P. W. SHIMER.

CRUCIBLE.

APPLICATION FILED OCT. 3, 1908.

928,552. Patented July 20, 1909.

FIG. I.

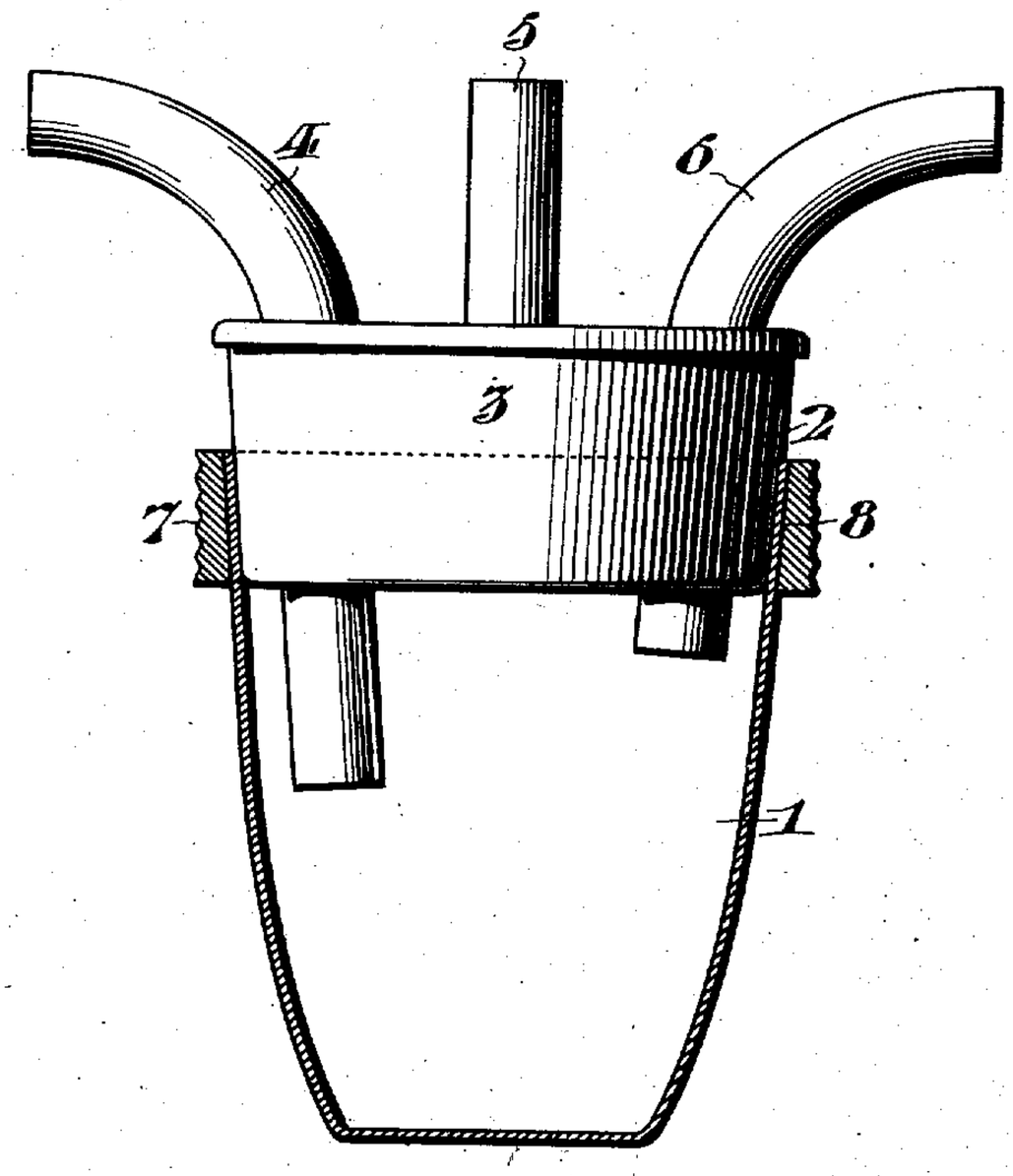
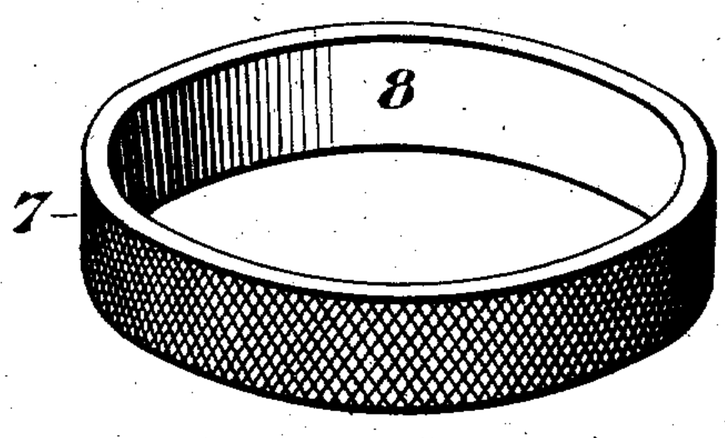


FIG. II.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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CRUCIBLE.

No. 928,552. Specification of Letters Patent. Patented July 20, 1909.

Application filed October 3, 1908. Serial No. 455,961.

To all whom it may concern:

Be it known that I, PORTER W. SHIMER, of Easton, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Crucibles, whereof the following is a specification, reference being had to the accompanying drawings.

In said drawings, Figure I, represents a central vertical longitudinal section through the crucible, showing the stopper in side elevation; and Fig. II, is a view in perspective of the removable ring which is employed in my improved construction.

In Letters Patent of the United States No. 653,823, dated July 17th, 1900, and No. 669,862, dated March 12th, 1901, I have shown and described certain crucibles adapted particularly for laboratory use, and therefore of the class to which the present invention belongs. Although the devices set forth in said patents have proved valuable, experience has shown the desirability of certain modifications, which insure even greater efficiency, and which at the same time materially reduce the cost of the apparatus. In practice, crucibles of this character are made of platinum, which is a highly expensive material, and it is therefore desirable that the walls of the crucible should be as thin as is consistent with durability and permanence under the handling which they must undergo. Upon reference to said prior patents, it will be noted that in each instance, the stopper is substantially less in diameter than the mouth of the crucible, a close joint being obtained by the interposition of a rubber gasket. When such a system of construction is employed, it is essential that the water current for cooling certain parts of the crucible shall be uninterrupted, since, if the water supply should fail, even for a few minutes, the rubber is liable to burn, or become impaired, thus destroying the integrity of the joint and ruining any chemical analysis, such as a carbon determination, which requires an absolute control of the admission of air or oxygen.

In the form of apparatus about to be described, I obtain the desired efficiency of the joint, without the interposition of a gasket, and moreover insure the protection and permanence of the crucible itself.

Referring to the drawings, 1, represents the crucible proper, which is made of relatively very thin platinum, and which has the portion adjacent to its upper edge or rim, flared slightly outward at a regular and uniform pitch. The inner surface of said flaring upper portion is ground to a substantially true frustum of a cone. The hollow stopper of the crucible is indicated at 3, said stopper being provided with pipes for circulation of water and controlled admission of air, as set forth in my Patent No. 669,862, above referred to. In the view shown in Fig. I, only three of these pipes are visible, being indicated respectively at 4, 5, and 6. The outer periphery of the lower portion of the stopper 3, is tapered downward, and is ground true, so as to conform as closely as possible to the inner surface 2, of the upper portion of the crucible.

A relatively heavy removable ring 7, which may be of German silver, or other material of moderate price, is arranged to fit snugly around the outer surface of the upper portion of the crucible rim, the interior surface 8, of said ring being flared outwardly upward in correspondence with the outward flare of the exterior of the crucible itself at the region referred to. The fit of the ring is such that when the crucible is inserted in position within it, and the ground stopper is at the desired depth, as indicated in Fig. I, the parts will be firmly seated within the ring, whose top is then just flush with the upper edge of the crucible itself. The exterior surface of the ring 7, is preferably milled as shown, so as to permit it to be readily manipulated for seating or removal.

By the construction above described, I find that the ground joint between the crucible and stopper can be maintained permanently, and with certainty, and, since no gasket is employed, if the water circulation temporarily ceases no harm is done. Moreover, the apparatus can be subjected to an exceedingly high temperature, such as is required in the determination of carbon by direct combustion of iron and steel in a current of pure oxygen. In such work, a few moments interruption of the water supply would ruin the efficiency of the rubber gasket, with consequent loss of the analysis.

The relatively heavy reinforcing ring prevents undue stretching of the mouth of the crucible when the stopper is forced home, and since said ring may be retained, or replaced in position, after the removal of the stopper, it serves to protect the thin metal at the edge of the crucible from accidental distortion or

indentation, when used without the stopper, or when laid aside.

The saving in weight and cost is relatively very large, thus for instance, a crucible of ordinary size, embodying the present invention, and having the same relative capacity as that shown in my Patent No. 669,862, will weigh only about fifty grams instead of ninety grams, which would be the weight of one constructed with a water-jacket as therein set forth.

In addition to insuring the efficiency of the apparatus when used with a stopper as a combustion crucible, my method of construction permits the use of the crucible proper, as a regular fusion crucible, the stopper and ring in such case being removed and an ordinary lid being employed.

Having thus described my invention, I claim:—

The combination, with a crucible of relatively thin metal having the internal portion adjacent to its rim flared outward in the frustum of a cone; of a water cooled stopper having a ground exterior peripheral portion tapering in conformity with the flared internal surface of the crucible rim and fitting closely in direct contact therewith; and a relatively heavy removable ring having its inner surface flared in conformity with the flare of the outer surface of the crucible rim, said ring being adapted to closely embrace the rim and form a rigid abutment against distension by insertion of the stopper, substantially as set forth.

In testimony whereof, I have hereunto signed my name, at Easton, Pa., this first day of October, 1908.

PORTER W. SHIMER.

Witnesses:

REUBEN KOLB,

ALICE FENICLE.