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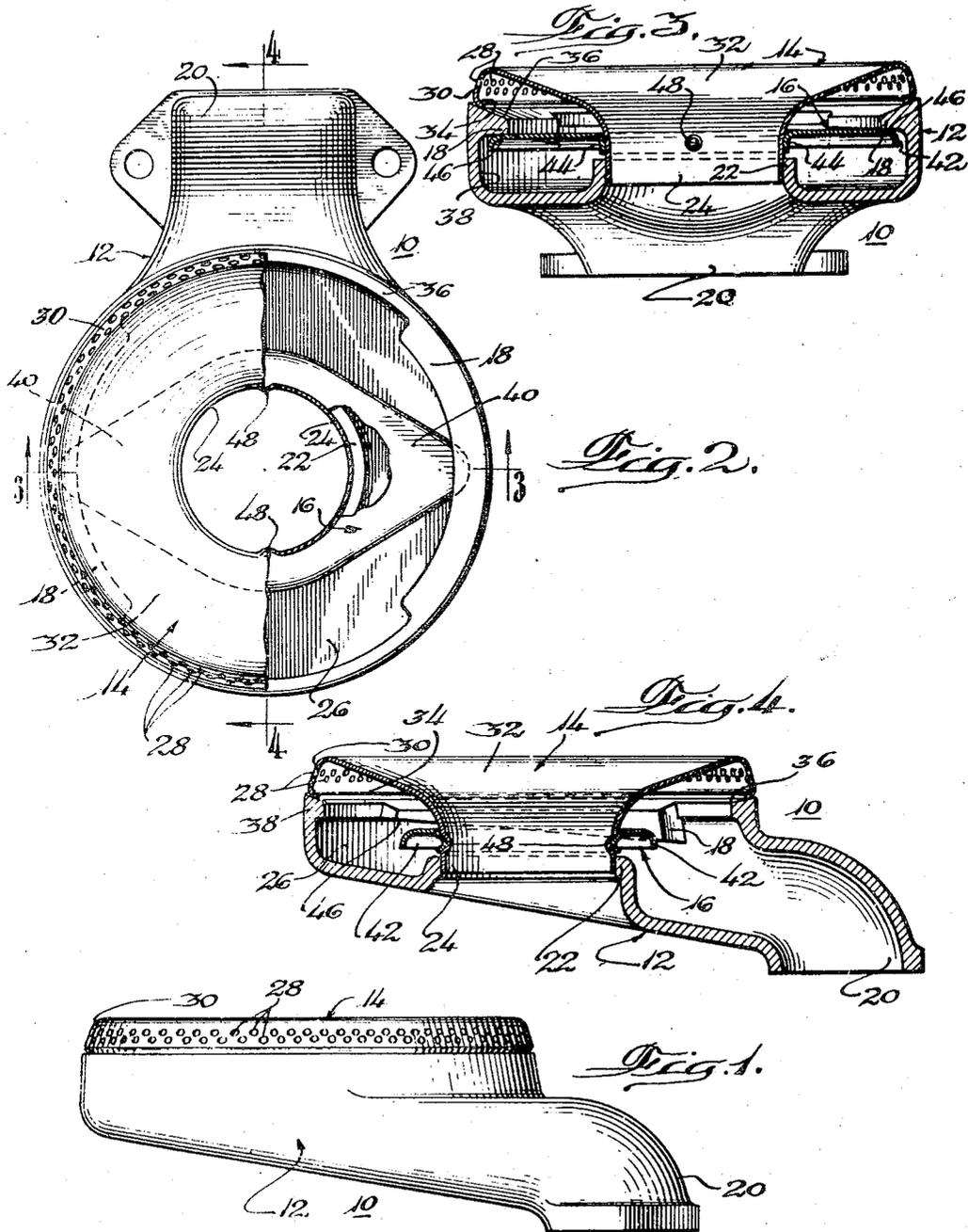
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2,486,278

GAS BURNER HAVING REMOVABLE CAP STRUCTURES

Filed April 28, 1944

2 Sheets-Sheet 1



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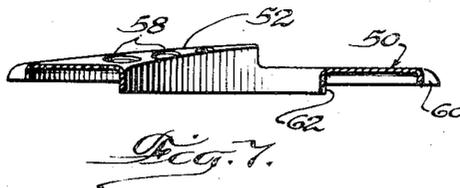
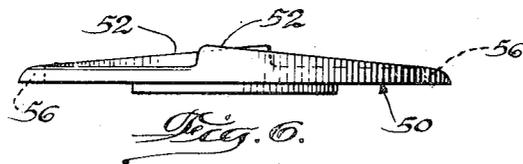
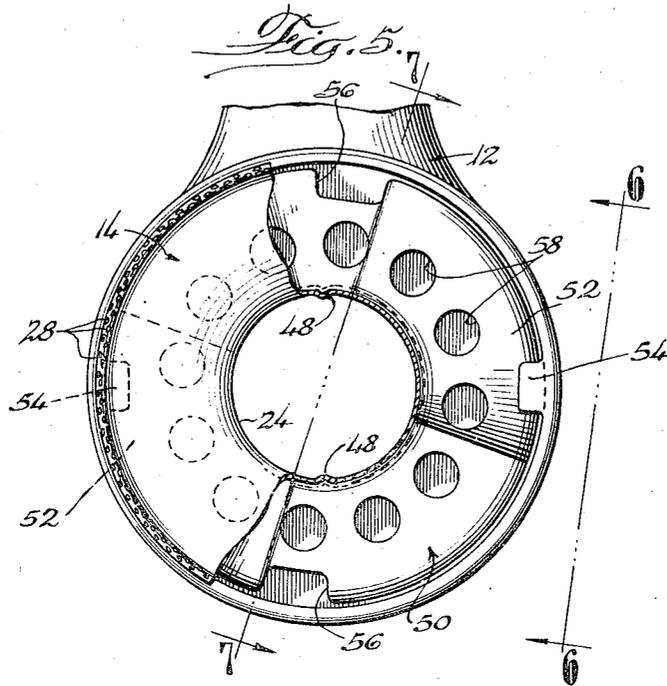
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UNITED STATES PATENT OFFICE

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GAS BURNER HAVING REMOVABLE CAP STRUCTURES

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Application April 28, 1944, Serial No. 533,159

19 Claims. (Cl. 158—116)

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The present invention relates to gas burners and particularly to burners of the type comprising detachably secured base and cap portions.

In the past, domestic gas range burners comprising base and cap or head portions have been held in assembled relation in various ways. Interfitting screw threads have been used, as have been bolts and other means. However, none of these arrangements has produced a burner cap which could be readily removed for cleaning. Screw threads invariably freeze as a result of alternate heating and cooling of the burner portions. Bolted constructions require the use of screw drivers or wrenches, are difficult to get at, and require considerable time for removal.

An improved gas burner construction, including fastening or securing means enabling the burner cap to be fastened to the base portion easily and also enabling it quickly to be detached for cleaning or other purposes, is disclosed in the copending application of myself and another Serial No. 379,618, filed February 19, 1941, which matured as Patent No. 2,386,113 on October 2, 1945. In the construction disclosed and claimed in this application, the cap and base portions are provided with cooperatively associated interengaging structure, whereby the head may be inserted into the base and then rotated a part turn to lock it in place.

The present invention has for its primary object a new and improved gas burner having securing means of the type including interengaging structure on the base and cap.

A further object of the present invention is the provision of a new and improved gas burner comprising detachable parts wherein the securing means requires no screws or bolts, and which requires only a few parts and can be manufactured readily.

A further object of the present invention is to provide a new and improved gas burner of the character aforesaid, wherein the securing means is of the "bayonet" type and of a character wherein "jamming" of the fastening means is minimized, the cap may be moved through a greater vertical distance relative to the base, and which can be manufactured from thin, light material.

Another object of the present invention is the provision of a new and improved gas burner including a burner base having an annular upwardly extending outer wall with spaced apart inward projections, a burner cap having a central dependent portion located centrally of the wall, and a securing member fastened to the de-

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pendent portion of the cap having opposed portions to engage the undersides of said projections, whereby the base and cap may be readily secured together and detached by relative rotation thereof.

Another object of the present invention is to provide a new and improved gas burner of the character set forth in the preceding paragraph, wherein the securing member is fixedly fastened to the cap and is made of material which can yield or bend somewhat if occasion demands when the cap and base are assembled.

Another object of the present invention is to provide a new and improved gas burner of the character set forth in the second preceding paragraph wherein the securing member is pivotally secured to the cap member.

Other objects and advantages of the present invention will become apparent from the ensuing description, in the course of which reference is had to the accompanying drawings, in which:

Fig. 1 is a side elevation of one embodiment of a gas burner constructed in accordance with the present invention;

Fig. 2 is a top plan view, partly broken away, of the burner shown in Fig. 1;

Fig. 3 is a vertical cross-sectional view taken along the line 3—3 of Fig. 2;

Fig. 4 is a vertical cross-sectional view of the burner taken along the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 2 of another embodiment of the present invention;

Figs. 6 and 7 are side elevational and cross-sectional views of the fastening member utilized in the burner shown in Fig. 5, Fig. 6 being a view looking in the direction 6—6 of Fig. 5 and Fig. 7 a view taken along the line 7—7 of Fig. 5.

As heretofore indicated, the present invention pertains particularly to the fastening means whereby the cap and base portions of the gas burner are detachably secured together. The fastening means may be utilized in various types of gas burners and in the instant case it has been illustrated in conjunction with a gas burner 10 comprising two parts, a base 12 and a cap or head 14 which are constructed in a manner disclosed and claimed in my copending application Serial No. 522,745, filed February 17, 1944, now abandoned.

In accordance with the embodiment of the invention illustrated in Figs. 1 to 4, inclusive, the burner base 12 and cap 14 are secured together by a "bayonet" type securing means comprising a bayonet member 16 secured to the cap and a pair of cooperating cam defining projections or

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lugs 18, preferably but not necessarily formed integrally with the outer wall of the base. The details of the securing means will be described in greater detail shortly after a brief description of the burner base and cap portions.

The gas burner illustrated in the drawings is actually the main burner section of a double burner, although the principles of the present invention may be utilized in the construction of other types of burners. The other section of the burner (the simmer section), which is located centrally of the illustrated section, has not been shown as it may take various conventional forms.

The base 12 is preferably made of cast iron. Gas is lead to it through a conduit defining lower portion 20, the bottom of which is machined so that it may be secured to a mixing tube (not shown) supplied with gas and primary combustion air in conventional manner.

The base is provided with an annular inner wall 22 defining a central opening, into which extends the cylindrical lower end 24 of the burner cap. This central opening receives the previously referred to but not illustrated simmer section of the burner. In the illustrated embodiment, the inside diameter of the opening in wall 22 is machined within close limits and the outer diameter of the cylindrical lower end 24 of the cap is formed within close limits to provide an accurate and close slip fit seal between the two, thereby to prevent undesired leakage of gas from the burner chamber defined by the base and cap members. A close fit of the two members is desirable as the illustrated cap is made of stainless steel, which has a coefficient of expansion approximately equal to that of cast iron.

The burner cap 14 is, in accordance with the invention of my copending application, made from thin metal stock, such as stainless steel, preferably having a thickness of about .020 inch and having a port arrangement providing efficient operation of the burner. Metals, other than stainless steel, and other thicknesses may be used.

The requisite port area is provided by a large number of small diameter ports 28 located relatively close together. These ports are formed in a portion 30 of the cap extending generally downwardly and outwardly, at an angle of about 15 degrees from the vertical, from the top of the cap which, it may be noted, is connected to the central lower cylindrical portion by a flared portion 32. The ports are arranged in two horizontal rows and the two rows of holes are staggered.

A gas seal is provided at the outer line of contact between the base and cap members by a relatively narrow sealing surface 34 at the underside of an inwardly and downwardly curved peripheral flange on the cap which abuts against the upwardly and outwardly extending annular sealing surface 36 formed at the upper end of the outer base wall 38, which end, it may be noted, is higher than the central opening 22 in the base. The surface 36 has an inclination of about 20 degrees from the horizontal and the turned over surface 34 rests against it. A good seal is thus formed with but little contact area between the two members so that the parts are not likely to stick and can be separated easily.

The fastening means of the present invention includes the previously referred to bayonet member 16, the opposite portions of which are indicated generally by the reference character 40. It may be noted, especially from Fig. 2, that the

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ends are rounded and of narrow arcuate extent so that they may be readily inserted between the adjacent ends of the cam defining projections 18. Generally speaking, the member 16 is diamond shaped.

The bayonet lock member 16 is mounted on the burner cap so as to be substantially transverse of the conduit 20 when the cap is secured to the base portion. When thus located, it does not interfere to any material extent with the flow of gas into the burner chamber 26 and through the ports 28.

In order to impart added strength to the bayonet member and to prevent it from cutting into the base member, its outer periphery is rounded to provide a downwardly extending peripheral flange 42. A similar flange 44 is provided at the central apertured portion of the bayonet member. In some instances it is preferable to have an upturned flange 44 at the central aperture rather than a downwardly extending flange as illustrated. This is particularly true where the projection 18 is lowered somewhat so that its upper surface need not be machined when the sealing surface 36 is machined.

The bayonet member 16 is constructed and arranged to provide an adjusting or compensating action in the event there is some variation in the two cam surfaces 46 located at the undersides of the projections 18. This can be accomplished by a pivotal fastening between the bayonet lock member and the burner cap, as by staking the bayonet lock member to the cap, as indicated by the reference characters 48 (see particularly Fig 4). In order that the requisite pivotal movement be obtained, the inside diameter of the central opening in the bayonet lock member is made slightly larger than the outside diameter of the central lower portion 24 of the burner cap. In other words, a loose fit is employed.

From the preceding detailed description of the present invention, it may be noted that the burner cap may be secured to and detached from the base member in a very simple manner. All that is necessary to secure the two in assembled relation is to place the cap over the base with the ends 40 of the bayonet lock member located between the ends of the projections 18. Then the cap is rotated to bring the ends 40 underneath the lugs 18 where they can contact the cam surfaces 46. Upon sufficient rotation, the cap is securely locked to the base member with the sealing surfaces 34 and 36 in abutting relation.

"Jamming" of the bayonet lock is substantially eliminated because of the rounded edges on the bayonet lock member and a considerable vertical movement may be given to the burner cap for the same reason and because of the relatively narrow ends 40 of the lock member.

The burner of the present invention also requires only a relatively few parts and is easy to manufacture. For instance, the pivoting action of the bayonet lock member 16 enables the cam surfaces 46 to be used in the "as cast" condition. Furthermore, few parts and no screws are required.

The principles of the present invention may be utilized in a construction wherein the cam surfaces are formed in the bayonet member, as illustrated in Figs. 5, 6 and 7. Here the fastening means includes a generally cylindrical "bayonet" member 50 loosely staked to the central dependent portion 24 of the burner cap. The outer peripheral portion of member 50 is provided with opposed upwardly facing cam sur-

faces 52, which can be done readily by a stamping operation, and preferably by a single stamping operation used in making the member.

The cam surfaces 52 cooperate with relatively narrow (in arcuate extent) inwardly extending projections 54 formed in the outer burner base wall. In order that the member 50, and the cap itself, may be properly placed relative to the base, the member is provided with slots 56 of widths somewhat greater than the projections 54. Considerable vertical movement of the burner cap is provided by making the cam surfaces extend over about 90° of the surface of the member.

In order that gas may flow to the ports without being materially affected by the fastening member, the latter is provided with an annular series of perforations 58.

Rigidity, strength, and prevention of cutting of parts is obtained by utilization of the downwardly extending outer and inner flanges 60 and 62 corresponding to flanges 42 and 44 of the first embodiment. The member 50 may be pivotally staked to the cap, as indicated by reference characters 48, the staking being so located that the member may pivot thereabout when the cap is being secured in place.

The embodiment of the invention possesses the advantages of the previously described embodiment and it is, therefore, believed unnecessary to repeat them at this point.

In accordance with another and important aspect of the present invention, the desired adjusting or compensating action, in the event there is some variation in the dimensions of the inwardly extending projections on the outer wall of the burner, may be provided by a securing member fixedly secured to the burner cap but capable of bending. For instance, the securing member 16 of the first described embodiment may be fixedly staked to the downwardly extending portion 24 of the burner cap and be made of material sufficiently thin so that it will bend in the event the projections 18 are not of the same dimensions.

While but two embodiments of the invention have been illustrated and described in detail, it should be understood that the details thereof are not intended to be limitative of the invention, except in so far as set forth in the accompanying claims.

What I claim as new and desire to secure by United States Letters Patent is:

1. In a gas burner, the combination including, a burner base having a central opening defined by an inner wall and having also an outer wall spaced from and extending higher than the inner wall, spaced apart projections extending a short distance radially inwardly from said outer wall, a burner cap overlying said burner base having structure defining an upwardly extending portion having a central opening and extending outward therefrom into abutting engagement with the top of the outer wall of the base and cooperating with the base to form a burner chamber, the inner wall of the base and the inner portion of said cap having adjacent mating sealing surfaces enabling the cap to be moved vertically relative to the base and fastening means on the upwardly extending portion of said cap above its gas seal forming surface and the inner wall of the base and extending outwardly across the chamber and underneath said projections for detachably fastening said burner cap to said base.

2. In a gas burner, the combination including,

a burner base having a central opening defined by an inner wall and having also an outer wall, spaced apart projections extending radially inwardly from said outer wall, a burner cap overlying said burner base having structure defining an upwardly extending portion having a central opening and extending outward therefrom into abutting engagement with the top of the outer wall of the base and cooperating with the base to form a burner chamber, the inner wall of the base and the inner portion of said cap having adjacent mating sealing surfaces enabling the cap to be moved vertically relative to the base and resilient structure on the upwardly extending portion of said cap above its gas seal forming surface and extending outwardly across the chamber and underneath said projections for yieldably and detachably fastening said burner cap to said base.

3. In a gas burner, the combination including, a burner base having a central opening defined by an inner wall and having also an outer wall, spaced apart projections extending radially inwardly from said outer wall, a burner cap including structure cooperating with said base to form a burner chamber and having an inner wall defining a central opening and resilient structure on the inner wall of said cap and extending outwardly across the burner chamber and underneath said projections for yieldably and detachably fastening said burner cap to said base.

4. In a gas burner, the combination including, a burner base having a central opening defined by an inner wall and having also an outer wall, spaced apart projections extending radially inwardly from said outer wall and having cam surfaces on their undersides, a burner cap overlying said burner base having structure defining an upwardly extending portion having a central opening and extending outward therefrom into abutting engagement with the top of the outer wall of the base and cooperating with the base to form a burner chamber, the inner wall of the base and the inner portion of said cap having adjacent mating sealing surfaces enabling the cap to be moved vertically relative to the base, and means secured to the upwardly extending portion of said cap above its gas seal forming surface and extending outwardly across the chamber and underneath the cam surfaces of said projections for detachably fastening said burner cap to said base.

5. In a gas burner, the combination including, a burner base having a central opening defined by an inner wall and having also an outer wall, spaced apart projections extending radially inwardly from said outer wall, a burner cap overlying said burner base having structure defining an upwardly extending portion having a central opening and extending outward therefrom into abutting engagement with the top of the outer wall of the base and cooperating with the base to form a burner chamber, the inner wall of the base and the inner portion of said cap having adjacent mating sealing surfaces enabling the cap to be moved vertically relative to the base, and means including structure on the upwardly extending portion of said cap above its gas seal forming surface and having cam portions extending across the chamber and underneath said projections for detachably fastening said burner cap to said base.

6. In a gas burner, the combination including, a burner base having a central opening defined by an inner wall and having also an outer wall, spaced apart projections extending radially in-

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wardly from said outer wall, a burner cap including structure cooperating with said base to form a burner chamber and having an inner wall defining a central opening, the inner wall of the base and the inner wall of said cap having adjoining surfaces arranged to form a gas seal, and resilient structure of thin bendable material secured to the structure of said cap above its gas seal forming surface and having opposed arms extending outwardly across said chamber and underneath said projections for yieldably and detachably fastening said burner cap to said base.

7. In a gas burner, the combination including, a burner base having structure defining spaced apart inner and outer walls, a burner cap having inner wall defining structure and structure cooperating with said base to form a burner chamber, the inner walls of said base and cap having adjacent annular concentric portions and said base and cap having vertically aligned abutting surfaces, whereby the cap can be placed on the base and rotated relative to the base with said abutting surfaces in engagement, and means for detachably securing said cap to said base by limited rotation of said cap relative to said base, said securing means including angularly spaced apart relatively short radially inwardly extending projections on and below the top of the outer wall of said base, and fastening structure on the inner wall of said cap having portions extending across the burner chamber and underneath said projections and engageable therewith upon rotation of said cap.

8. In a gas burner, the combination including, a burner base having structure defining spaced apart inner and outer walls and a gas inlet passageway, a burner cap having inner wall defining structure and structure cooperating with said base to form a burner chamber, the inner walls of said base and cap having adjacent annular concentric portions and said base and cap having vertically aligned abutting surfaces, whereby the cap can be placed on the base and rotated relative to the base with said abutting surfaces in engagement, and means for detachably securing said cap to said base by limited rotation of said cap relative to said base, said securing means including a pair of diametrically opposite relatively short radially inwardly extending projections on and below the top of the outer wall of said base, and resilient fastening structure secured to the inner wall of said cap having opposed arms extending across the burner chamber and underneath said projections and engageable therewith upon rotation of said cap, said projections being located so that said arms are substantially transverse of the inlet passageway when the cap is secured to the base.

9. A detachable gas burner cap having an annular generally vertical wall defining a central opening, top structure extending generally outwardly from said wall and terminating in an outer rim portion, said wall and structure adapted to comprise part of a burner chamber wall, and resilient burner cap attaching structure extending radially outwardly from said annular wall to the region of the vertical projection of the rim.

10. A detachable gas burner cap having an annular generally vertical wall defining a central opening, top structure extending generally outwardly from said wall and terminating in an outer rim portion, said wall and structure adapted to comprise part of a burner chamber wall, said vertical wall having an annular con-

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tinuous outwardly facing sealing surface, and resilient burner cap attaching structure secured to said annular wall above said sealing surface and extending radially outwardly from said annular wall to the region of the vertical projection of the rim.

11. In a gas burner, the combination including, a burner base having structure defining an inner portion and a wall spaced radially outwardly of and above said inner portion, a burner cap having inner, intermediate and outer portions and cooperatively associated with said base to form a burner chamber, the inner portions of said base and cap having apertured concentric portions and said intermediate portion of said cap being spaced from said base wall and said outer portion of said cap seating on the top of said base wall, whereby the cap can be placed on the base and rotated relative to the base with said concentric portions interfitted and said outer portion abutting against the top of said base wall, and means for detachably securing said cap to said base by limited rotation of said cap relative to said base, said securing means including angularly spaced apart structures below the top of said base wall and extending radially inward from said wall and cooperating fastening structures on said cap extending radially outwardly therefrom and underneath said structures.

12. In a gas burner, the combination including, a burner base having structure defining an inner portion and a wall spaced radially outwardly of and above said inner portion, a burner cap having inner, intermediate and outer portions and cooperatively associated with said base to form a burner chamber, the inner portions of said base and cap having apertured concentric portions and said intermediate portion of said cap being spaced from said base wall and said outer portion of said cap seating on the top of said base wall, whereby the cap can be placed on the base and rotated relative to the base with said concentric portions interfitted and said outer portion abutting against the top of said base wall, and means for detachably securing said cap to said base by limited rotation of said cap relative to said base, said securing means including angularly spaced apart structures on said radially outwardly spaced base wall located below the top of said base wall and radially inwardly from the abutting portions of said cap and wall and cooperating fastening structures on said cap extending radially outwardly therefrom and underneath said structures.

13. In a gas burner, the combination including, a burner base having structure defining a central opening and a wall located radially outwardly from and above the opening, spaced apart projections disposed below the top of said wall and extending radially inwardly therefrom, a burner cap cooperating with said base to form a burner chamber and having structure defining a central opening and concentrically located relative to the opening defining base structure and a top portion adapted to abut on the top of said base wall, the cap and base being spaced from each other in between said concentric and abutting portions and the concentric portions of said base and cap interfitted in such manner that the cap can be moved both vertically and angularly relative to the base when the cap is placed on the base, and fastening means for detachably securing said cap and base by limited relative angular movement between them, said fastening means including camming portions on said cap between

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its opening defining structure and abutting portion extending radially outwardly across the space between the top and base wall and underneath said projections on the wall.

14. In a gas burner, the combination including, 5
 a burner base having structure defining an inner portion and a chamber wall portion spaced radially outwardly of and above said inner portion, a burner cap cooperating with said base to form a burner chamber and having vertically 10
 spaced apart inner and outer portions cooperatively associated with said inner and wall portions of the base, respectively, said cap having a portion intermediate its inner and outer portions spaced from said base wall portion and 15
 said base and cap having vertically aligned abutting surfaces, the inner portions of said base and cap having interfitting apertured concentric portions, whereby the cap can be placed on the base and rotated relative to the base with said 20
 concentric portions interfitted and with said abutting surfaces in engagement, and means for detachably securing said cap to said base by limited rotation of said cap relative to said base, said securing means including angularly spaced 25
 apart structures below the top of said base wall portion and extending radially inward from said wall portion and cooperating fastening structures on the intermediate portion of said cap extending 30
 radially outwardly therefrom across said space and underneath said angularly spaced apart structures.

15. A burner cap assembly including a burner cap and a bayonet member for detachably securing the burner cap to a burner base, said cap 35
 having a central annular dependent portion, and said bayonet member comprising a generally diamond shaped member of resilient material and having a central aperture with a continuous annular surface and surrounding and secured to 40
 the dependent annular portion of the cap.

16. A burner cap assembly as claimed in claim 15, wherein the periphery of the aperture in said member is flanged and the outer periphery of said member has a rounded downwardly extending 45
 flange.

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17. A burner cap assembly including a burner cap and a bayonet member for detachably securing the burner cap to a burner base, said cap having a central dependent portion and said bayonet member comprising a generally circular, centrally apertured member surrounding and secured to the dependent portion of the cap, said member having oppositely located cam defining portions, and an annular series of perforations therethrough.

18. A burner cap assembly as claimed in claim 17, wherein the periphery of the aperture in said member is flanged and the outer periphery of said member has a rounded downwardly extending flange.

19. A burner cap assembly including a burner cap and a bayonet member for detachably securing the burner cap to a burner base, said cap having a central annular dependent portion and an outer rim portion, and said bayonet member comprising structure having a central aperture and surrounding and secured to the dependent annular portion of the cap, said structure including also angularly spaced apart bayonet type fastening members of resilient material extending from said dependent portion outwardly to the region of the vertical projection of the rim.

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