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[CONTRIBUTIONS FROM CHEMICAL LABORATORY, U. S. DEPARTMENT OF AGRICULTURE.—NO. 4.]

LAMP FOR CONSTANT MONOCHROMATIC FLAME.

BY H. W. WILEY.

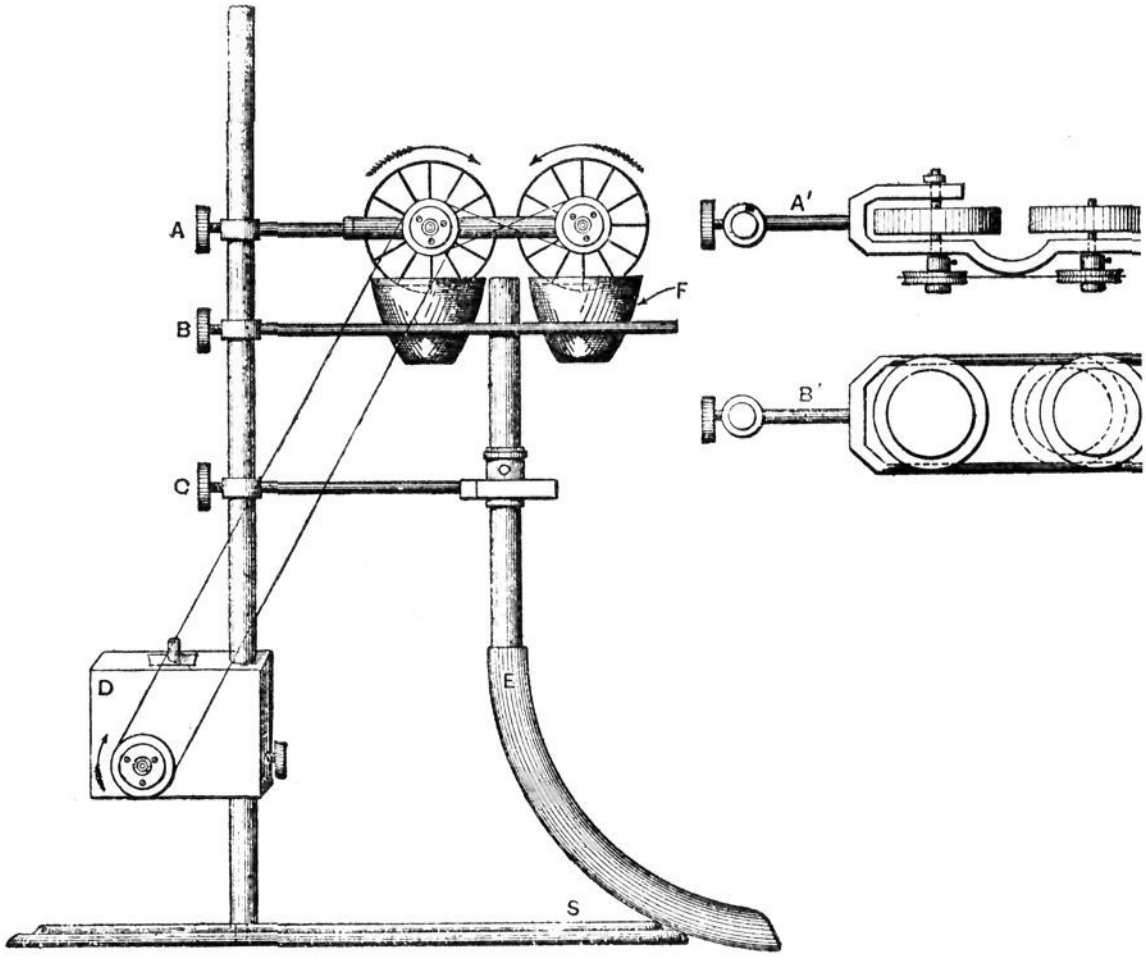
Received May 3, 1893.

IN optical experiments requiring a constant monochromatic flame there is great difficulty in securing an intensity of illumination which remains constant for an indefinite time. The ordinary lamps, for instance, producing a sodium flame, are fed by introducing, from time to time, fragments of fused salt into a platinum mesh spoon which touches the edge of the flame. The intensity of the illumination at the time of adding a fresh portion of the fused salt is great, but after a few minutes there is a sensible difference. For this reason, polarimetric observations are rendered somewhat difficult, inasmuch as the instrument which is set at zero with one intensity of illumination would vary somewhat from that with a different illumination. Probably this would not be the case if absolutely pure chemicals could be used. The only difference then would be in the intensity of the light. In point of fact, however, a difference in the color of the light is often disclosed with the lamps of ordinary construction, so that an instrument which is set at zero at the moment a fresh piece of fused salt is placed in the flame would not show the same zero after the salt had been ignited for some time.

To avoid such difficulties as these and secure a constant,

[1] Presented to Washington Chemical Society, April 13, 1893.

uniform coloration for polarimetric observations, the lamp which is to be described has been devised.



It consists essentially of two wheels with platinum gauze perimeters and platinum wire spokes, driven by a clock-work, D, and mounted by the supports A A′, as shown in the figure. The sodium salt, chlorid or bromid, in saturated solution, is placed in the porcelain crucibles, F, supported by B B′, as indicated in the figure, to such a depth that the rims of the platinum wheels dip beneath the surface as they revolve. The salt is volatilized by the lamp, E. By means of the crossed bands the wheels are made to revolve in opposite directions as indicated by the arrows. The solution of the salt, which is taken up by the platinum net work of the rim of the wheel, thus has time to become perfectly dry before it enters the flame, and the sputtering which a moist salt would produce is avoided.

At every instant, by this arrangement, a minute fresh portion of salt is introduced into the flame with the result of making a perfectly uniform light, which can be used for hours without any perceptible variation. The mechanism of the apparatus is so simple that no further description is necessary. The polariscope should be so directed toward the flame as to bring into the field of vision its most luminous part. The platinum wheels are adjustable and should be so arranged as to produce between them an unbroken yellow flame. The wheels are eight cm. in diameter and driven at a rate to make one revolution in six to ten minutes.

[CONTRIBUTIONS FROM THE CHEMICAL LABORATORY U. S. DEPARTMENT OF AGRICULTURE. NO. 5.]

IMPROVED EXTRACTION APPARATUS.

BY H. W. WILEY.

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THE apparatus for the extraction of substances soluble in ether, alcohol, etc., described in the *Journal of Analytical and Applied Chemistry* for February, 1893, pp. 65, *et seq.*, can be more conveniently operated when constructed in the manner to be described.

It is convenient to have the bath for holding the tubes made in two separate portions, K and K'. The box K can be conveniently made of galvanized iron with legs, U and U', of any convenient length, so that a lamp can be placed underneath the box.

The liquid to be used in the bath may be water or other substance of different boiling point, and should stand at the height represented by the line W. The box has a false bottom represented by the dotted line O, with circular perforations to receive the bottom of the extraction tubes, as indicated. Both sides of this box are conveniently made of glass or mica so that the operator can see the progress of the evaporation of the solvent.

This box K' is to rest lightly on K but is not fastened to it in any way. It is also conveniently made with one or both sides of glass or mica. The bottom of the box carries rubber diaphragms, perforated to receive the extraction tubes, through