

[54] **GAS CYLINDER HOLDER**

[75] Inventor: **Ilden R. Folkerth**, Sparta, Mich.

[73] Assignee: **Michigan Instruments Inc.**, Grand Rapids, Mich.

[22] Filed: **Aug. 3, 1972**

[21] Appl. No.: **277,683**

3,667,714 6/1972 Ziaylek, Jr. 248/313 X

Primary Examiner—Samuel Scott
Attorney, Agent, or Firm—Price, Heneveld, Huizenga & Cooper

[52] **U.S. Cl.**..... **137/343**, 128/203, 211/71, 248/313

[51] **Int. Cl.**..... **F16I 5/00**

[58] **Field of Search** 137/343; 128/145.8, 145.5, 128/145, 142.3, 203; 211/71; 248/311, 313

[56] **References Cited**

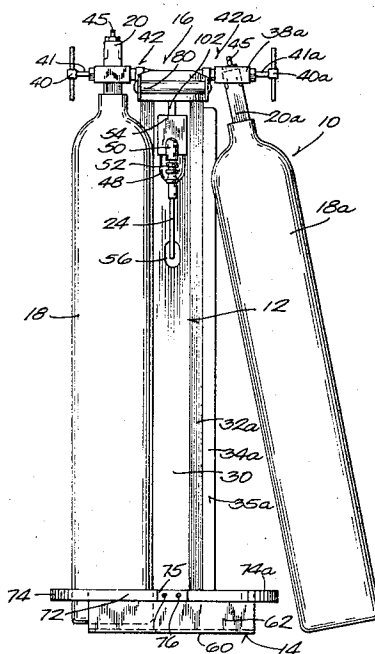
UNITED STATES PATENTS

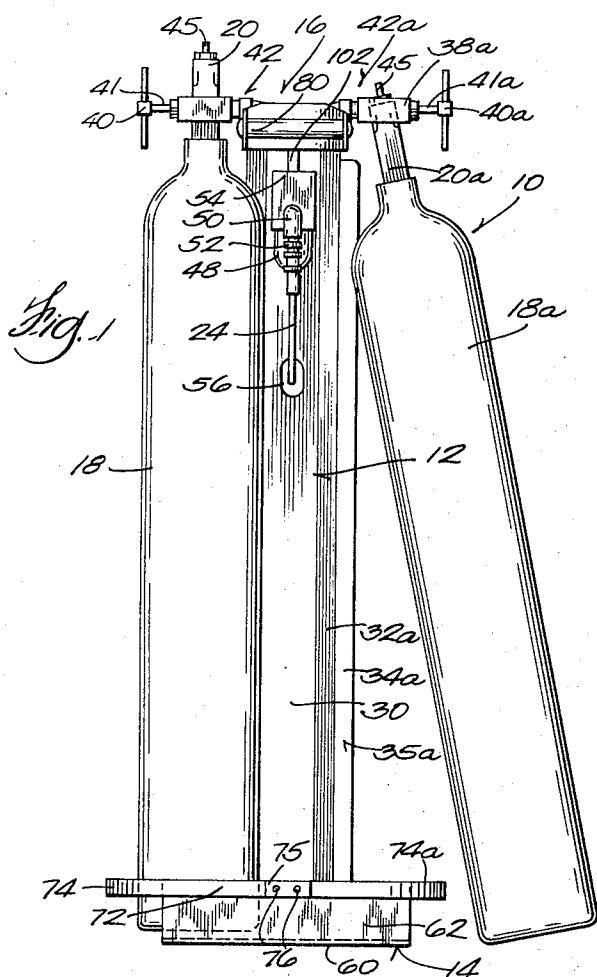
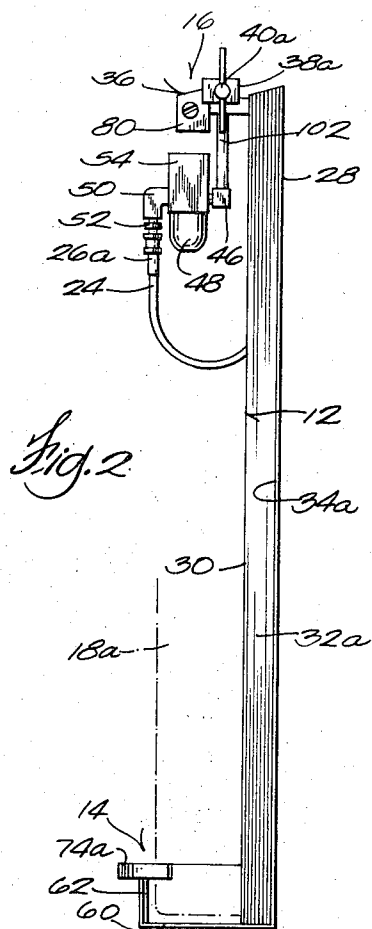
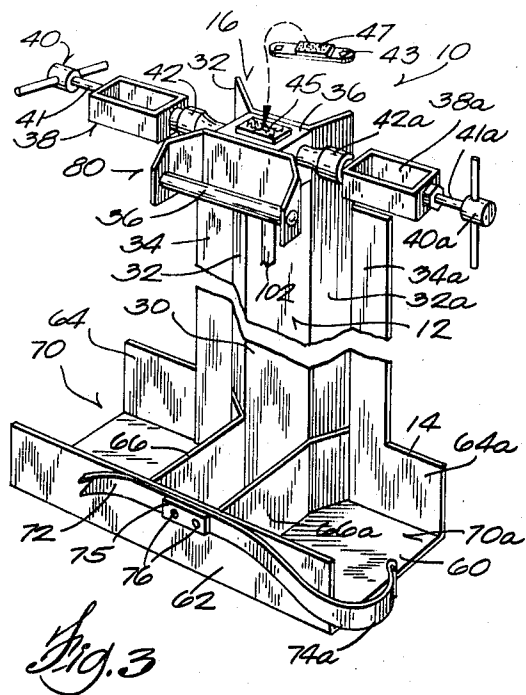
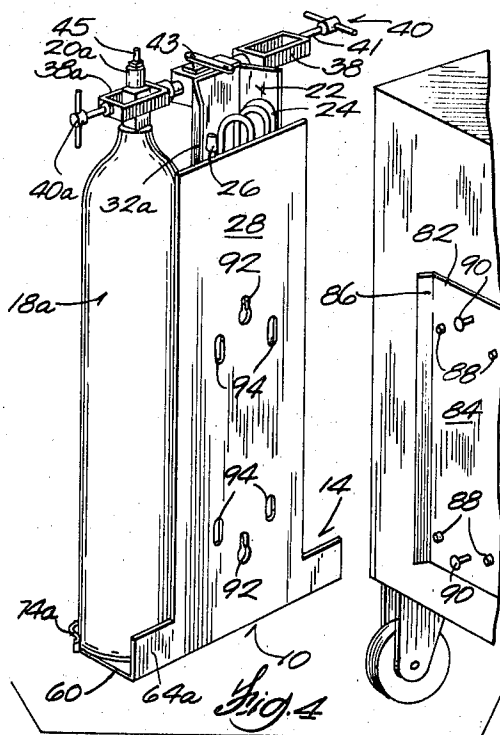
2,122,897	7/1938	Straw	128/203 X
3,065,857	11/1962	Sanders.....	211/71
3,565,384	2/1971	Lockwood	211/71 X
2,042,474	6/1936	McKesson.....	128/203
2,382,610	8/1945	Dann	128/145.8
2,385,786	10/1945	Brubach et al.	128/203
3,069,019	12/1962	Schuster	248/311 X
3,602,368	8/1971	Gould	211/71 X

[57] **ABSTRACT**

A support column includes a base at one end and a yoke assembly at the other for receiving and holding a pair of gas cylinders side-by-side. The base includes two pockets which open in opposite directions to permit rotation of the bottom of each cylinder outwardly of the base for independent removal. The pocket depth facilitates handling cylinders of varying lengths, and a spring clamp is provided for each bottle to hold it in the base. The support column includes a hose receiving cavity and openings for quick extension and removal of the hose. In addition, openings in the support column permit quick and easy mounting to a special mating support bracket fixture, the latter having guides for indexing the support column relative to the bracket.

13 Claims, 4 Drawing Figures





GAS CYLINDER HOLDER

BACKGROUND OF THE INVENTION

I. Field of Invention

This invention relates to a gas cylinder holder and more particularly, to a holder particularly adapted to permit removal and replacement of one gas cylinder without interrupting service from the other.

II. Discussion of the Prior Art

The prior art teaches a gas cylinder holder adapted to receive a pair of gas cylinders and hold them in a side-by-side relationship with the discharge end of each cylinder being connected to a yoke assembly with a conduit feeding into a manifold which is connected into a regulator from whence an outlet adapter is provided for using the gas. Such an apparatus permits independent or simultaneous feeding of the gas from the cylinders.

A portable oxygen supply is in constant demand in hospitals, ambulances, and other permanent or transitory facilities. In many instances, the need for oxygen is located at a point remote from a permanent oxygen supply facility. In addition, the orientation of the portable oxygen supply can vary greatly from the vertical to the horizontal under emergency situations, interruption of service even momentarily can be critical to the patient's safety. A major drawback to known portable gas cylinder holders is that they do not permit a quick and easy changing of one of the cylinders regardless of the orientation of the apparatus without affecting the operation of the other cylinder. One reason for this is the variation in length of various gas cylinders of the same type. Thus, there is a need for a gas cylinder holder which will accommodate gas cylinders of the same type but of varying lengths.

Other drawbacks relate to the overall compactness and mobility of present gas cylinder holding apparatus including means for quick and easy mounting to a support bracket on a fixture or vehicle. Still another drawback is the lack of a means for storing the hose assembly in such a way that it can be easily compacted for storage or quickly removed for extensions of arbitrary length. Still other drawbacks relate to the overall simplicity and cost of the holder itself.

SUMMARY OF THE INVENTION

Conventionally, a pair of cylinders are held by an apparatus in a side-by-side arrangement with the discharge ends of the cylinder being interconnected to a yoke assembly. Conduit means are generally provided which lead from the yoke assembly into a pressure regulator from whence an adapter extends for connecting the gas to an end use mechanism.

In accordance with the invention, the apparatus includes a support column having a base at one end and the yoke assembly at the opposite end. The base includes a pair of pockets opening laterally to opposite sides to permit easy insertion and removal of individual cylinders regardless of whether the apparatus is oriented vertically or horizontally. A spring means clamps each cylinder in place and is positioned on the base to effect clamping engagement with cylinders of varying lengths.

In a more narrow aspect of the invention, the support column includes an inner cavity for storing the outlet hose for quick extension or removal. Key-shaped openings permit facile mounting or detachment from a sup-

port bracket which includes indexing guides. A bracket can be permanently mounted to a wall or hand cart or the like.

The apparatus of the invention greatly reduces the manipulation of mechanical fasteners to mount the apparatus on a support bracket or insert or remove each gas cylinder. In addition, the overall simplicity provides a durable and yet inexpensive apparatus.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation view of the gas cylinder holder provided by the invention with one of the gas cylinders partially removed;

FIG. 2 is a side elevation view of the holder shown in FIG. 1 with the gas cylinders removed;

FIG. 3 is a fragmentary perspective view of the holder with the gas cylinders removed; and

FIG. 4 is a fragmentary view of the holder assembly and bracket and support bracket provided by the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, FIG. 1 illustrates a gas cylinder holder 10 adapted to hold two gas cylinders 18 and 18a in a side-by-side relationship. Holder 10 includes a support column 12 having a base 14 at one end and a yoke assembly 16 at the other end. The yoke assembly 16 is adapted to receive the gas discharge end 20 and 20a of each cylinder.

Support column 12 is hollow (FIG. 4) defining an inner cavity 22 (FIG. 4) for storing the outlet hose 24 when the apparatus is not in use. Since the apparatus is generally portable and used under various circumstances, it is desirable to have an output hose of varying lengths. Support column 12 with cavity 22 provides a simple way for storing the hose out of sight when not in use. The support column 12 has an open top to permit quick extension of the hose by simply pulling on the snap-on adapter 26. The rear wall 28 of support column 12 is formed of a flat piece of metal stock. The front and side walls 30, 32 and 32a are likewise formed of a flat piece of metal stock stamped or shaped to encompass cavity 22. The formed piece is provided with an extending flange portion 34 and 34a on each side which provides a convenient surface to weld or fasten the front member to the rear member 28 which also includes a portion extending beyond the sides of cavity 22.

Attached to the front wall 30 at the upper end of support column 12 is a manifold 36 (FIG. 3) which forms the hub of yoke assembly 16. Extending laterally from each side of manifold 36 are sub-yoke assemblies 38 and 38a. Each sub-yoke assembly is conventional in that they are adapted to receive the gas discharge end 20 and 20a of a gas cylinder and firmly anchor it in the sub-yoke. Each sub-assembly includes a threaded shaft 41 or 41a which is advanced by handles 40, 40a into engagement with the respective discharge end 20 or 20a (FIG. 1) of the cylinder when the gas discharge end 20 or 20a is inserted in the sub-yoke assembly.

The head of screws 41 includes a conical needle hose which seats in a similarly shaped recess in the discharge end of the gas cylinder. The face 43 (FIG. 3) of each sub-yoke has three triangular spaced protuberances, the two lower ones of which are pin shaped and received in recesses in the gas cylinder discharge end for

indexing the cylinder with the yoke and manifold. The upper protuberance seats in a corresponding recess to seal and form a continuous flow passageway. This type of arrangement is widely used in the art and hence not shown in detail. Thus, when the handles are tightened, the gas discharge end is seated in communication with a one-way check valve 42 or 42a so that when the main valve 45 (FIG. 1) of the gas cylinder is opened, flow communication is established with manifold 36 (FIG. 3). If one of the cylinders is removed from the sub-yoke assembly, check valve 42 or 42a prevents gas discharge through the vacant sub-yoke assembly.

A wrench 43 is provided for turning the main cylinder valves on and off. Preferably mating Velcor tape 45 and 47 (FIG. 3) is affixed to the top of manifold 36 and the wrench to provide positive storage of the wrench when not in use. To avoid inadvertent loss, a chain (not shown) may be used to connect the wrench to the support frame.

Discharge from manifold 36 is provided through a stem 102 (FIG. 2) which is connected through an adapter 46 into a pressure regulator 48. The gas exits out regulator 48 through an adapter 50 which includes a one-way check valve 52 for receipt of one end of hose 24. Thus, at each end of the conduit from the inlet to the outlet, there is a check valve to prevent unintentional escape of gas from the cylinders when a disconnect occurs. A pressure gauge 54 (FIG. 3) is incorporated into the upper portion of regulator 48 to provide a visual verification of the pressure.

Hose 24 when connected to the output check valve 52 of regulator 48 extends directly into cavity 22 through an enlarged opening 56 (FIG. 1) positioned conveniently just below check valve 52. Opening 56 is formed in front wall 30 of the support column and is large enough to permit passage of the snap-on adapter 26a. The remaining portion of hose 24 is foldable in lengths generally corresponding to the length of support column 12 within cavity 22. The insertion and removal of hose 24 is achieved through the open top end of support column 12.

Attached to the lower end of support column 12 is a base 14 adapted to both support the assembly in a vertical orientation and anchor the lower ends of each cylinder firmly thereto to prevent accidental movement once the cylinders are inserted in the holding assembly. Base 14 includes a flat bottom 60 (FIG. 3), a front wall 62, a pair of rear walls 64, 64a and inner side walls 66, 66a. The inner sides 66 and 66a extend straight back from front wall 62 to the side walls 32 and 32a of support column 12 whereupon they deflect outwardly along sides 32, 32a to rear walls 64, 64a. In so doing, they form a pair of pockets 70 and 70a which are open both upwards and laterally outwards from support column 12 in opposite directions.

Each pocket 70 and 70a is specifically designed to receive the lower end of a gas cylinder such as 18 or 18a. The dimensions of the pocket are designed to correspond generally to the overall cross-sectional size of a gas cylinder to limit its movement in all directions except through the open side portion. The pockets have a finite depth equal to that of the height of front wall 62 and inner side wall 66, 66a, the latter two preferably being equal to the height of front wall 62. The depth of each pocket is selected so that the lower end of conventional gas cylinders of a particular type will extend into the pockets 70 or 70a when attached to the apparatus

of the invention. The overall diameter and length of gas cylinders of a particular type varies slightly and it is one of the advantages of the present invention that the holder assembly will accommodate easy insertion and removal of gas cylinders of varying sizes without affecting the operation of the other of the two cylinders held by the holder of this invention. Since the overall length of the gas cylinders vary somewhat, it will be appreciated that in many cases, the bottom of the gas cylinder will not rest on bottom 60 of base 14 as illustrated in FIG. 1.

A spring element 72 is connected to the upper portion of front wall 62 of base 14 and includes an inwardly curved portion 74 and 74a beyond the lateral ends of each pocket. The curved portions 74 and 74a abut against a cylinder positioned in either of the pockets 70 and 70a and urge it directly in towards the support column 12 and more specifically sides 32 and 32a of the column. However, the slope of sides 32, 32a relative inner sides 66, 66a and rear wall portions 64, 64a is such that the cylinder 18 or 18a abuts against a respective inner side wall and rear wall to provide positive indexing in pocket 70 or 70a to prevent further inward or rearward movement. The direction of the spring force of spring element 72 will prevent unintentional forward or outward movement. The weight of the gas cylinders is primarily supported by the sub-yoke assemblies 38 or 38a since in many cases the bottom of a cylinder does not rest on the floor of the base. However, the spring force of spring element 72 is selected to hold each gas cylinder in place even though subjected to normal vibrations and movements of the portable apparatus itself. However, when handles 40, 40a and shafts 41, 41a are rotated to release the gas discharge end 20 or 20a, positive manual movement of a cylinder such as cylinder 18a shown in FIG. 1 will easily overcome the spring force. The curvature of portions 74, 74a provide a simple means of gripping the outer ends of spring 72 to release or insert a gas cylinder. In addition, the utilization of a spring element provides an automatic adjustment for the variation in cylinder diameters. The utilization of a spring also eliminates the necessity and need for manipulating mechanical fasteners. The spring can be easily attached to front wall 62 by a clamp 75 anchored to wall 62 by fasteners 76. It will be appreciated, however, that mechanical fasteners such as a threaded thumbscrew could be threaded through each upper corner of front wall 62 to prevent outer movement of the cylinder once in position. Under conditions where the holding apparatus might be subjected to severe forces, screws may be preferred since they provide a physical barrier which cannot be overcome unless they are withdrawn.

One of the principal features of the apparatus of this invention is its portability. In this regard, a handle 80 (FIG. 3) is anchored to the front surface of manifold 36 to permit quick and easy lifting or manipulation of the apparatus. In certain instances, the apparatus will be positioned horizontally in which case it is supported by the rear wall 28 of support column 14 or vertically as shown in FIGS. 1 and 2. In other instances, it may be desirable to removably attach the apparatus to a stationary support such as a wall or the side of a portable hand cart or the like as illustrated in FIG. 4.

Referring to FIG. 4, a mounting bracket 82 is provided for receiving and holding apparatus 10. Bracket 82 is formed of a generally flat elongated plate 84 hav-

ing a pair of upturned side edges 86 only one of which is shown in FIG. 4. The bracket is attached to a flat support surface by a plurality of screws 88. The width of bracket 82 corresponds generally to the width of support column 14 so that it is positionable snugly between the upturned edges 86. The upturned edges thus define a guide track for indexing apparatus 10 to facilitate facile mounting of the apparatus to the mounting bracket. Apparatus 10 is detachably secured to bracket 82 by a pair of studs 90 having an enlarged head which fits within corresponding keyway openings 92 on the rear wall 28 of support column 14. The lower portion of each keyway is enlarged to permit passage of the head of studs 90 whereupon when the apparatus is released the weight will move the apparatus downwardly such that the head of each stud is captured by the narrowed portion of each keyway.

Elongated openings 94 in rear wall 28 are provided to permit clearance of the heads of fasteners 88 so that a tight flush lock is achieved between studs 90 and keyway openings 92. The entire apparatus 10 can thus be quickly and simply attached or separated from a permanent mounting bracket by simply lifting up on handle 80 to disengage the apparatus or sliding it down for engagement with the bracket.

Although but one embodiment has been shown and described in detail, it will be obvious to those having ordinary skill in this art that the details of construction of this particular embodiment may be modified in a great many ways without departing from the unique concepts presented. It is, therefore, intended that the invention is limited only by the scope of the appended claims rather than by particular details of construction shown, except as specifically stated in the claims.

I claim:

1. A portable apparatus for holding two gas cylinders side-by-side comprising, in combination: a support column; a yoke assembly attached to one end of said column for receiving and holding the gas discharge end of the cylinders; a base attached to the other end of said column, said base including means for gripping and holding the lower ends of gas cylinders of varying length and diameter while permitting removal of one of the cylinders from said apparatus without interrupting the operation of the other of said cylinders regardless of whether the cylinders and apparatus are in a vertical or horizontal position.

2. The apparatus according to claim 1 wherein said base includes a pair of pocket means, each of said pocket means includes a front and rear wall and inner side wall for limiting the movement of the lower end of a gas cylinder of varying length and diameter positioned therein except through said remaining open side, said base further including movable spring means on said base for retaining the lower end of a gas cylinder of varying length and diameter against unintentional removal through said open side.

3. The apparatus according to claim 2 wherein said spring means is attached to the front of said base and includes a first portion extending laterally beyond each pocket means and a second portion curving inwardly toward the open side of said pockets to urge a gas cylinder positioned in one of said pockets against the inner side and rear wall of said one pocket.

4. Apparatus according to claim 2 wherein said open sides of each of said pocket means open laterally in opposite directions whereby each gas cylinder positioned

in each of said pocket means is movable generally coplanar with respect to each other when inserted or removed from said pocket means.

5. The apparatus according to claim 1 wherein conduit means including an output adapter transfer gas from said cylinders to said output adapter said support column is generally tubular and said conduit means includes a detachable hose foldable within said support column.

6. The apparatus according to claim 5 wherein said support column has an open top, said hose being foldable through said open top for rapid removal therefrom.

7. The apparatus according to claim 6 wherein said support column includes means defining a second opening through one side thereof, said hose being removable through said second opening.

8. The apparatus according to claim 1 wherein said apparatus further includes a mounting bracket affixed to a support means, said bracket having means cooperative with said support column for indexing and detachably securing said support column to said bracket.

9. The apparatus according to claim 8 wherein said bracket includes a pair of guide rails between which said support column is positionable and stud means having a head thereon adapted for insertion through key-shaped openings in said support column to permit quick and easy mounting and removal of said support column from said mounting bracket.

10. In an apparatus for holding at least two gas cylinders in a co-extending side-by-side relationship having a support column; a base at one end of said column for receipt of said cylinder; a yoke assembly at the other end of said column, said yoke assembly being adapted to receive and hold the gas discharge end of said cylinder; the improvement comprising: said base including a pair of enclosure means for receiving and holding the lower end of a gas cylinder of varying length and diameter, each enclosure means including means defining an opening through which a cylinder end of varying diameter is movable into and out of each enclosure, and bias means urging a cylinder positioned within each enclosure against unintentional movement out of each enclosure while permitting insertion and removal under positive force direction.

11. The improvement according to claim 10 wherein each enclosure means includes wall means on three sides, said bias means comprising a movable spring fixed to one of said wall means and having a first portion extending laterally beyond each enclosure means and a second portion curving inwardly toward the open side of said enclosure means to urge a gas cylinder positioned in one of said enclosure means against the inner wall means opposite said opening.

12. The improvement according to claim 10 wherein said support column is generally tubular and has an open top and a second opening through one side thereof, said tubular support column providing a storage for a gas hose connectable to said yoke assembly, the discharge end of the hose being positioned through said second opening.

13. The improvement according to claim 10 wherein said apparatus further includes a mounting bracket adapted for securement to a support means, said bracket having means cooperative with said support column for indexing and detachably securing said support column to said bracket.

* * * * *