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F. E. ROBINSON

2,113,712

MATERIAL HANDLING DEVICE

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2 Sheets-Sheet 2

FIG.4.

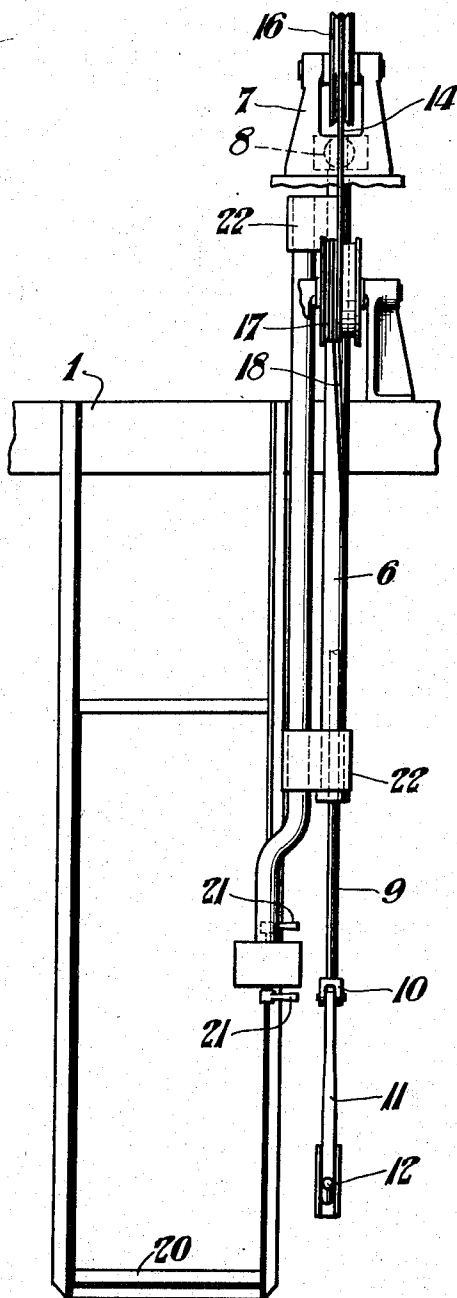


FIG.3.

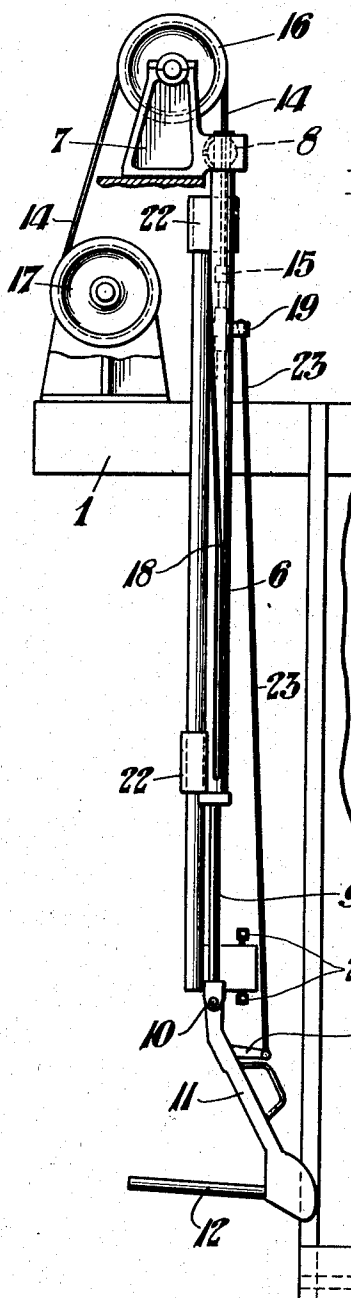


FIG.5.

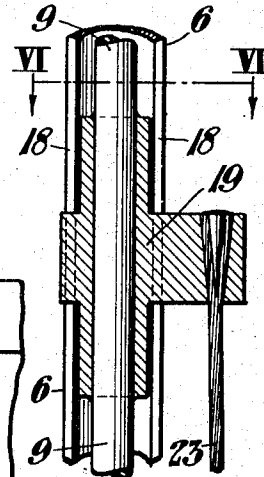
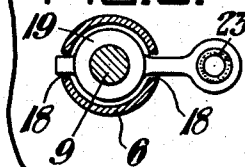


FIG.6.



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UNITED STATES PATENT OFFICE

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MATERIAL HANDLING DEVICE

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5 Claims. (Cl. 212—18)

This invention relates to material handling devices, and, more particularly, to such devices that are in the nature of traversing hoists for transporting annular articles from one place to another.

In the steel industry, it is usual to convey coils of wire and strip from the manufactory, or warehouse, to the railroad line, or other shipping depot, by means of traveling hooks arranged in spaced endless relation. These hooks are usually suspended from a track that is extended in an elevated position parallel to the railroad track or other roadway of shipment. Such conveyor hooks are usually disposed with the plane of the hook normal to the trackway from which it is suspended, and, therefore, normal to the railroad track past which it runs. In this position, coils of wire, or strip, when carried by such hook conveyors, are disposed in a vertical plane parallel to the railroad tracks.

In transferring these coils from the hook conveyors to the railroad cars, it has, heretofore, been the custom to remove them from the hook conveyors and dispose them within the cars in a vertical position that is 90° to the positions they formerly assumed when on the hook conveyors. This operation has heretofore been accomplished manually, which has entailed the expenditure of much physical labor, time, and energy, to load one railroad car. Furthermore, this occupation has been considered as involving considerable risk to the life and limbs of the men employed for this work.

It is, therefore, the primary object of this invention to provide a mechanical means whereby the manner of loading railroad cars with coils of wire and strip may be accomplished without the employment of manual labor.

It is another object of the present invention to provide a material handling device that is capable of transporting articles from one point to another in any direction, and which is capable of turning such articles through a substantial arc before finally discharging the same.

Other objects and advantages will become apparent hereinafter in the following specification when read in conjunction with the accompanying drawings, in which:

Figure 1 represents a schematic elevational view disclosing the subject of this invention as it is associated with a hook conveyor for loading a railroad car.

Figure 2 represents a fragmentary sectional elevation taken along line II—II in Figure 1.

Figure 3 is an enlarged side elevational view

of one form of device constructed in accordance with the present invention.

Figure 4 is a front elevational view of the device shown in Figure 3.

Figure 5 is a fragmentary sectional elevation of a detail of the present invention.

Figure 6 is a sectional view taken along lines VI—VI in Figure 5.

Referring now more specifically to the drawings in which like reference characters refer to like parts throughout:

A carriage 1, provided with suitable wheels 2, is disposed upon the trackway 3. The trackway 3 may be carried by a wheeled platform 4 that is mounted by trackways 5 above a railroad trackway or other loading zone.

Depending from the carriage 1 is a rigid tubular member 6 that extends through openings in the platform and carriage from a mounting 7 on top of the latter to which it is fastened by a universal joint 8. The universal joint is adapted to permit the tubular member 6 to be moved in all directions at its lower end, but it is constructed to prevent the tubular member from having any rotative movement about its longitudinal axis.

Telescoped within the tubular member 6 is a relatively rigid rod 9 which is adapted to slide up and down within the tubular member. The lower end of the rod 9 projects beyond the lower extremity of the tubular member 6, and is provided with a clevis 10 to which is secured a collapsible hook member 11. The hook member is provided with an article-engaging bar 12 which, by manipulation of a release mechanism (not shown) that is actuated by lever 13, is adapted to swing downwardly so as to discharge any articles suspended thereon.

The rod 9 at its upper extremity within the tubular member 6 is secured to a flexible strand or cable 14 by any suitable means, such as a cable socket 15. The cable 14 extends upwardly through the tubular member 6; outwardly through a central aperture within the universal joint 8; upwardly over a suitable guide sheave 16, and downwardly to a suitably powered drum or windlass 17. The sheave and windlass are suitably mounted, as by the mounting 7, upon the carriage 1, and are suitably controlled so as to raise and lower the rod 9 within the tubular member 6, and, thus, to raise and lower the hook member 11 relative to the carriage 1.

The tubular member 6 is provided with an elongated spiral slot 18 within which a slide 19, that is rigidly secured to the rod 9, is disposed

to ride. The slot 18 forms a cam, which, as the rod 9 is raised and lowered within the tubular member 6 by the cable 14, induces the slide 19 to follow its spiral path, which, in turn, exerts a torque upon the rod 9, and causes it to turn substantially 90° about its own axis. The purpose for the cam slot and rotative movement of the rod 9 will become apparent hereinafter when the operation of the mechanism is discussed.

An operator's platform 20 is also hung from the carriage 1 so as to be disposed adjacent the upper extremity of movement of the hook 11, which is its principal loading position. Suitable controls 21 are provided adjacent the operator's platform 20, and may be advantageously secured upon the tubular member 6 by suitable brackets 22, whereby the operator on platform 20 may control the position of the platform 4, the carriage 2, and the hook 11, without moving from his post. A pull-cord 23 is secured to the hook trip-lever 13, and is fastened at its upper end to the slide 19 so that, even though the hook is moved to its lowermost position, the operator will always have access to it to collapse the hook 11.

Referring more particularly to Figures 1 and 2, it will be seen that the articles to be handled, such as, coils of wire or strip 24, are conveyed by conveyor hooks 25 in endless succession past railroad tracks 26, onto which a car 27 to be loaded has been moved. In the normal course of the loading operations, it is necessary that the coils be hoisted from the conveyor hooks 25; moved to a position overlying the car 27, and lowered therein to the position shown at 24'. This necessitates that the coils be rotated 90° in the particular arrangement illustrated in Figure 1. Therefore, to effect the transfer of the coils 24 from the hook conveyors 25 into the car 27, the operator on the platform 20, first brings the movable platform 4 into proper position above the railroad car, and then actuates the carriage 1 so that the hook 11 is confronting the conveyor hooks 25. In this position, the hook 11, by virtue of the universal mounting 8, is swung toward the coil so as to dispose its article-engaging bar 12 into the central opening thereof. Simultaneously, the windlass 17 is energized to cause the cable 14 to lift the rod 9 within the tubular member 6, thereby lifting the coil from the conveyor hooks 25 so as to permit the coil 24 to swing clear thereof, and to be fully supported by the collapsible hook 11.

The operator then actuates the carriage 1 to a suitable position so that the coil hanging upon the collapsible hook is properly positioned over the railroad car 27. Here the windlass is reversed so as to permit the coil to be slowly lowered into the car by the retrogressive motion of the hook 11, rod 9, and cable 14. During this lowering movement, the slide 19, rigidly secured to the rod 9, follows the contour of the cam slot 18 within the tubular member 6, and, thus, causes the rod 9 to turn the hook, and to rotate the coil substantially 90°, to a position substantially as is shown at 24' in Figure 1, where it is discharged. The discharging movement is accomplished by the operator pulling the pull-cord 23 to raise the lever 13 so as to unlatch the trip mechanism (not shown) that positions the bar 12 in the horizontal position. After discharging the coil, the hook may again be returned to its position adjacent the platform 20 preparatory to receiving the next coil, which concludes one complete cycle of its operation.

In order not to interfere with the movement of the railroad cars, the carriage 1 may be withdrawn to one extremity of the trackway 3 upon the platform 4, and the collapsible hook 11, by virtue of the universal mounting 8, drawn inwardly and secured so as to afford clearance for objects passing therebeneath.

The invention is principally concerned with the provision of the novel article-handling means, which may be raised and lowered, and simultaneously turned through a substantial arc, thus simulating movements obtainable hitherto only by the use of manual labor. Many modifications may be made without departing from the spirit of the invention, such as by transposing the tubular member 6 and the rod 9 so that the latter becomes the stationary part, and the tubular member 6, the relative movable part supporting the collapsible hook 11. Also, the precise arc through which the hook 11 is rotated may be varied to satisfy any particular situation, whereby the cam slot 18 may be redesigned to afford the proper amount of rotative movement. Such a hoisting device has utility and merit as dissociated from either the traveling carriage 1 or the traveling platform 4, with which it has been shown associated in the present disclosure for purposes of illustration only, and as but one of the many uses to which it is adapted. Furthermore, any suitable power means, other than that shown, may be employed to raise and lower the hook member, and to cause its traversing movements. The power means may be carried upon the carriage, or positioned at a remote point therefrom.

Therefore, while I have shown and described a specific embodiment of my invention, I do not intend to be limited thereto since many modifications, such as those discussed above, may be made without departing from the scope of my invention as defined by the appended claims.

I claim as my invention:

1. A transfer mechanism comprising a material-engaging device, a rigid member supporting said device, a support for suspending said rigid member and device, said support being swiveled to an anchorage for non-rotative universal movement, means for raising and lowering said rigid member and device relative to said support, and means rendered effective by said raising and lowering movement to rotate said material-engaging device a substantial amount.

2. A transfer mechanism comprising an elongated guide, an elongated rigid member telescopically associated with said guide, a collapsible hook secured to the free end of said rigid member, a cam rigidly affixed upon said guide, a cam-slide rigidly affixed upon said member, a flexible strand for raising and lowering said member relative to said guide, and for coaxing said cam and cam-slide to vary the planar disposition of said hook.

3. A transfer mechanism comprising a relatively elevated trackway, a carriage arranged to traverse said trackway, a hoist suspended from said carriage including a rigid member supporting said device, a support for suspending said rigid member and device, said support being swiveled to an anchorage upon said carriage for non-rotative universal movement relative to the latter, means on said carriage for raising and lowering said device, and means on said support for effecting rotation of said device incident to its raising and lowering movement.

4. A transfer mechanism for transporting articles from a pick-up depot to a point of deposit comprising an elevated trackway extending between said depot and point of deposit, a carriage disposed to traverse said trackway, a hoist 5 suspended from said carriage and fastened thereto by a universal joint, a hook on said hoist for engaging and transporting articles, and associated means for rotating the hook together with the articles a substantial amount preliminary to 10 the discharge of the articles at said point of deposit.

5. A transfer mechanism comprising a rela-

tively elevated trackway, a carriage disposed to traverse said trackway, an elongated rigid guide swiveled to said carriage, an elongated rigid member telescopically associated with said guide, a collapsible hook secured to the free end of said 5 rigid member, cam means carried in complementary relation by said guide and member, a flexible strand secured to said member, means on said carriage to take-up and pay-out said strand to raise and lower said hook, and to render effec- 10 tive said cam means to rotate the latter.

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