

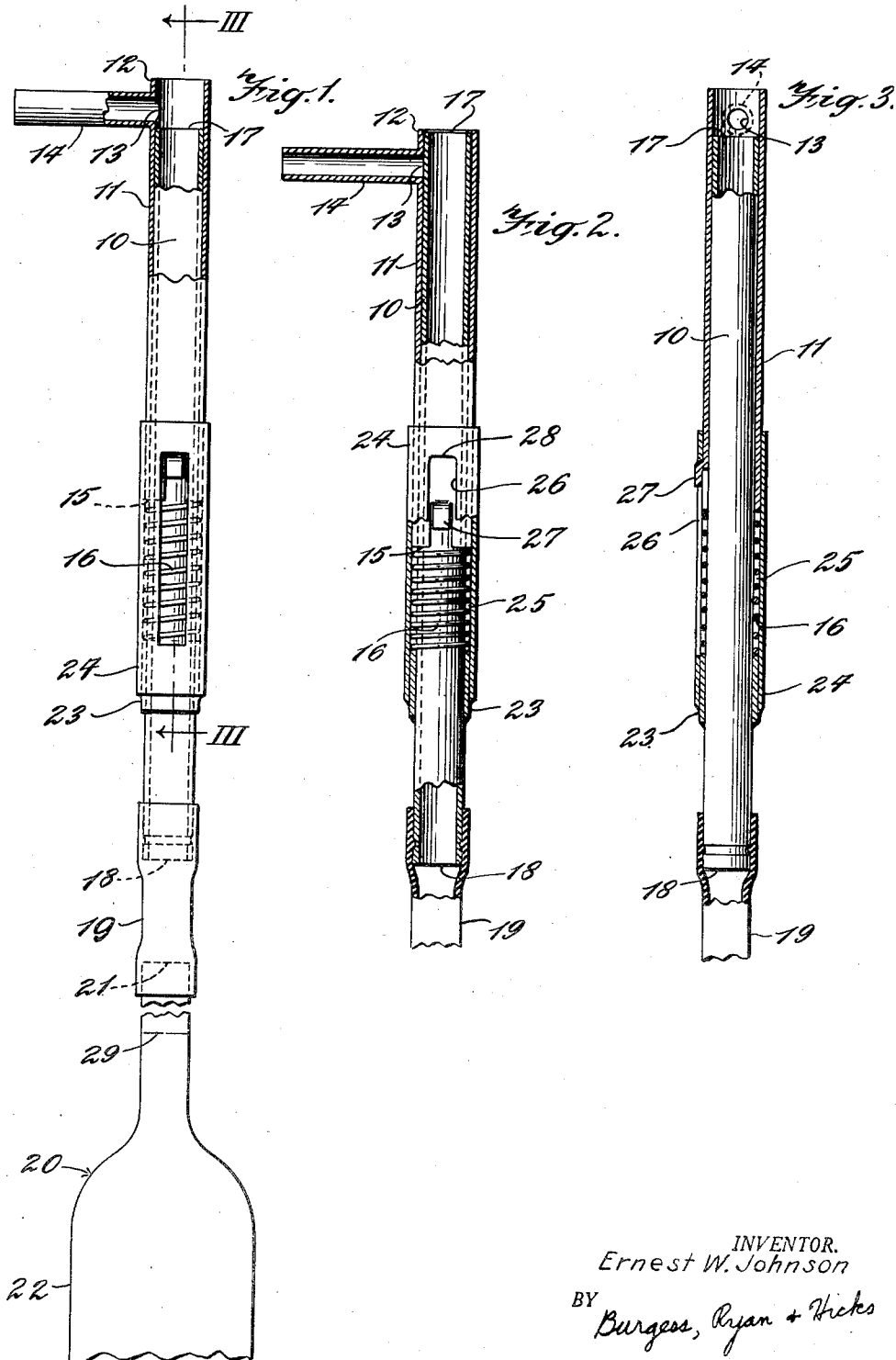
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DEVICE FOR EVACUATING AND FILLING VESSELS BY MEANS OF PRESSURE

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DEVICE FOR EVACUATING AND FILLING
VESSELS BY MEANS OF PRESSURE

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3 Claims. (Cl. 73—425.6)

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This invention relates to a device for evacuating vessels such as those generally found in laboratories and more particularly to a device for controlling the vacuum applied to such vessels. While not limited thereto, the device will be described for illustrative purposes in connection with the evacuating of pipettes in order to fill the latter with liquid, the liquid, of course, entering the pipette as vacuum is applied.

Broadly speaking, the invention comprises an open-ended tube and a second tube slidably enclosing or surrounding the same. The second tube has an opening adjacent its upper end which serves to establish communication on its inner side with the first tube and on its outer side with a source of vacuum. By sliding the second or outer tube relatively to the first tube, the opening can be moved into and out of communication with the first tube. Means are also provided for tensionally supporting the second tube about the first such that the opening is normally in communication with the first tube, thus exposing the latter to the vacuum source.

The invention may be better understood by referring to the accompanying drawing in which a preferred embodiment of the invention is illustrated and in which:

Fig. 1 is a broken, partially sectioned, side elevational view of the device;

Fig. 2 is a partially sectioned view similar to Fig. 1 but showing the tubes in a different position relatively to each other; and

Fig. 3 is a sectioned and partially broken away view of Fig. 1, the section being taken along the line III—III.

As seen in Fig. 1, 10 is an open-ended inner tube slidably disposed within a second or intermediate tube or sleeve 11. Adjacent its open upper end 12 the tube 11 is provided with an opening 13 which on its outer side communicates through connection 14 with a source of vacuum, not shown. By "vacuum" is meant a condition of low pressure which is always less than atmospheric. On its inner side the opening 13 is in communication with the tube 10 and the atmosphere. Tube 11 extends longitudinally of tube 10 and downwardly thereof to a point intermediate the ends of tube 10, as indicated at 15. Tension means in the form of compression spring 16 supports and acts against the lower end 15 of tube 11 to position the tube relatively to tube 10 in the manner generally shown in Fig. 1. In this relative arrangement of the tubes the upper end 17 of tube 10 is in communication with the vacuum source through connection 14. Lower

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end 18 of tube 10 is connected through a length of flexible tubing 19 to a space to be evacuated, which in the present case is defined by the pipette 20, the upper end of which is shown at 21 and the body or reservoir at 22.

Spring 16 is supported on the tube 10 by suitable means, which in the form shown comprises an external annular shoulder 23 adjacent the lower end of the tube.

A third or outer tube or sleeve 24 surrounds the tubes 10 and 11 and spring 16 and aids in supporting the latter. In effect, sleeve 24 confines the spring to operation within the annular space 25 between the inner and outer tubes (Fig. 3).

Sleeve 24 is securely fastened at its lower end to the shoulder 23. The upper end of the sleeve is open, and the tube 11 is slidably movable therein. As is evident, the spring acts to move the tube 11 upwardly, and in this connection

sleeve 24 also serves to restrain the upward movement of tube 11 at a point where the connection 14 is above the upper end 17 of tube 10, in other words to maintain tube 10 in communication with connection 14. For this purpose means are pro-

vided on sleeve 24 in the form of slot 26 to cooperate with other means on the tube 11 in the form of the projection or lug 27. As will be apparent, the latter moves up and down in slot 26 as tube 11 is moved relatively to the tube 10 and sleeve 24. Downward movement of tube 11 is brought about manually, as will be later described, and upward movement is effected by the uncoiling of spring 16. The latter movement is checked by engagement of projection 27 with the stop portion 28 at the upper end of the slot.

To operate the device, the tubing 19 is connected to the end 21 of the pipette 20 and the connection 14 is connected to a source of low pressure, such as, for example, an aspirator. The tip or nozzle end (not shown) of the pipette is immersed in the usual way in a reservoir or container of the liquid to be drawn into the pipette, and then the operator seals the upper end 12 of tube 11 by placing his index finger thereover, thus enabling liquid to be forced upwardly in the pipette. In this manoeuvre the device may be supported by grasping sleeve 24 between the thumb and second finger, and the index finger is gently but firmly held over the end of tube 11. When the liquid in the pipette reaches a point between the mark 29 and the upper end 21, tube 11 is pressed downwardly by the index finger against the action of spring 16 until the vacuum is cut off by virtue of the fact that opening 13 passes below the upper end of tube 10, as shown

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in Fig. 2. In this position, air may be admitted to tube 10 by manipulating the index finger covering the upper ends of tubes 10 and 11, i. e. by slightly raising the finger, and in this way the liquid level in the pipette may be lowered until it coincides with the mark 29. The pipette may then be removed from the container and its contents discharged by simply removing the index finger from contact with the ends of tubes 10 and 11.

While the invention has been described and illustrated in connection with a more or less specific embodiment thereof, it will be appreciated that it is capable of obvious variations without departing from its scope.

In the light of the foregoing description, the following is claimed:

1. A manually operable hand device of the character described comprising an open-ended inner tube, an intermediate tube slidably surrounding said inner tube and having a vacuum connection adjacent the upper end thereof, spring means supported on the inner tube and acting against the intermediate tube to move the latter upwardly relatively to the inner tube, an outer sleeve surrounding said spring means, and cooperating means on said sleeve and intermediate tube for limiting upward movement of the intermediate tube at a point where the inner tube is in communication with the vacuum connection of the intermediate tube.

2. A manually operable hand device of the character described comprising an open-ended inner tube, an intermediate tube concentric with

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and slidably surrounding said inner tube and having a vacuum connection adjacent the upper end thereof, an outer tube surrounding both said inner and intermediate tubes and fastened at the lower end thereof to the inner tube, said intermediate tube being slidable in the upper portion of the outer tube, and tension means supported by the outer tube and acting against the intermediate tube, said tension means serving to position the intermediate tube relatively to the inner tube so that the vacuum connection of the intermediate tube is normally in communication with the inner tube.

3. In a device of the character described, an open-ended tube, a second tube slidably surrounding said first tube and having a vacuum connection adjacent the upper end thereof, said second tube being movable longitudinally of the first tube to bring the latter into and out of communication with the vacuum connection, and tension means supported about the first tube for normally maintaining the second tube positioned relatively to the first tube such that the latter is in communication with the vacuum connection.

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