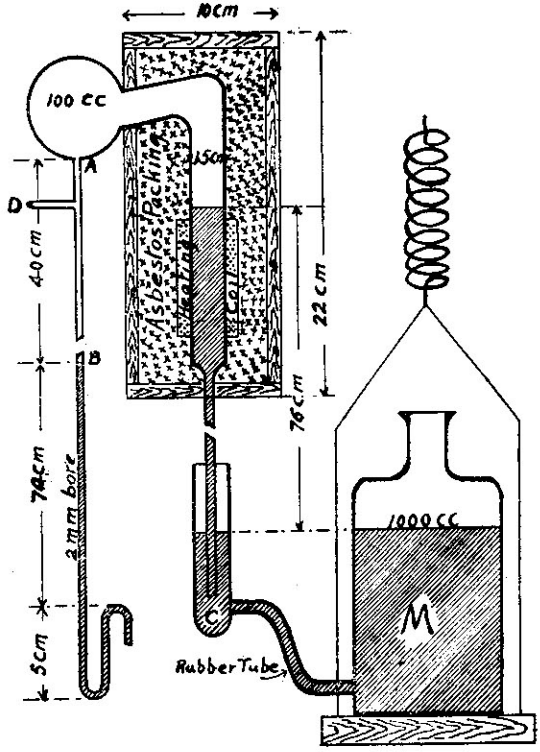
A Simple Automatic Mercury Still.—By Howard L. Bronson, Ph. D., Professor of Physics, Dalhousie University, Halifax, N. S.

(Presented 21 March 1927)

Mercury stills of various types and many designs are widely used in university and commercial research laboratories. In fact, there is scarcely a laboratory so small that it does not feel the need of some such device for purifying mercury, but most of those at present in use either require too much attention or withdraw too much mercury from circulation.

The accompanying figure illustrates a still that possesses certain very definite merits.



(1) The mercury container M is supported by a spring of such length and stiffness that the mercury level in C is practically independent of the quantity of mercury in M. As far as the writer is aware, this is a new device which enables the still to operate continuously and without attention for as long as three or four days. If desired, the heating circuit can easily be arranged so that it will be opened automatically by the fall of the mercury level in C, in case the container M. becomes empty.

(2) The tube AB is made of such length and size that it acts as a Sprengel pump and thus insures a permanent high vacuum above the mercury and consequently a low boiling point.

(3) The volume of mercury permanently tied up in the still is only about 50cc and this could readily be reduced to 20cc by the use of still smaller apparatus.

(4) It can be easily and quickly made in any laboratory at a very small expense and the cost of operation is trifling.

The following details in addition to those furnished in the figure may be found helpful in constructing such a still:

Pyrex glass was used throughout and the heating coil wound directly on it. The latter was made of about 45 feet of No. 26 oxidized "Ideal" wire having about 1.2 ohms per foot. The E. M. F. supply was taken from a small homemade transformer giving about 37 volts on the secondary. An ordinary "heavy duty" bell-ringing transformer would be quite suitable for the purpose. A fairly low voltage is desirable for much greater care would have to be taken with the insulation if the still was to be operated directly off a 110-volt lighting circuit. The power consumption in the above heating coil is about 25 watts and about 110 grams of mercury is distilled per hour. The still was originally exhausted through the side tube D by means of a common air pump.

The fact that the efficiency of the process is only about 40% is a minor consideration when the total power consumed is so small. However, it could undoubtedly be considerably increased by taking sufficiently great care with the asbestos packing.