

[54] **QUICK COUPLING DEVICE FOR LPG CONTAINERS**

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[22] Filed: **Dec. 21, 1970**

[21] Appl. No.: **99,991**

[30] **Foreign Application Priority Data**

Dec. 23, 1969 France.....6944586

[52] U.S. Cl. ....**285/315, 285/319, 285/322**

[51] Int. Cl. ....**F16I 37/12**

[58] Field of Search.....285/322, 315, 316, 321, 319, 285/258; 222/400.7, 402.16

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[57] **ABSTRACT**

A coupling device for mounting appliances such as camp stoves gas lamps on compressed gas containers of the type having an opening surrounded by a circular projecting fold. The device comprises a hollow member equipped at one end with a number of fingers, and a sleeve, which may be displaced vertically along this hollow member. This sleeve in its lower position presses the fingers against the fold and is blocked in this lower position either by means of two semi-circular springs which co-operate with a special shaped slit in the sleeve or by means of special fingers which block the sleeve.

**5 Claims, 10 Drawing Figures**

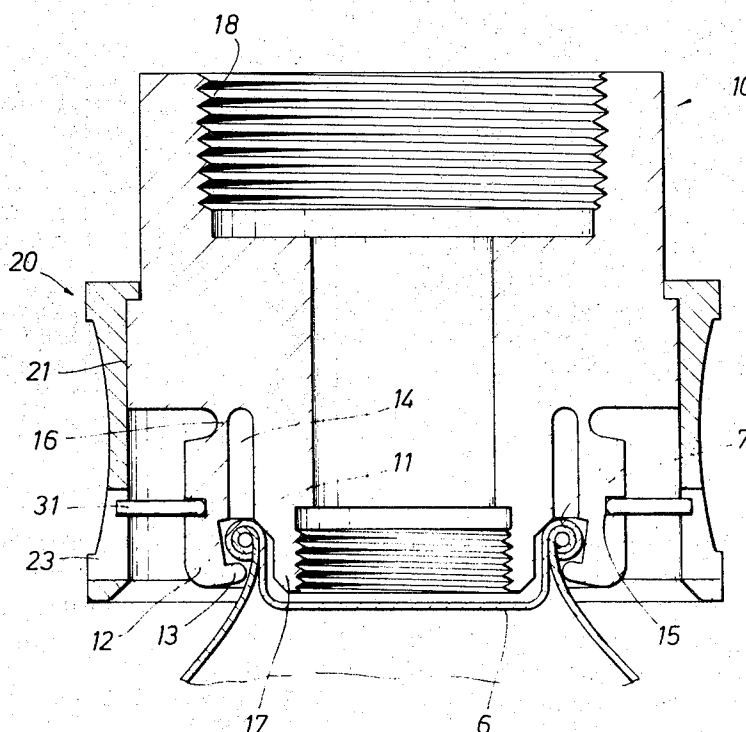


FIG. 1

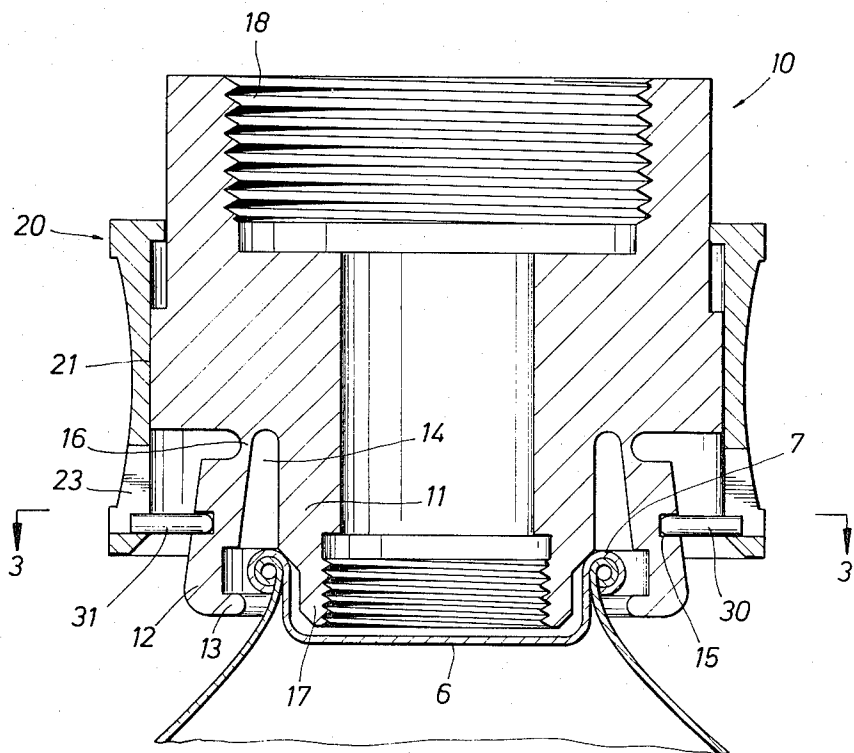
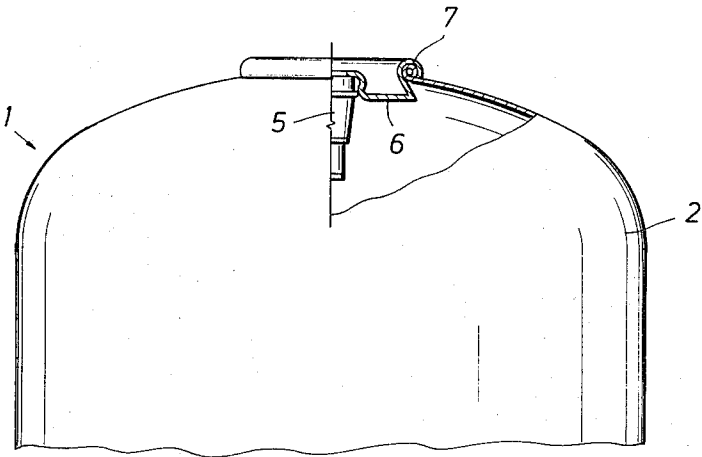


FIG. 2

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FIG. 3

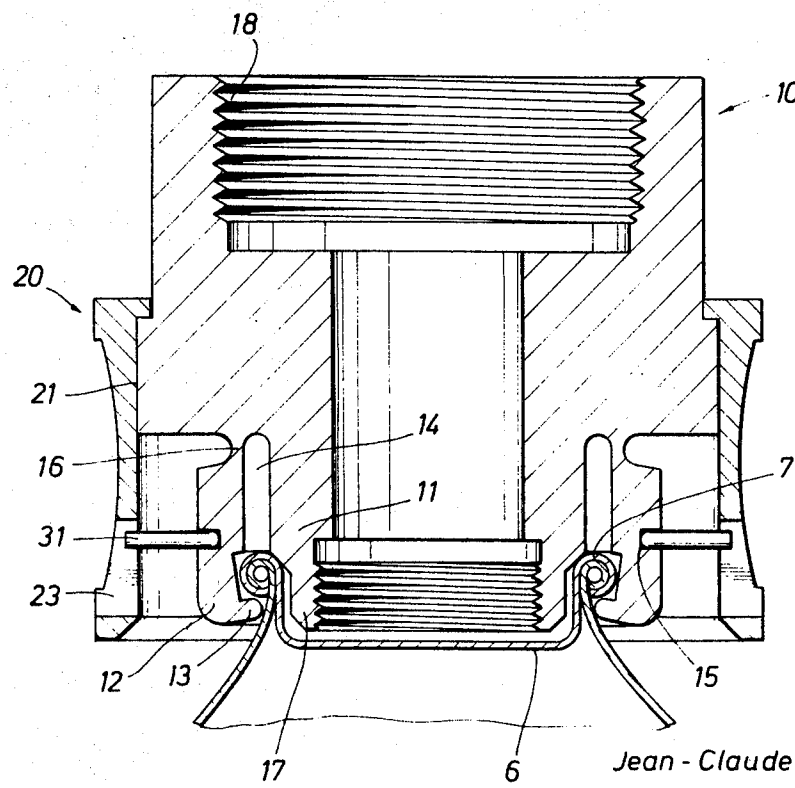
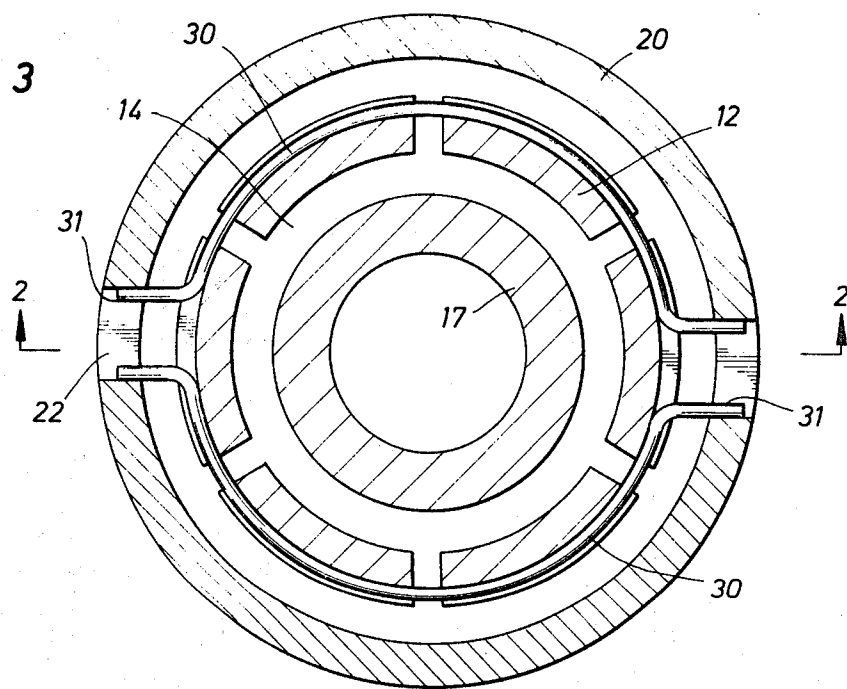


FIG. 4

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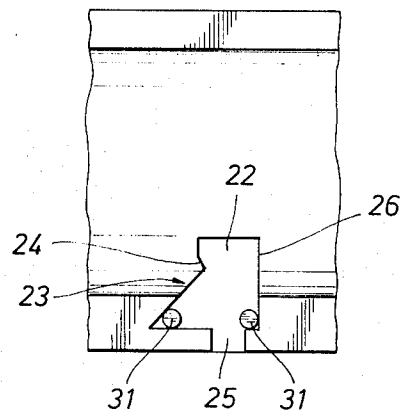


FIG. 5

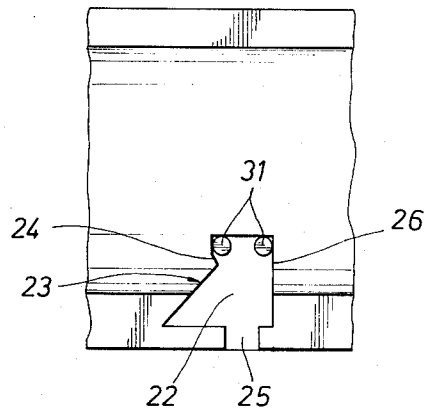


FIG. 6

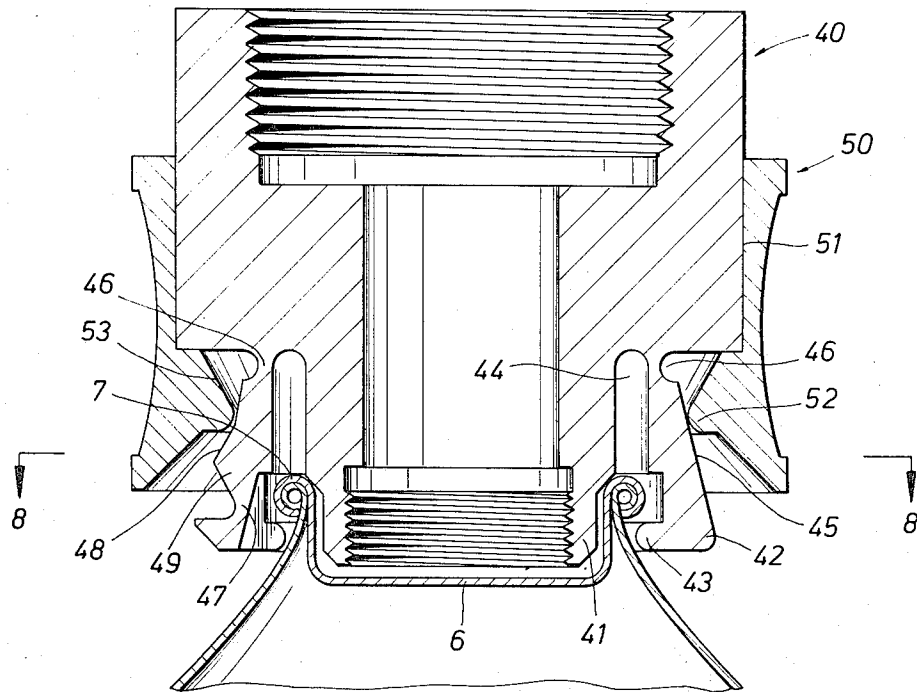
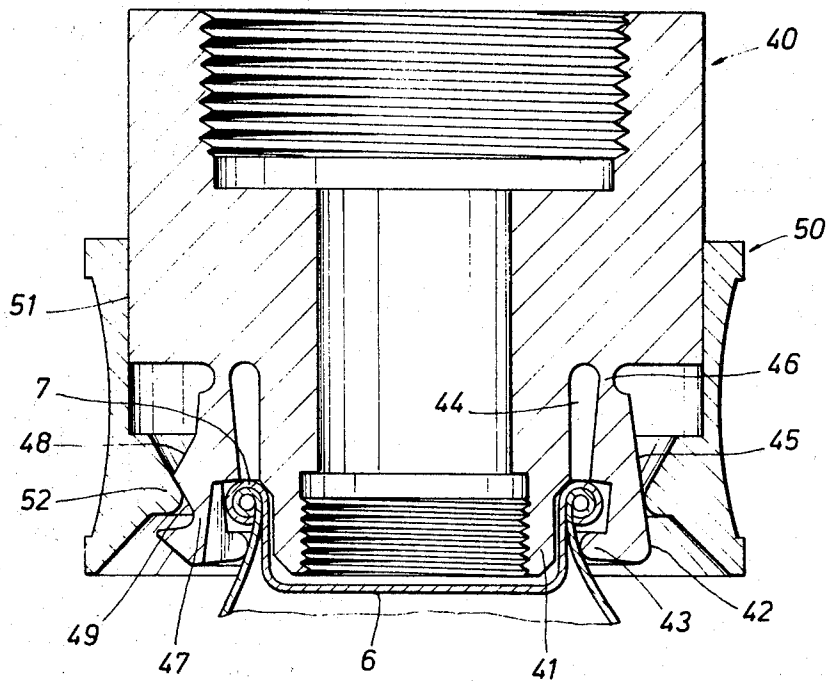
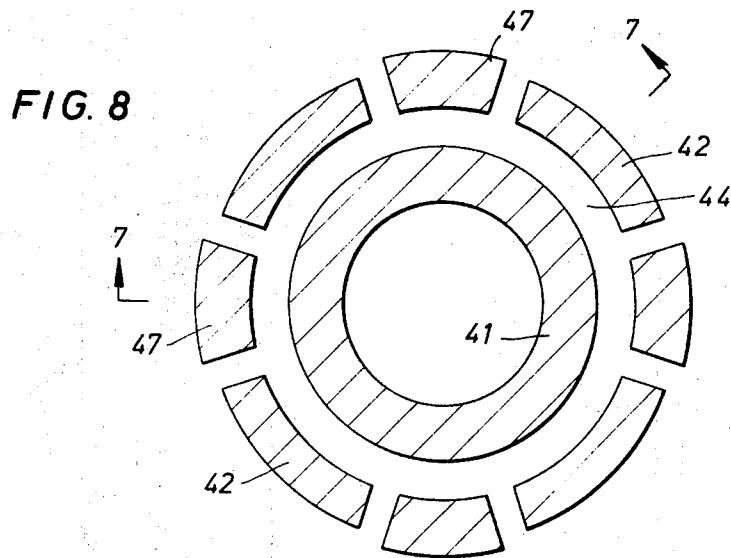


FIG. 7

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**FIG. 9**

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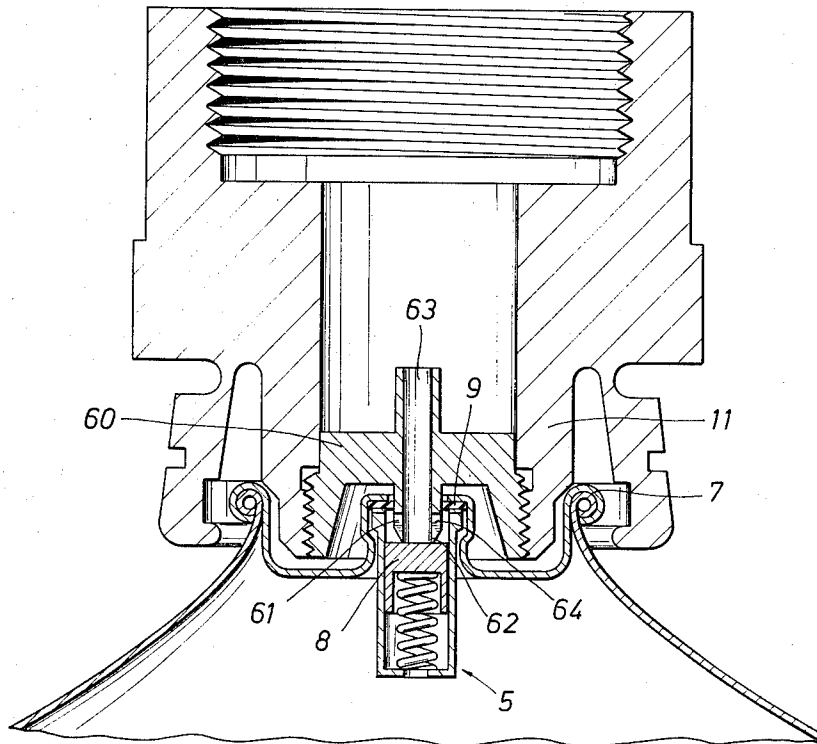


FIG. 10

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## QUICK COUPLING DEVICE FOR LPG CONTAINERS

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to the mounting of gas operated appliances on containers holding the gases, particularly on containers for butane and propane in compressed and/or liquefied form.

The invention relates more particularly to the coupling and fastening of appliances on gas cartridges of the type comprising a cylindrical chamber in the center line of which a valve, such as an aerosol type valve, may be arranged and which chamber terminates in a circular projecting fold in the shape of a collar.

#### 2. Summary of the Invention

The object of the invention is to provide a coupling device permitting rapid coupling and fastening of various appliances such as camp stoves and gas lamps to gas containers having a collar or projecting fold of the above-mentioned type. One of the objects of the invention is to permit rapid and simple coupling with little manual effort. Another object of the invention is to permit an efficient coupling, ensuring the centering of the various appliances on the opening of the container, particularly in the center line of its valve. To this end, the coupling device according to the invention comprises a hollow member and a cylindrical sleeve. The member is provided at one of its extremities adapted to be attached to the container with regularly spaced elastic fingers. The cylindrical sleeve can be slid along the exterior surface of the member between two longitudinal positions; tightening means permit the fingers to be pressed against the exterior of the fold projecting from the container, and co-operate with an inclined face to ensure progressive tightening when the sleeve is displaced toward its position nearest the extremity carrying the fingers. Locking means are provided to retain the sleeve in this tightened position, thus avoiding its free displacement as a result of the elasticity of the locking fingers.

In a first embodiment of the invention, the tightening means consist of flexible rings accommodated in one or more grooves on the exterior of the fingers, and of which at least one extremity co-operates with a tightening inclined face borne by the cylindrical sleeve. The locking means comprise an inclined face of short length and of an inclination inverse to that of the tightening inclined face, with respect to a radial plane.

In a second embodiment of the invention, the tightening means comprise an inclined face arranged on the exterior part of the fingers, co-operating with an annular interior projecting part of the cylindrical sleeve. The locking means comprise elastic arms carried by the member, the exterior part of the locking means having two faces with inverted inclinations, with respect to a radial plane. These faces confine the projecting parts on the exterior surface of the arms which can co-operate with the annular interior projecting part of the cylindrical sleeve.

Mounting of the coupling device on an appliance, for example a gas lamp, may be effected by various known methods. It may be fastened, for example, by a screw connection, bayonet connection, snap connection or the like, preferably comprising a circular sealing joint. The coupling device may also be an integral part of the appliance.

The coupling device may be provided on its exterior part with a push-element for opening the valve, of the gas container is provided with one. This push-element may also be provided on the appliance itself.

For a better understanding of the practice of the invention, reference is made to the following description and the accompanying drawings given by way of non-limitative examples.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows an elevation partly in cross-section, of a container of the aerosol type, to which the coupling device according to the invention is adapted to be attached.

FIG. 2 shows an elevational view, in axial cross-section taken along the line 2—2 in FIG. 3, of the coupling device according to the invention in a first embodiment.

FIG. 3 shows the same device in a transverse cross-section taken along the line 3—3 in FIG. 2.

FIG. 4 is similar to FIG. 2, the device being in the tightened and locked position.

FIGS. 5 and 6 are partial side elevations of the device, in the tightened and released positions, respectively.

FIG. 7 shows an elevation, in axial cross-section taken along the line 7—7 of FIG. 8 of the coupling device of the invention in a second embodiment.

FIG. 8 shows a top plan view of this same device in transverse cross-section taken along the line 8—8 of FIG. 7.

FIG. 9 shows this same device in the tightened and locked position, in a view similar to that of FIG. 7.

FIG. 10 shows a partial view of a device according to the invention comprising a push-element co-operating with a valve.

### DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 shows a container 1 of the type to which the devices according to the invention are adapted to be coupled. This container comprises a member 2 of stamped sheet iron and a sealing cap 6 likewise of stamped sheet iron. The sealing cap 6 is provided in its center with a standardized valve 5 of the aerosol type. The edge of the cap 6 is rolled around the edge of the member 2 so as to form a projecting rim 7. The valve 5 is situated inside the hollow space of the cap 6, below the plane tangential to the upper part of the rolled rim 7.

For the coupling to a container of the type shown in FIG. 1 the invention provides a first device shown in FIGS. 2-6, comprising a hollow member 10, a cylindrical sleeve 20 and flexible rings 30. The hollow member 10, a cylindrical sleeve 20 and flexible rings 30. The hollow interior of the member 10 preferably contains coupling means such as screw threads 17 and 18 adapted to receive respectively a piece enabling the valve 5 to be opened and an appliance operating when the gas leaves the container. At its extremely adapted to be fixed to a container 1, the member contains a cylindrical part 11 and fingers 12. The fingers 12 are grooved with an external slot 15 and have jaws 13. They are connected to the member 10 by a narrowed part 16. Between the fingers 12 and the cylindrical part 11 there is a space 14.

The cylindrical sleeve 20 can slide along the member 10, being guided by its cylindrical interior surface 21. In two diametrically opposed parts the sleeve 20 comprises notches 22 shown in FIGS. 5 and 6. Each notch 22 has at its bottom end an opening 25 and has two inclined faces 23 and 24 which are very unequal in length.

Each of the flexible rings 30 has a semi-circular part accommodated in the groove 15 provided on the exterior of the fingers 12 and two extremities 31 extending in a substantially radial direction. One of the extremities 31 of each flexible ring 30 engages in each of the notches 22.

The operation of the device described above is easy to understand. The device, having its various components in the respective positions shown in FIGS. 2 and 3, is placed over the edge which is so rolled as to form a collar 7 of a container 1, its cylindrical 4 part penetrating into the hollow space of the cap 6 of the container. Simultaneously, the rolled edge is inserted between the cylindrical part 11 and the widely separated fingers 12. Then the sleeve 20 is slid along the member 10 towards its bottom end. The flexible rings 30 cannot be moved towards the bottom end as they are retained longitudinally by the groove 15; their extremities 31 will then slide along the rims of the notches 22, one extremity of each ring co-operating with the inclined faces 23 and 24. The extremity 31 of the ring forced to glide along the inclined faces 23 and 24 will at first cause a tightening of the rings which, engaging the groove 15 with the fingers 12, will tighten these fingers and move them progressively to the position shown in FIG. 4.

Since the extremities 31 co-operate with the inclined faces 23, the elasticity of the fingers, due to their narrowed part 16, tends to oppose the tightening movement obtained by sliding the sleeve 20 towards the bottom end. From the moment the extremities 31 have left the inclined face 23 and have reached the inclined face 24 the elasticity of the fingers tend, while separating the ring 30, to co-operate with the descending movement of the sleeve. The position shown in FIGS. 4 and 6 is therefore a stable position: it is the locked position.

To release the device from the container, the movement is reversed: that is to say, the sleeve 20 is raised by sliding it towards the top along the member 10. At first, the elasticity of the fingers 12 tends to oppose the movement, since the extremities 31 of the rings 30 co-operate with the inclined face 24. Subsequently, the fingers 12 tend to accelerate the raising of the sleeve since the extremities 31 of the rings 30 co-operate with the inclined face 23.

In a second embodiment, shown in FIGS. 7-9, the device comprises a member 40 and a sleeve 50. The member 40 has at its lower extremity adapted to be connected to a container 1 a cylindrical part 41, fingers 42 and arms 47. The fingers 42 have jaws 43, a narrowed part 46 connecting the fingers 42 to the member 40 ensuring their elasticity, and an inclined face 45 on their exterior part. The arms 47 have a narrowed connecting part 46 and two oppositely inclined faces 48 and 49 forming the exterior surfaces. Between the fingers 43 and the arms 47 on the one hand and the cylindrical part 41 on the other, there is a space 44. The fingers 42 and the arms 47 are alternately arranged around the cylindrical part 41.

The cylindrical sleeve 50 can slide along the member 40, being guided by its cylindrical interior surface 51. It has an annular interior projecting part 52, confined by an inclined face 53.

The operation of the second device is similar to that of the first. The device having different components in the respective positions shown in FIG. 7, is placed on the edge which is so rolled as to form a collar 7 of a container 1, its cylindrical part 41, penetrating into the hollow of the cap 6 of the container 1. Simultaneously, the rolled edge 7 is inserted between the cylindrical part 41 on the one hand and the separated fingers 42 and arms 47 on the other hand. Then the sleeve 50 is displaced towards the bottom end by sliding it towards the bottom end along the member 40. The annular internal projecting part 52 of the sleeve 50 comes into contact with the inclined faces 45 of the fingers 42 and the inclined faces 48 of the arms 47, and pivots the fingers and the arms around their narrowed part 46 in continuing its descending movement. The projection part 52 soon reaches the inclined face 49 of the arm 47. From this moment, the fingers 42 continue to oppose the movement towards the bottom end of the sleeve 50 which continues to press them against the rolled edge 7, but the arms 47 are released, their inclined face 49 co-operating with the inclined face 53 of the projecting part 52 of the sleeve 50. When the movement towards the bottom of the sleeve 50 is arrested, the fingers 42 are tightly pressed on to the rolled edge 7, and in reaction, tend to push up the sleeve 50. But the arms 47, which would be urged back by such a movement, oppose it. The device is thus locked since the shoulder on the cylindrical part 41 prevents downward movement of the member 40.

To release the device from the container 1, the movement is reversed, that is to say, the sleeve 50 is raised by sliding it along the member 40. At first, the fingers 42 promote this movement, whereas the arms 47 oppose it. Then, when the projecting part comes into contact with the inclined face 48, the arms promote the movement as well.

FIG. 10 shows a coupling device according to the first embodiment described which is provided with a push-element 60, screwed into the screw-threaded hole 17 of the lower part of the member 10. This push-element has an axial tubular part 61 provided with a bore 63 the lower part of which is conical in shape, the tubular part 61 of the push-element has at its extremity a gas passage formed by a radial slot 64. When the coupling device is placed in position on a container having a valve 5, the tubular part 61 penetrates into the valve and pushes away the sealing joint 9 with its conical extremity 62. This same tubular part 61 pushes back the valve body 8 of the valve against the action of the valve spring, and thus allows gas to escape from the container. However, the gas can only flow out through the bore 63, as the joint 9 ensures the sealing effect around the tubular part 61. Control or shutting-off of the gas flow can be affected by means connected to the coupled appliances.

Of course, the invention is not limited to the embodiment described, but also covers all modifications falling within the scope of the invention. In particular, tightening and locking may be effected by different means, which may comprise a single ring or more than two rings. The number of fingers and arms provided on the



member may vary but there should be at least three fingers.

The coupling devices according to the invention permit the coupling of a large variety of appliances, particularly small stoves, radiators, gas lamps, refrigerators, blow-lamps and spraying appliances to gas containers.

Finally, in the cross-section shown in FIGS. 2, 4, 7, 9, the opening of the container has not been drawn: this opening may be provided and arranged in any appropriate manner.

I claim as my invention

1. A coupling device for mounting an appliance on a compressed gas container of the type having an opening surrounded by a circular projecting fold which comprises:

- a hollow base member having a top part adapted to be coupled to the appliance;
- a sleeve slidably mounted on the base member;
- a plurality of elastic fingers carried by the base member at the bottom end thereof and spaced around the periphery of the base member at regular intervals, the elastic fingers being biased to a normally open position in which the fingers can be fitted over the circular projecting fold;

tightening means comprising at least one flexible ring at least partially surrounding the elastic fingers and a tightening inclined face provided on the sleeve, said elastic finger having a slot for receiving said flexible ring, said ring having at least one extremity which cooperates with said tightening inclined face whereby when the sleeve is displaced longitudinally along the base member toward a tightened

position, the extremity of the ring slides along the tightening inclined face causing the ring to move inward with respect to the base member thereby moving the elastic fingers radially inward into engagement with the circular projecting fold; and

locking means operatively connected to the sleeve for locking the sleeve in the tightened position.

2. The coupling device of Claim 1 wherein the base member comprises a cylindrical part at the end which carries the elastic fingers for co-operating with a cylindrical hollow space of the container internal of the circular projecting fold.

3. The coupling device of Claim 2 wherein the cylindrical part comprises a circular shoulder for co-operatively engaging the top part of the circular projecting fold when the sleeve is in the tightened position to prevent downward movement of the base member.

4. The coupling device of claim 1 wherein the locking means comprise a locking inclined face provided on the sleeve and having an incline inverse to that of the tightening inclined face, said locking inclined face intersecting the tightening inclined face at a position such that when the sleeve is displaced longitudinally along the base member toward the tightened position the extremity of the ring slides along the tightening inclined face to the point of intersection of the tightening inclined face with the locking inclined face and then slides along the locking inclined face to lock the sleeve in the tightened position.

5. The coupling device of claim 1 including a central push-element carried at the bottom end of the coupling device for opening the push valve in the gas container when the coupling device is mounted on the container.

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