

SUPPLEMENT TO CIRCULAR LETTER NO. 32

The following method for silvering small glass surfaces is being successfully used by the Optical Instruments Section of the Bureau of Standards.

Silvering Solution

Dissolve 31.10 grams silver nitrate in 35 cc distilled water. And 15.55 cc potassium hydroxide (purified by alcohol) is dissolved in 30 cc distilled water.

Add 31 cc silver nitrate solution to 3785.4 cc distilled water. Then add ammonia, drop by drop, until the precipitate is formed. Stir the solution well. Ammonia is again added, drop by drop, and the solution is stirred continuously until nearly clear.

Having the solution at this point, add the 30 cc potassium hydroxide solution; and continue adding ammonia as before. Stir and add ammonia until the whole solution is nearly clear. Add the remaining 6.5 cc silver nitrate solution.

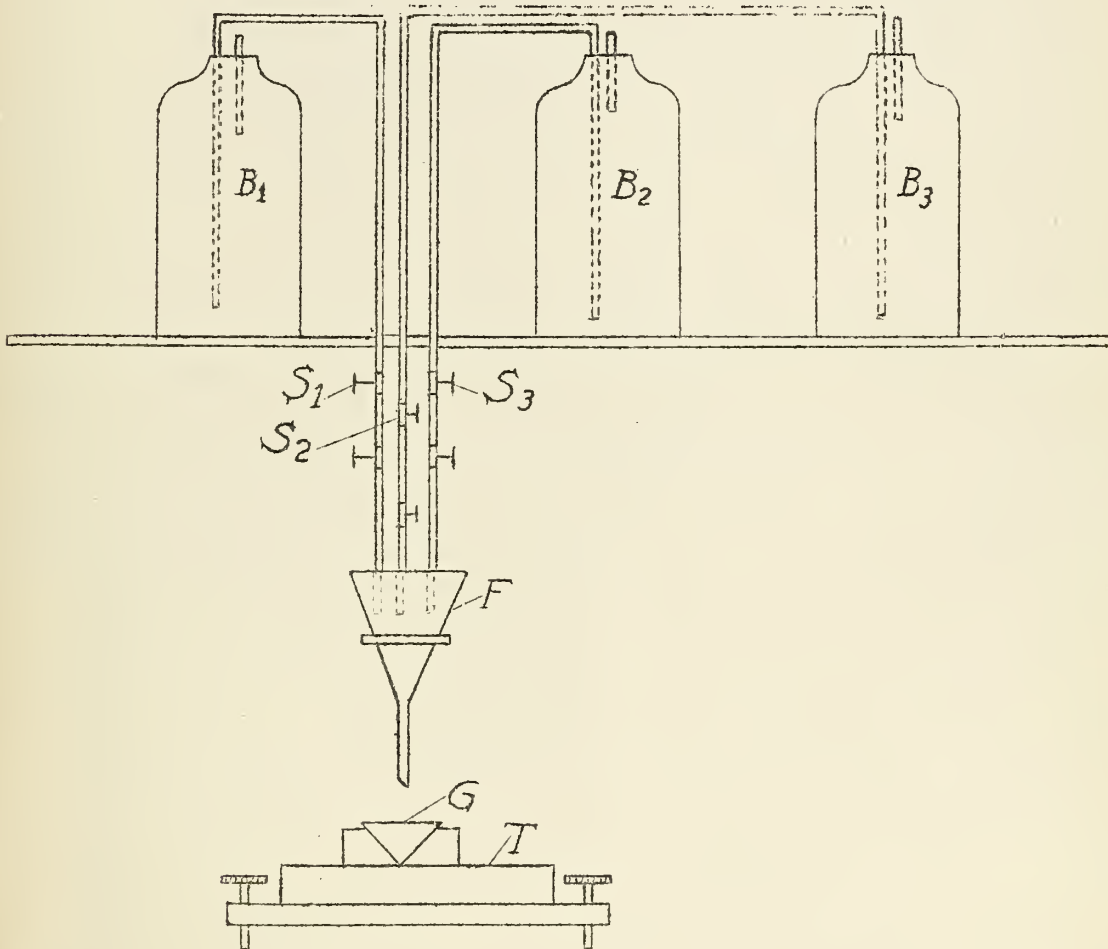
Reducing Solution

Dissolve 209.95 grams cane sugar in 2839 cc distilled water. Add 7.39 cc nitric acid, C.P. Stir. Add 236.6 cc grain alcohol. Stir.

This solution improves with age, and when used should be at least one month old.

The reducing solution, silvering solution, and distilled water are placed in three separate bottles, B₁, B₂ and B₃. Glass syphon tubes, each of which is fitted with two stop-cocks, extend from each of the bottles. The upper stop-cocks, S₁, S₂ and S₃, are set permanently to give the desired rate of flow of each solution. This rate of flow is as follows: 80 drops of silvering solution, 16 drops of reducing solution, and 80 drops of distilled water per minute.

The solutions drop from the tubes into a glass funnel F where they become mixed. The glass G to be silvered is placed about an inch below the funnel. While the process is going on the funnel should be moved so that the liquid is uniformly distributed over the level surface of the glass. The spent solution flows into a receptacle which is placed beneath the glass. The glass to be silvered and the receptacle are placed on the levelling table T, in order that the surface of the glass may be easily levelled.



Cleaning the Glass for Silvering

The surface of the glass should be cleaned with naphtha, nitric acid, ammonia, then nitric acid, and finally distilled water, in the order named. The surface should not be allowed to dry between cleaning and silvering.

