United States Patent [19]

Boecker

[11] 3,737,133

[45] June 5, 1973

[54] QUICK-RELEASE ARTICLE HOLDER

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[73] Assignee: **Akron Brass Company,** Wooster, Ohio

[22] Filed: **Nov. 16, 1970**

[21] Appl. No.: **89,855**

[52] **U.S. Cl.** **248/313,** 211/71

[51] **Int. Cl.** **A62c 39/00**

[58] **Field of Search** .....248/316 R, 316 B, 248/309, 313, 311, 154; 211/89, 8, 71

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[57] **ABSTRACT**

A quick-release article holder adapted for mounting on a vertical surface and having a bifurcated lower support member and a spaced upper clamping member which is pivotally mounted for rotative movement into or out of engagement with the upper portion of the article to be held. The holder is particularly adapted for use in retaining cylindrical breathing apparatus which is mounted on the wall of a fire station or on a panel of a mobile fire apparatus and serves to retain and support the breathing apparatus when it is not in use or while it is being harnessed to the back of the user. A lever-operated linkage serves to pivot the upper retaining member out of clamping engagement with the apparatus so that the entire breathing apparatus can be moved horizontally away from the holder by the action of the user walking away from the holder after the breathing apparatus has been harnessed to his back. The breathing apparatus can be restored to the holder by reversing the removal procedure and moving the upper clamping member back into locking engagement with the upper part of the breathing apparatus. Adjustable features are provided for varying the spacing between the upper and lower members, changing the position of the upper member at its limits of pivotal movement and maintaining a spring-loaded clamping force on the upper member.

9 Claims, 6 Drawing Figures

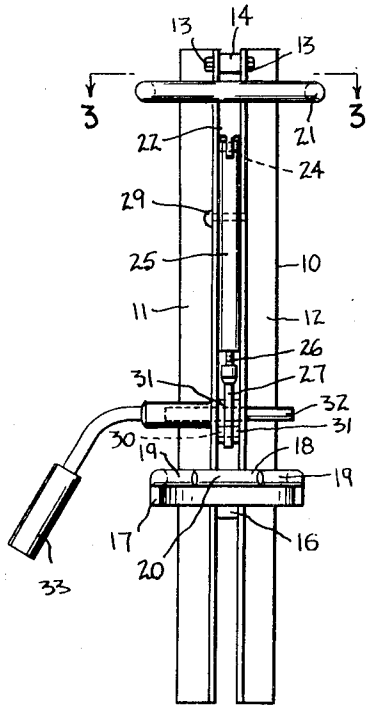


FIG. 1

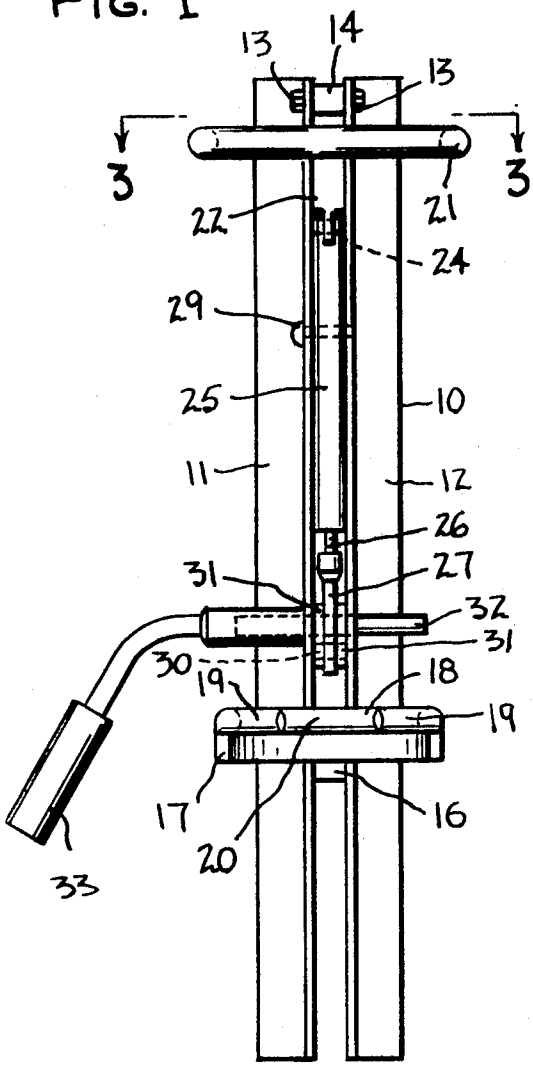
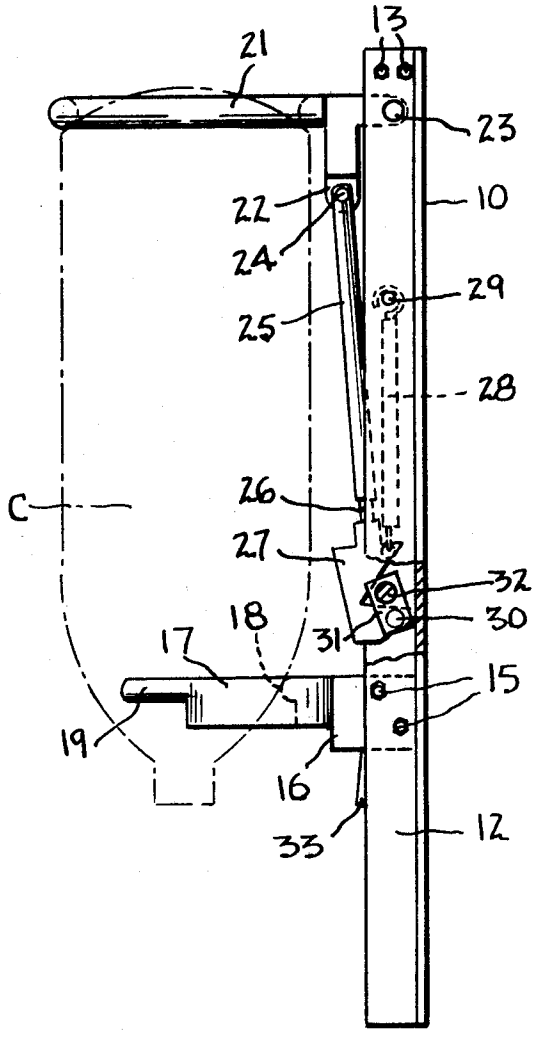


FIG. 2



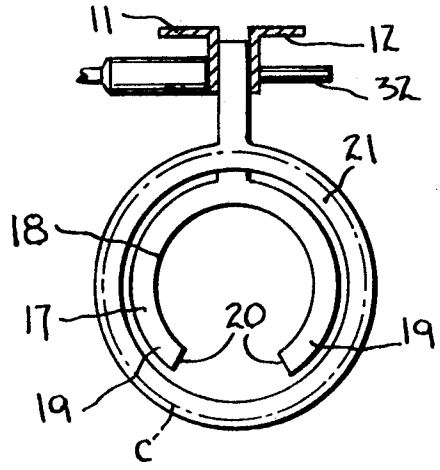
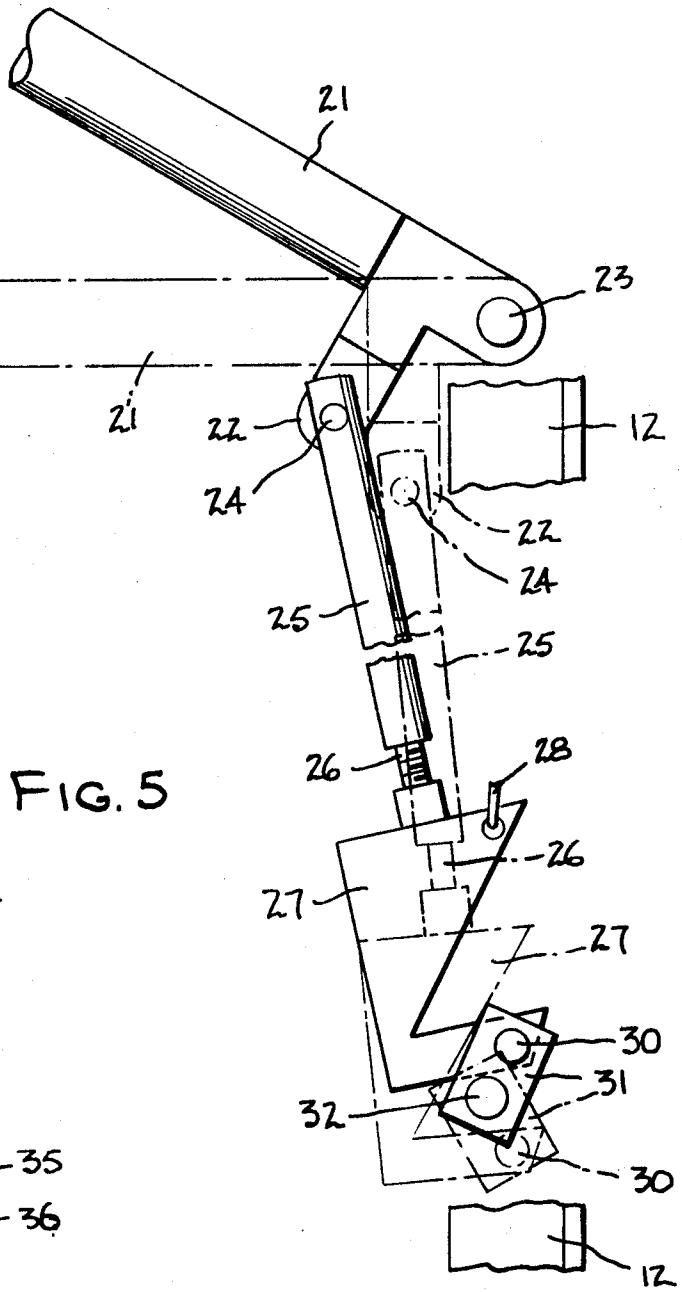


FIG. 3

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FIG. 4



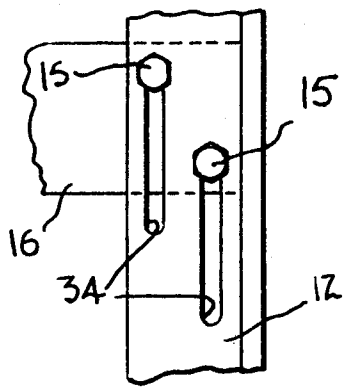


FIG. 5

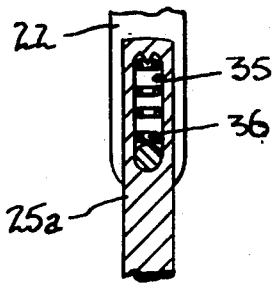


FIG. 6

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QUICK-RELEASE ARTICLE HOLDER

BACKGROUND OF THE INVENTION

Persons whose occupation or activity requires them to go into foul or exygen-depleted atmospheres, ordinarily utilize portalbe breathing apparatus to provide pure air through a face mask during the time that they are compelled to be in such an atmosphere. The pure air is retained in a compressed state in an air cylinder which is strapped to the back of the user by a suitable harness arrangement. The compressed air is metered to the face mask through suitable controls and hoses. The apparatus can be quite cumbersome and heavy and a person would find it difficult to strap it to his back without assistance, unless the apparatus is supported at the proper height by some suitable device during the time that the user is manipulating the harness.

In order to provide some solution to this problem, the prier art has provided holders or brackets which are mounted on the wall at a fire station or mounted on a vertical panel of mobile fire-fighting apparatus, for the purpose of retaining the breathing apparatus in position for quick attachment to the wearer or user. Such prior art devices generally consist of a pair of vertically spaced spring clips which embrace the air cylinder of the breathing apparatus and retain it yieldably against removal. Assuming that the breathing apparatus is at approximately the proper height, the fireman or other user positions himself with his back toward the breathing apparatus and secures the harness of the apparatus to his body. He then walks away from the holder or bracket to force the spring retaining clips to open or expand and release the air cylinder. In order to accomplish this, he has to overcome the force of the retaining spring clips, which may require considerable effort on his part. If the spring pressure is extremely great, it may be almost impossible to remove the air cylinder by means of the horizontal walk-away movement of the user. On the other hand, if the spring tension is too weak, the air cylinder is easily removed and replaced but the holder will not satisfactorily retain the air cylinder in its storage position, particularly when it is subject to the vibration and dislodging forces encountered during transport on a mobile fire-fighting apparatus. Therefore, it is extremely difficult to establish a spring tension which will be sufficient to adequately retain the breathing apparatus during the various conditions of storage and transport which it encounters, while at the same time maintaining such spring tension low enough or weak enough to suit the convenience of the user in detaching the air cylinder quickly and without undue effort from the holder.

SUMMARY OF THE INVENTION

The present invention has for its primary object the provision of a holder for articles, such as the breathing apparatus previously described, in which the user does not have to overcome the holding or retaining force of the holder in order to remove the article. Instead, a holder is provided with suitable retaining means which are positive in action and which can be released or disengaged to completely free the article from restraint during its removal from the holder.

Another object of the invention is to provide a holder whose use is not limited to a particular size or diameter of article, but which can be adjusted to accomodate

reasonable variations in the size of the articles it is designed to retain or hold.

It is another object of the invention to provide a holder which has the above-mentioned features and advantageous characteristics in which a simple and easily operated lever mechanism is utilized to effect quick-release of the retained article.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a view in front elevation of a holder embodying the features of the invention and particularly adapted for use with cylindrical articles such as the breathing apparatus above mentioned.

FIG. **2** is a side elevation of the holder shown in FIG. **1**, taken as viewed from the right side thereof, and with portions thereof broken away to show interior details.

FIG. **3** is a plan view of the holder shown in FIG. **1**.

FIG. **4** is an enlarged fragmentary side elevation of a portion of FIG. **2** showing details of the arrangement and operation of the operating linkage utilized in the holder.

FIG. **5** is an enlarged fragmentary side elevation showing a modified form of adjustable mounting for the lower support member of the holder.

FIG. **6** is an enlarged longitudinal cross-sectional view showing details of a modified form of spring-loaded lost motion connection for pivotally securing the link to the upper retaining member of the holder.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. **1–4** of the drawings, the articie holder is shown to include a wall-mounting body or bracket **10** consisting of two parallel angle iron portions **11** and **12** which are secured to each other in spaced relationship by fasteners **13** extending through intermediate tubular spacers **14.** The lower portion of the angle irons **11** and **12** are also secured in spaced relationship to each other by means of fasteners **15** which extend through the body portion **16** of a support member **17.** The body portion **16** lies intermediate the legs of the angle iron portions **11** and **12** and serves to maintain these portions in spaced relationship in the same functional manner as do the upper spacers **14.** The fasteners **15** not only serve to interconnect the angle iron portions, but also serve to secure the support member **17** on the wall bracket.

The support member **17** can be of any suitable form, but is here shown as being a ring member **18** which is bifurcated to provide two arcuately extending oppositely disposed support arms **19** which provide a passageway or clearance space **20** between the free ends of the arms. This support member is particularly designed for use with an article in the form of a necked cylinder, shown in phantom outline in FIG. **2,** and the clearance space **20** is made of sufficient size to permit the neck of the cylinder to pass between the support arms when the cylinder is moved horizontally into or out of the article holder.

The upper portion of the wall bracket **10** has pivotally secured thereto a retaining or clamping member **21** having an ear portion **22** which is pivotally mounted on a pivot pin **23** which extends through the wall bracket. The retaining member **21** can be of any suitable form to accomodate the article to be held and is here shown in the form of a ring which is spaced upwardly from the support member **17** and normally lies in a plane sub-

stantially parallel to the plane of the support member. The article to be held is intended to be retained between the retaining member 21 and the support member 17. This retention may simply involve a physical interference by the retaining member against horizontal movement of the article which may project upwardly therethrough, or may involve a clamping action of the retaining member against the upper portion of the article being held so as to frictionally resist its removal from the holder, or may involve the combination of both these functions, depending upon the characteristics desired, as will appear more fully hereinafter.

Pivotally secured as at 24 to the ear 22 of the retaining member 21 at a location forwardly of the pivotal axis defined by the pin 23 is a draw rod or link 25 whose opposite end is externally threaded as at 26 for securement to a toggle plate or cam follower 27. The threaded portion 26 on the link 25 is sufficiently long to permit adjustment of the effective length of the link, if desired, when its upper portion is disconnected from its pivotal connection with the ear 22. A change in the effective length of the link 25 causes a change in the limits of arcuate movement of the retaining member 21 and thus serves as a means for positioning the retaining member 21 for optimum operational engagement with the article to be held.

The upper end of the toggle plate 27 has secured thereto one end of an expansion coil spring 28 whose other end is anchored by a pin 29 to the wall bracket 10 at a location upwardly from the toggle plate. The lower end of the toggle plate is pivotally secured, as by pivot pin 30, to a cam plate 31 which is affixed to a shaft 32 journalled for rotation in the wall bracket 10. The shaft 32 has connected thereto an angularly extending operating handle 33 by means of which the shaft can be caused to rotate about its own axis to cause corresponding rotation of the cam plate 31 and orbital movement of the pin 30 which engages the toggle plate 27.

As best seen in FIG. 4 of the drawings, when the cam plate is in the dotted line position shown in FIG. 4, the cam pin 30 is disposed rearwardly of a vertical line extending through the axis of the shaft 32 and may be considered to be "over-center" with respect to the pivotal axis of the cam plate. The spring 28 acting through the toggle plate 27 serves to yieldably maintain the cam plate in this limit of position and the toggle rod or link 25 is drawn downwardly by means of the toggle plate to cause the retaining ring or member 21 to assume its retaining or clamping position, as shown in FIGS. 1, 2 and 3.

However, when the operating handle 33 is rotated upwardly or clockwise as viewed in FIG. 4 from the dotted line position to the colid line position, the cam plate 31 is also rotated in a clockwise direction to bring the cam pin 30 above and rearwardly of the axis of the shaft 32 so that it is now over-center on the opposite side of the shaft and has caused upward displacement of the toggle plate 27 with consequent upward linear displacement of the link 25. The cam pin 30 is retained in this over-center position by the action of the spring 28. The upward extension or linear displacement of the link 25 causes upward or clockwise rotation of the retainer member 21 through the moment arm defined between the pivotal connection 24 and the axis of the pivot pin 23.

When the retainer member 21 has achieved this open or unlocked position shown in solid lines in FIG. 4, there is no longer any restraint on horizontal movement of the article C which is shown in phantom outline in FIG. 2 of the drawings. The article can be drawn away from the holder in a horizontal movement, during which the neck of the article will pass freely through the clearance opening or space 20 which is provided between the support arms 19 to permit such movement, as previously described.

The article holder herein described has been specifically designed for holding the compressed air cylinder of an emergency breathing apparatus such as is used by firemen and other disaster workers. Such emergency breathing apparatus and its associated controls is provided with a harness arrangement (not shown) by means of which the apparatus can be strapped and secured to the back of the user. The lower portion of the air cylinder is customarily necked or reduced in diameter and has secured thereto the necessary hoses and controls for metering the air to the face mask worn by the user. The main body of the compressed air cylinder is, as the name implies, of cylindrical configuration, and the upper end of the air cylinder terminates in a semi-spherical configuration. In the embodiment shown, the arcuate lower support arms 19 define an internal diameter which is smaller than the diameter of the cylindrical portion of the air cylinder, so that the main body portion of the cylinder will rest upon the support member 17 and be supported thereby even though the neck portion of the air cylinder does extend through and below the support member 17. Similarly, the retaining member 21, which is here shown as ring shaped, has an internal diameter which is smaller than that of the cylindrical portion of the air cylinder C so that the retainer ring 21 will fit snugly upon the semi-spherical upper end of the air cylinder to both encircle it to physically obstruct its removal horizontally as well as to exert a clamping force downwardly upon it to maintain it firmly in position and prevent it from rattling or vibrating during transport. As previously described, the effective length of the support link 25 can be adjusted to cause the locked position of the retaining member 21 to be usch as to achieve this function. However, it is to be noted that even if the internal diameter of the retaining ring 21 were greater than that of the air cylinder, the downward movement of the ring from its open position to its locked position would still cause the retaining ring to encircle the cylinder and obstruct its horizontal removal from the wall bracket. In such case, there would be no clamping action or downward force exerted by the retaining member upon the cylinder and it would be free to vibrate or rattle during transport and might even eventually slip out from the holder. This would not occur if the holder were mounted on a stationary wall, as in a fire station, in which instance the clamping action of the retaining member would not be so necessary.

When the fireman or other disaster worker wishes to attach the emergency breathing apparatus to himself, he positions himself with his back to the holder and secures the harness to himself while the heavy air cylinder is still supported by the holder. After the harness is secured in place, the user rotates the operating handle 33 from the position shown in FIGS. 1 and 2 of the drawings to the solid line position shown in FIG. 4 of the drawings, thus causing the pivotally mounted re-

taining member or ring **21** to be moved upwardly to its open or unlocked position, as previously described. The upper end of the air cylinder is now free of restraint and the lower end is merely gravity-supported on the lower support member **17.** The user can now walk away from the holder and the apparatus is free to move with him. When the emergency breathing apparatus has served its purpose and is to be returned to the holder, the removal operation is reversed. The user positions his back toward the holder and moves toward it so as to pass the necked portion of the air cylinder between the lower support arms and bring the cylinder to rest upon the lower support member **17.** The user is now relieved of the weight of the air cylinder and can rotate the operating handle **33** from the solid line position shown in FIG. **4** to the locked position shown in FIGS. **1** and **2** where the upper retaining member **21** again engages the air cylinder. The user can then remove the harness.

FIG. **5** of the drawing shows a modified form of the invention which permits adjustment of the position of the lower support member **17** so as to vary the spacing between the lower support member and the upper retaining member to accomodate to different sizes or lengths of cylinders. In this modified form of the invention, the fasteners **15** which serve to secure the support member **17** between the spaced angle iron elements **11** and **12,** extend through elongated slots **34** which are provided in the elements **11** and **12.** The slots permit the location of securement of the lower support member **17** to be adjusted within the limits defined by the length of the slots.

FIG. **6** of the drawing shows another modification of the invention in which the draw rod or link **25***a* is provided with a spring-loaded lost motion connection with the ear **22** of the retaining member **21.** In this form of the invention, the upper end of the link **25***a* is slotted as at **35** to accompdate the pivot pin **24** which can move slidably upwardly or downwardly in the slot. A compression coil spring is anchored at the top of the slot **35** in the path of upward movement of the pivot pin **24** relatively to the link **25***a.* In this modified arrangement, when the operating handle **33** is rotated upwardly to bring the retainer member **21** to the unlocked position, the bottom of the slot **35** travels into engagement with the pivot pin **24** to cause pivoting upward movement of the retaining member **21.** On the other hand, when the operating handle **33** is moved downwardly to lock the article in the holder, the free end of the spring **36** seats on the pivot pin **24** as the toggle rod **25**a is drawn downwardly. As long as there is no significant resistance to the downward rotation of the retaining member **21,** the spring **36** will not be compressed. However, when the retaining member **21** abuts the article, even if this abutment should occur before the completion of downward movement of the link **25***a,* the link is still free to continue its movement to completion in opposition to the action of the spring **36.** In this manner, the compression of the spring **36** causes a significant downward clamping action or force to be exerted on the upper end of the article which causes it to be snugly retained in the holder. Even if the article is of such configuration that its upper end cannot be encircled or embraced by the retaining member **21,** the clamping action exerted by the reatining member in simple abutment with the end of the article will often be sufficient for holding purposes.

It is to be understood that the forms of my invention, herewith shown and described, are to be taken as preferred examples of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a quick-release article holder for mounting on a vertical surface, the combination of a horizontally-extending lower support member adapted to underlie the article, a retaining member spaced upwardly from said support member and engageable with the article, means mounting said retaining member for pivotal movement toward and away from said article-engaging relationship, and an operation linkage connected to said retaining member for effecting said pivotal movement, said operating linkage including a link connected to said retaining member to create a moment arm about said pivotal connection, a toggle plate secured to the free end of said link, an operating lever, a rotatable cam operatively secured to said lever and engaging said toggle plate to provide an over-center toggle joint interconnecting said link to said lever to effect linear displacement of said link relative to said moment arm in response to lever-actuated plate-displacing rotation of said cam, and spring means yieldably maintaining said toggle joint in one or the other limit of its position.

2. A combination as defined in claim **1,** wherein said support member is bifurcated to provide spaced article-support arms to underlie one portion of the article, the space therebetween providing an opening for horizontal movement therethrough of another portion of the article.

3. A combination as defined in claim **1,** including adjustable mounting means for said members for selectively changing the spacing between said support member and said retaining member.

4. A combination as defined in claim **1,** wherein said retaining member is mounted for pivotal movement about a horizontal axis.

5. A combination as defined in claim **4,** wherein said retaining member is ring-shaped and adapted to overlie an article of cylindrical shape.

6. A combination as defined in claim **1,** including means carried by said link for adjustably changing the effective length thereof to vary the limits of position of said retaining member.

7. A combination as defined in claim **1,** wherein said retaining member clampingly engages the article in response to lever-actuated retraction of said link.

8. A combination as defined in claim **7,** including a spring-loaded lost-motion connection between said link and said retaining member to yieldably permit retraction of said link after pivotal movement of said retaining member has been arrested.

9. In a quick-release holder for an air cylinder having a downwardly-projecting necked portion, the combination of a horizontaly-extending support member adapted to underlie said cylinder, said support member having spaced support arms to permit horizontal traverse of the necked portion of said cylinder therebetween, a ring-shaped retaining member of smaller internal diameter than said cylinder spaced upwardly from said support member and adapted to be disposed in overlying clamped engagement with said cylinder, means mounting said retaining member for pivotal movement about a horizontal axis, and a lever-

operated operating linkage connected to said retaining member to effect pivotal movement thereof out of and into clamping engagement with said cylinder, said linkage including a spring-loaded lost-motion connection to said retaining member to yieldably permit retraction of said linkage after pivotal movement of said retaining member has been arrested by said cyinder.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,737,133 Dated June 5, 1973

Inventor(s) Allan J. Boecker

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet, in the heading, item [73] should read as follows:

-- Assignee: by mesne assigt to Premier Industrial Corporation, Cleveland, Ohio, a Corporation of Ohio --.

Signed and sealed this 18th day of June 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

USCOMM-DC 60376-P69
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