FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

extend the draw-tube of the microscope to about the 176 mm. point for clear images, as most microscopes at present on the market are corrected for the normally interposed vertical illuminator.

Questions have arisen repeatedly regarding the use of a lamp of such low wattage for photomicrography. Experiments conducted in the writer's laboratory prove that good results are obtainable with the 0.7 ampere, 9 volt daylight lamp with 8 and 16 mm. objectives and those of lower power, when the eyepiece is removed. With the colorless 0.7 ampere, 20 volt silvered lamp or the one ampere, 13 volt lamp it is unnecessary to remove the eyepiece, as the light intensity is ample to yield clear images on the ground glass.

Focusing may be facilitated by greasing the ground glass with a little vaseline, subsequently rubbing it as dry as possible with a cloth. Bronzes, highly polished ball bearings, enamel, paper, etc., have been photographed in this way. The best results were obtained with Hammer Ortho extra fast and Hammer Ortho nonhalation plates.

Figs. 3, 4, 5, 6, 7 and 8 show results obtained with the 0.7 ampere, 20 volt silvered lamp with exposures of from 15 to 30 seconds, using a 16 mm. objective and 10X eyepiece. Fig. 3 is a blue enameled steel; 4, a steel casting, 0.37 carbon, not pressed or heat treated; 5, an iron-zinc alloy obtained in zinc manufacture; 6, a piece of blue cover paper; 7, a piece of cloth; 8, a cast iron specimen.

In conclusion, the writer wishes to express his appreciation to the scientists in various fields who have experimented with the new device and made suggestions which have resulted in valuable improvements in methods of application.

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A SPECIAL STOPCOCK FOR DROPPING LIQUIDS ARRANGED FOR EQUALIZING THE PRESSURE ABOVE AND BELOW THE OUTLET IN THE STOPCOCK¹

By HARRY L. FISHER

Received June 4, 1918.

The stopcock described herein was designed in connection with a generator for carbon dioxide which was to be used alternately with pressures below and above atmospheric in the final preparation of cupric oxide and for the determination of nitrogen by the Dumas method according to the modification of Fieldner and Taylor.²

Ordinarily an outside tube connecting the top of the reservoir of acid with the upper part of the container of the carbonate is used. In this new apparatus the connection is made by means of an annular groove in the key of the stopcock so that no matter which position the key occupies there is always communica-

¹ Presented at the Boston Meeting of the American Chemical Society, September 10-13, 1917.

² Fieldner and Taylor, *THIS JOURNAL*, 7 (1915), 106.

tion between the atmosphere in the lower flask and the atmosphere in the upper flask. One arm of the stopcock is extended until it opens above the liquid in the upper container. The liquid enters at an aperture in the lower part of this extended arm and is delivered through a small glass tube sealed in at this opening. The entire arrangement is more clearly understood by a glance at the accompanying diagram. Two different styles were made, using the same principle in each.

FIG. 1—LONGITUDINAL SECTION
FIG. 1a—CROSS SECTION AT CENTER
FIG. 2—LONGITUDINAL SECTION

ADDITIONAL DIMENSIONS

	Fig. 1 Mm.	Fig. 2 Mm.
Length of stopcock barrel.....	35	35
Outside diameter of inner tube.....	5	5
Inside diameter of inner tube.....	3	3
Outside diameter of outer tube.....	10	13
Inside diameter of outer tube.....	7	9.5

If the flasks are used as shown they must be securely fastened by clamps close to the lips. The upper flask can be filled through a funnel attached by means of a piece of rubber tubing. The liquid will flow down the inside walls and not drop into the extended tube. The arrangement and kind of flasks can be changed as desired, and it is believed that the apparatus will be of service elsewhere.

I wish to acknowledge my thanks to Mr. W. Wiegand of the firm of Eimer and Amend, New York City, for his interest and skill in making these two stopcocks.

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A NEW TIMING DEVICE FOR SIMPLIFYING THE THERMOMETRIC READING OF CALORIMETRIC DETERMINATIONS

By CHAS. A. MYERS, JR.

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At the beginning of the war the chemical laboratory of the New York Navy Yard was called upon to do all the chemical analyses of coal used by the fleet and its auxiliaries in the northern district. This wrought a tremendous increase in the work which the laboratory in normal times was expected to do; but notwithstanding the increase in the number of analyses it was essential that there should not be any sacrifice in the accuracy to which these operations were ordinarily accustomed. The writer, who has for some time been engaged in the work in question, has developed an electrical timing device for calorimeters which he believes would be of great assistance to anyone called upon to determine calorific values under such circumstances, where radiation factors are involved.

One of the chief advantages of this timing device is its absolute accuracy in giving the operator the exact second at which to read the thermometer. The instrument, moreover, relieves to an almost unbelievable

FIG. 1

extent the strain on the operator who may be called upon to make constant readings over an extended period of time. With this device it is no longer necessary to divide attention between the stop watch and the thermometer, first looking at one and then the other, as an audible warning signal is given 5 seconds before the time to read, and a second signal at the moment at which the reading should be taken.