(No Model.)

J. A. HOWELL.

ARTIFICIAL LEECH.

No. 391,414. Patented Oct. 23, 1888.

Fig. 1.

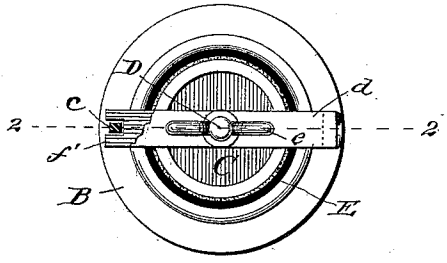


Fig. 2.

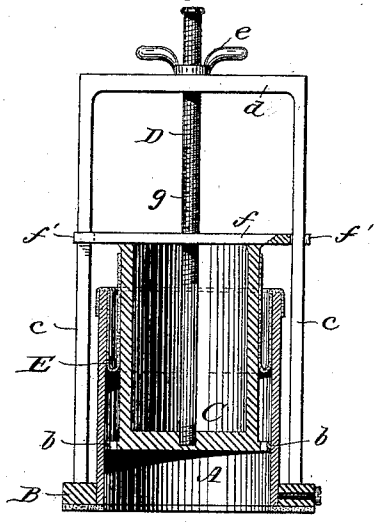


Fig. 3.

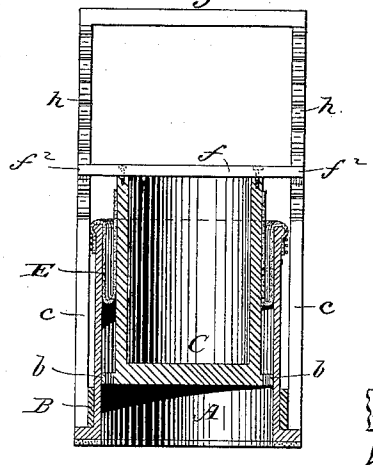
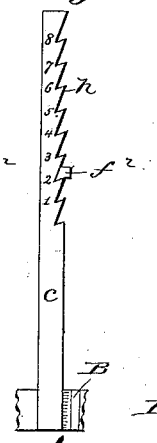


Fig. 4.



Witnesses:

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E. F. Dick.

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John A. Howell.

by Marcellus Bailey,

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UNITED STATES PATENT OFFICE.

JOHN A. HOWELL, OF WASHINGTON, DISTRICT OF COLUMBIA.

ARTIFICIAL LEECH.

SPECIFICATION forming part of Letters Patent No. 391,414, dated October 23, 1888.

Application filed April 20, 1885. Serial No. 162,834. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. HOWELL, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Artificial Leeches, of which the following is a specification.

Artificial leeches as ordinarily constructed have but small power of suction, due only to the elastic dilation of a previously-squeezed rubber bulb or to the expulsion of the air by means of heated ether or other highly-volatile fluid. In some cases the leech has been provided with an air-pump attachment; but such an arrangement is expensive, complicated, and inconvenient, and in all cases it is difficult to ascertain definitely the degree of suction or exhaustion.

It is the object of my invention to produce an artificial leech which shall be free from these objections, to which end I have devised an artificial leech comprising in combination the following instrumentalities, viz: a cylinder provided with a mouth to fit over and around the part to which suction is to be applied, a piston or plunger movable within said cylinder and of a length at least equal to the range of movement it is to have, a pliable sleeve of air-tight material—such, for instance, as rubber—of a length at least equal to the range of movement of the piston, one end of said sleeve being fastened air-tight to the cylinder and the other end fastened in a similar way to the piston, and space being left between the piston and the cylinder in which the folds of the sleeve may lie, and, finally, means by which the piston can be maintained in retracted or drawn-out position, these means being preferably so arranged and organized that they will maintain the piston in varied retracted position.

In the accompanying drawings, Figure 1 is a plan, and Fig. 2 is a vertical central section, of an artificial leech embodying my invention. Fig. 3 is a vertical central section of a modified form of the device, and Fig. 4 is a side elevation of one of the ratchet standards or bars of said modification.

In Figs. 1 and 2, A is a cylinder, preferably of glass to permit the operation of the leech to be watched. Its mouth is provided with a facing of rubber or other smooth material, which also faces the under part of the ring B, which is fastened in place around the mouth and is designed to support the frame by which the piston is held in retracted position. The object of the rubber facing is to insure that the mouth of the cylinder shall fit tightly over the part to which it is applied. Within the cylinder is the loosely-fitting long piston or plunger C, closed at its base and provided at that point with side lugs, *b*, which guide it in its movements in the cylinder. The supporting-frame for the piston consists of side standards, *c*, and a cross-bar, *d*, through which passes the upper end of a screw-threaded stem or handle, D, which is fastened to the base of the plunger or piston C, and has upon it a thumb-nut, *e*, that rests upon top of the cross-bar *d*. A cross-head, *f*, attached to the open top of the piston, has projecting forked ends *f'*, which straddle the standards *c*, and thus serve as additional guides to the piston in its movements. The annular space between the piston and external cylinder is of sufficient width to admit freely at least two thicknesses of the pliable air-tight sleeve E. This sleeve, which preferably is made of rubber, is of a length at least equal to the range of movement of the piston. One end of it is secured air-tight to the top of the cylinder and the other end is secured in a like way to the upper end of the piston, and the portion of said sleeve intermediate between its two fastened ends is folded down into the space between the piston and cylinder, lying in part against the inside wall of the cylinder and in part against the exterior surface of the piston, the arrangement being such that when the piston is moved said sleeve, in proportion as it rolls off from the cylinder, will roll onto the piston, and vice versa. In the position of parts shown in the drawings the piston is represented as partly raised, thus inducing a partial vacuum in the cylinder. Suppose the mouth of the latter to be fitted tightly over the part to which suction is to be applied. Under these conditions the external air-pressure will keep the two folds of the pliable sleeve separate from one another and press them tightly against the walls of the cylinder and piston, respectively,

thus insuring the air-tight closure, which is indispensable to the efficiency of the leech, without in any way interfering with the free movement of the piston. The stem D can be lifted by hand as far as convenient, and then the thumb-nut can be turned down to rest on the cross-bar, and any subsequent lifting of the piston to attain a higher degree of suction can be effected by turning the thumb-nut in the proper direction. A scale can be marked upon the stem D (represented at *g*) to indicate the degree of exhaustion or vacuum within the cylinder.

For many reasons I prefer to use a sleeve made of rubber or other material, which not only is pliable, but is elastic as well. Such a material is more efficient in action, more readily applied, and secures a tighter joint between the parts, the slight expansion to which it is subjected by reason of the external air-pressure upon its fold resulting only in more closely sealing the parts against entrance of air.

The general arrangement of parts in Figs. 3 and 4 is similar to that in the figures already described, the difference being that I dispense with the screw-stem and thumb-nut, and in lieu thereof form a series of ratchet-teeth, *h*, in the vertical standards *c* and form the ends f^2 of the cross-head *f*, that is attached to the open top of the piston, in such a way that they will take into these ratchets. Thus by taking hold of the cross-head the piston can be drawn up by hand, and when raised to the desired height a slight lateral movement of the cross-head toward the standards will suffice to engage its ends f^2 with the ratchet-teeth which may be opposite to them. A scale can be marked on the sides of the standards, as represented in Fig. 4, to indicate the degree of vacuum attained at each tooth.

Various other ways manifestly may be employed by which the piston can be drawn out and held in that position, and I do not, therefore, restrict myself to the special details herein described and shown in illustration of my invention; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the leeching-cylinder, the piston, the pliable air-tight sleeve uniting the same, and means, substantially as described, for maintaining the piston in retracted or drawn-out position, subtantially as and for the purposes hereinbefore set forth.

2. The combination of the leeching-cylinder, the piston, the pliable air-tight sleeve uniting the same, means, substantially as described, for maintaining the piston in varied retracted position, and a scale indicative of the degree of suction obtained, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 17th day of April, 1885.

JOHN A. HOWELL.

Witnesses:
WOODBURY BLAIR,
FREDERICK H. PAINE.