March 10, 1953 W. H. FREYGANG 2,630,936

WELDED CONTAINER AND CAP

Filed June 30, 1949 2 SHEETS—SHEET 1

Fig. 1

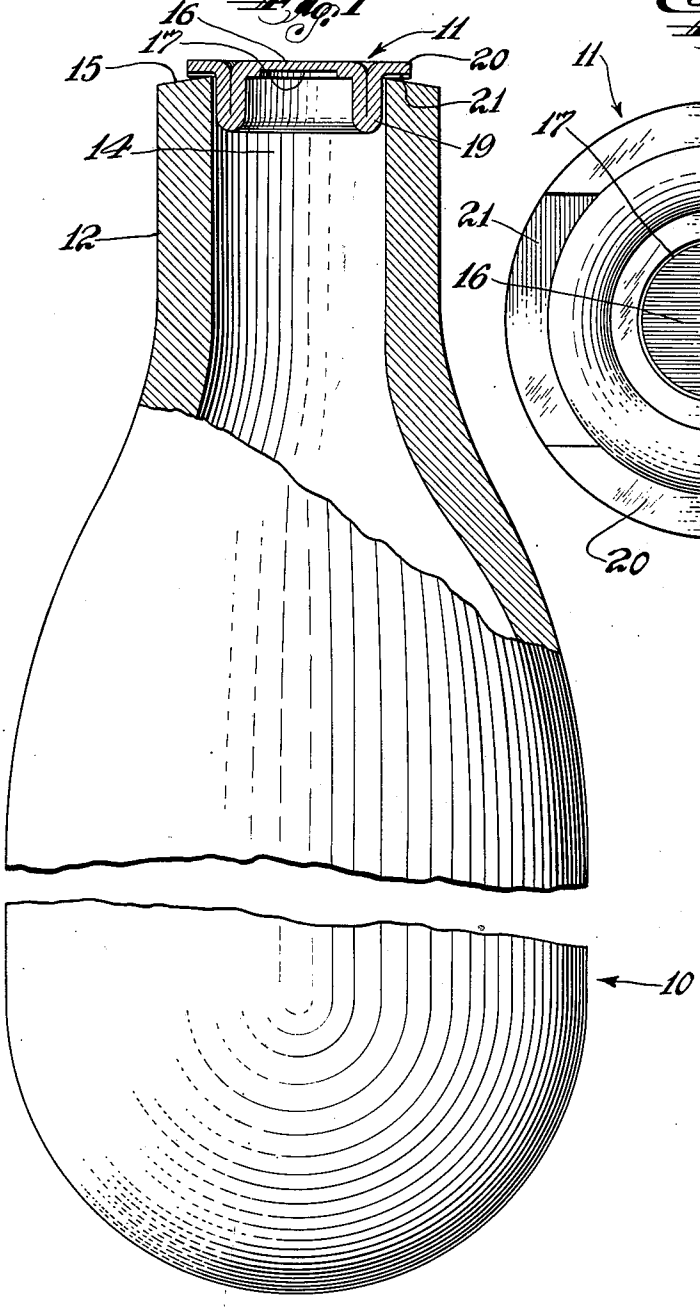
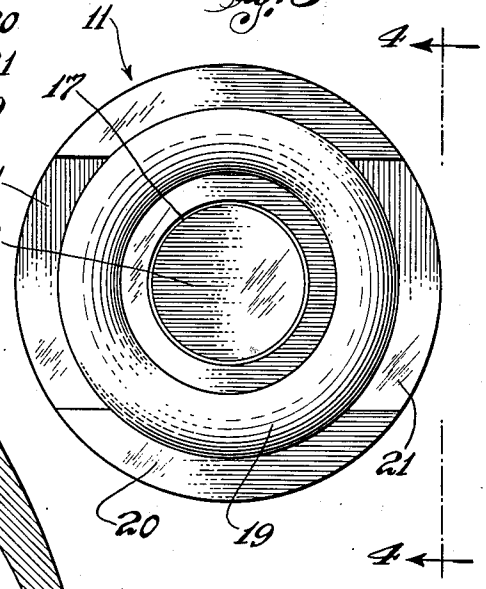


Fig. 3



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Fig. 2

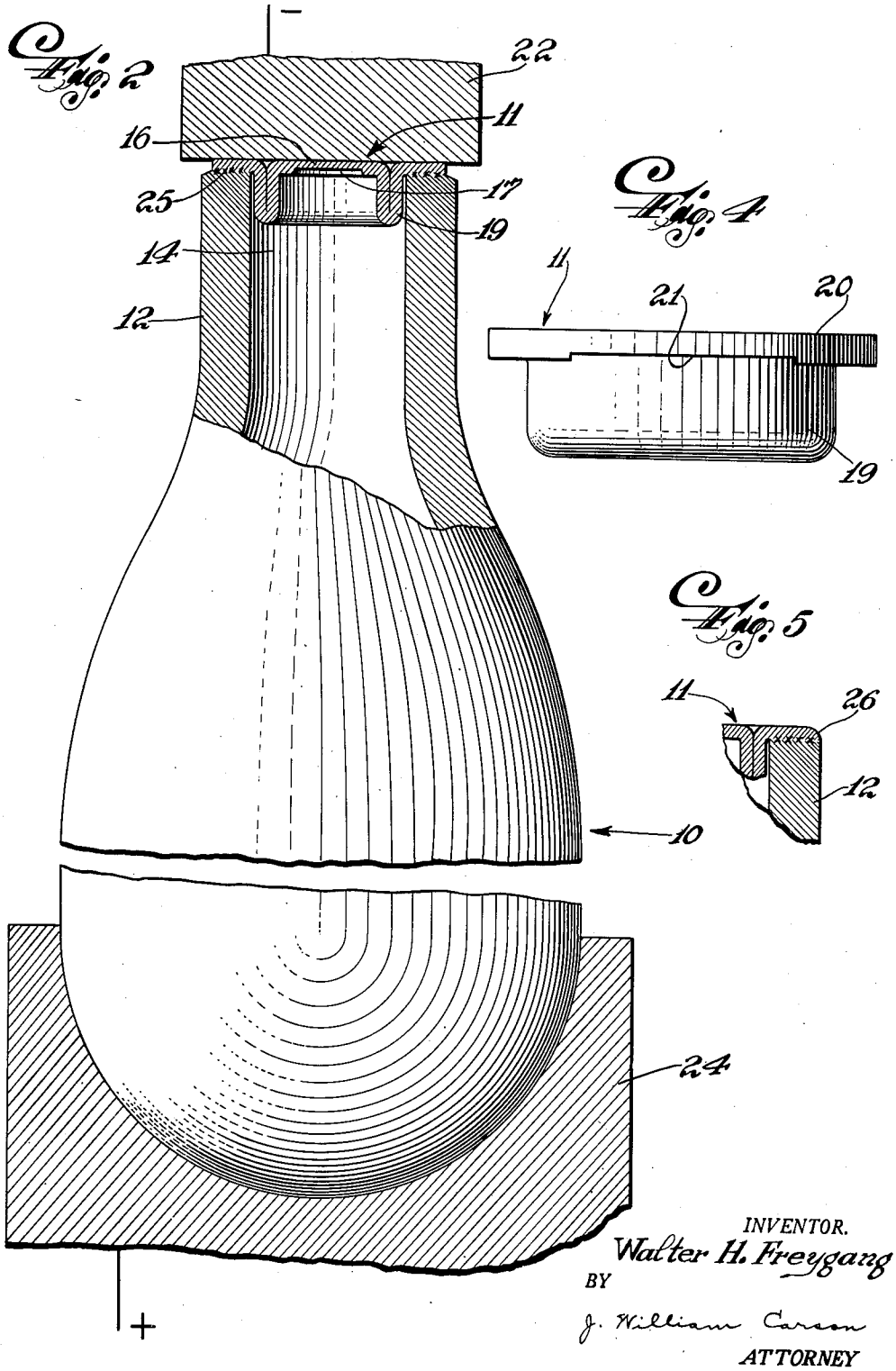


Fig. 4

Fig. 5

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WELDED CONTAINER AND CAP

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2 Claims. (Cl. 220—3)

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The present invention relates to cartridges or capsules for storing fluid medium under pressure, and, more particularly, relates to a welded container and cap structure for confining compressed and/or liquefied gases such as carbon dioxide, nitrous oxide and the like, and to a method of forming the weld.

The present invention aims to provide a container having a tubular portion formed with an opening and an annular edge, and a cap having a depending skirt extending into the container opening to position the cap on the container for filling of the latter and having an annular flange contacting the container edge and adapted to be butt welded thereto, the flange being provided with means for admitting fluid medium into the container while the cap is positioned thereon prior to being welded to the container.

Accordingly, an object of the present invention is to provide a container and cap structure which is simple in construction and can be economically manufactured.

Another object is to provide a container and cap structure which can be readily filled while positioned between welding electrodes.

Another object is to provide a container and cap structure adapted for securement by resistance welding.

A further object consists in the details of construction and arrangement of the container and cap whereby the foregoing objects are accomplished.

A still further object is to provide an improved method of welding the cap on the container.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawing, forming a part of the specification, wherein:

Figure 1 is an enlarged fragmentary view, partly in section and partly in elevation, illustrating a container and cap structure in accordance with the invention prior to securement of the cap to the container.

Figure 2 is a view similar to Figure 1, illustrating the cap and container positioned between welding electrodes and secured to each other.

Figure 3 is a plan view of the cap as viewed from the underside thereof.

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Figure 4 is an end view of the cap as viewed along the line 4—4 on Figure 3, illustrating a detail of the cap.

Figure 5 is a fragmentary sectional view, illustrating the peripheral edge portion of the container after reforming thereof.

Referring to the drawing in detail, there is shown a cartridge or capsule comprising a container 10 and a cap or closure 11, each constructed of material suitable for welding, such as metal.

The container illustrated herein by way of example is of the bulb-shaped type having a tubular neck portion 12 formed with an opening 14 and provided with a bevelled or chamfered annular edge 15. The edge 15 preferably is chamfered downwardly and outwardly at an angle of between about ten and twenty degrees to the horizontal to facilitate butt welding the cap thereto by a resistance welding operation as described more fully hereinafter.

The cap 11 comprises a central disc portion 16 having a coined area 17 on the underside thereof to facilitate piercing, a tubular skirt 19 depending from the central portion adapted to extend into the opening 14 to cooperate with the inner wall of the tubular neck portion of the container to position the cap on the container during the filling of the latter, and an annular horizontal flange 20 extending outwardly from the skirt adapted to partially overlie and be superimposed on the container edge 15 for butt welding thereto.

In order to facilitate filling of the container with fluid medium under pressure while the cap is positioned thereon as illustrated in Figure 1, the underside of the flange is formed with recess means 21 forming a passage for admitting the fluid medium between the flange and the container edge 15.

As shown more particularly in Figures 3 and 4, the recess means 21 preferably comprise a pair of diametrically opposed recesses, each extending along the underside of the flange for approximately one-quarter of the circumference of the flange. These recesses may be advantageously provided by simultaneously forming the same with the coined area 17 or by separate operations.

In order to fill the cartridge and thereafter weld the container and cap, the cap is placed on the container, as shown in Figure 1, the depending skirt cooperating with the neck wall to retain the cap in assembled position and thereby facilitate handling thereof either manually or by automatic machinery. The assembled cap and con-

tainer are then positoned in a charging chamber (not shown) between electrodes **22** and **24**, such as shown in Figure 2, and fluid medium is admitted to the charging chamber and is caused to flow into the container by way of the passages between the cap flange and the container edge.

When a predetermined quantity of fluid medium has been introduced into the container, electric current is caused to flow between the electrodes **22** and **24**, which is of a value to produce a resistance welding operation. During the flow of the current, axial pressure is applied on the cap to hold the same on the container, whereby the chamfered edge fuses progressively from its inner periphery towards its outer periphery and the cap flange thins out to increase its contact area on the edge to form an annular butt weld **25** of considerable width between the container and the cap flange, as shown in Figure 2, serving to confine the fluid medium in the container for storage.

After the container and cap are welded, the peripheral corner of the edge may be crimped to round off the same at **26**, as shown in Figure 5.

In view of the foregoing description, it will be seen that the present invention provides an improved cartridge for storing fluid medium under pressure which is extremely simple in construction, can be manufactured economically, and is readily filled and closed. The depending skirt inserted into the neck opening facilitates assembly of the cap and container, and the chamfered edge and the cap flange cooperate to provide a leak-proof seal for confining liquefied and/or compressed gas. Also, by rounding the peripheral edge portion of the container damage thereby to gaskets or sealing surfaces which it engages during use of the cartridge is prevented.

As various changes may be made without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

I claim:

1. In a welded container and cap structure for confining fluid medium under pressure, a container of resistance weldable metal having a tubular neck portion formed with an opening and provided at the extreme end thereof with an upwardly facing outwardly and downwardly chamfered annular surface forming a relatively sharp edge defining said opening; and a closure cap of resistance weldable metal having an inverted cup-shaped portion including a central circular section of a thickness to facilitate puncturing the same and including a tubular depending skirt extending into said container opening in close proximity to but spaced from the inner wall of said tubular neck portion for centering said cap on said container but providing a passage for the fluid medium with which said container is to be filled, and said cap having an annular horizontal flange extending outwardly from said skirt and at least partially overlying said neck surface with said sharp edge engaging the underside of said flange adjacent the outer wall of said skirt, said flange having arcuate circumferentially extending shallow recess means extending from the outer edge to the inner edge of said flange at the underside thereof, said recess means having a circumferential length equal to about half the circumference of the flange for permitting fluid medium to pass freely with minimum flow resistance between said flange and said annular container neck surface and enter said container while said cap is positioned on said container prior to being welded thereto, said recess means by reason of the shallowness and circumferential length thereof being readily filled with fused metal of said container edge upon welding said cap to said container whereby a continuous annular seal is formed between said cap flange and said container edge.

2. In a welded container and cap structure for confining fluid medium under pressure, a container of resistance weldable metal having a tubular neck portion formed with an opening and provided at the extreme end thereof with an upwardly facing outwardly and downwardly chamfered annular surface forming a relatively sharp edge defining said opening; and a closure cap of resistance weldable metal having an inverted cup-shaped portion including a central circular section formed with a central recess at the underside thereof and including a tubular depending skirt extending into said container opening in close proximity to but spaced from the inner wall of said tubular neck portion for centering said cap on said container but providing a passage for the fluid medium with which said container is to be filled, and said cap having an annular horizontal flange extending outwardly from said skirt and being of a width substantially less than that of said annular neck surface and partially overlying said neck surface with said sharp edge engaging the underside of said flange adjacent the outer wall of said skirt, said flange having a pair of arcuate circumferentially extending and diametrically opposite shallow recesses extending from the outer edge to the inner edge of said flange at the underside thereof, said recesses having a combined circumferential length equal to about half the circumference of the flange for permitting fluid medium to pass freely with minimum flow resistance between said flange and said annular container neck surface and enter said container while said cap is positioned on said container prior to being welded thereto, said recesses by reason of their shallowness and circumferential length being readily filled with fused metal of said container edge upon welding said cap to said container whereby a continuous annular seal is formed between said cap flange and said container edge.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,380,310	Wolcott	May 31, 1921
1,732,227	Fenn	Oct. 22, 1929
2,268,297	O'Neil	Dec. 30, 1941
2,280,088	Honegger	Apr. 21, 1942
2,322,236	Ingram	June 22, 1943
2,352,754	Anderson	July 4, 1944
2,424,801	Crabbe et al.	July 29, 1947
2,425,448	Weida	Aug. 12, 1947
2,496,883	McKalip	Feb. 7, 1950
2,501,621	Smith	Mar. 21, 1950