STOVES AND LIKE APPARATUS USING LIQUEFIED GAS


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8 Claims. (Cl. 158—33)

My invention relates to stoves and other apparatus using a combustible gas liquefied under pressure in an easily interchangeable container. It has been proposed to provide such containers with a lid or plug adapted to be perforated when the container is to be connected with the stove or the like. With such an arrangement means should be provided to prevent the gas from escaping in the outer atmosphere. The container may for instance have a rubber plug which is perforated by means of a hollow needle, or the container may be formed with an internally threaded discharge head adapted to receive the correspondingly threaded gas intake end of the stove, the said head being normally closed by a membrane which is cut or perforated by a hollow punch solid with the said end. These known arrangements complicate the container and substantially increase the cost thereof. It becomes therefore practically impossible to consider the container as a non-refillable can adapted to be rejected after use.

A first object of my invention is to provide a stove or like apparatus using a combustible gas under liquefied form, wherein the gas container will comprise no screw-threaded discharge head, no plug of plastic or like material and will be in the form of a mere inexpensive can.

A further object of my invention is a stove or like gas apparatus comprising a slidable gas intake member provided with an end ring of flexible material adapted to be tightly applied against the wall of the gas container, and an axial perforating needle, movable with respect to the said ring and adapted to be driven through the said wall to form therein an orifice connecting the container with the inner space of the said gas intake member, while means are provided to maintain the said member in gas-tight engagement with the said wall already before the said needle has perforated the latter.

The perforating needle is preferably of non-circular cross-section in the per se known manner, and means are provided to lower this needle and to rotate it about its own axis when the gas intake head has been applied against the container wall, whereby the said needle will make therein a circular hole corresponding to the circumference circumscribed about the cross-section of the needle.

In order to improve tightness between the end ring of flexible material and the container wall, there is advantageously formed in the said wall a cup-shaped depression adapted to receive the said ring, which is correspondingly shaped in axial section, whereby inflation of the ring under the action of the gas under pressure will cause a more intimate contact between the outer periphery of the ring and the inner periphery of the depression. The face or side of the container on which the said depression is formed is preferably bulged to obtain an increased mechanical resistance against the axial pressure exerted on the said face or side by the ring of flexible material.

In a preferred embodiment of my invention the apparatus comprises a support in which the liquefied-gas container may be secured by appropriate means, which support is provided with an internally threaded sleeve adapted to receive the end portion of a gas intake head, the said end portion slidably enclosing a spring pressed tubular gas intake member the outer end of which carries the ring of flexible material, while the perforating needle, disposed co-axially to the said member, is solid with the foregoing end portion whereby it rotates on itself and moves downwardly when the said end portion is screwed into the sleeve of the said support. When the gas intake head is screwed into the sleeve of the support, the end ring of flexible material is first pressed into tight engagement with the container wall under the action of the urging spring, then the perforating needle comes into contact with the said wall and drills therein a hole through which gas may flow from the container into the gas intake head.

In the annexed drawings:
Fig. 1 is a general vertical section of a portable stove according to my invention.
Fig. 2 is the corresponding plan view thereof.
Fig. 3 is a fragmental enlarged sectional view showing the details of an elastic clip adapted to retain the container in the support.
Fig. 4 is a partial vertical section showing the gas intake head disposed above the sleeve of the support to be engaged thereinto.
Fig. 5 to 7 are sections taken along lines V—V, VI—VI and VII—VII of Fig. 4.
Fig. 8 to 10 are large scale detail sections illustrating three successive steps during the screwing down of the tail portion of the gas intake head into the sleeve of the support of the gas container.

The apparatus illustrated comprises a support 1 in the form of an inverted cup having a frusto-conical bottom. The central portion or smaller base of the said bottom carries an internally screw-threaded sleeve 2 which is for instance welded in a hole provided therein. This support 1 is adapted to receive a container 3 filled with liquefied gas under pressure, for instance butane gas, the said container being in the form of a cylindrical can of reduced height with the upper end bulging upwardly. In the central portion of this upper end there is provided a spherical depression 3a. This container 3 is made of relatively thin sheet metal, its lower end being sealed and/or soldered. It comprises no particular gas discharge member such as a plastic plug, a threaded head with a ball valve or a membrane, etc. It is engaged upwardly into the support 1 and it is secured thereon by pivoted spring clips 4. Each clip 4 is formed of a band of spring metal, as for instance steel, one end of which is rolled on a small pin 5 (Figs. 3 and 5) fixed to the support 1, while its other end is bent in the form of a hook adapted to engage elastically the lower edge 3b of the container 3. This band is besides appropriately shaped to follow the contour of the side of the container 3. The support 1 is slotted in front of each clip 4 in order that the latter may freely come into contact with the side of the container 3.

The apparatus illustrated further comprises a gas intake head 6 provided with an end or tail portion 6a adapted to be screwed into the sleeve 2. This body 6 carries a needle valve 7 actuated by an outer knob 8 to close a passage between the inner blind bore of the end portion or tail 6a and an upper bore co-axial to the said tail 6a and adapted to receive the conventional gas outlet nozzle 9 of the gas burner of the stove, the said nozzle carrying a sleeve 10 provided with air inlet holes 11a and topped by a cup 11 with a perforated cover 12.

The end portion or tail 6a forms a cylinder for a tubular piston-like member 13 provided with a sealing ring
14. The number 15 is one of a down towards the 16, in which a downward extending rod 12 is formed in an assembly. As shown in Fig. 7, this rod 16 projects sub-
stantially below the edge of the said cup 15 and is dis-
posed of in this manner, except that the annular face of this rod 16 is free from contact with the base of the cup 15. The rod 12 is dis-
posed of in the said cup 15 in a manner as above described.

15. The number 16 is disposed of in the said cup 15 in a manner as above described. As shown in Fig. 7, this rod 16 projects sub-
stantially below the edge of the said cup 15 and is dis-
posed of in an assembly, except that the annular face of this rod 16 is free from contact with the base of the cup 15. The rod 12 is dis-
posed of in the said cup 15 in a manner as above described.

16. The number 16 is disposed of in the said cup 15 in a manner as above described. As shown in Fig. 7, this rod 16 projects sub-
stantially below the edge of the said cup 15 and is dis-
posed of in an assembly, except that the annular face of this rod 16 is free from contact with the base of the cup 15. The rod 12 is dis-
posed of in the said cup 15 in a manner as above described.

The number 16 is disposed of in the said cup 15 in a manner as above described. As shown in Fig. 7, this rod 16 projects sub-
stantially below the edge of the said cup 15 and is dis-
posed of in an assembly, except that the annular face of this rod 16 is free from contact with the base of the cup 15. The rod 12 is dis-
posed of in the said cup 15 in a manner as above described.
take member to perforate said perforable wall, said perforating needle being so disposed within said gas-intake head that it does not engage said perforable wall before said ring has been tightly applied against same.

2. In a portable stove or like apparatus as claimed in claim 1, said perforable wall being formed with a depression adapted to receive said ring.

3. In a portable stove or like apparatus as claimed in claim 1, said perforable wall being formed with a depression adapted to receive said ring and the outer end of said ring being substantially frusto-conical to fit into said depression.

4. In a portable stove or like apparatus as claimed in claim 1, said container being in the form of a cylindrical can having a bulged upper end, the top of said bulged end being adapted to form said perforable wall.

5. In a portable stove or like apparatus as claimed in claim 1, said tubular tail portion having a blind bore, said perforating needle having a T-shaped head and said spring means being interposed between said T-shaped head and said tubular gas-intake member to maintain said T-shaped head against the bottom of said blind bore.

6. In a portable stove or like apparatus as claimed in claim 1, said abutment carried by said tubular tail portion to limit the outward stroke of said tubular gas-intake member within said tubular tail portion under the action of said spring means, the outermost position of said tubular gas-intake member being such that said needle terminates short of the outer end of said ring.

7. In a portable stove or like apparatus a sealed gas container having a perforable wall; a gas-intake head adapted to receive gas from said container after perforation of said perforable wall, said gas-intake head being formed with an outwardly opening bore; a tubular gas-intake member slidable and rotatably movable in the bore of said gas-intake head; spring means urging said gas-intake member outwardly with respect to said gas-intake head; a ring of a flexible sealing material at the outer end of said tubular gas-intake member; means to force said gas-intake head towards said perforable wall against the action of said spring means to cause said ring to be pressed against said wall in gas-tight engagement therewith; and a perforating needle carried by said gas-intake head coaxially to said gas-intake member to perforate said perforable wall when said gas-intake head is forced towards said container, said needle being so disposed within said head that it does not engage said perforable wall before said ring has been tightly applied against same.

8. In a portable stove or like apparatus as claimed in claim 7, means to limit the outward stroke of said tubular gas-intake member under the action of said spring means, the outermost position of said tubular gas-intake member being such that said needle terminates short of the outer end of said ring.

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