Jan. 20, 1959 J. D. SELVAGGIO ET AL 2,869,845

CRUCIBLE FURNACE

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FIG. 1.

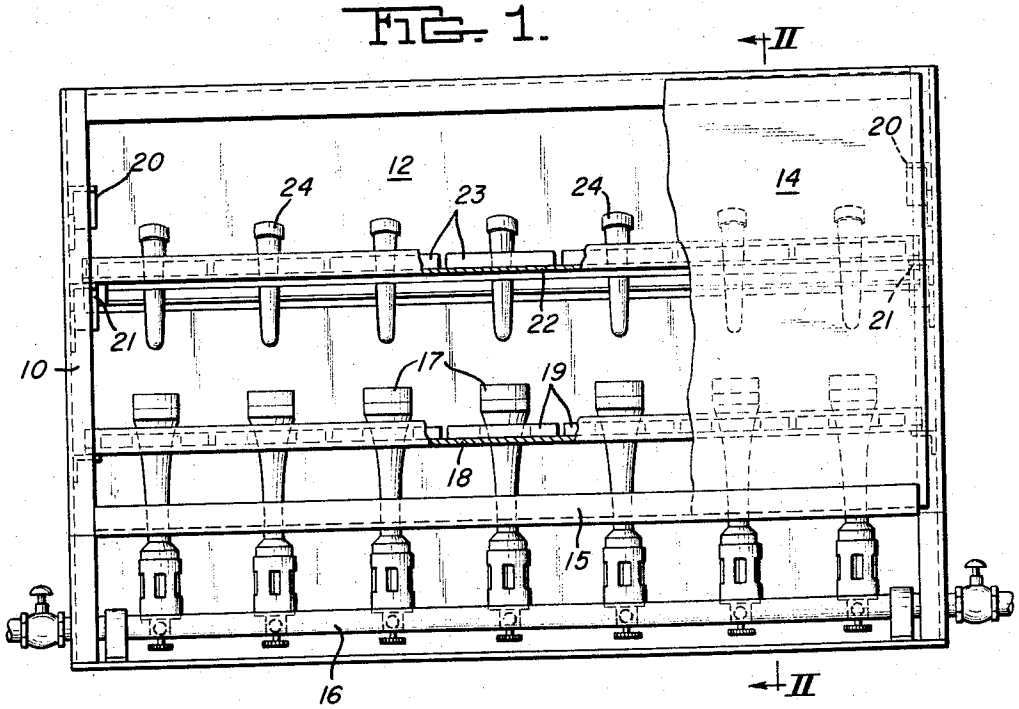
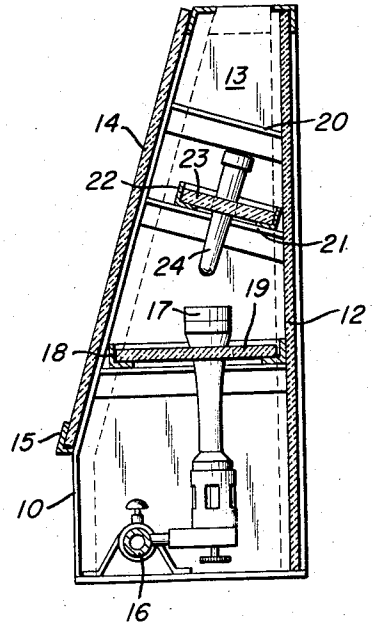


FIG. 2.



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CRUCIBLE FURNACE

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3 Claims. (Cl. 263—2)

This invention relates to an improved crucible-type laboratory furnace.

Our furnace is especially useful for preparing samples of iron ore, limestone or the like for analysis of their alkali content. Before such an analysis can be made, the alkali must be converted to a soluble form. This conversion can be accomplished by fusing the sample with appropriate reagents, such as a mixture of calcium carbonate and ammonium chloride. These materials are fused in an elongated nickel or platinum crucible whose bottom is heated to a high temperature, but whose upper portion must be kept relatively cool to prevent loss of alkali by volatilization. Our furnace is used for heating the crucibles in this procedure, although obviously it may be used elsewhere where similar problems are encountered.

An object of our invention is to provide an improved furnace for supporting and heating elongated crucibles of the aforementioned type and confining the heat to where it is actually needed.

A further object is to provide a compact draft-free furnace which can heat a large number of crucibles at a time while maintaining the upper portions of the crucibles relatively cool.

In accomplishing these and other objects of the invention we have provided improved details of structure, a preferred form of which is shown in the accompanying drawing, in which:

Figure 1 is a front elevational view, partly broken away, of a furnace constructed in accordance with our invention; and

Figure 2 is a vertical section on line II—II of Figure 1.

Our furnace comprises a metal frame **10** preferably of welded angle iron construction, and a back wall **12**, end walls **13** and front wall **14** of rigid insulating material, such as that sold under the trademark "Transite." The front wall is removably supported on a bracket **15**, but the other walls can be permanently affixed to the frame **10**. The top of the frame is open. A manifold **16** is fixed within the frame adjacent the bottom and carries a plurality of Bunsen burners **17**, to which it also supplies fuel. Adjacent the upper ends of said burners the frame carries a support **18** on which a plurality of heat shields **19** are mounted, one for each burner. Each of said heat shields is a rectangular block of rigid insulating material which contains an opening to accommodate the burner. The frame also includes an upper pair of downwardly sloping brackets **20** and a similar lower pair of such brackets **21**.

Either pair of brackets **20** or **21** is adapted to support a removable crucible rack **22**. This rack includes a rigid angle iron frame of rectangular outline and a plurality of rectangular crucible supporting blocks **23** removably resting in said frame. The blocks **23** correspond with the respective burners **17** and are of rigid insulating material. Each has an opening in which the lower end of an elongated nickel or platinum crucible **24** can be fitted. The upper ends of the crucibles project well above the upper faces of the blocks. When the rack **22** is placed on either set of brackets **20** or **21**, the crucibles lie directly over the corresponding burners.

In operation, as applied to preparation of samples for alkali determination, mixtures of sample and reagent are placed in the crucibles **24**, which are mounted in the rack **22**. First this rack is placed on the upper set of brackets **20**. The burners **17** are lighted and the removable front wall **14** installed. The burners are adjusted first to produce a low flame and later a full flame and held thus for 15 to 20 minutes. Next the burners are turned off and the rack is lowered to the lower set of brackets **21**. After the front wall is replaced, the burners again are adjusted to full flame and held thus for about one hour. During each burner operation the heat shields **19** prevent loss of heat downwardly and protect the manifold **16** against excessive heat. The blocks **23** prevent loss of heat upwardly and maintain the upper portions of the crucibles relatively cool to prevent loss of alkali by volatilization.

While we have shown and described only a single embodiment of the invention, it is apparent that modifications may arise. Therefore, we do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

We claim:

1. A furnace comprising a frame, walls of insulating material supported on said frame, a plurality of Bunsen burners mounted in the lower portion of said frame, means for supplying fuel to said burners, vertically spaced sets of supporting brackets in said frame above said burners, and a crucible rack adapted to be removably supported on either of said sets of brackets, said rack including a rectangular frame and a plurality of blocks of rigid insulating material supported thereon and corresponding with said burners, each of said blocks having an opening adapted to receive the lower portion of an elongated crucible for exposure to a different one of said burners, said blocks being adapted to maintain the upper portions of the crucibles relatively cool.

2. A furnace as defined in claim 1 including heat shields of rigid insulating material surrounding each of said burners to prevent downward loss of heat.

3. A laboratory furnace for fusing samples of iron ore, limestone or the like preparatory to determination of their alkali content comprising a frame, walls of insulating material supported on said frame, a plurality of Bunsen burners mounted in the lower portion of said frame, means for supplying fuel to said burners, upper and lower vertically spaced sets of supporting brackets in said frame above said burners, a crucible rack including a rectangular frame and a plurality of blocks of rigid insulating material supported thereon and corresponding with said burners, each of said blocks having an opening, elongated crucibles adapted to receive samples for fusion fitted into the respective openings with their lower ends projecting below said blocks for exposure to said burners and their upper ends being open and projecting above the blocks, said upper brackets being adapted to support said rack during initial heating of said crucibles and samples therein, said lower brackets being adapted to support said rack during final heating of the crucibles and samples, said blocks insulating the upper portions of said crucibles from said burners and thus maintaining the upper portions relatively cool to prevent loss of sample through the open ends by volatilization, and heat insulating shields of rigid insulating material surrounding each of said burners to prevent downward loss of heat.

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