Sept. 4, 1945. H. L. HUSSON ET AL 2,384,307

MATERIAL HANDLING APPARATUS

Filed Oct. 30, 1943 2 Sheets-Sheet 1

FIG. 7

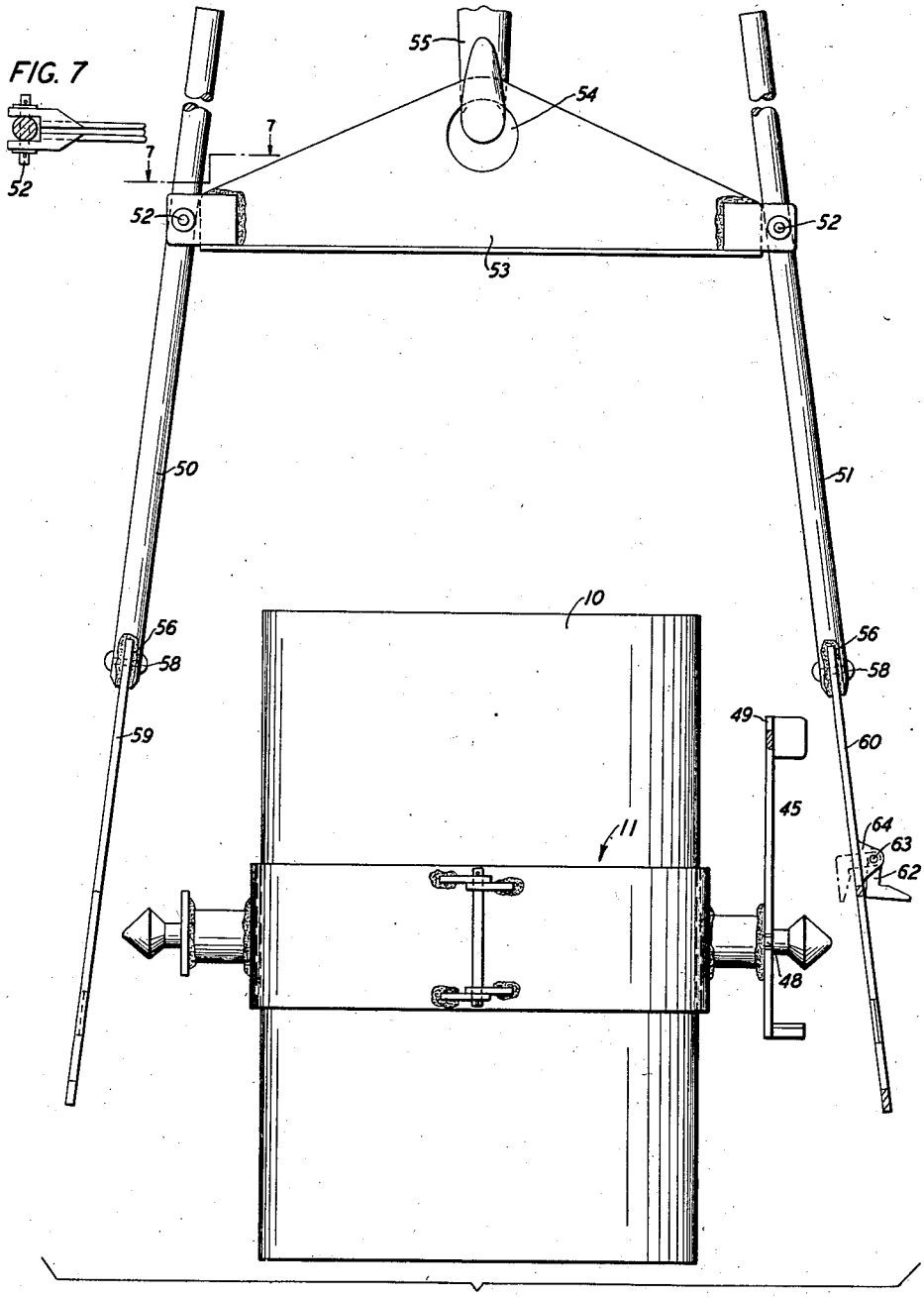

FIG. 1

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Filed Oct. 30, 1943 2 Sheets-Sheet 2

FIG. 2.

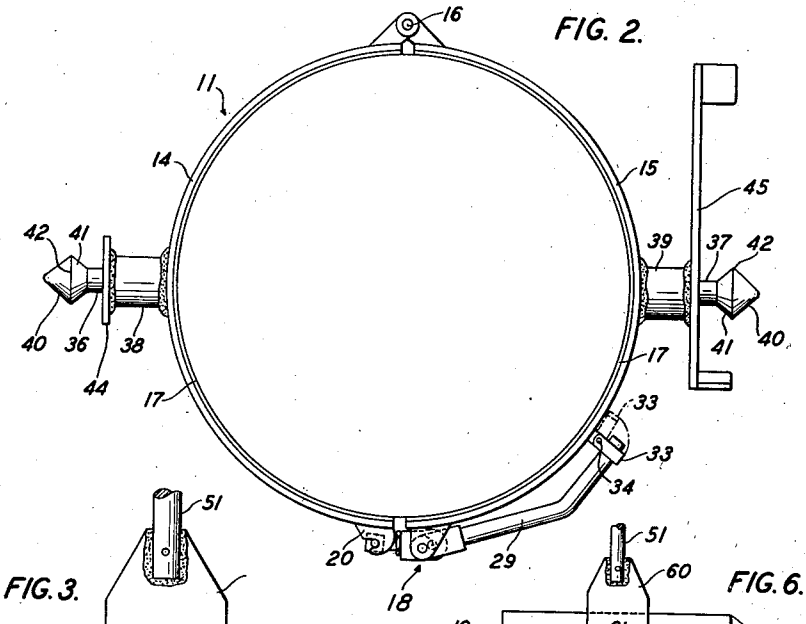


FIG. 3.

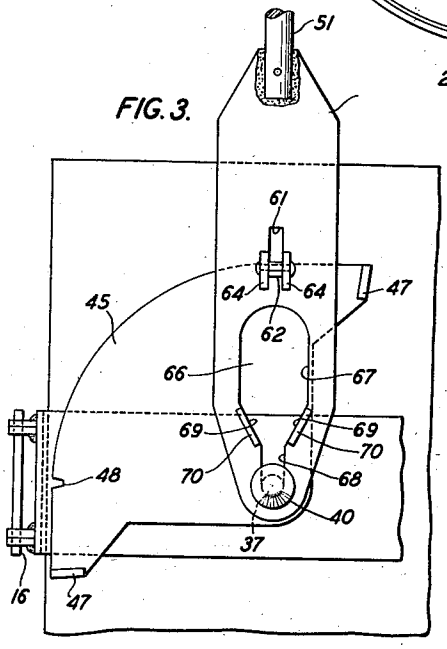


FIG. 6.

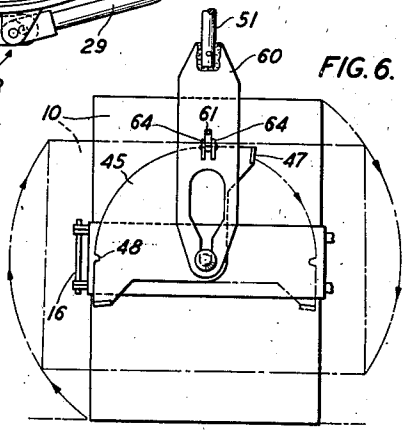


FIG. 4.

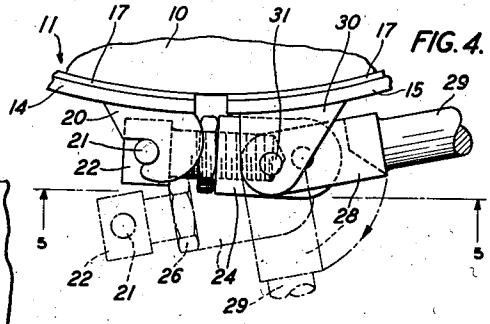
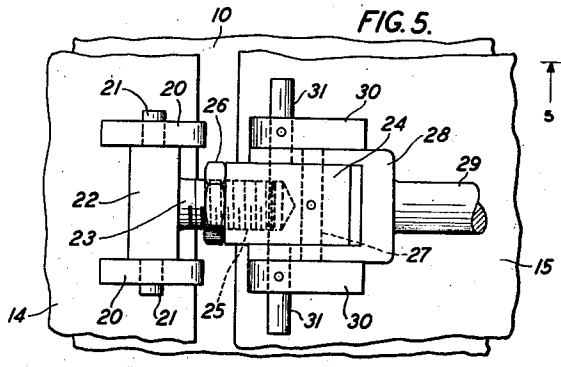


FIG. 5.



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UNITED STATES PATENT OFFICE

2,384,307

MATERIAL HANDLING APPARATUS

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Application October 30, 1943, Serial No. 508,430

7 Claims. (Cl. 294—67)

This invention relates to material handling apparatus, and more particularly to a grapple for conveying large smooth-surfaced articles.

An object of the invention is to provide a material handling apparatus which is particularly adaptable for conveying smooth-surfaced articles.

With this and other objects in view, the invention comprises a trunnion carrying band adapted to encircle an article and be attached thereto, the trunnions being positioned for removable locking engagement with depending arms carried by an element adapted for engagement with a hoisting apparatus.

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

Fig. 1 is a front elevational view of the apparatus illustrating the band attached to an article, with the arms positioned outwardly ready for engagement with the trunnions on the band;

Fig. 2 is a bottom plan view of the band shown in locked position on the article;

Fig. 3 is a fragmentary side elevational view of a portion of the apparatus illustrating the connection between one of the arms and its respective trunnion of the locking band;

Fig. 4 is a fragmentary top plan view of the locking means for the band shown in solid lines in locked position and in dot and dash lines in unlocked position;

Fig. 5 is a fragmentary front elevational view of the locking means taken along the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary side elevational view of the apparatus illustrating the different positions, in which the article may be conveyed, or, into which it may be moved while being conveyed, and

Fig. 7 is a fragmentary sectional view taken along the line 7—7 of Fig. 1.

This apparatus is the solution to a problem of conveying large and heavy smooth-surfaced cylindrical articles during the manufacture thereof. To successfully convey an article as indicated at 10 it is necessary to first provide the article with projecting means to which hoisting means may be connected; thus the provision of the locking band indicated generally at 11. The locking band is provided with two semi-circular members 14 and 15 hinged together at 16 and provided with friction lining members or material 17. This material may be of any desired structure, for example, any commercially known brake lining material capable of establishing a gripping or holding force between the band members 14 and 15, to which they are attached, and the article 10, into engagement with the outer surface of which they are forced through the aid of a locking means indicated generally at 18.

By viewing Figs. 4 and 5 in connection with Fig. 2, it will be noted that the member 14 adjacent the forward or locking end is provided with a pair of spaced notched ears 20 adapted to receive, in the notches thereof, reduced ends 21 of a latch or locking element 22. The locking element 22 has an integral threaded portion 23 projecting at right angles from the center thereof for adjustable threaded engagement with a supporting member 24. A threaded aperture 25 of the member 24 receives the threaded portion 23, and through the aid of a lock nut 26, the member and element may be held together at any desired adjusted position. The member 24 is pivotally supported at 27 in a yoke 28 of a locking lever 29. Spaced ears 30 on the member 15 support pivot rods 31 in aligned apertures therein, the rods providing a pivotal support for the yoke 28 by passing through aligned apertures therein spaced from the pivot 27. The locking lever 29 is of the angular contour shown and is adapted to be held in locked position by a retaining element 33. The element 33 is pivotally supported at 34 upon the member 15 movable from the dot and dash line position into the solid line position shown in Fig. 2, to extend around the end of the lever 29 and hold the latter against accidental movement into open position.

Trunnions 36 and 37, through the aid of intermediate spacing members 38 and 39, are fixed at diametrically opposed positions upon their respective members 14 and 15. It will be noted that a conical outer portion 40 of each of the trunnions and truncated cone inner portions 41 are joined by edges 42, to eliminate accidental connection of the hereinafter described arms other than at the reduced inner portions of the trunnions. The trunnion 36 is provided with a stop or locating plate 44, while a locating plate 45 is provided for the trunnion 37. The locating plate 45 is of the contour shown in Figs. 1, 2, 3 and 6, having laterally projecting stop portions 47 and latch receiving notches 48 and 49 in the arcuate outer surface thereof.

To complete the apparatus, arms 50 and 51 are provided and pivotally supported at 52, as illustrated in Figs. 1 and 7, at the ends of a spreader bar 53. The spreader bar 53 is apertured at 54 for connection with a hook 55 or other suitable structure of a hoisting apparatus not shown.

The upper portions of the arms 50 and 51 are

cylindrical in cross-section as illustrated, the lower ends of these portions being slotted as at 56, to receive and be connected, as at 58, with their respective lower arm members 59 and 60. The lower arm members 59 and 60 are identical in structure excepting that the member 60 is notched at 61 for a latch 62, the latter being pivotally supported at 63 by ears 64 fixed to the member 60. Otherwise, a description of one member 59 or 60 will apply equally well to both members. The general contours of the members are shown in Fig. 3. Here the member 60 is of sufficient width for a trunnion receiving aperture 66, the latter having a wide upper portion 67 and a narrow lower portion 68 with intermediate angularly projecting portions 69. The portions 69 have knife-like edges 70 to eliminate the possibility of the heads or outer portions of the trunnions from resting thereon accidentally during the connection of the arms with the trunnions.

To demonstrate the function or operation of the apparatus, let it be assumed that the article 10 is resting upon the floor or any other suitable support, and that it is desirable to convey this article to another position. The locking band is first attached to the article. This is accomplished by spreading the then unlocked members 14 and 15 about their hinge 16 until they may be brought about the article near the center thereof, after which the element 22 is positioned with its reduced ends 21 disposed in the notches of the ears 20 with the lever 29 in the open position shown in dot and dash lines in Fig. 4. The lever may then be moved into locking position and through the off-center arrangement of the pivots 27 and 31, the members 14 and 15 of the locking band 11 are brought into gripping engagement with the article, this gripping engagement existing through the friction members 17. Furthermore, the locking means 18 is self-locking by the movement of the pivot 27 beyond the dead centers of the pivot 31 and the ends 21 of the element 22. The arms 50 and 51 are then lowered to position the apertures 66 of the members 59 and 60 thereof in general alignment with the trunnions 36 and 37. At this time the arms may be moved inwardly for engagement with the trunnions aided by the conical ends 40 of the latter, after which the arms are raised to cause the trunnions to lie in the reduced portions 68 of the apertures 66. Through the raising of the arm the angular portions 69 of the apertures assist in guiding the relative movement of the arms and trunnions. When this has been accomplished the latch 62 may be swung about its pivot through the aperture or notch 61 and into the notch 49 of the plate 45.

The apparatus is now ready to transport the article to another position and through the aid of hoising apparatus this may be accomplished. When the article reaches its destination, if the operator chooses to deposit the article in a horizontal rather than a vertical position, this may be accomplished by releasing the latch 62 from the notch 49 and moving the article about the trunnions, acting as pinions, from the solid line position shown in Fig. 6 to the dot and dash line position shown therein. At this time the latch 62 may be moved into the notch 48 and the article thus locked in its horizontal position. It is apparent that the reverse of this procedure may be similarly accomplished, that is, the movement of the article from a horizontal position to vertical position. When the article is lowered upon suitable supports, the arms may continue in their downward movement to bring the large portions 67 of the apertures 66 into registration with the trunnions for removal of the arms. The locking band 11 may then be removed from the article by first moving the retaining element 33 to the dotted line position (Fig. 2) and moving the locking lever 29 into the dot and dash line position shown in Fig. 6.

With this apparatus, regardless of the size and weight of the article, the smooth external surface thereof may be protected against harm and means may be positively connected thereto for the transportation of the article to different locations and into various positions.

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. An article handling apparatus comprising a locking band adapted for frictional gripping engagement with a cylindrical article, spaced projections carried by the locking band, arms adapted for interfitting engagement with the projections, means, adapted for connection with a transporting means, supporting the arms, and interconnectible means carried by the band and one of the arms to hold the article in a selected one of a plurality of positions.

2. An article handling apparatus comprising an element adapted to grip a smooth-surfaced article, spaced projections on the element, arms adapted for interfitting engagement with the projections, means, adapted for connection with a transporting means, supporting the arms, and interconnectible means respectively carried by the element and one of the arms to hold the article in a selected one of a plurality of positions.

3. An article handling apparatus comprising an element adapted to grip a smooth-surfaced article, spaced trunnions mounted on the element, arms adapted for interfitting engagement with the trunnions and for supporting the trunnions for rotary movement with the element and article, means, adapted for connection with a transporting means, supporting the arms, and means to latch the trunnions and element with the article in any selected one of a plurality of positions relative to the arms.

4. An article handling apparatus comprising an element adapted to grip a smooth-surfaced article, spaced trunnions mounted on the element, arms adapted for interfitting engagement with the trunnions and for supporting the trunnions for rotary movement with the element and article, means, adapted for connection with a transporting means, supporting the arms, means to limit the rotary movement of the trunnions, element and article, and means to latch the trunnions and element with the article in any one of a plurality of positions.

5. An article handling apparatus comprising a locking band including pivotally connected portions with frictional lining members extending over the inner surfaces of the said portions and fixed thereto, means to move the said portions about their pivotal connection to force the said members into gripping engagement with a cylindrical article, spaced trunnions carried by the locking band and having head portions with surfaces tapering inwardly from edges, and lifting arms adapted for removable engagement with the trunnions and having knife-like edge portions

cooperating with the said edges of the trunnions to assure positive engagement of the arms and trunnions.

6. An article handling apparatus comprising a locking band adapted for frictional gripping engagement with a cylindrical article, spaced trunnions carried by the locking band and having head portions with surfaces tapering inwardly from edges, and lifting arms adapted for removable engagement with the trunnions and having knife-like edge portions cooperating with the said edges of the trunnions to assure positive engagement of the arms and trunnions.

7. An article handling apparatus comprising a locking band adapted for frictional gripping engagement with a cylindrical article, spaced trunnions carried by the locking band and each having conical-like surfaces meeting at a circular edge, and lifting arms adapted for removable engagement with the trunnions and having knife-like edge portions cooperating with the said edges of the trunnions to assure positive engagement of the arms and trunnions.

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