Oct. 30, 1945. H. H. MERWIN 2,388,005

ARTICLE HANDLING APPARATUS

Filed June 29, 1944

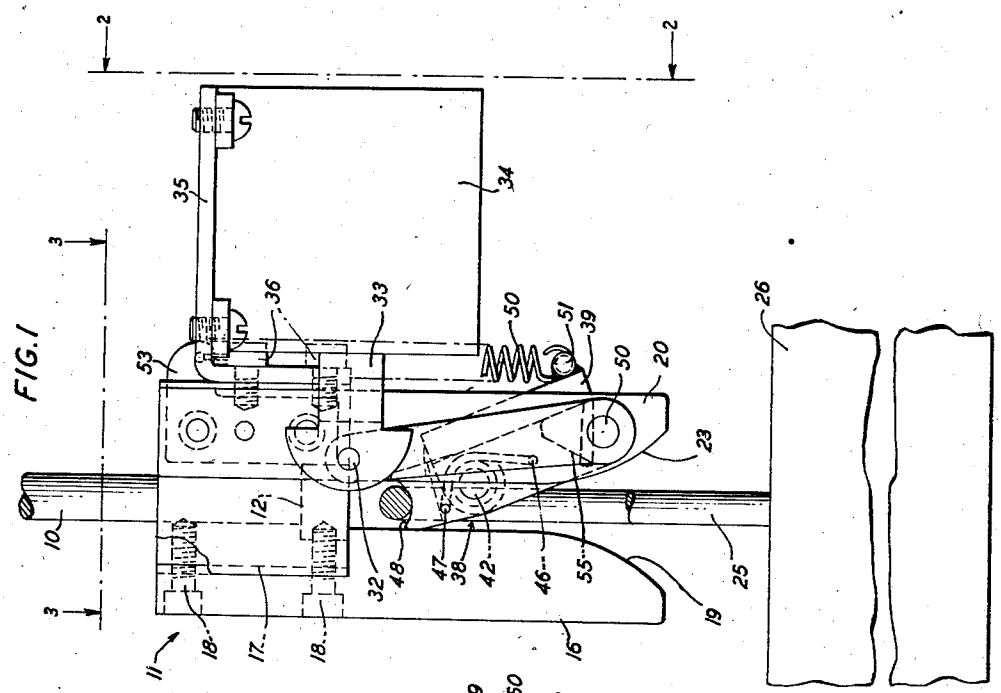


FIG. 1

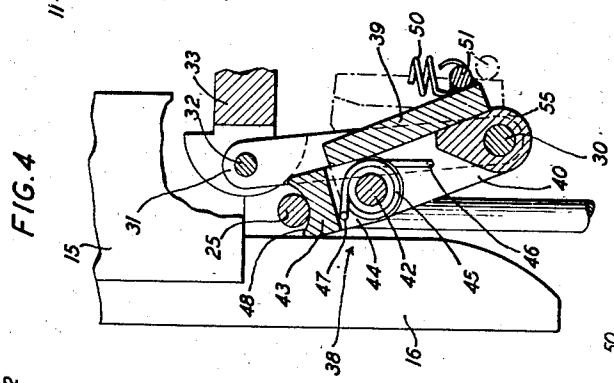


FIG. 4

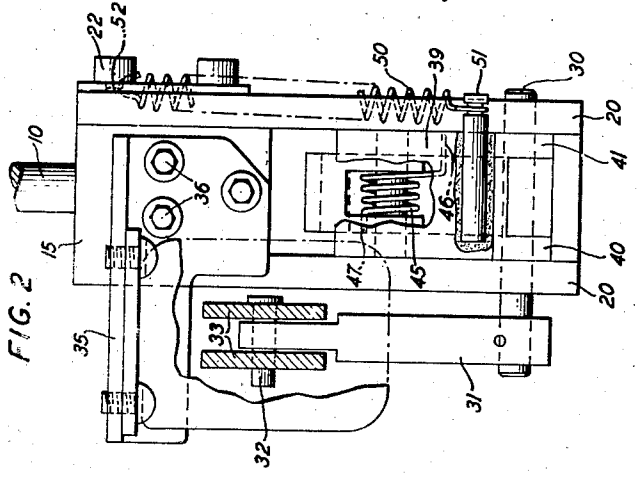


FIG. 2

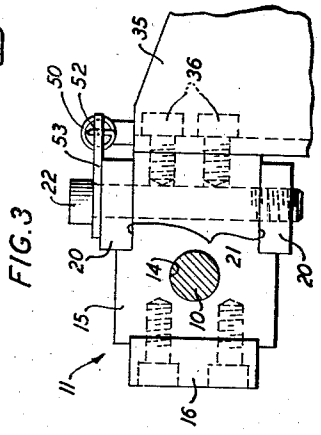


FIG. 3

INVENTOR
H. H. MERWIN
BY
E. R. Moulan
ATTORNEY

Patented Oct. 30, 1945

2,388,005

UNITED STATES PATENT OFFICE

2,388,005

ARTICLE HANDLING APPARATUS

Harry H. Merwin, Rutherford, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application June 29, 1944, Serial No. 542,646

6 Claims. (Cl. 294—83)

This invention relates to article handling apparatus, and more particularly to apparatus for hoisting articles.

An object of the invention is to provide an article handling apparatus which includes a simple, efficient and highly practical unit for engaging, lifting and releasing articles.

With this and other objects in view, the invention comprises an article handling apparatus including a movable unit having an element formed of interconnected relatively movable parts normally disposed to support an article and movable relative to each other to free the article from the unit.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawing, wherein

Fig. 1 is a fragmentary front elevational view of the apparatus shown in engagement with an article;

Fig. 2 is a fragmentary side elevational view taken substantially along the line 2—2 of Fig. 1, portions thereof being broken away;

Fig. 3 is a lateral sectional view taken along the line 3—3 of Fig. 1, and

Fig. 4 is a fragmentary sectional view of the structure shown in Fig. 1, portions thereof being removed to illustrate, more clearly, the connections of the members.

Referring now to the drawing, reference numeral 10 designates a hoisting or lifting element which is connected to any suitable means (not shown) for moving a unit, indicated generally at 11, vertically in a given path. In actual structure guide means is employed for the unit to restrict it to its given path but to illustrate the invention without hiding it beyond these other features of the structure, namely the guide means and hoisting means, they have been purposely omitted.

The element 10 has an enlarged portion 12 at its lower end and extends through an aperture 14 in a head 15 of the unit 11. A single leg 16, formed for interfitting engagement, as at 17, with the head 15, is fixedly mounted upon one side thereof as at 18 and projects downwardly therefrom, its inner surface curving outwardly at 19 near the lower end thereof. A pair of legs 20, similar in contour to the leg 16 but smaller in width, is disposed in recesses 21 at opposite sides of the head 15 and secured in place by bolts 22. The legs 20 have their inner surfaces curved outwardly at 23, similar to the curvature 19 of the leg 16. The legs are thus formed so that they may straddle a handle 25 of an article 26, the leg 16 upon one side of the handle and the pair of legs 20 upon the other side thereof as illustrated in Figs. 1 and 4. The handle 25 of the article is substantially U-shaped in general contour, the central portion thereof being receivable in the cavity or space between the legs of the unit. The article 26 may be of any desired contour, it being preferred that its connection with the handle 25 be rigid.

A shaft 30 extends through aligned apertures in the lower portions of the legs 20 and beyond one of the legs a sufficient distance to support a lever 31. The lever 31 extends upwardly and is pivotally connected, as at 32, to a core 33 of a solenoid 34. The function of the solenoid will hereinafter be described, it being understood, however, that it may be energized at will through the closing of an electrical circuit (not shown). The solenoid is supported by a bracket 35, the latter being mounted as at 36 upon the head 15.

A lever-like element, indicated generally at 38, includes a member 39 which is U-shaped in cross section, the lower extended portions of legs 40 thereof being apertured to receive the shaft 30. Aligned apertures are also provided in the upper portions of the legs 40 of the member 39 to receive the ends of a shaft 42. A companion member 43 of the element 38 is also U-shaped in general contour, the legs 44 of which are positioned between the legs 40 of the member 39 and are provided with aligned apertures for mounting upon the shaft 42. The member 43 is free to rotate upon the shaft 42 and is normally urged into engagement with the central portion of the member 39, as illustrated particularly in Fig. 4, through the force of a helical spring 45, one end of which is fixed as at 46 to the adjacent leg 40 of the member 39, the other end 47 being fixed to the member 43. The central portion of the member 43 has a concave article engaging surface 48 adapted to engage the handle 25 of the article and thus support the article.

Attention is directed to the relationship of the center lines of the shaft 30, the shaft 42 and the central portion of the handle 25. Normally, the center line of the shaft 42 is beyond dead center of the shaft 30 and the handle 25 to cause the element 38 including the members 39 and 43, to normally act as a solid structure. A spring 50, having one end connected to a pin 51 of the member 39 and the other end fixed as at 52 to a bracket 53 supported on the head 15 through the aid of the bolts 22, normally urges the element 38 so that its upper end, namely the upper portion of the member 43 thereof, will engage the inner wall of the leg 16.

The means for tripping the element 38 includes the solenoid 34, its core 33 and the lever 31 which controls the actuation of the shaft 30. An arm 55, disposed between the legs 40 of the member 39 upon the shaft 30 and fixed to the latter, is positioned to engage the central portion of the member 39, and upon energization of the solenoid, move the member from its normal or solid line position shown in Fig. 4 to the dot and dash line position to trip the element 38.

Upon considering now the operation of the apparatus, let it be understood that the element **10** is movable vertically between given limits and that it may be held at these limits for desired lengths of time. To illustrate the apparatus, let it therefore be assumed that the article **26** is to be raised a given distance and then released and allowed to drop onto a suitable support. The article **26** may be of considerable weight and it is therefore important that it may be freed from the apparatus without excess strain or damage either to the article or to the apparatus.

With this in mind, let it be assumed that the unit **11** is disconnected from the handle **25** and is at a desired position above the handle and the article attached thereto. By moving the unit **11** downwardly, the legs thereof will straddle the handle **25** aided by the rounded portions or surfaces **19** and **23**, the single leg **16** being positioned upon one side of the handle while the pair of legs **20** is positioned upon the other side thereof. During this downward movement, the element **38**, laying diagonally across the space between the legs of the unit, will engage the handle **25** and be moved thereby about its shaft **30** as a solid element until the central portion of the head **15** engages the handle. When this has occurred, that is, as soon as the member **43** of the element **38** has moved downwardly beyond the central portion of the handle, the element will be moved inwardly through the force of the spring **50** to position th pocket or surface **48** to serve as a support for the handle and thus for the article.

The article may at this time be elevated to a given height by moving the element **10** together with the unit **11** upwardly. When the article has reached the desired height it may be released through the energization of the solenoid **34**. As a result of this action, the core **33** of the solenoid is drawn inwardly, moving the lever **31** clockwise to rock the shaft **30** and with it the arm **55**, which moves the member **39** from the solid line position (Fig. 4) to the dot and dash line position thereof, to thus trip the element **38**. The weight of the article **26** applied to the member **43** through the handle **25** is sufficient to hold the member **43** against movement with the member **39**, but instead the member **43** will pivot about its shaft **42** against the force of the spring **45** until the shaft **42** is moved beyond dead center, that is, at the opposite side of the present alignment of the centers of the shaft **30** and the handle **25**, thus allowing the article to drop freely from the unit. After the element **38** has been tripped through the energization of the solenoid **34**, the article dropped, and the solenoid deenergized, the element **38** will again be moved into its normal position through the force of the spring **50**, the member **43** of the element having been returned to its normal position through the force of the spring **45** and allowed to rest upon the inner surface of the leg **16**. The unit is thus automatically set to again engage and lift the article **26**. The contour of the pocket or surface **48** in the member **43** assures positive holding of the article through its handle during the lifting or elevating movement, and further assures quick releasing of the article when the element **38** is tripped.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. In an article handling apparatus, a movable unit including members positioned to straddle an article, an element pivotally mounted adjacent its lower end to one of the members and having pivotally connected portions normally extending diagonally upwardly to close the space between the members and support the article on the upper end thereof, means to elevate the unit and the article, and means to cause relative movement of the portions about their pivot to free the article.

2. In an article handling apparatus, a movable unit including members positioned to straddle an article, a pivot, an element having an upper portion to support an article and a lower portion connected to the upper portion by the pivot to thus pivotally support the upper portion, means to pivotally connect the lower portion to one of the members to normally position the element diagonally to close the space between the members, means to elevate the unit and the article, and means to cause relative movement of the portions about the pivot to free the article.

3. In an article handling apparatus, a movable unit including members positioned to straddle an article, a pivot, an element having an upper portion to support an article and a lower portion connected to the upper portion by the pivot to thus pivotally support the upper portion, means to pivotally connect the lower portion to one of the members, means to normally urge the element to close the space between the members, means to elevate the unit and the article, and means to cause relative movement of the portions about the pivot to free the article.

4. In an article handling apparatus, a movable unit including members positioned to straddle an article, an element pivotally mounted adjacent its lower end to one of the members and having pivotally connected portions normally extending diagonally upwardly to close the space between the members and support the article on the upper end thereof, means to elevate the unit and the article, an energizable solenoid carried by the unit, and means actuated by the solenoid when energized to cause relative movement of the portions about their pivot to free the article.

5. In an article handling apparatus, a movable unit including members positioned to straddle an article, a pivot, an element having an upper portion to support an article and a lower portion connected to the upper portion by the pivot to thus pivotally support the upper portion, means to pivotally connect the lower portion to one of the members to normally position the element diagonally to close the space between the members, means to elevate the unit and the article, an energizable solenoid carried by the unit, and means actuated by the solenoid when energized to cause relative movement of the portions about the pivot to free the article.

6. In an article handling apparatus, a movable unit including members positioned to straddle an article, a pivot, an element having an upper portion to support an article and a lower portion connected to the upper portion by the pivot to thus pivotally support the upper portion, means to pivotally connect the lower portion to one of the members, means to normally urge the element to close the space between the members, means to elevate the unit and the article, an energizable solenoid carried by the unit, and means actuated by the solenoid when energized to cause relative movement of the portions about the pivot to free the article.

HARRY H. MERWIN.