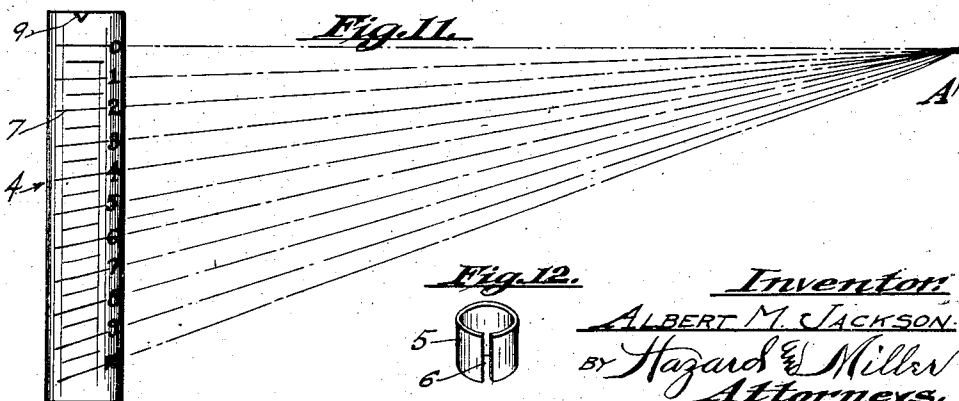
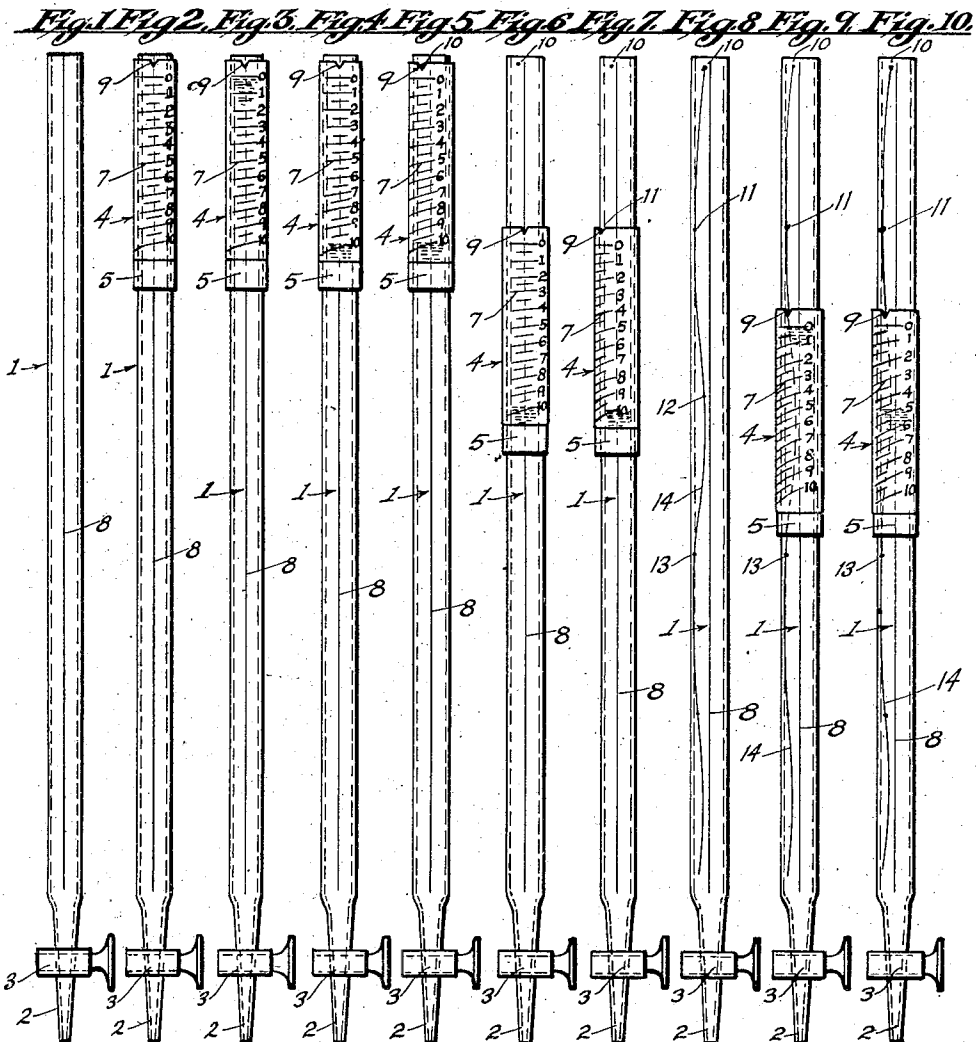


1,386,571.

Patented Aug. 2, 1921.



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UNITED STATES PATENT OFFICE.

ALBERT M. JACKSON, OF LOS ANGELES, CALIFORNIA.

DIRECT-READING BURETTE.

1,386,571.

Specification of Letters Patent.

Patented Aug. 2, 1921.

Application filed July 29, 1920. Serial No. 399,960.

To all whom it may concern:

Be it known that I, ALBERT M. JACKSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Direct-Reading Burettes, of which the following is a specification.

This invention is a direct reading burette and has for its object the provision of a graduated slide longitudinally adjustable relative to the burette and arranged to directly measure variations in volume within the burette.

It is a further object of the invention to provide a slide of this character which may be accurately adjusted to compensate for variations in the uniformity of the capacity of the burette longitudinally of the same.

The invention will be readily understood from the following description of the accompanying drawings, in which—

Figure 1 is a side elevation of a burette before mounting the graduated slide upon the same.

Fig. 2 is a similar view showing the slide upon the burette.

Figs. 3, 4 and 5 are similar views showing the successive steps in determining the variations in uniformity of capacity of the burette at the upper end thereof.

Figs. 6 and 7 are similar views showing the method of determining the variations of capacity at a point along the burette spaced from the end thereof.

Fig. 8 is a similar view showing the capacity variation indicating line upon the burette.

Figs. 9 and 10 are similar views of the burette with the slide thereon, the parts being graduated for use and showing the successive steps in using the burette.

Fig. 11 is a side elevation of the graduated slide.

Fig. 12 is a perspective view of the retaining clip for releasably securing the slide in adjusted positions along the burette.

The burette consists of the usual tube 1 having the nozzle 2 at its lower end controlled by the pinch cock 3.

A slide 4 shown as a transparent sleeve is received over the burette and is arranged to be longitudinally adjusted along the burette. The slide is, preferably, releasably retained in adjusted positions by means of

a spring clip 5, preferably, split as shown at 6 and adapted to yieldably engage the burette below slide 4 so as to form a support for the slide relative to the burette.

Graduations 7 are formed upon the slide and are arranged to measure variations in the cubic contents of the burette as determined by the variations in level of the contents of the burette.

The graduations 7 are, preferably, longitudinally alined along slide 4 and are shown as transverse lines upon said slide. These lines are angularly disposed relative to one another as radii from a common center A beyond the slide and as indicated in Fig. 11.

A reading line 8 is marked upon the burette, said line being the usual straight line extending the length of the burette. A notch 9 is formed in the upper edge of slide 4, preferably, in longitudinal alinement with a medial line through the graduations 7. The slide is placed upon the burette with line 8 in alinement with notch 9, and the graduations 7 are positioned upon the slide so that the points at which said graduations cross the line 8 will indicate successive units of the measuring system for a burette of uniform cubic capacity. The measuring system employed is, preferably, cubic centimeters, and the slide is, preferably, graduated to measure 10 c. c.

In practice it has been found impossible to construct burettes of uniform cross sectional area throughout their lengths and as a consequence when notch 9 is in alinement with line 8 graduations 7 will not accurately measure the cubic contents of the burette at various points along the latter where variations in the cross sectional area occur.

In order to compensate for such variations in order that accurate readings may be obtained, the following arrangement is made: The burette is approximately filled and the zero of graduations 7 is alined with the liquid level, with notch 9 in alinement with line 8. This arrangement of the parts is shown in Fig. 3. By any measuring system known to be accurate, exactly 10 c. c. of the contents of the burette are withdrawn. If the portion of the burette upon which the slide is positioned is of uniform cross sectional area, the intersection of the liquid level with line 8 will also intersect the graduation of the slide denoting 10 c. c. If,

however, the burette is not uniform in size the 10 c. c. graduation will not intersect the crossing of the liquid level and line 8. This condition is shown in Fig. 4. Without shifting the slide lengthwise of burette, the slide is then rotated upon the burette until the 10 c. c. graduation crosses the intersection of the liquid level and line 8. This position is shown in Fig. 5. The notch 9 will now be at one side of line 8 and the position of the notch relative to the burette is indicated upon the latter by the point 10.

The slide is then shifted along the burette until the zero graduation crosses the intersection of the liquid level and line 8, the slide being also reversely turned upon the burette so that notch 9 is again in alinement with line 8. This position is shown in Fig. 6. Exactly 10 c. c. of the contents of the burette are then withdrawn as previously described, and if the 10 c. c. graduation does not cross the intersection of the liquid level with line 8, which condition is illustrated in Fig. 6, the slide is again turned relative to the burette until such crossing does occur, as shown in Fig. 7.

The off-set position of notch 9 relative to line 8 is indicated upon the burette by the mark 11. In similar manner the off-set position to which it is necessary to turn slide 4 in order to obtain an accurate reading is indicated by marks 12—13 etc. along the length of the burette. A curved line 14 is then marked upon the surfaces of the burette connecting the points 10, 11, 12, 13 etc.

In use, when it is desired to measure a difference in cubic contents of the burette the slide 4 is turned relative to the burette and is longitudinally positioned thereon so that notch 9 is in alinement with guide line 14 and the zero graduation of the slide crosses the intersection of the liquid level and line 8. This position of the slide is shown in Fig. 9. If, now, a portion of the contents of the burette is withdrawn, the difference in cubic contents may be accurately read upon the slide, the crossing of one of the graduations of the slide with the intersection of the liq-

uid level with line 8 denoting the change in cubic contents.

By the construction as thus set forth it will be seen that the slide is adjusted relative to the burette at points throughout its length in order that an accurate reading may be obtained upon the slide irrespective of variations in the cubic capacity of the burette at various points along its length.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is:

1. The combination with a burette, of a transparent graduated sleeve slidable longitudinally along said burette:

2. The combination with a burette, having a reading line extending lengthwise of said burette, of a member longitudinally and circumferentially adjustable with relation to said burette and having graduations thereon inclined relative to said reading line.

3. The combination with a burette, having a reading line extending lengthwise of said burette, of a member longitudinally and circumferentially adjustable with relation to said burette and having graduations thereon inclined relative to said reading line, said graduated member being rotatably adjustable upon said burette, and means for guiding said rotatable adjustment.

4. The combination with a burette, having a reading line extending lengthwise of said burette, of a member longitudinally and circumferentially adjustable with relation to said burette and having graduations thereon inclined relative to said reading line, said graduated member being rotatably adjustable upon said burette, and means for guiding said rotatable adjustment arranged to cause readings by said graduations at the common intersection of said graduations with the level of the contents of the burette and said reading line.

In testimony whereof I have signed my name to this specification.

ALBERT M. JACKSON.