

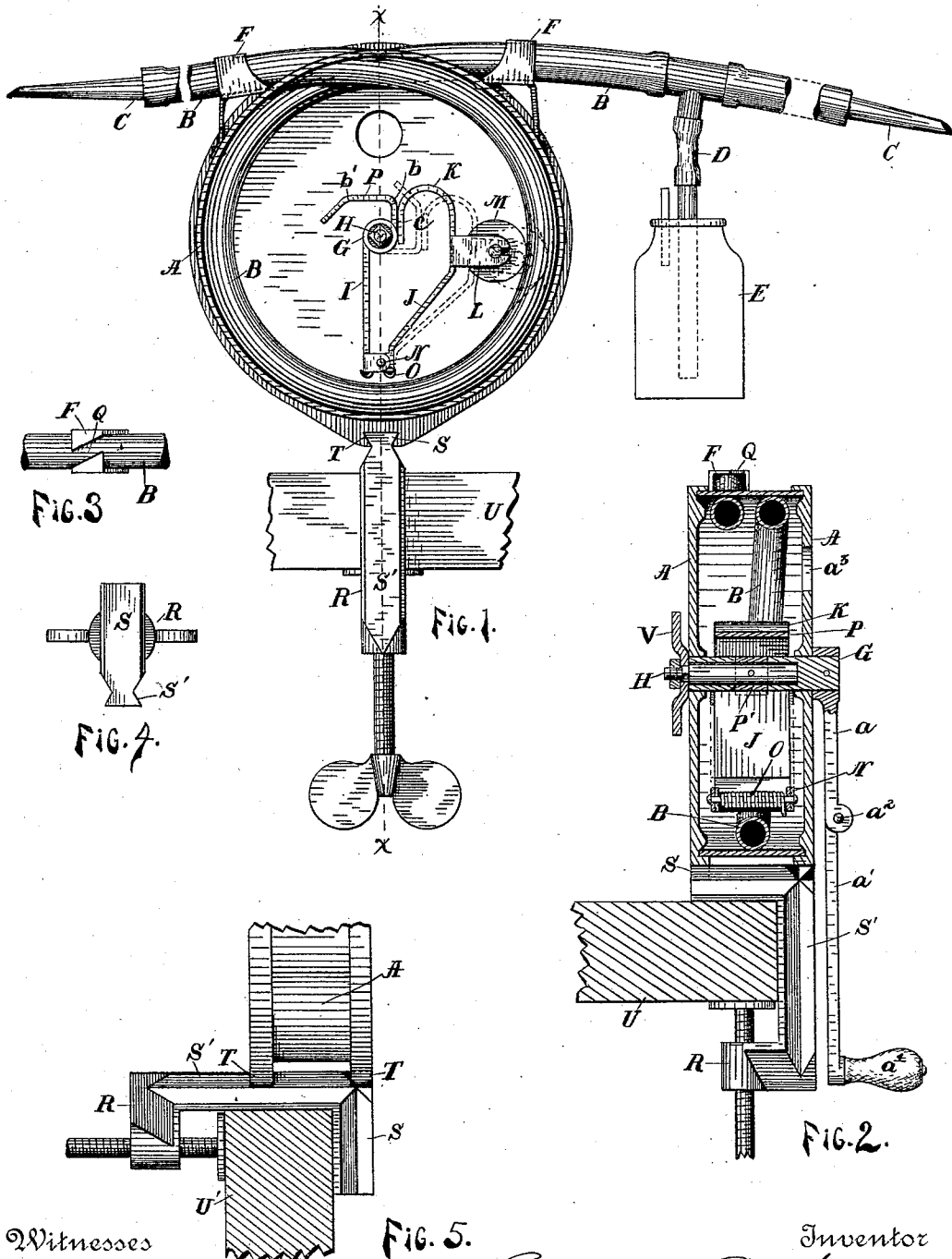
(No Model.)

E. E. ALLEN.

INSTRUMENT FOR THE TRANSFUSION OF BLOOD.

No. 424,944.

Patented Apr. 8, 1890.



Witnesses

J. A. Rutledge
Geo. H. Rea

FIG. 5.

Inventor

Engineer Allen
By his Attorney
Edward Taggart

UNITED STATES PATENT OFFICE.

EUGENE EDWARD ALLEN, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO
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INSTRUMENT FOR THE TRANSFUSION OF BLOOD.

SPECIFICATION forming part of Letters Patent No. 424,944, dated April 8, 1890.

Application filed February 8, 1889. Renewed November 20, 1889. Serial No. 331,028. (No model.)

To all whom it may concern:

Be it known that I, EUGENE EDWARD ALLEN, of Grand Rapids, Michigan, have invented a new and useful Improvement in Instruments for the Transfusion of Blood, of which the following is a specification.

My invention relates to certain improvements on the device patented to me by Letters Patent of the United States, dated June 21, 1887, and numbered 365,227; and it consists in a novel method of applying the pressure-roller to the elastic tube and in novel devices for fastening the machine to a table or bed rail or other article of furniture.

The objects of my invention are to increase the efficiency and to simplify the construction of my former invention in machines for the transfusion of blood and other purposes. These objects may be accomplished by the present invention, an embodiment of which is illustrated in the accompanying drawings, in which—

Figure 1 is a rear elevation of the apparatus attached to a table's edge, the cylindrical cap having been removed for the purpose of illustrating the internal arrangements of the mechanism, the parts being illustrated in full lines in such position as that the pressure of the roller upon the tube is released, and in dotted lines in the position for exerting pressure. Fig. 2 is a sectional view on line *xx* of Fig. 1. Fig. 3 is a plan view of one of the outside tube-holders with a portion of the tube clasped within it. Fig. 4 is a plan view of the supporting-standard. Fig. 5 is a view of the standard placed in a horizontal position and attached to a perpendicular body like a bed-rail.

Similar letters refer to similar parts throughout the several views.

A is a cylindrical case of any suitable size.

B is an elastic tube coiled within the case and passing out through the case, its ends lapping by each other, as shown in Figs. 1 and 2. Attached to the outer side of the case are two supporting-clasps, (shown at F F,) for supporting and holding in place the elastic tube.

D is a branch tube used to connect the main tube with the receiver E.

Within the case is the arbor G, one end of which is journaled in the front plate and the other end in the back plate, as shown in Fig. 2. Connected to the arbor G at one end, so as to be outside of the case, is a crank composed of the two parts *aa'*, hinged together at *a²*, so as to be capable of being folded upon itself, thereby allowing the knob *a⁴* of the part *a'* of the crank to enter an opening *a³* in the case, which thus renders the device compact and locks the parts against movement.

Attached to the arbor G and extending laterally therefrom is the bar I, to the opposite extremity of which is hinged the bar J, which is in turn connected with the roller-carriage L for the roller M. Beyond the carriage L the arm J is prolonged into the curved spring-piece K, which curves inward and backward, as shown in Fig. 1, so that its extremity rests against the arbor G when the pressure of the roller upon the tube is released. A coil-spring O is provided at the hinge between the bars I and J, which coil-spring has a tendency to hold the piece E in contact with the arbor G.

Now, it will be observed that when the parts already described are in the position shown in full lines in Fig. 1, by turning the handle *a* the arbor will be turned, and with it the bar I, fixed thereon, and the bar J, hinged thereto, so as to move the roller and roller-carriage in its orbit around the arbor without producing any substantial compression of the tube.

For the purpose of causing the roller to compress the tube the following mechanism is provided: The arbor G is chambered concentrically, and within this chamber is placed a supplemental arbor H, capable of turning within the arbor G and projecting outside of the case A on the opposite side to that upon which the crank is located. A thumb-piece V is fixed upon the outer end of the arbor H for turning the same. An arm P is fixed upon the arbor H and projects laterally from the same out through the arbor G, which is slotted for that purpose. The slot through the arbor G extends sufficiently far around to admit of the arm P being moved from the position shown in full lines, Fig. 1, to the position shown in dotted lines without turning the arbor G. The slot is also located at the point

at which the curved portion K rests upon the arbor, and the arm P and curved part K are therefore in position to act upon one another.

When the tube is not compressed, as shown in full lines, Fig. 1, the arm P is not in use. When, however, the arm P is moved from the position shown in full lines, Fig. 1, to the position shown in dotted lines, the movement causes that portion of the arm P which is lettered *b* to act as a link or prop between the arbor and the extremity *c* of the curved piece K. As soon as this movement has advanced far enough so that the extremity *c* has passed over the shoulder formed at the extremity of the prop *b*, the extremity *c* will rest upon the part *b'* of the arm P, in which position the part *b'* acts as a stop to prevent further movement of the arm P unless by pressure exerted through the arbor H. At the same time the arm P is stopped against any return movement, because the radial line passing through the arbor and the extremity of the link *b* has passed slightly beyond the line of pressure, so that any return movement, as well as any forward movement, will tend to increase the compression of the elastic tube A.

The force of the pump is determined by the amount of pressure on the tube.

The arm J and curved piece K are constructed so as to constitute a spring between the cam and the roller, whereby the roller may yield slightly to inequalities in the thickness of the tube or irregularities in the curve of the cylindrical case, not sufficiently elastic, however, to allow the roller to yield so as to permit the tube to open.

P consists substantially of the combination of an arm or prop *b* and a stop *b'*, which in the form I prefer, as shown, constitutes practically a cam pivoted in the center of the coiled tube and having its bearing-surface so constructed as to thrust outward and lock the extremity *c*, so that the roller is held against inward radial movement, which would tend to produce variations in the force of the pump.

In practical use it is found desirable, in order to preserve the elasticity of the elastic tube, to entirely relieve it from the pressure when not in use, and to have a simple device whereby the pressure may be applied in different degrees. All this is provided by the construction just described.

The tube-holders F F, I provide with oblique slots, one of which is shown at Q in Fig. 3. This will enable the operator to quickly apply the tube to the case and to remove it therefrom.

At one side of the cylindrical case, which I call the "bottom" of the case, I provide a dovetailed groove, which is shown in Fig. 1 at T. I also provide a clamp having two sides at right angles, provided with a male dovetail, as shown by SS'. The clamp has an ear for the third side, (shown at R,) through which works a screw-bolt of the ordinary form. At the end of the screw-bolt is a fin-

ger-grasp. A washer may be provided, as shown in Fig. 2.

U represents the edge of the table, and Fig. 1 shows the machine attached thereto.

U' in Fig. 5 represents a perpendicular body, like a bed-rail, to which the machine is represented as attached.

I do not limit myself to the form of mechanism by which the roller is supported and moved in its orbit; nor do I limit myself to the form of arm whereby the adjustment of the pressure is controlled or the manner in which said arm is mounted, since I am aware that in details the mechanism may be largely modified without departing from the principle of my invention.

I claim—

1. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with the roller and mechanism for supporting the roller and causing the same to move in its orbit, of a hand-piece whereby said mechanism is actuated, an arm independent of the roller-support, arranged to thrust the roller against the tube, and a second hand-piece operating independently of the first, whereby said arm is set in position to produce the required pressure, substantially as described.

2. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with the roller and the arbor about which it moves, of an arm projecting laterally from the arbor, a second arm connected with the first at one end and carrying on its opposite end the roller, and a third arm interposed between the arbor and roller, whereby the roller is forced to compress the tube, substantially as described.

3. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with the roller and mechanism for supporting the roller and causing the same to move in its orbit, of an arm whereby the roller is forced to compress the tube, and a stop arranged to arrest the motion of the arm when it has moved slightly beyond the line of pressure exerted against it by the roller, substantially as described.

4. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with a roller and mechanism for supporting the roller and causing the same to move on its orbit, of an arm independent of the roller-support, arranged to thrust the roller against the tube, and a spring whereby the thrust is made yielding, substantially as described.

5. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with the roller and mechanism for supporting the roller and causing the same to move in its orbit, of an independent cam formed with a surface adapted to thrust outward and lock, substantially as described, whereby the cam is locked against

forward or backward adjustment, both while the pump is in operation and at rest, substantially as described.

6. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with the roller, of actuating mechanism for moving the roller in its orbit, radial actuating mechanism, and two arbors, upon one of which the first actuating mechanism is fixed and upon the other of which the radial actuating mechanism is fixed, one of said arbors being chambered within the other, substantially as described.

7. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with the roller, of an arbor mechanism connecting the same with the roller to carry the latter around its orbit, a second arbor carried by the first arbor, and an arm secured to the second arbor, whereby the roller is thrust outward against the tube, substantially as described.

8. In a surgical pump operated by the traveling pressure of a roller upon an elastic tube coiled within a cylindrical case, the combination, with the roller, of actuating mechanism for moving the roller in its orbit, radial actuating mechanism, two connected arbors, each projecting through an end of the case, upon one of which the first actuating mechanism is fixed and upon the other of which the radial actuating mechanism is fixed, and means by which each of said arbors may be turned from outside the case, substantially as described.

9. The combination of a cylindrical case provided with an elastic tube coiled within said case, a roller adapted to press upon said elastic tube, a spring adapted to exert force upon said roller, and a cam adapted to operate upon the spring, whereby the pressure is applied to and removed from the elastic tube within the case, substantially as described.

10. The following parts in combination, viz: the elastic tube coiled within the case, the roller M, the arms J K, hinge N, spring O, arm I, arbor H, and arm P, all substantially as described.

11. In combination with the case A, an elastic tube coiled within the case, with its ends crossing each other and projecting through the case, and supporters F F upon the outside of the case, adapted to clasp and support the tube, substantially as described.

12. In a surgical pump operated by the traveling pressure of a roller upon a coiled elastic tube, the combination, with the roller and the arbor about which it moves in its orbit, and the case containing the coiled tube, of a jointed handle secured to the arbor outside of the case, the said case being provided with an opening to receive the knob of the handle when folded, substantially as set forth.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

EUGENE EDWARD ALLEN. [L. s.]

Witnesses:

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