

[54] VISE FOR GAS CONTAINERS AND SIMILAR TANKS

[75] Inventors: **Wayne R. Burrell**, Golden Valley;
Richard P. Burrell, Stillwater, both
of Minn.

[73] Assignee: **Burrell Bros., Inc.**, Coon Rapids,
Minn.

[22] Filed: **Apr. 5, 1972**

[21] Appl. No.: **241,357**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 200,294, Nov. 19,
1971.

[52] U.S. Cl. **248/313, 269/130**

[51] Int. Cl. **A62c 33/00**

[58] Field of Search **248/231, 313, 316 R,**
248/309; 24/273; 269/130, 132

[56] References Cited

UNITED STATES PATENTS

1,578,134	3/1926	Kaiser	248/313 X
2,029,707	2/1936	Dodelin	248/313
3,332,650	7/1967	Judge	248/231 X

2,277,737	3/1942	Wilkinson	248/313 X
1,646,463	10/1927	Stokesberry	24/273 UX
1,288,839	12/1918	Conrad et al.	248/313
3,379,431	4/1968	Gill	269/130

FOREIGN PATENTS OR APPLICATIONS

214,297	8/1960	Austria	248/313
1,089,288	9/1960	Germany	248/313

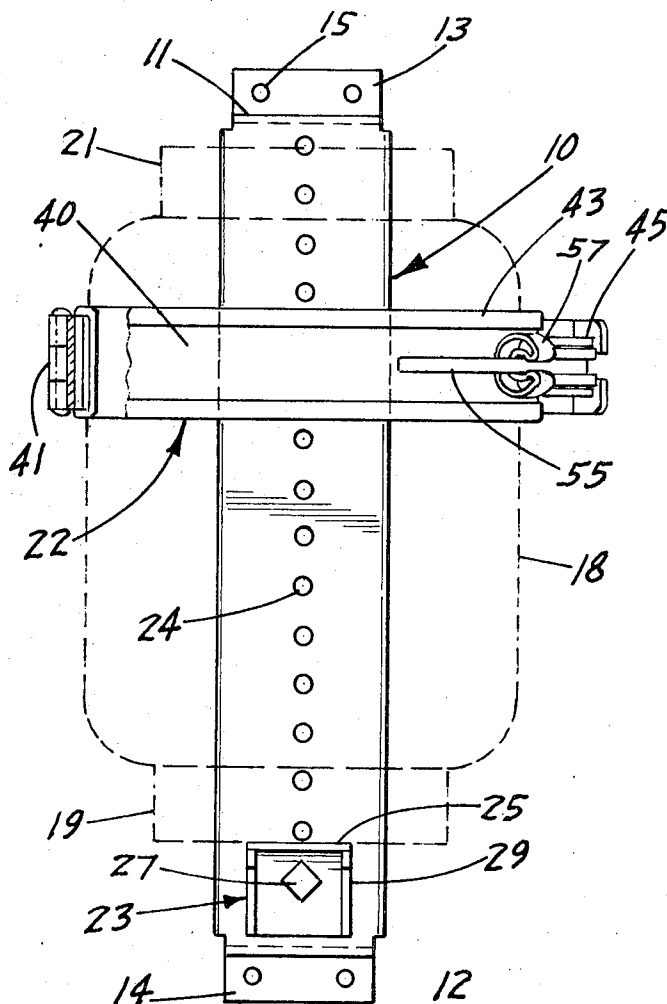
Primary Examiner—J. Franklin Foss

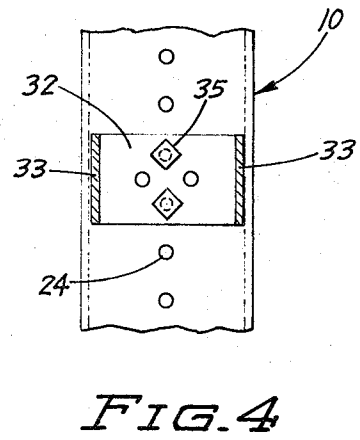
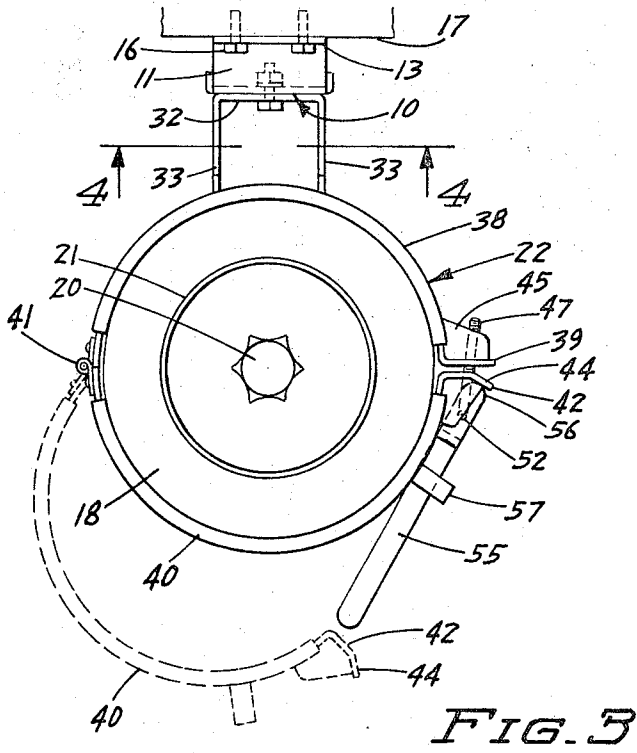
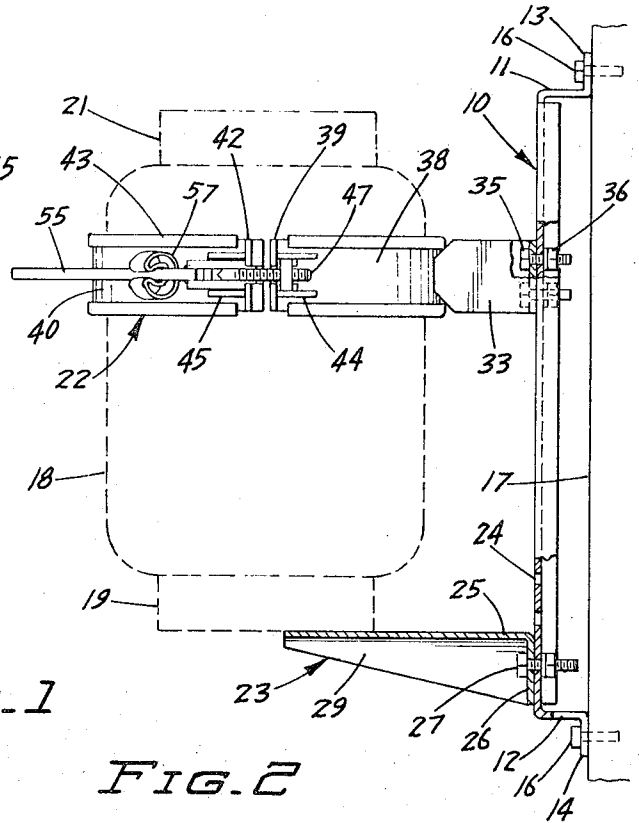
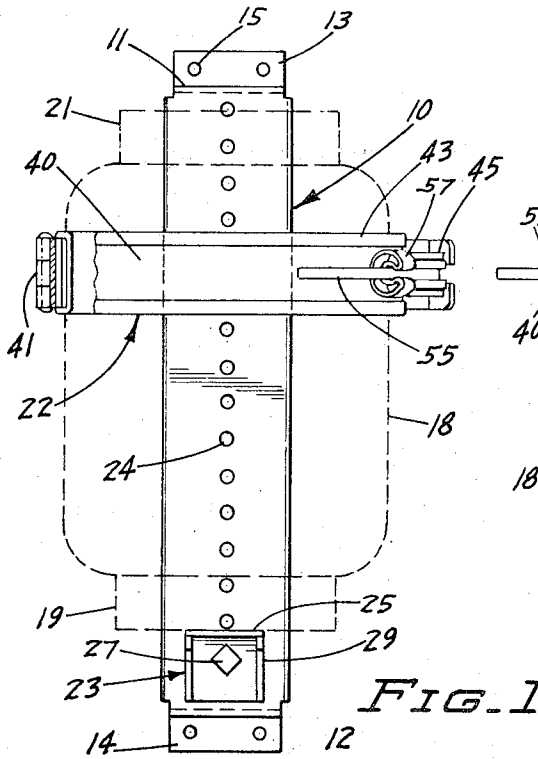
Attorney—L. Paul Burd et al.

[57] ABSTRACT

A vise or clamp for rigidly supporting and holding tanks, such as containers for compressed and liquefied gases such as refrigerant gases, fuel gases, and the like, while their valve assemblies are removed and installed. The vise is of simple sturdy construction permitting easy placement and removal of the gas container. At the same time, the gas container is held securely against rotation to permit relative rotation of the valve assembly. The vise is made in a variety of sizes to accommodate gas containers of different sizes. The vise may be used either horizontally or vertically.

6 Claims, 8 Drawing Figures





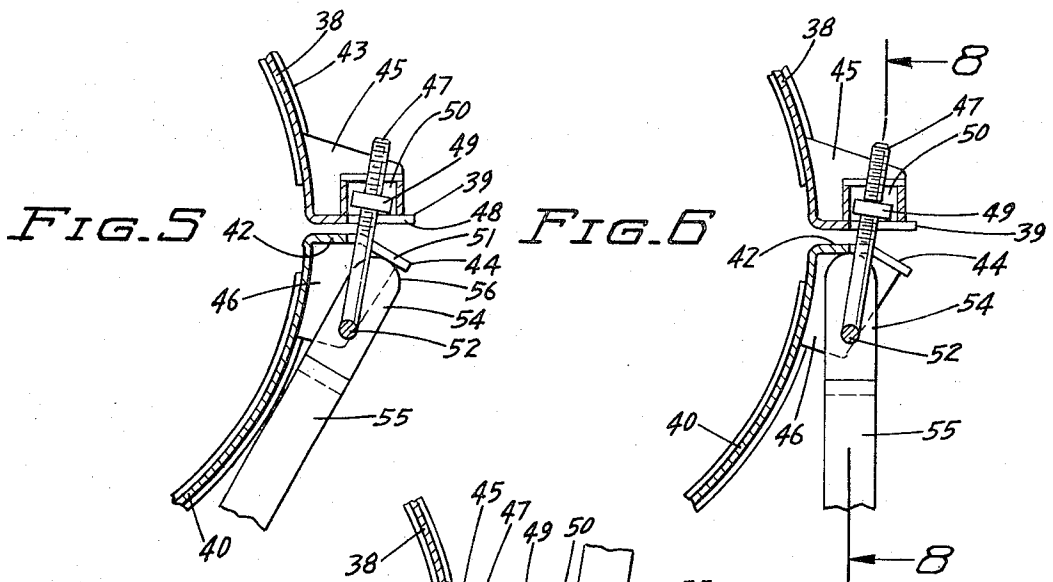


FIG. 7

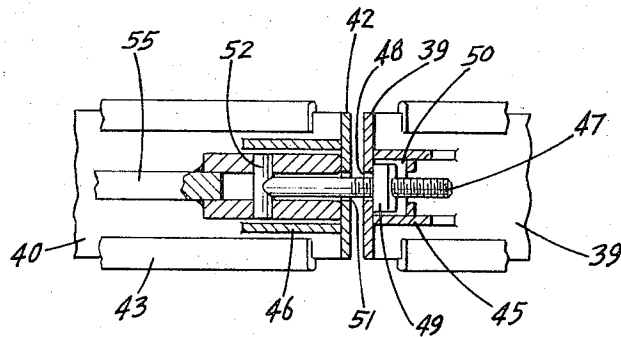
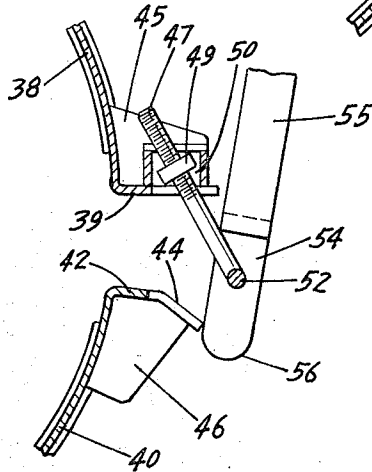


FIG. 8

WISE FOR GAS CONTAINERS AND SIMILAR TANKS

This application is a continuation-in-part of our copending application Ser. No. 200,294, filed Nov. 19, 1971.

This invention is directed to a vise or clamp for holding pressure containers for compressed and liquefied gases as, for example, refrigerant gases such as the fluorinated hydrocarbons sold under the brand names Freon and Daiflon; fuel gases such as propane, butane, liquefied petroleum gases, acetylene, and the like; oxygen; nitrogen; helium; etc., and similar tanks, to permit working on the valve assemblies thereof by removal, etc. Our first aforesaid copending application discloses and claims a bracket especially designed for and adapted to the mounting of a spare container of refrigerant gas on over-the-road trucks and trailers. That bracket comprises generally a longitudinal support plate, means for attaching the support plate to a mounting structure, as on a vehicle, a support ring secured to the support plate at one end thereof, that ring being adapted to engage the bottom end of a gas container, and a support collar secured to the support plate spaced from the support ring, that collar being adjustable and adapted to engage the top end of a gas container. Our second aforesaid application is directed to a simplified form of bracket requiring the use of only one ring or collar for supporting a single tank and especially adapted to the mounting of more than one tank, either vertically or horizontally, on a single support.

The present invention is directed to a modified form of bracket of generally similar structure especially adapted for securely holding a cylindrical tank against rotation while permitting relative rotation of the top mounted valve assembly of the tank for purposes of removing and replacement. This vise or clamp may be mounted on a wall or bench or similar solid supporting structure. It may be used to hold a tank vertically or horizontally while working on the valve assembly. Tanks may be easily placed in and removed from the vise. While held in the vise, the containers are held rigid and free from rotation.

The invention is illustrated in the accompanying drawings in which the same numerals are used to identify corresponding parts and in which:

FIG. 1 is a front elevation of a vise according to the present invention shown with parts broken away and in section to illustrate details of construction and shown with a pressure gas container in broken lines to illustrate the manner of use of the vise;

FIG. 2 is a side elevation showing the vise mounted and holding a gas container;

FIG. 3 is a top plan view of the vise and gas container;

FIG. 4 is a fragmentary vertical section on the line 4—4 of FIG. 3 and in the direction of the arrows;

FIG. 5 is a fragmentary horizontal section on an enlarged scale showing details of construction of the vise clamping and locking means in the locked position;

FIG. 6 is a similar view showing the mechanism in partially open position;

FIG. 7 is a similar view showing the mechanism fully open just prior to swinging separation of the vise ring members; and

FIG. 8 is a fragmentary elevation in section on the line 8—8 of FIG. 6.

Referring now to the drawings, the vise comprises an elongated rigid support plate, indicated generally at 10,

the opposite ends 11 and 12 of which (FIG. 2) are bent inwardly at approximately right angles and then outwardly to form transverse flanges 13 and 14, respectively, which lie in a plane spaced from but generally parallel to the main body of the support plate. Flanges 13 and 14 are provided with appropriate holes 15 to permit mounting of the bracket by means of screws or bolts 16 to a firm solid structural member 17 which may be a wall or stanchion or bench or the like to which a tank may be firmly secured to permit working on the valve, depending upon the particular environment in which the vise is to be used. Although the bracket is shown as being mounted vertically on a vertical structural member, this is for purposes of illustration only. As shown, the plate end portions 11 and 12 hold the main body of the support plate 10 spaced from the mounting surface 17 so as to permit adjustment to accommodate gas containers of different heights.

The conventional pressurized gas container 18 is generally cylindrical or spherical. It may have a circular flange 19 welded or otherwise secured to the bottom of the tank to function as a base. An appropriate dispensing valve 20 is fitted into the top of the gas container. To protect the valve against accidental damage, a protective collar 21 is often provided or a protective cap may be fitted over the valve.

The tank is held by a single tank-holding ring or collar, indicated generally at 22. To help support a short vertically held tank, a foot member 23 may be provided. Support plate 10 is provided with a plurality of holes 24 disposed centrally along the longitudinal axis of the support plate and equally spaced apart. Foot member 23 comprises a flat supporting surface 25 projecting from a base 26 by which the foot is secured to support plate 10 by means of bolt 27 extending through one of holes 24 and held by nut 28. A pair of right triangular gussets 29 provide additional strength. Tall tanks may rest on the floor, making foot 23 unnecessary.

The vise ring or collar 22 is supported from the mounting plate 10 by means of a yoke comprising a base 32 and a pair of short generally parallel spaced apart projecting arms 33. As best seen in FIG. 4, the yoke base 32 is provided with two pairs of centrally disposed holes 34, the holes of each pair being equally spaced by the same distance as the holes 24 in plate 10 and the central lines joining the holes of each pair being disposed at right angles to one another. This permits the vise ring 22 to be mounted with the longitudinal axis of the tank either parallel to or perpendicular to the longitudinal axis of the support plate 10 by means of bolts 35 and nuts 36 or similar fastening means which engage one pair of holes 34 and one adjacent pair of holes 24.

The vise ring 22 includes a fixed semi-circular portion 38 welded or otherwise rigidly secured to arms 33 and having an outwardly projecting ear 39, and a semi-circular movable portion 40 secured to the fixed portion 38 by means of hinge 41 and having an outwardly projecting ear 42. The segments 38—40 of the support collar 31 are preferably provided with a resilient liner or gasket 43 having cuff portions 44 extending over and around the top edges of collar portions 38 and 40. Gasket 43 is formed from natural or synthetic rubber or synthetic rubber-like plastic materials capable of maintaining their resilience through a wide range of temperatures and resistant to deterioration from sunlight and hydrocarbon fuels and oils, and the like. The gasket

serves to help the ring tightly clamp the tank against rotation.

Cylindrical gas tanks are available in a variety of sizes and diameters so that each vise ring is made to hold a tank of one particular diameter. In most instances any particular user of such tanks generally is concerned with tanks of only one size, or at most a very few sizes, so that it is not necessary to have a large number of vise rings of various sizes.

Ear 42 has a slightly flared lip 44. Both ears 39 and 42 are strengthened and reinforced by a pair of parallel spaced apart gussets 45 and 46, respectively. Ears 39 and 42 are secured together to hold vise ring members 38 and 40 in tight gripping relation with tank 18 by means of a T-bolt 47 which functions as a link member. The threaded elongated shank of T-bolt 47, after passing through slot 48 in ear 39, engages a nut 49 held loosely captive in a cage 50 recessed between gussets 45. Ear 42 likewise is provided with a slot 51 through which bolt 47 extends. The ends of the T-head 52 of bolt 45 are of circular cross-section and are engaged for relative pivotal movement in circular holes in the spaced apart parallel arms 54 of lever 55. The free outer ends 56 of arms 54 are arcuate for engagement in cam action with ear 42 and lip 44, as explained in greater detail hereinafter. A heavy bifurcated spring clip 57 holds the free end of lever 55 in engagement with the outer surface of ring member 40 when the vise ring is in closed position. The length of the shank of bolt 47 permits adjustment of the diameter of the collar to accommodate tanks of slightly different diameters.

In use, the vise is first mounted on a suitable support by securing a support plate 10 to the support structure 17. A vise ring 22 of appropriate diameter is secured to the support plate 10 at the appropriate location to accommodate the size of gas container to be held in the vise. The vise may be disposed with either horizontal or vertical configuration as required. A foot member 23 may be employed if necessary. The arrangement and spacing of holes 34 in yoke base 32 permits change in orientation of the tank, without the necessity of changing the orientation of the support plate.

The vise ring is opened by disengaging lever 55 from clip 57 and pivoting lever 55 on bolt head 52 until cam surfaces 56 are free from engagement with ear 42 and lip 44. Then, because nut 49 is only loosely held, the shank of bolt 47 may be moved sufficiently through slot 51 in ear 42 to disengage the clamping and locking means from ring member 40. Member 40 is then free to pivot outwardly on hinge 41 to open the ring widely to receive a tank. The movable semi-circular portion 40 of the vise ring may thus be swung on hinge 41 through an arc of 90° or more.

In this manner, with the vise ring 22 completely open, a gas container or similar tank may be easily positioned within the ring. Then the movable portion 40 of the ring is swung around into place and tightened by slight pivotal movement of bolt 47 into slot 51 of ear 42 and engagement of the arcuate heel 56 of lever 55 with the edge of lip 44 of ear 42 (FIG. 7). At this time, lever 55 extends generally tangentially from the edge of ring 22 toward the supporting structure 17. Then, the lever is swung through an arc of from somewhat more than 90° to almost 180° (depending upon how snugly the tank is engaged by the ring on initial placement) pivoting on the ends of bolt head 52. As this arcuate movement of lever 55 occurs, the arcuate cam surfaces 46 engage

the surface of lip 44 and ear 42 moving the head of bolt 47 inwardly (FIG. 6) somewhat past dead center until lever arm comes to rest against the outer surface of the vise ring, between gussets 46, now extending generally tangentially in the opposite direction, away from the supporting structure (FIG. 5). This movement of the lever 55 bringing cam surfaces 56 into engagement with ear 42 forces ear 42 toward ear 39 to tighten the grip of the ring on the tank. The tank is held securely against rotation to permit relative rotation of the valve assemblies to remove and reinstall them. The gas container is removed with equal ease by merely reversing the placement procedure.

Because of the resiliency of the gasket 43 and the adjustment permitted by the length of bolt 47, the tank is tightly and rigidly held in spite of minor variations from individual tank to tank of a particular size. Because the gas container is rigidly and securely held, it is of relatively little importance whether it is mounted with its longitudinal axis vertical, horizontal or diagonal. The vise ring may obviously be mounted to open in the direction most convenient dependent upon the particular circumstances under which it is used.

It is apparent that many modifications and variations of this invention as hereinbefore set forth may be made without departing from the spirit and scope thereof. The specific embodiments described are given by way of example only and the invention is limited only by the terms of the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A vise for holding containers of gas under pressure and similar tanks, which device comprises a vise ring and means for secure attachment of the ring to a mounting structure, said vise ring comprising:
 - A. a pair of semi-circular members, one of said members being adapted to be rigidly attached to a mounting structure;
 - B. hinge means pivotally connecting said members at one end;
 - C. an outwardly projecting ear at the other end of each of said members;
 - D. clamping means carried by one of said ears for engagement with the other whereby the free ends of both of said semi-circular members may be secured together in clamping engagement with a tank to hold the same against rotation; and
 - E. adjustment means for said clamping means whereby the diameter of the ring may be varied to accommodate slight variations in tank diameter; and said attachment means comprising:
 - F. a yoke, said yoke having
 1. a base, and
 2. a pair of short arms projecting from said base and rigidly secured to the outside perimeter of one of the semi-circular members of said vise ring;
 - G. two pairs of holes in the base of said yoke, the center line connecting the holes of one pair being at right angles relative to the center line connecting the holes of the other pair;
 - H. a rigid elongated support plate;
 - I. transverse flanges at opposite ends of said plate; and
 - J. a plurality of equally spaced holes centrally located and aligned longitudinally along said plate, said

5

holes being engageable by fastening means for adjustably securing said yoke, the spacing between said holes being the same as the spacing between the holes of the base of said yoke.

2. A device according to claim 1 further characterized in that the inside surfaces of said vise ring are provided with a resilient gasket.

3. A device according to claim 1 further characterized in that said clamping means comprises:

A. a link member loosely secured to one of said ears to permit slight relative movement therewith,

B. a lever pivotally secured to said link member,

C. a slot in said other ear to receive said link member, and

D. at least one arcuate cam surface on one end of said lever and engageable with said other ear.

4. A device according to claim 3 further characterized in that:

6

A. said link member includes an elongated shank and a T-head of circular cross-section,

B. said lever includes a pair of spaced apart parallel arms, and

C. the arms of said lever have holes therein to receive the ends of the link T-head in pivotal engagement between said lever and link member.

5. A device according to claim 4 further characterized in that:

A. said link member is a T-bolt, and

B. said link member is engageable with a nut loosely held in a cage secured to one of said ears.

6. A device according to claim 1, further characterized in that a spring clip is secured to the outer surface of one of said semi-circular ring members, said clip being engageable by said lever.

* * * * *

20

25

30

35

40

45

50

55

60

65