J. I. AYER.

TEST TUBE HEATER.

APPLICATION FILED AUG. 12, 1912.

1,043,561.

Patented Nov. 5, 1912.

Fig. 1.

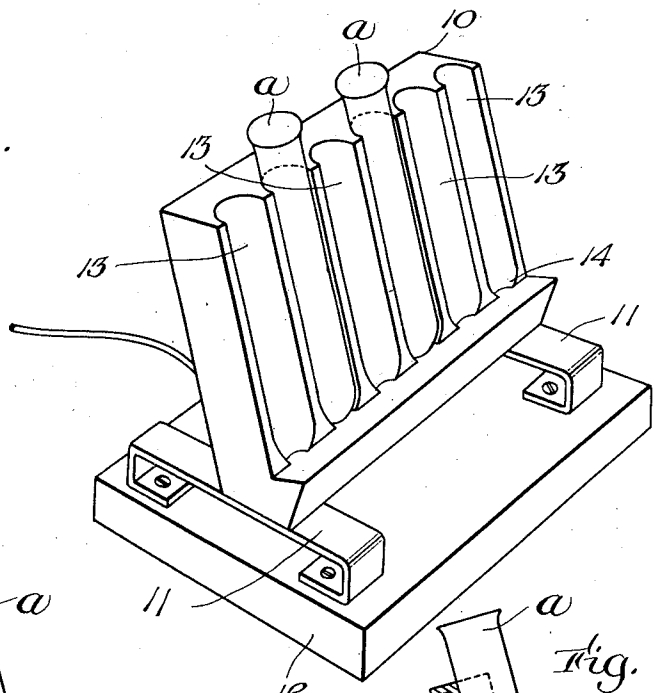


Fig. 2.

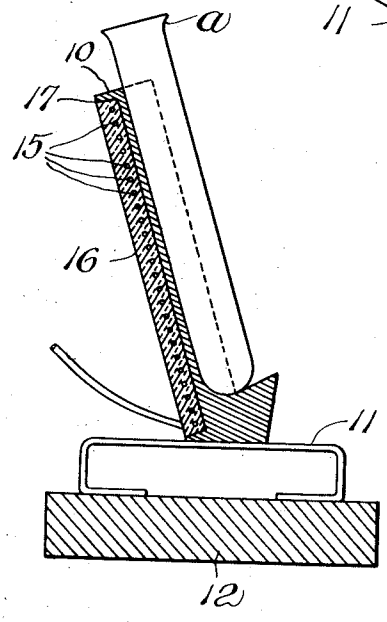
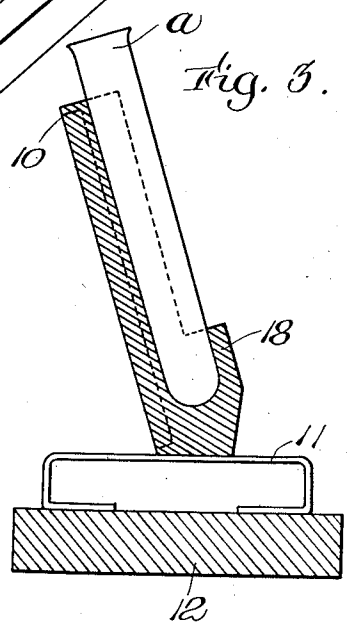


Fig. 3.



Witnesses:
Louise A. Jordan
C. L. Rogers

Inventor:
James I. Ayer,
by Geo. H. Maxwell,
Attorney.

UNITED STATES PATENT OFFICE.

JAMES I. AYER, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO SIMPLEX ELECTRIC HEATING COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

TEST-TUBE HEATER.

1,043,561. Specification of Letters Patent. Patented Nov. 5, 1912.

Application filed August 12, 1912. Serial No. 714,600.

To all whom it may concern:

Be it known that I, JAMES I. AYER, a citizen of the United States, and resident of Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Test-Tube Heaters, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to apparatus for heating tubes, such as the test tubes commonly used in laboratories. Test tubes are principally used for boiling solutions or for evaporating their fluid contents and in the operations involved in the use of test tubes in laboratories it is desirable to have them in position where comparative results can be observed in two or more tubes at a time.

My invention provides an electrically heated metal rack or form adapted to hold the tubes so that one or a series thereof is in position for convenient inspection, and so that the evaporating action or chemical changes occurring can be most readily observed.

The improved device is arranged to hold the tubes so that the heat is applied uniformly along substantially the entire length of the tube, giving a more effective and generally preferable heating action than is the case when the heat is applied only at the bottom, as is usually the case with a gas flame and other methods of heating.

In carrying out my invention I provide a rack or form having one or more pockets to receive and partially inclose the tubes, these pockets holding the tubes while exposing them along most or all of their length for inspection. To facilitate convenient observation, the rack or form is preferably mounted in inclined position on a suitable base.

The invention will be better understood from the following detailed description, taken in connection with the accompanying drawings, and will be thereafter pointed out in the appended claims.

Referring to the drawings, Figure 1 is a perspective view showing a preferred form of my improved device; Fig. 2 is a transverse section through the form of the device shown in Fig. 1; and Fig. 3 is a similar section showing a slightly modified form of the invention.

A rack or form is shown at 10 of any suitable conductive metal, mounted by means of brackets 11 on a suitable base 12, this rack being shown as in the form of a slab upstanding from its base in a somewhat inclined position, so that the series of tube holding pockets 13 formed therein face forward and upward. These pockets extend vertically of the rack and are shaped to approximately fit the usual test tube *a*, the lower ends of the pockets being drawn in, as seen at 14, to extend further around the bottoms of the tubes to better hold them in place. It will be noticed that these pockets extend around a considerable part of the diameter of the tubes throughout the length thereof, thus giving large conductive areas for the transmission of the heat from the rack 10 to the tube contents, while at the same time there is a sufficient portion of the tubes exposed throughout their length to enable the action taking place therein to be readily observed. The rack or slab 10 may be heated in any suitable manner by electric current, but I prefer the form shown wherein a resistance member formed as a coil or ribbon 15 is embedded in enamel or the like 16, in a dished-out cavity 17 formed at the back of slab 10, this dished-out portion, as seen in Fig. 2, having the effect of bringing the resistance element quite close to the tubes to be heated throughout the length thereof.

The form of the invention shown in Fig. 3 is similar to that of Figs. 1 and 2, except that the lower portion of the tube holding pockets are formed to completely inclose and fit the lower ends of the test tubes, as seen at 18. It will be understood that part or all of the pockets may be formed in this manner, as desired. While as explained, it is desirable to construct the holder with a plurality of sockets to hold a number of test tubes in juxtaposition so that the comparative action in different ones can be observed at the same time, it will be understood that the invention in its broader aspects is not limited thereto, and may be also carried out with a rack to hold only a single tube, while on the other hand, the rack can, of course, be extended indefinitely to hold any desired number of tubes for simultaneous heating.

The invention is not only valuable and important in enabling the heat to be uniformly and evenly applied throughout the

length of the tube and over a large area thereof while holding the tubes in the best and most convenient position for inspection, but it is also advantageous in that the heat application can be easily controlled at will by a usual rheostat or the like, and whatever the degree of heat applied by such controlling means, it is still uniformly distributed to all parts of the tubes.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device of the kind described, comprising a holder having a pocket for receiving an article like a test tube formed to engage the tube along the length thereof, and means for electrically heating said holder.

2. A device of the kind described, comprising a holder having a pocket formed to inclose an article like a test tube about a substantial part of the circumference thereof and along a substantial part of the length thereof, and means for electrically heating said holder.

3. A device of the kind described, comprising a holder having a pocket formed to embrace an article like a test tube about a substantial part of the circumference thereof and along a substantial part of the length thereof, while leaving the tube exposed to inspection along its length, and means for heating said holder.

4. A device of the kind described, comprising a holder having a pocket to hold and inclose a test tube about a substantial part of the circumference thereof and for a substantial part of the length thereof, while leaving the tube exposed to inspection along a substantial portion of its length, a mounting for said holder adapted to hold it in inclined position, and an electric resistance element embedded in the back of said holder.

5. A device of the kind described, comprising a slab having a series of juxtaposed parallel pockets formed to each inclose a test tube about a substantial portion of its circumference and for a substantial part of its length, and a resistance element embedded in the back of said slab in juxaposition to the tubes fitted in said pockets.

6. A device of the kind described, comprising a slab formed with a series of juxtaposed parallel pockets formed to each receive and inclose a substantial portion of a test tube while leaving the tube exposed to inspection, the lower portion of said pockets being formed to retain the tubes from displacement, and an electric resistance element also forming a part of said device in position to transmit heat to the tubes in said pockets.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JAMES I. AYER.

Witnesses:
C. L. ROGERS,
R. J. HERSEY.