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R. E. STEVENS
COVERED WIRE TRIANGLES FOR HEATING
CRUCIBLES IN CHEMICAL ANALYSIS
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2,936,222

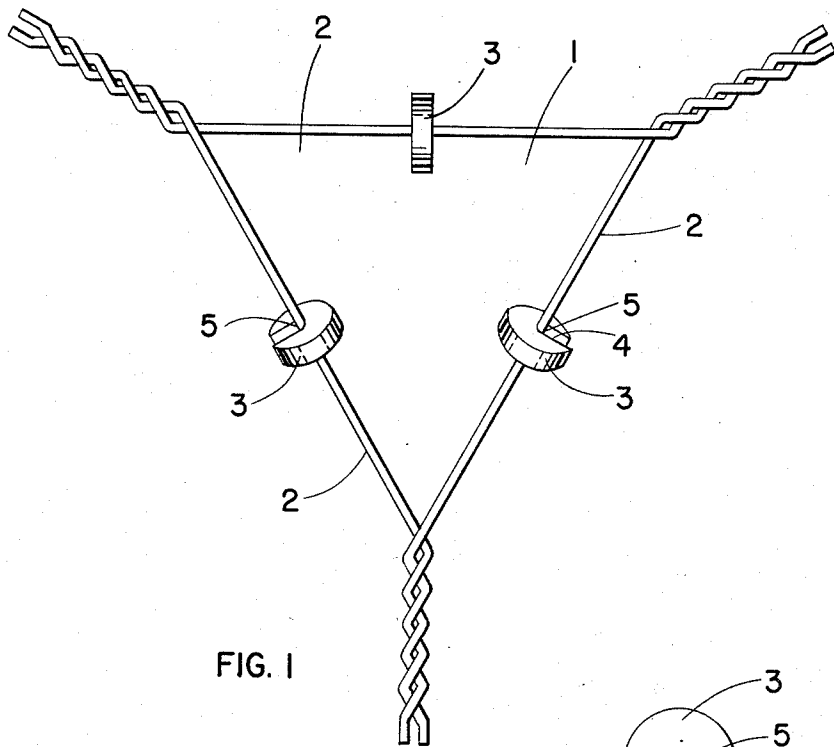


FIG. 1

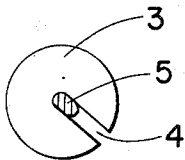


FIG. 2

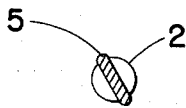


FIG. 3

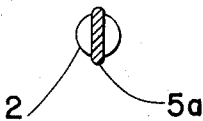


FIG. 4



FIG. 5

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COVERED WIRE TRIANGLES FOR HEATING
CRUCIBLES IN CHEMICAL ANALYSISRollin E. Stevens, Boulder, Colo., assignor to the United
States of America as represented by the Secretary of
the Interior

Application February 5, 1958, Serial No. 713,515

4 Claims. (Cl. 23—292)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention herein described and claimed may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of royalties thereon or therefor.

The invention relates to wire frames used for supporting crucibles over open flames during chemical manipulating steps.

Heating crucibles is required for conducting certain quantitative chemical analyses, as well as many other laboratory operations. As commonly performed, the crucible is supported in the flame by a wire framework, usually a wire triangle consisting of three pieces of wire, each of which may be covered at their midsection. The wires are twisted together at their bare ends, leaving a triangular opening. An uncovered triangle is satisfactory for heating crucibles made of ceramic materials, such as porcelain. For heating crucibles made of metal, such as platinum, gold, or silver, the sides of the triangle must be covered with a material that does not alloy with or contaminate in any way the metal of the crucible. The most commonly used materials for covering the sides of the wire triangles are fired clay, or fused silica. These may be either straight tubes covering the wire, or tubes having knobs or enlargements at the center of each side, which act to keep the crucible away from the sheath proper, thus allowing a freer access of flame.

However, the sheath, in both of these types, blocks complete contact of the flame with the crucible, impeding the attainment of high temperatures and even heat distribution within the metal crucibles. The triangles are not readily adjustable to accommodate different sized crucibles. Because of the rigid ceramic sheath surrounding the wires, they cannot be bent outward to make a larger opening, if desired. When one of the sheaths is broken, it cannot be replaced readily and the triangle is usually discarded.

The general object of my invention is to remedy the above enumerated faults of the conventional covered wire triangle. Specifically, the objects of this invention are to provide:

- (1) Removable ceramic spacers for a bare wire triangle.
- (2) Ceramic spacers which do not materially impede full contact of the crucible with the flame.
- (3) Ceramic spacers which can be readily replaced if broken.
- (4) Wire triangles, having ceramic spacers, which can be bent to accommodate different shaped crucibles.
- (5) Low cost wire triangles which can be cheaply constructed because of minimal use of expensive ceramic materials.

Other objects will be apparent from a consideration of the specification and claims.

My invention consists of thin disks of fused silica, fused clay, or other ceramic material, having a radial slot extending from the circumference to center, or somewhat beyond. By slipping these disks on the wires of a triangle, metal crucibles may be supported thereon for heat-

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ing over an open flame with relatively little heat loss. Since the disks are thin, there is much less chance of breakage of the ceramic elements, than in the conventional triangles, but if they do break, they are readily replaceable, in contrast to those presently available. No impediment to bending the triangles to accommodate different sized crucibles is presented by my ceramic spacing disks. This latter is impossible with conventional covered triangles.

10 In the drawing,

Figure 1 shows a triangle having the ceramic supporting disks mounted thereon.

Figure 2 is an enlarged cross-sectional view through one of the disks.

15 Figures 3, 4 and 5 show enlarged cross-sectional views of the flattened wire portion of the right-hand wire of Figure 1 at various angles.

In Figure 1, a wire triangle 1, formed by twisting together the ends of three wires, 2, has mounted thereon a plurality of ceramic disks 3. Each disk has a radial slot 4, which extends up to or somewhat beyond the center.

20 These ceramic disks may be made of porcelain, fired clay, or fused silica, for example. One method of making them is to cut a ceramic rod of suitable size, such as fused silica rod of 9 mm. diameter, into short lengths, such as about 3 mm. Then a slot somewhat narrower than the diameter of the wire is cut radially into the disk. When metal crucibles are not employed, other materials may be used.

25 Each of the wires 2 contains a flattened portion 5, as shown in Figures 2 to 5, made by pressing or stamping, so that the slotted portion may be fitted easily on the wires. The disk may be left on the flattened portion, or moved laterally along the wire until the slot contacts and binds on the unflattened portion, in order to clamp the disk on the wire.

30 These flattened areas may be made so that the flattened surface is inclined to the plane of the triangle, at right angles, or parallel thereto, as shown by elements 5, 5a, and 5b, in Figures 3, 4, and 5. Preferably, these surfaces are inclined upwardly and toward the center of the triangle, as in Figures 1 and 2, when the triangle is horizontal, since in this position gravity aids in keeping the disks in position.

35 Instead of a radial slot, having parallel sides, these may approach one another so as to form a triangularly shaped sector. Clamping may be achieved in this case on the round position of wire 2 simply by forcing the wire toward the apex. If desired, the supports may have shapes other than circular disks, as for example, polygonal configurations, or elliptical.

40 These disks can be kept on hand in large numbers to replace those that through some accident become broken. They may be conveniently packaged by wrapping in thin sheeting, such as paper, to form a cylindrical body, similar in appearance to a roll of candy wafers.

45 Although the description given herein is specific to a triangular frame, it is to be understood that my invention is not limited thereto, and that other shaped frames may be employed. Instead of thin plate-like spacers, other solid, slotted geometrical shapes may be employed, such as spheres for example. The important consideration in selecting the shape of the spacer is that access of flame to the crucible shall not be substantially impeded.

50 It is obvious that the invention described herein is susceptible over various modifications and changes without departing from the spirit thereof. It is therefore to be broadly construed, and to be limited only by the scope of the appended claims.

55 I claim:

60 1. In a wire frame crucible support having wire sides and adapted to hold a crucible over a flame, the improve-

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ment which comprises supporting means adapted to contact the sides of a crucible, said supporting means consisting of a relatively thin plate-like member, whereby flame access to the crucible is not substantially impeded, said plate-like member having a relatively narrow substantially radial slot extending approximately to the center thereof, said plate-like member at approximately its center being mounted on said wire, the wire extending into the said slot, and means whereby said plate-like member is restrained from lateral movement along said wire.

2. In a wire frame crucible support having wire sides and adapted to hold a crucible over a flame, the improvement which comprises supporting means adapted to contact the sides of a crucible, said supporting means consisting of a relatively thin disk, whereby flame access to the crucible is not substantially impeded, said disk having a relatively narrow substantially radial slot extending approximately to the center thereof, said disk at approximately its center being mounted on said wire, the wire extending into the said slot, and means whereby said disk is restrained from lateral movement along said wire.

3. In a crucible support adapted to hold a crucible over a flame consisting of three wire members arranged to form a triangular frame, the improvement which comprises supporting means adapted to contact the sides of a crucible, said supporting means consisting of a relatively thin plate-like member, whereby flame access to the crucible is not substantially impeded, said plate-like member having a substantially radial slot slightly narrower than the wire and extending to at least approximately the center of said plate-like member, each wire frame member

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being slightly constricted in at least one portion along its length, said plate-like member, at approximately the center thereof, being mounted on wire frame member at the place of constriction, the wire fitting into said slot, whereby the supporting member is restrained from substantial movement on the said wire.

4. In a crucible support adapted to hold a crucible over a flame consisting of three wire members arranged to form a triangular frame, the improvement which comprises supporting means adapted to contact the sides of a crucible, said supporting means consisting of relatively thin disks of ceramic composition, each of said disks having a slot along the radius thereof, said slot being slightly narrower than the wire of said wire frame members, each wire frame member being slightly constricted in at least one portion along its length, said disk, at approximately the center thereof, being mounted on the wire frame member at the place of constriction, the wire fitting into said slot, whereby the supporting member is restrained from substantial movement on the said wire, and flame access to a crucible is not impeded.

References Cited in the file of this patent

UNITED STATES PATENTS

2,391,466 Levin ----- Dec. 25, 1945

OTHER REFERENCES

Scientific Materials Blue Book, 1919, p. 501, item No. 5644.

General Laboratory Apparatus and Supplies, Lenz and Naumann, Inc., 1915, p. 464, Triangle No. 6462.