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PAPERS READ.

AUTOMATIC ZERO BURETTE.¹

BY EDWARD R. SQUIBB, M. D.

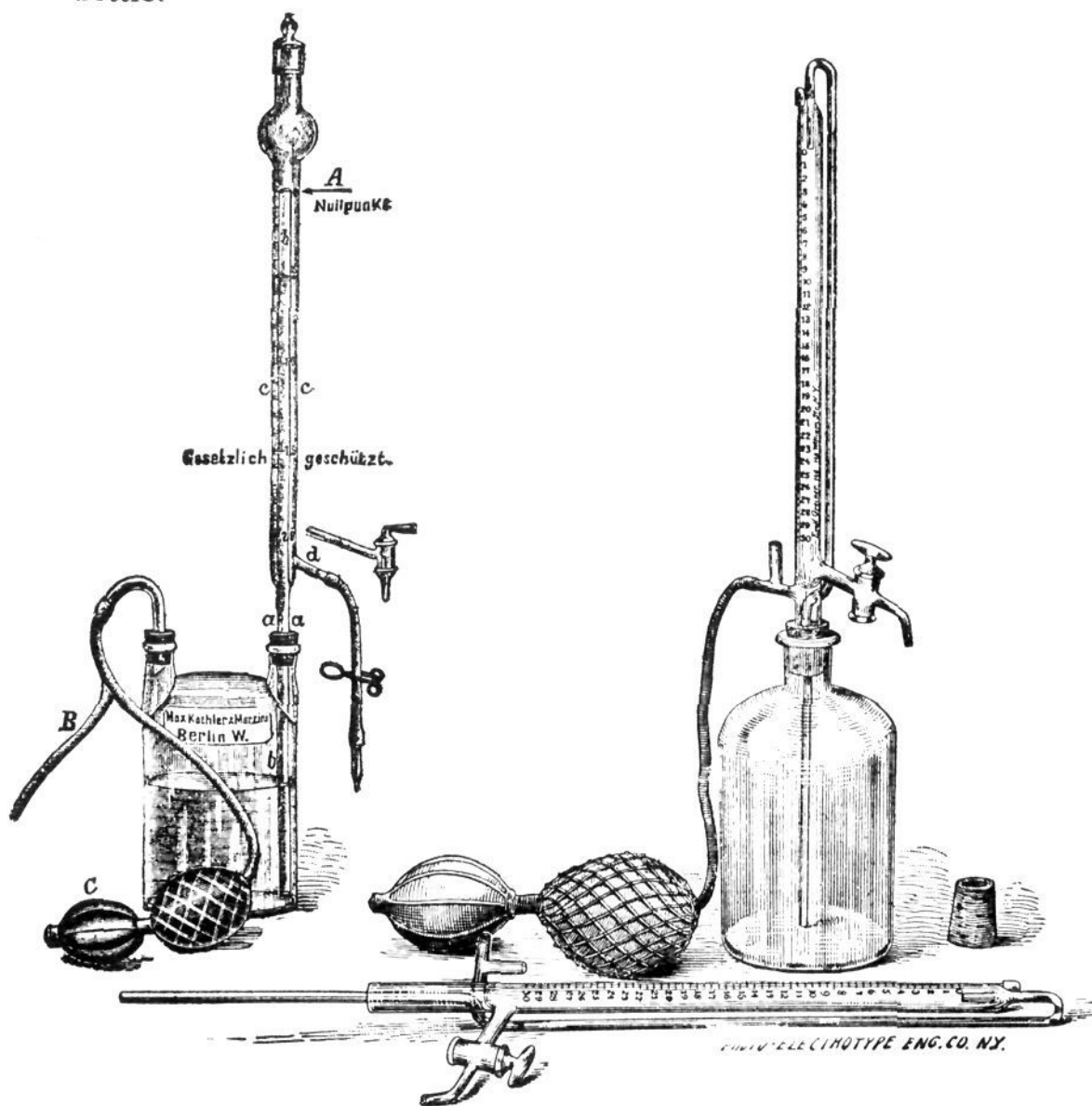
IN many manufactories and laboratories two or more volumetric solutions are in frequent use, and for such it is convenient to have a burette that can be rapidly used, and be carried about from place to place. This is practicable with the ordinary burette and stand. But then the bottle of volumetric solution has also to be carried about and much time is required in filling and adjusting to the Zero mark.

In the *Berichte der deutschen chemischen Gesellschaft* for October 24, 1892, No. 15, page 3010, Stanislaus Krawczynski has a description and cut of a new form of burette with an arrangement for automatic or mechanical filling to the zero point. The cut of this apparatus is reproduced here in the left-hand group of the first illustration plate in order that the inventor may have due credit for the physical principles of which he has availed himself.

On having a couple of these made for trial the writer observed that solutions of different physical properties gave different levels in overflowing through the central tube and were not fairly constant to the zero mark. Messrs. Eimer and Amend, of New York, had one made in which the internal tube was turned over upon itself for about one cm. at the upper end and this gave a

¹ Read December 8, 1893.

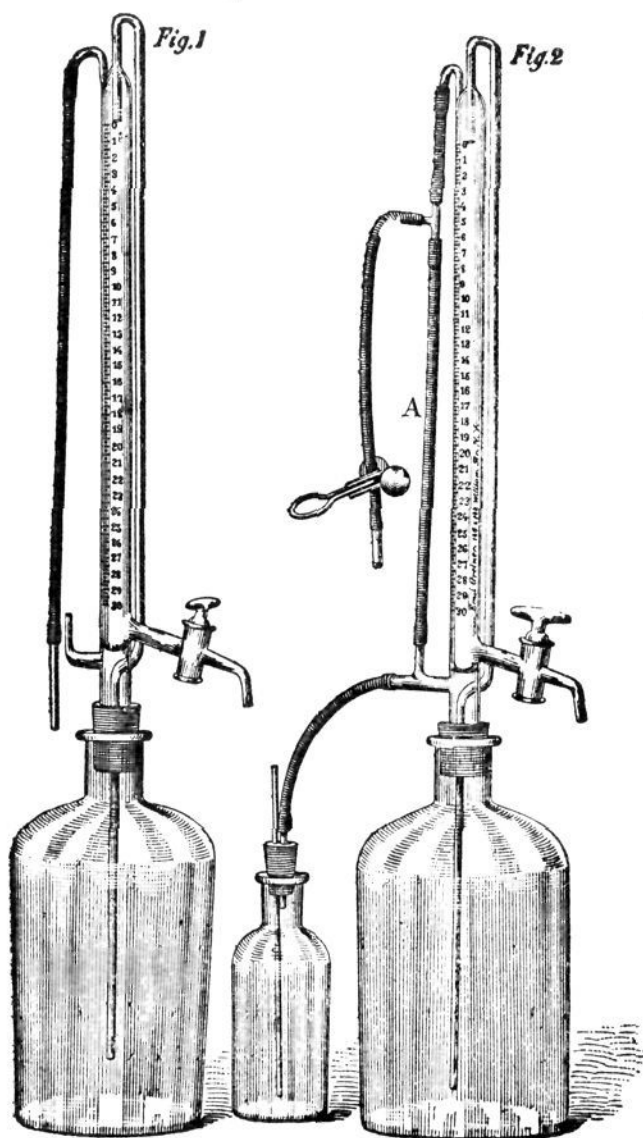
more uniform level with different solutions; and they substituted an ordinary Erlenmeyer flask of liter size for the two necked bottle.



But it was found impracticable to get the internal tube quite straight, and to have it exactly in the center of the outer graduated tube throughout its length, and the least variation in this condition gave a distorted meniscus. Then again the distortions were not uniform nor constant, but varied with the relations between the inner and outer tubes so as to disturb the values of the readings in different parts of the burette.

To overcome these disadvantages this writer simply put the filling tube from the bottle on the outside of the burette in the way shown in the right-hand group of the illustration. By this arrangement the excess of liquid blown over by the rubber pressure bulbs is siphoned off to the zero point with a fair degree of accuracy and uniformity after the finger is removed from the open end of the **I** tube on the left.

After a little experience with this modification it was easy to reach another that had still greater advantages over the last. In this the expensive and cumbersome rubber pressure bulbs are



dispensed with, and the burette is filled by mouth-suction, just as an ordinary pipette is filled. The apparatus shown by Fig. 1, of the second cut shows this design in its simplest form. Here the suction is applied at the top of the burette, the filling liquid rising from the bottle through the outside tube until the zero mark is passed. Then on stopping the suction the excess of solution is siphoned off to the zero mark and flows back into the bottle. If the apparatus is to be set aside for any considerable length of time it may be closed against the external

air by removing the glass mouth-piece from the suction tube.

and slipping the end of the rubber tubing over the turned up end of the glass tube by which air is admitted to the bottle to replace the solution drawn up the filling tube. But this is hardly necessary in any ordinary usage.

In many cases, however, it is necessary to exclude the carbon dioxide and other impurities of the laboratory air from volumetric solutions, and to prevent concentration of the solutions by evaporation of their water. These conditions are met in the modification shown in Fig. 2, of the second cut. Here a small wash-bottle is added, through which all the air admitted to the apparatus, either above or below, must pass, and be washed in passing. This bottle may be supplied with baryta water or lime water when it will serve to saturate the air through it with moisture, and free it from ordinary gases and vapors. In using this apparatus a pinch-cock is necessary on the rubber suction tube near the mouth-piece, by which the mouth-piece is conveniently handled, and during the suction this pinch-cock is opened and the rubber tube below is pinched at A by the thumb and finger of the left hand. This apparatus is constantly sealed from the external air, and is safe and accurate for any length of time, and is always in readiness for use, care being taken to well wash the end of the stop-cock, and to waste the solution that is outside of the cock whenever the apparatus has stood unused for even a few hours.

These burettes are very well made by Mr. Emil Greiner, of 146 William Street, near Fulton, New York City, who supplies them with or without the bottles as ordered. The only advantage in ordering the burette and bottle together is to have the internal tube of the right length to reach the bottom of the bottle.

A COMPRESSED AIR WASH-BOTTLE.¹

By W. C. FERGUSON.

THIS idea, not yet put in practical operation, was suggested by the difficulty attending the washing of such precipitates as hydrate of alumina, the complete removal of very small amounts of finely divided material from the sides of the contain-

¹ Read December 8, 1893.