantially as described.

3. The combination, with the cylindrical cap and inclosed elastic tube, of a hot-water reservoir supporting and nearly surrounding said cap, substantially as and for the purpose set forth.

4. The combination, as herein set forth, of the elastic tube coiled within the cylindrical cap and provided with the glass connecting tube or tubes, one or more, the roll, and the mechanism for operating said roll, substantially as described.

5. The following parts in combination, viz: the cylindrical cap, the elastic tube coiled within the cap, the roller adapted to produce the moving pressure upon the tube, the springs for regulating the pressure, the brace for connecting and disconnecting the spring, the center standard for supporting the springs, and the ratchet-wheel and dog and axle with chain for adjusting the roll to the elastic tube, substantially as described.

EUGENE E. ALLEN.

Witnesses:
GEORGE CLAPPERTON,
EDWARD TAGGART.