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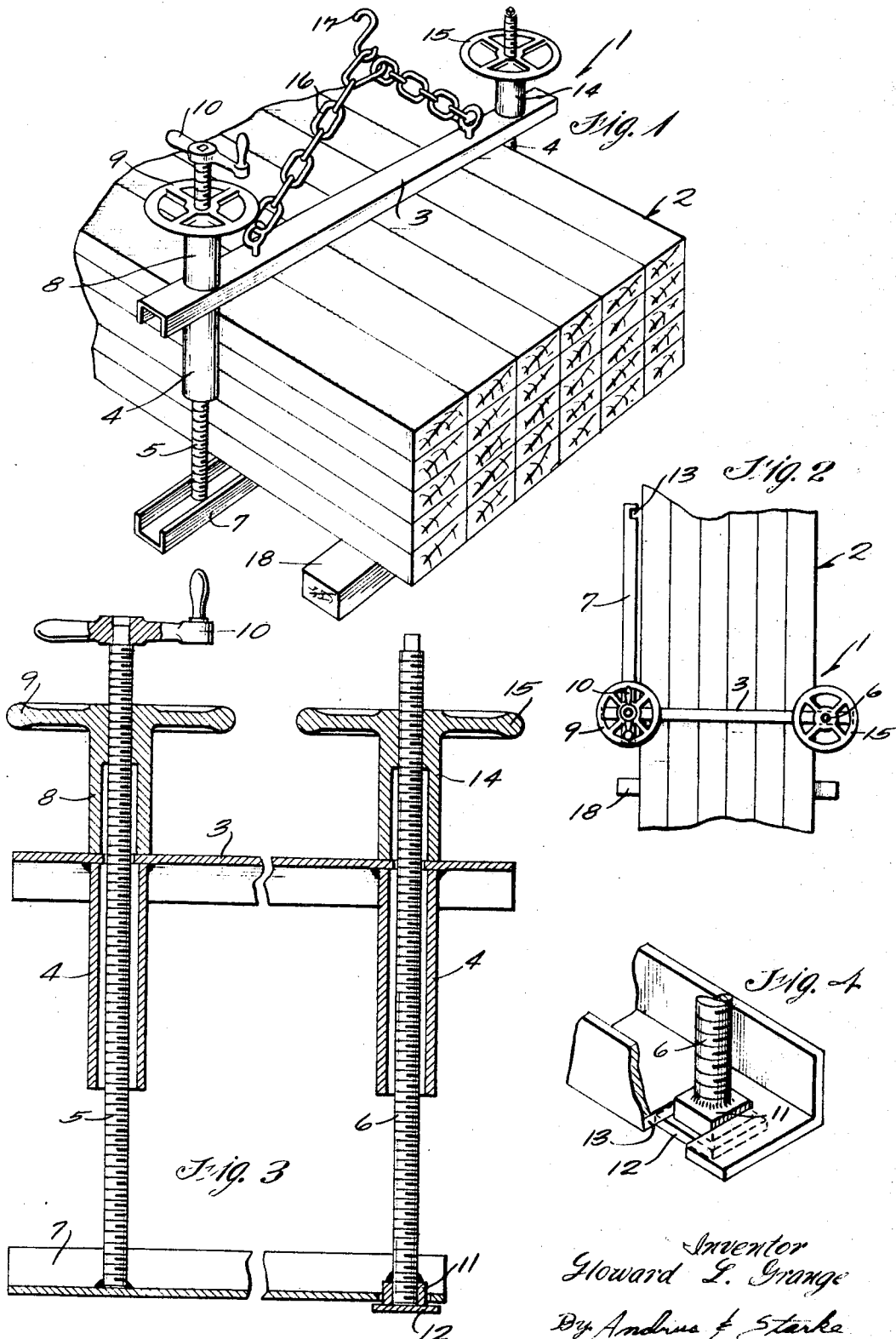
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3,443,831

DEVICE FOR CLAMPING AND HANDLING ARTICLES

Filed April 14, 1967

Sheet 1 of 2



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Sheet 2 of 2

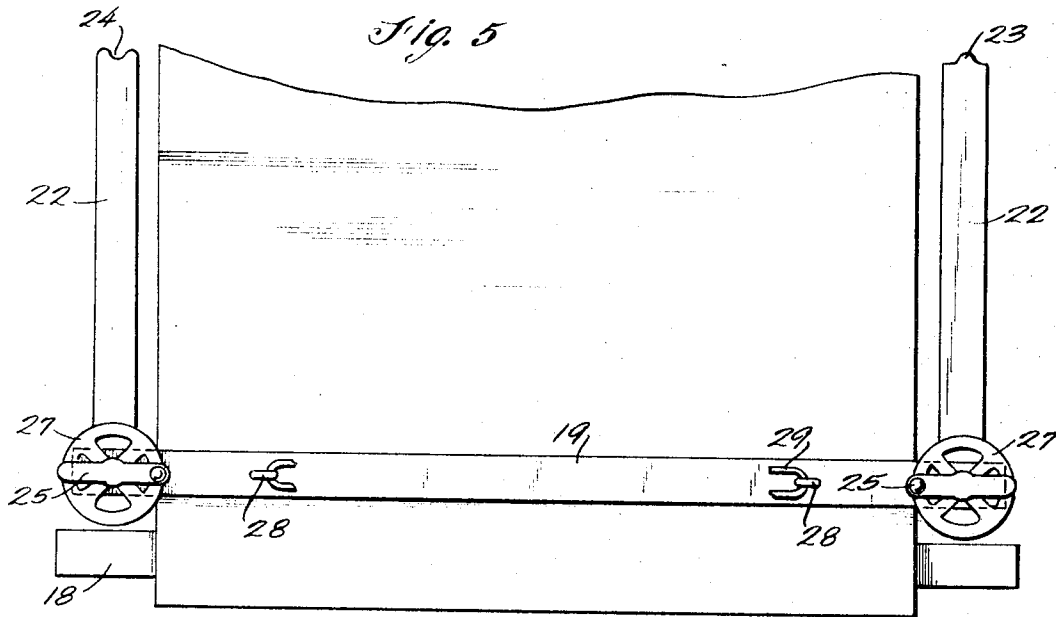
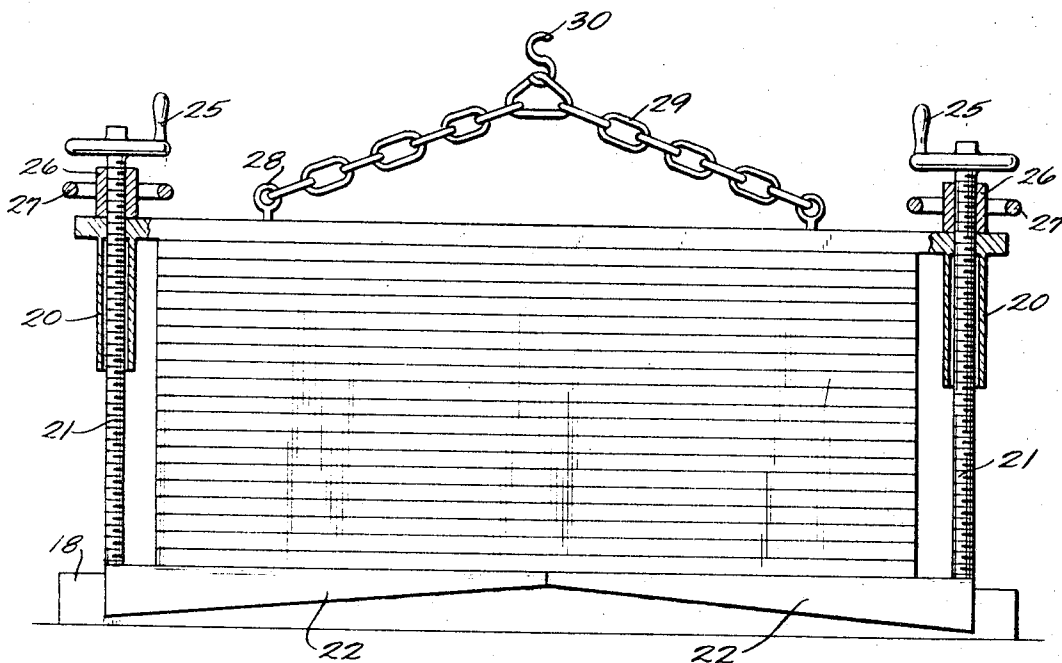


Fig. 6

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1

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DEVICE FOR CLAMPING AND HANDLING ARTICLES

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9 Claims

ABSTRACT OF THE DISCLOSURE

The invention relates to a device for clamping and handling a stack of lumber or other articles. The device includes an upper arm adapted to be disposed across the upper surface of the stack and a lower arm is pivotally connected to the upper arm and is movable in a plane beneath the stack from a position at right angles to the upper arm to a position parallel to the upper arm. By drawing the parallel arms together the stack is clamped therebetween so that the stack can then be elevated and transported.

The handling of lumber has traditionally been a manual operation in which the various pieces of lumber such as 2 x 4's, 2 x 6's, plywood sheets and the like are manually lifted from a boxcar to the lumberyard warehouse and subsequently manually lifted to a truck for transportation to the job site. Recently, mechanical handling equipment, such as forklift trucks and straddlebug trucks, have been used in larger operations where they are economically justified, but even this usage has been limited. Not only is mechanical handling equipment expensive, but the lumberyards, warehouses and sheds are generally not laid out for efficient use of mechanical handling equipment such as forklift trucks. In most lumberyards, the lumber stacks are arranged with the ends of the stacks facing the driveway or aisle and not parallel to the aisle. Because of this, the normal lumberyard layout does not lend itself to the use of mechanical equipment for it does not normally provide sufficient room for the mechanical equipment to properly maneuver and handle the stacks. Even when the stacks are arranged parallel to the aisles or driveways and can be more readily handled, it is not normally possible to remove stacks from an interior area where there is no access for the lift truck.

The present invention is directed to an inexpensive device for clamping and handling lumber which can be used in relatively small lumberyards and warehouses. More specifically, the device includes an upper arm which is adapted to be located across the stack of lumber and a lower arm which is pivotally connected to the upper arm and is movable in a plane beneath the stack from a position 90° with respect to the upper arm to a position generally parallel to the upper arm. With the two arms in the parallel relation, the arms are drawn together by a threaded connection to clamp the stack between the arms. A hook or other attaching member is connected to the upper arm and is adapted to be engaged by a crane or vehicle-mounted boom to lift and move the clamped stack to the desired location.

The present invention is a relatively inexpensive unit which can be used to clamp and handle lumber and is particularly adaptable for small lumberyards or warehouses.

The device is adapted to be engaged by a crane or truck-mounted boom, and with the use of a crane or boom the clamped stack can be readily moved in and out of railway cars, sheds, as well as being loaded and unloaded from trucks for shipment to the job site. Moreover, the device of the invention enables interiorly located stacks to be lifted by a crane or boom without the

2

necessity of the stack being located adjacent an aisle or driveway.

Other objects and advantages will appear in the course of the following description.

The drawings illustrate the best mode presently contemplated of carrying out the invention.

In the drawings:

FIG. 1 is a perspective view of a lumber stack clamped by the clamping device of the invention;

FIG. 2 is a top view showing the lower arm in the initial position before it is swung beneath the lumber stack;

FIG. 3 is a vertical section of the unit with parts broken away;

FIG. 4 is a fragmentary perspective view with parts broken away showing the connection between the lower arm and the vertical rod;

FIG. 5 is a view similar to FIG. 2 showing a modified form of the invention; and

FIG. 6 is a transverse vertical section of the device shown in FIG. 5 as clamped to the lumber stack.

The drawings illustrate a clamping and handling unit 1 associated with a stack 2 of generally parallel articles such as pieces of lumber. As shown in the drawings, the clamping and handling unit 1 is employed to handle a stack of construction lumber such as 2 x 4's or 2 x 6's, but it can also be employed to clamp and handle other elongated members such as pipe, rods, plywood sheets, wallboard and the like.

The unit 1 includes an upper arm 3 which is generally channel-shaped in cross section and is disposed transversely across the stack 2 of lumber. Extending downwardly from the upper arm 3 are a pair of tubes 4 which are located on either side of the lumber stack 2 and each of the tubes 4 receives a rod 5 and 6. The lower end of rod 5 is secured to one end of a lower arm 7, formed with a channel-shaped cross section, while the upper portion of the rod 5 is threaded and receives a nut 8 which is located above the upper arm 3. A handwheel 9 is connected to the nut 8 and by turning the handwheel 9, the nut 8 can be threaded downwardly on the rod 5 to move the upper arm 3 toward lower arm 7 and clamp the stack 2 between the arms.

Connected to the upper end of the rod 5 is a handle 10, and by turning the handle 10 the lower arm 7 can be pivoted with respect to the upper arm 3.

The lower end of the rod 6 is provided with a generally square end located above the lower head 12 and the square end 11 is adapted to be received in a notch 13 formed in the lower arm 7. As the lower arm 7 is pivoted to a position generally parallel to the upper arm 3 by turning the handle 10, the notch 13 in the lower arm will engage the square end 11 on rod 6 to properly position the lower arm 7 with respect to the upper arm 3.

A nut 14, similar to nut 8, is threadedly engaged with rod 6 and a handwheel 15 is secured to nut 14. As in the case of handwheel 9, turning of handwheel 15, when rod end 11 is engaged with notch 13 in arm 7, will draw arm 3 toward the lower arm 7 to clamp the stack 2 therebetween.

Connected to the upper surface of upper arm 3 is a chain 16 which is adapted to be engaged by a hook 17 carried by a crane or vehicle mounted boom. By engaging the chain 16, the crane or boom can move the stack of lumber 2 to the desired location.

In operation, the stack of lumber 2 is normally positioned on a series of spacers or stickers 18 which space the lower pieces of lumber from the floor or foundation. To lift the lumber stack, the upper arm 3 is positioned on the top of the lumber stack and the lower arm 7 is located at about 90° with respect to the upper arm and

generally parallel to the lumber pieces. By turning the handle 10 the lower arm is then pivoted beneath the lumber stack to bring the notch 13 of arm 7 into engagement with the end 11 of rod 6 and position the lower arm 7 in parallel relation with the arm 3. With the lower arm 7 parallel and locked to the upper arm, the handwheels 9 and 15 are turned to thread the nuts 8 and 14 downwardly and clamp the lumber between the arms 3 and 7. The chain 14 can then be engaged by the hook 15 associated with the crane or boom so that the lumber stack can then be moved to the desired location.

The tubes 4 which are secured to the underside of upper arm 3 maintain general alignment of the unit when it is in a non-clamping position. For example, when the unit is not engaged with the stack 2, the upper arm 3, being freely mounted on rods 5 and 6 can slide downwardly toward arm 7. However, the engagement of the lower ends of tubes 4 with arm 7 prevents the complete collapse of the arm 3 and maintains the general rectangular shape of the unit.

The engagement of notch 13 of arm 7 with rod end 11 serves to lock the arms in generally parallel relation without the necessity of the operator having to manually attach the members together. As the end 11 is non-circular in shape, the engagement with the complementary non-circular notch will prevent rotation of the rod 6 when the handwheel 15 is turned, and the engagement of end 11 with notch 13 also prevents the lower end of rod 6 from swinging laterally outward.

FIGS. 5 and 6 illustrate a modified form of the invention which has particular use in handling wide-short stacks of materials, such as plywood or wall board sheets, or for stacks having a lesser spacing between the supporting stickers 18. As shown in FIGS. 5 and 6, the unit comprises an upper arm 19, corresponding generally to arm 3 of the first embodiment, and a tubular member 20 extends downwardly from each end of the arm 19 and freely receives a rod 21.

As best shown in FIG. 6, the lower end of each rod 21 is secured to an end of an arm section 22 and by rotating the rods 21 the corresponding arm sections 22 can be pivoted from a position alongside, and generally parallel to the stack 2 as shown in FIG. 5, to a transverse position beneath the stack 2, as shown in FIG. 6.

To interlock the arm sections 22 when they are in the transverse supporting position beneath the stack 2, the free end of one of the arm sections is provided with a projection 23 which is received within a recess or notch 24 in the free end of the other arm section.

Rotation of the vertical rods 21 is accomplished by turning a handle 25 secured to the upper end of each rod.

The upper arm 19 is drawn toward the lower arm sections 22 in the manner described with respect to the embodiment of FIGS. 1-4. Nuts 26, carrying handle wheels 27, are threaded on the upper ends of rods 21 and by turning the nuts 26 down through operation of hand wheels 27, the upper arm 19 will be moved downwardly to thereby clamp the stack between the upper arm 19 and the interconnected lower arm sections as illustrated in FIG. 6.

The unit of FIGS. 5 and 6 is operated in a manner similar to that of FIGS. 1-4. The upper arm is initially positioned on the top of the stack 2 which is supported on spaced stickers 18, and the lower arm sections 22 are located along the sides of the stack and generally parallel to the length of the stack. Handles 25 are then rotated to pivot the lower arm sections beneath the stack to the interconnected transverse position illustrated in FIG. 6. With the arm sections 22 interconnected, the nuts 26 are threaded down to clamp the stack securely between upper arm 19 and the lower arm sections 22.

As in the case of the first embodiment eyelets 28 are secured to the arm 19, and a chain 29 is connected between the eyelets. A hook 30 or other lifting means is adapted to engage the chain 29 to lift and transport the clamped stack.

The unit shown in FIGS. 5 and 6 is particularly adaptable for use with wide stacks such as plywood, wall board, sheathing, or the like where it would be difficult for a single lower arm to span the width of the stack, or with stacks which have a relatively short spacing between the supporting stickers.

The handling unit of the invention is extremely compact and can be utilized with a minimum spacing of approximately four inches between the stacks. As previously mentioned, the lower arm is pivoted beneath the lumber stack to a position parallel to the upper arm and only a two-inch spacing is required between the stack and the floor for the arm to be moved into position.

With the use of a crane or a vehicle mounted boom the clamping and handling unit of the invention is exceptionally versatile, capable of moving material in and out of railway cars, sheds, warehouses, as well as loading and unloading material on trucks for transporting to a job site.

The unit can be used to lift and transport various types of material in addition to lumber, as for example, sheeting, pipes, rods or any other type of elongated material which is generally spaced above a floor during storage.

While the drawings show the controls to be manual, it is contemplated that a mechanized unit can be employed in which electrical, hydraulic or pneumatic means can be employed to rotate the handwheels 9 and 15, pivot the handle 10, as well as pivoting the connection of the unit with the crane or boom.

The unit of the invention is relatively inexpensive compared to the conventional lumber-handling equipment such as forklift trucks or straddlebug trucks, and when used with a crane or a boom can clamp and move material from locations which are not accessible to lift trucks or the like.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. A device for handling a series of generally parallel articles, comprising an upper support member extending transversely across the upper surface of said stack of articles, a lower support member movable in a horizontal plane beneath said upper support member between a first position approximately 90° with respect to said upper support member to a second position beneath said stack and parallel to said upper support member, a first vertical member pivotally connected to a first end of said upper support member and rigidly secured to a first end of said lower support member, pivoting means connected to said first vertical member for rotating said first vertical member and pivoting said lower support member between said first and second positions, a second vertical member carried by the second end of said upper support members, locking means associated with the second end of said lower support member and disposed to engage said second vertical member when said lower support member is pivoted to said second position, and means for moving one of said support members toward the other of said support members when said lower support member is in the second position to thereby clamp the stack between said support members.

2. The device of claim 1, in which said upper support member is freely movable in a vertical direction with respect to said vertical members.

3. The device of claim 2, and including spacing means extending downwardly from said upper support member for spacing the upper support member from said lower support member when the device is disengaged from said stack.

4. A device for handling a stack of generally parallel articles, comprising a pair of side members extending vertically along the sides of the stack, an upper support member connected to the upper ends of the side members

5

and extending across the stack, a lower support member having a first end connected to the lower end of one of said side members and being movable in a horizontal plane beneath said upper support member between a first position approximately 90° with respect to said upper support member to a second position beneath said stack and parallel to said upper support member, pivoting means for pivoting the lower support member between said first and second positions, locking means removably engageable with the second end of the lower support member for maintaining the lower support member in said second position, and means for moving one of said support members toward the other of said support members when the lower support member is in the second position to thereby clamp the stack between said support members.

5. The device of claim 4, wherein the first end of said lower support member is rigidly secured to the respective side member, and said pivotal means comprises a handle connected to the upper end of said side member and located above said upper support member.

6. The device of claim 4, in which said locking means includes a recess adjacent the second end of said lower support member and facing laterally of the length of said lower support member, said recess disposed to engage the corresponding side member when said lower support member is in the second position.

7. The device of claim 4, and including a second lower support member connected to the lower end of the other side member and being movable in a plane generally parallel to the plane of movement of said first lower support member from a first position parallel to said articles

6

to a second position beneath said stack and in alignment with said first lower support member, and second pivoting means for moving said second lower support member between its first and second positions.

8. The device of claim 7, wherein said locking means comprises locking elements disposed on the free ends of said first and second lower support members, said locking elements being disposed in engagement when said first and second lower support members are in the second position.

9. The device of claim 4 and including means connected to said first support member and disposed to be engaged by a handling member to lift the device and the attached stack.

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