Sept. 20, 1971 A. R. TAYLOR 3,606,390

SWIVEL YOKE

Filed April 1, 1969

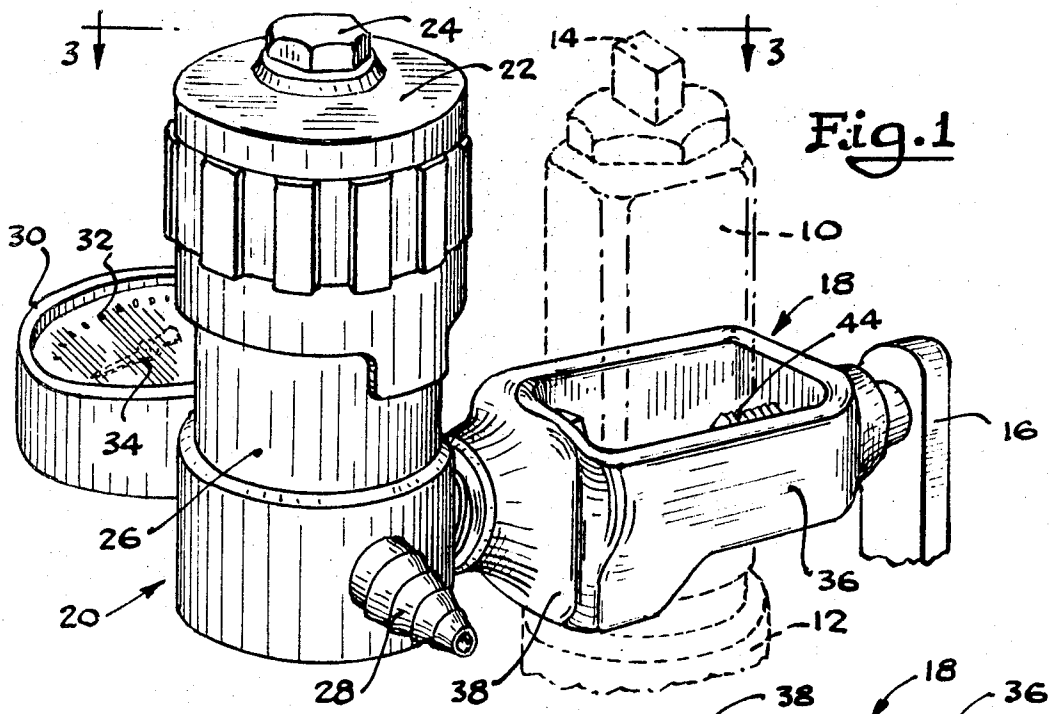

Fig.1

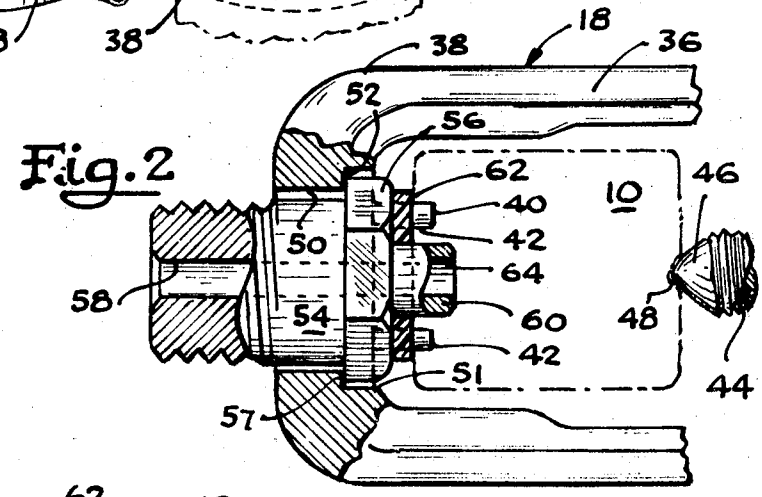

Fig.2

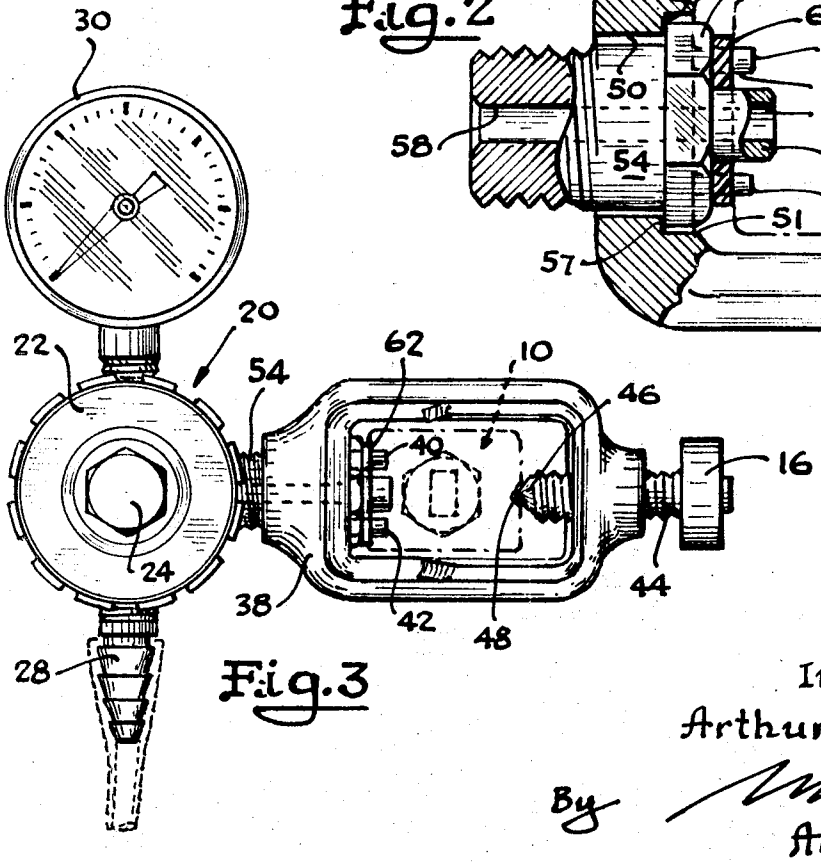

Fig.3

Inventor
Arthur R. Taylor

By

Attorney

United States Patent Office 3,606,390 Patented Sept. 20, 1971

3,606,390

SWIVEL YOKE

Arthur R. Taylor, Alameda, Calif., assignor to Chemetron Corporation, Chicago, Ill.

Filed Apr. 1, 1969, Ser. No. 812,183
Int. Cl. F16l 35/00
U.S. Cl. 285—39 1 Claim

ABSTRACT OF THE DISCLOSURE

A yoke for connecting to a valve body, the yoke having a tubular stem rotatably and slidably received in a through bore having an axis generally parallel to the plane of the yoke and fastening means to secure a head on the stem between a circumferential shelf surrounding the bore and the valve body.

This invention relates to a swivel yoke when connected to a container for gas permits a regulator and a cylinder pressure gauge to be selectively positioned on the cylinder for various cylinder placements.

More specifically, a gas such as gaseous oxygen contained under pressure in a cylinder is delivered from the cylinder through a cylinder valve assembly. Many pressure reducing regulators and flow control devices are constructed and adapted so that they may be attached either directly to a cylinder valve in one position only or to a yoke which itself may be attached to the cylinder valve in one position only. Because these are wrench fixed positions, the operator must close the cylinder valve when repositioning the regulator in order to prevent gas from escaping while the regulator is loosened. With such a fixed assembly, a cylinder pressure gauge attached to the regulator also is positioned in a preselected but inflexible relationship to the cylinder itself. Thus, if the cylinder is repositioned, the regulator and gauge are relocated relative to the hands and eyes of the operator.

For many uses, such as when the cylinder is being used in respiratory emergencies, it is important to have the regulator at all times within the operator's reach and to have the cylinder pressure gauge at all times within the operator's sight. Through the novel arrangement provided by this invention, the regulator and cylinder pressure gauge are capable of being repositioned by hand, in an operable and readable location respectively, when the cylinder is placed in different positions. The regulator carrying the gauge may be hand-swivelled on the yoke. Further, the regulator and attached gauge are movable with respect to the cylinder valve assembly to selected positions, in response to hand pressure, without the use of a wrench to loosen the regulator from the cylinder valve. There is no need to close the cylinder valve during the adjusting operation.

It is a principal object of this invention to provide a simple and efficient yoke for selective positioning of a pressure reducing regulator and associated gauge on a cylinder.

Another object of this invention is to provide mounting means for a gas regulator on a cylinder which compensates for variations in cylinder placement in response to hand pressure alone.

Further objects, features and advantages of this invention will become apparent as the following description of an illustrated embodiment thereof proceeds taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective view of a swivel yoke, incorporating the principles of this invention, connecting a regulator to a cylinder valve.

FIG. 2 is an enlarged horizontal view, partially in section, showing the yoke of FIG. 1 connected to the valve; and

FIG. 3 is a horizontal plan view of the apparatus shown in FIG. 1.

Referring now more specifically to the drawings and particularly to FIG. 1, a valve body **10** is threaded into a cylinder, a portion of which is shown at **12**. The cylinder contains a supply of gas such as breathing oxygen under pressure. A valve stem **14** extends from the valve body **10** and is rotatable by a handle or key **16**. The stem **14** is connected to valve mechanism (not shown) within the valve body **10** for permitting or stopping flow of the gas from the cylinder. A swivel yoke assembly **18** is connected between the valve body **10** and a pressure reducing regulator and flow meter **20**. The regulator **20** may be manually adjusted in known manner so as to effect a desired reduction of gas pressure within its operating range by turning a handle **22**. A screw **24** is turned by the handle **22** so as to increase or decrease the tension on a spring which counters the pressure exerted on a diaphragm by gas in a relatively low pressure chamber within a pressure reducing regulator body **26**. A valve cylinder cooperates with a piston positioned therein so as to form a variable opening through which controlled quantities of gas may be transferred from a relatively high pressure chamber into the relatively low pressure chamber adjacent the diaphragm. The spring actuates a pin carried by the diaphragm, which pin opens the valve. The gas under regulated pressure enters the low pressure chamber and forces the diaphragm against the spring and thus permits the valve to move toward a closing position. However, a condition of balance is established between the pressure of the gas in the low pressure chamber and the pressure of the spring as determined by the adjustment of the handle **22**. Thus, a desired amount of gas is permitted to pass through the regulator. The gas in the low pressure chamber is discharged from a barbed filter orifice outlet **28** opening out of the regulator body. A cylinder pressure gauge **30** operatively connects into the body **26** to illustrate the pressure of the cylinder **12** in terms of pounds per square inch by indicia **32** printed on the gauge and a rotatable needle **34** responsive to the gas pressure within the cylinder **12**. For many uses, such as when the cylinder **12** is being used in a respiratory emergency, it is important to have the gauge **30** visible to and the regulator **20** operable by an individual manually adjusting the flow of the gas.

The yoke assembly **18** which adjustably mounts the regulator **20** to the valve body **10** includes a unitary frame **36** illustrated as having a generally rectangular shape and being adapted to surround the valve body. Because different gases may be supplied in cylinders having a generally similar external appearance, a safety arrangement is included on the frame **36** and valve body **10** to prevent the distribution of an undesirable gas through the regulator. An enlarged portion **38** on one side of the frame is provided with key means **40** (FIG. 2) having an individual formation, here represented by a plurality of pins having a special arrangement, number, size and/or shape individual to mating key means **42** on the valve body **10**. The latter mating key means **42** are here represented by a plurality of holes in the valve body **10** corresponding in arrangement, number, size and/or shape with the pins comprising the key means **40**. In the illustrated arrangement, the key means are adapted to fit into the mating key means, but only when the correct yoke has been connected in proper orientation with the valve body **10**. If the yoke is incorrectly arranged, the key means and mating key means cannot interengage.

A fastening device is associated with the frame **36** to hold the key means and the mating key means together and to connect the yoke assembly **18** to the valve body **10**. The illustrated fastening device is a yoke screw **44** which is threaded through the side of the frame **36** opposite the side carrying the key means **40** and is generally parallel with the plane of the frame. The inner end of the screw **44** is adapted, as with a tapering portion **46**, to seat in an indentation **48** formed in the side of the valve body **10** opposite the side carrying the key means **42**. The outer end of the yoke screw is configured to receive and be turned by the key **16**. Rotation of the screw **44** toward the valve body **10** by the key fixes the yoke assembly **18** to the valve body **10**.

Side **38** of the frame **36** has a through hole or bore **50** (FIG. 2) which is generally coaxially aligned with the yoke screw **44**. The bore **50** is circumferentially enlarged at its inside end to provide an enlarged hole **51** coaxially of the bore **50** having a depressed shelf portion **52** adjacent the inside end of the frame. The hole **51** may be omitted and the shelf **52** formed about the bore **50** on the face of the frame carrying the key means **40**. A stem **54** is passed loosely through the hole **50** and is threaded into the regulator body **26** so that the frame **36** is adapted to rotate of the stem **54**. The stem **54** has an enlarged head **56** configured to provide gripping surfaces for a wrench for threading the stem into the regulator body. The enlarged end of the bore is of sufficient circumferential dimension to permit the head **56** to enter freely therein. A shoulder **57** on the enlarged head **56** faces and cooperatively engages the depressed shelf **52** of the frame **36** and limits the axial movement of the yoke from the stem **54** when the stem **54** is connected to the regulator. The depth of the enlarged hole **51** is selected to receive only a portion of the length of the head **56**. Thus when the shoulder **57** and the shelf **52** are engaged a portion of the head **56** extends into the inside of frame **36**. A passageway **58** is formed longitudinally of the stem **54** and through a nipple **60** extending outwardly of the head **56**. A nylon tank-yoke washer **62** surrounds the nipple **60** and seats against the outer surface of head **65**. When the yoke is properly aligned with the valve body **10** through the interengagement of the key means **40** and the mating key means **42**, the nipple **60** is received in a valve outlet opening or orifice **64** formed in the valve body **10**. As the yoke screw **44** draws the valve body **10** and the frame **36** together, the washer **62** seats between the enlarged head of the stem **54** and the valve body **10** and prevents gas leakage from the interface. When the valve stem **14** is rotated to operate the valve mechanism within the valve body **10**, gas from the cylinder flows through the valve and out of the orifice into the passageway **58** from which it flows into the regulator **20**.

With the stem **54** and head **56** being loosely rotatable in the holes **50** and **51**, the pressure regulator **20** and the cylinder pressure gauge **30** are rotatable by hand pressure to selected positions relative to the valve body **10** with the key means **40** and mating key means **42** still generally interengaged. There is no need to remove the yoke frame **36** from the valve body **10** or to close the valve. When the regulator **20** and gauge **30** are repositioned, the yoke screw **44** is threaded axially toward the valve body **10**, and, as described, the side **38** of the frame **36** is drawn toward the valve body **10**, the enlarged depressed shelf **52** in the frame **36** engages the shoulder **57** of the enlarged head **56** on the stem **54**, and the washer **62** is drawn tightly between the head **56** and the valve body **10** with the nipple **60** seated in the valve outlet opening **64**. With the frame **36** being tightly connected to the valve body **10**, the frictional engagement between the shoulder **57** and the shelf **52** holds the regulator **20** and the cylinder pressure gauge in the preselected position and prevents their rotation about the stem **54**.

Thus it will be appreciated that all of the recited objects, advantages and features of this invention are obtainable in a simplified and highly practical arrangement. It will be further understood that although this invention has been described with respect to certain specific embodiments thereof this invention is not limited thereto, since various modifications of said invention will suggest themselves from the aforesaid description and are intended to be encompassed within the scope of the appended claim wherein there is claimed:

1. A swivel yoke adapted to be connected to a valve body having an outlet orifice, said yoke comprising: a frame adapted to surround the valve body, said frame having a through bore disposed generally parallel with the plane of said frame and a circumferentially continuous annular shelf formed in said frame at the inner margin of said bore; a tubular stem having inner and outer ends and an axial through passage between said ends and being slidably and rotatably received in said bore with sufficient clearance to permit free rotation of said stem within said bore, said outer end being adapted to freely pass through said bore and having means thereon to connect other apparatus to said stem, said inner end being adapted to receive sealing means thereon to engage the valve body for communication between the outlet orifice of the valve body and said passage; at said inner end an enlarged head having a shoulder and being configured to provide a plurality of flat gripping surfaces for a tool, said shoulder being adapted to engage said shelf with sufficient clearance between said shoulder and said frame at the margin of said shelf to permit free rotation of said stem with respect to said frame; and fastening means for drawing said head toward the valve body and to force said shelf against said shoulder.

References Cited

UNITED STATES PATENTS

1,026,066	5/1912	Wolf	285—198
2,169,082	8/1939	Stevens et al.	285—198
1,484,108	2/1924	Zoltowski	285—198

FOREIGN PATENTS

778,661	2/1968	Canada	285—IRR
1,076,528	7/1967	Great Britain	285—198

DAVE W. AROLA, Primary Examiner

U.S. Cl. X.R.

285—198, Dig. 15