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S. F. JACKES ET AL

2,600,538

HANDLING APPARATUS FOR HOLLOW COILS AND THE LIKE.

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4 Sheets-Sheet 1

FIG. 10.

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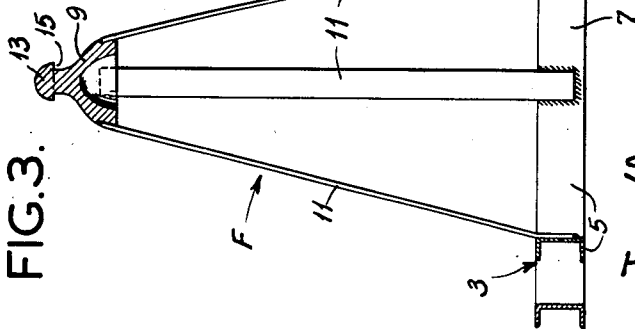
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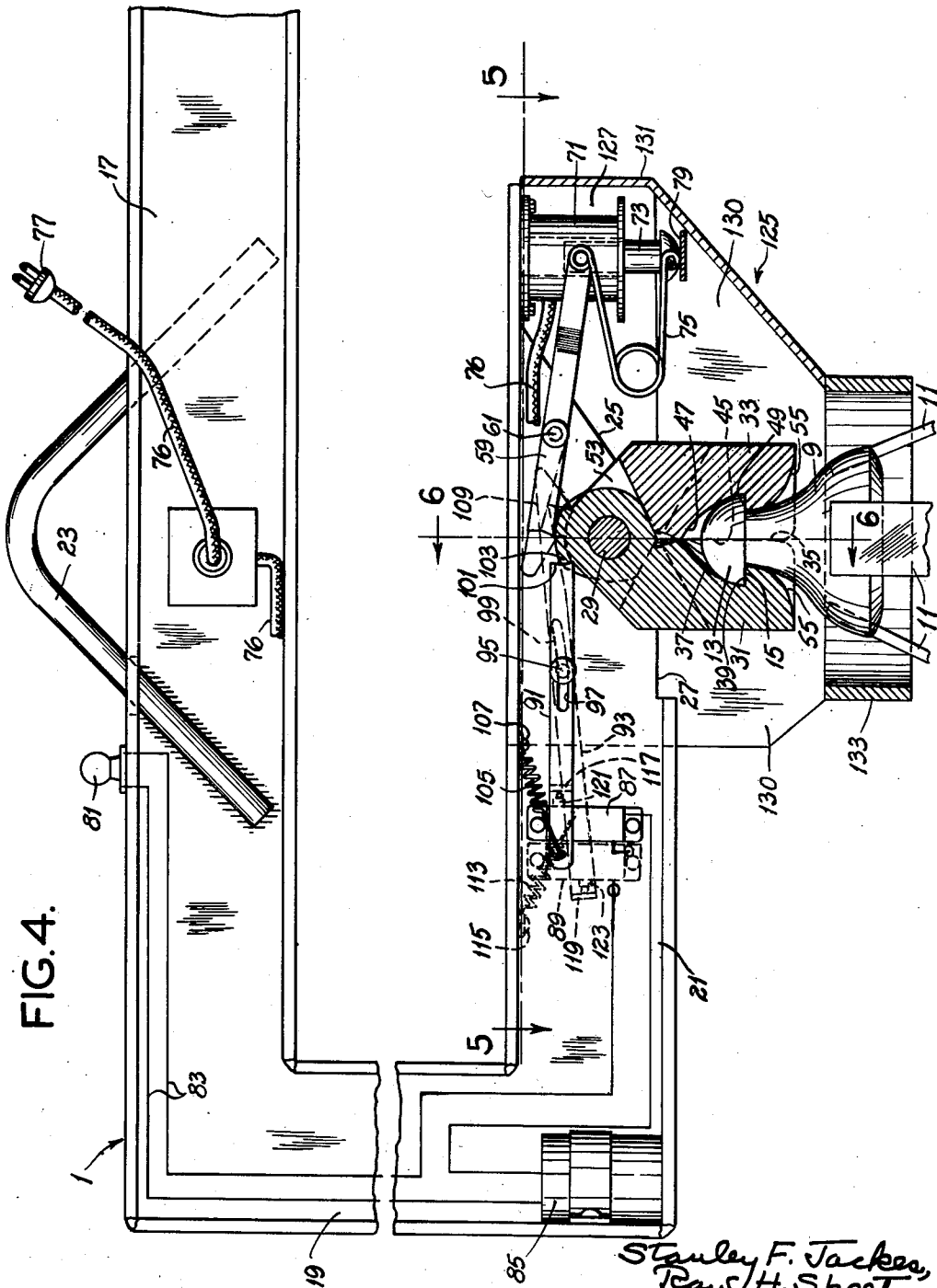
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Stanley F. Jackes,
Ray H. Sheets,
Inventors.
Haynes and Koenig
Attorneys.

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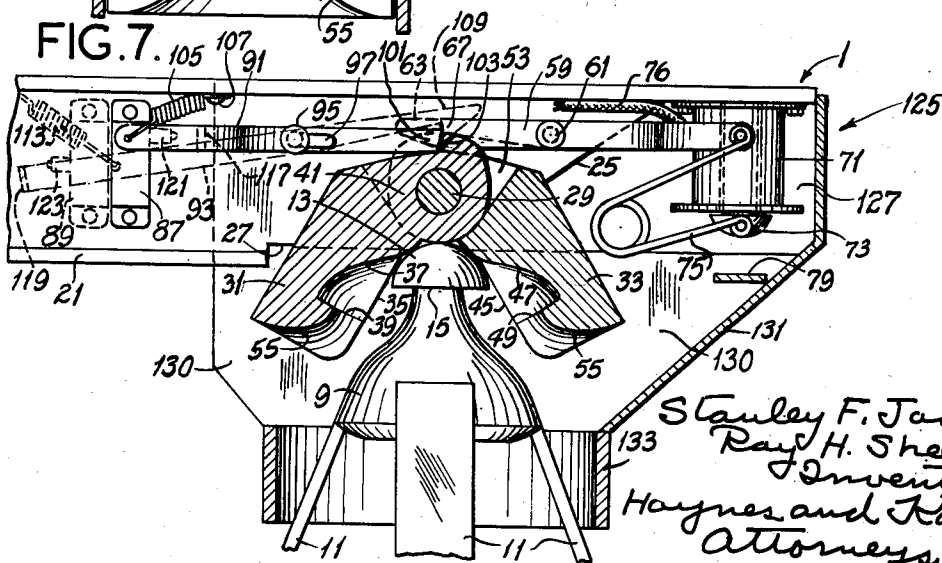
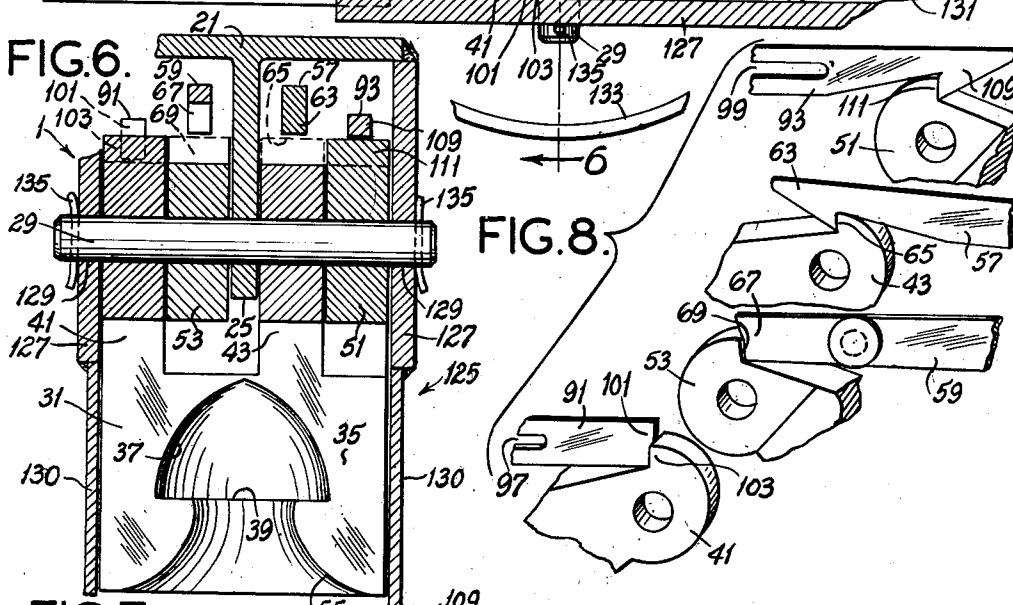
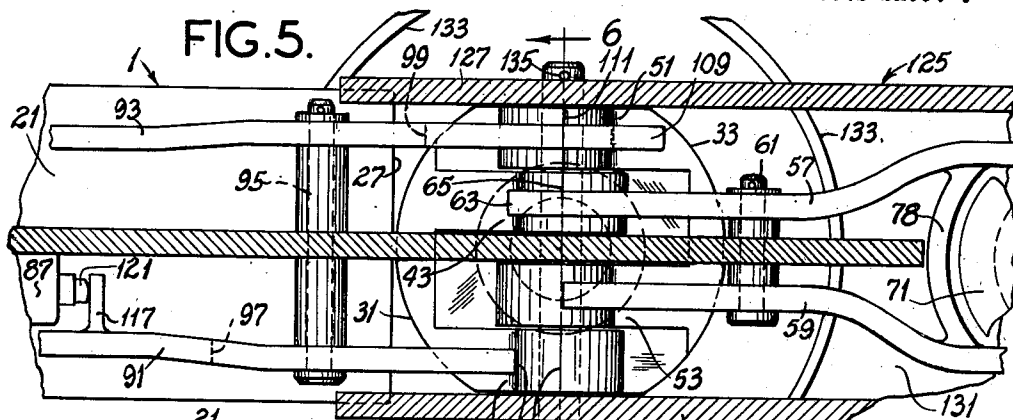
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HANDLING APPARATUS FOR HOLLOW COILS AND THE LIKE

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133 Stanley F. Jackson,
Ray H. Sheets,
Inventors.
Haynes and Koenig
Attorneys.

UNITED STATES PATENT OFFICE

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HANDLING APPARATUS FOR HOLLOW
COILS AND THE LIKE

Stanley F. Jackes, University City, Mo., and Ray
H. Sheets, Granite City, Ill., assignors to Jackes-
Evans Manufacturing Company, St. Louis, Mo.,
a corporation of Missouri

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5 Claims. (Cl. 294—82)

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This invention relates to handling apparatus for heavy, hollow cylindrical objects, such as coils of sheet metal, wire and the like.

Among the several objects of the invention may be noted the provision of handling apparatus adapted to facilitate the conveying of heavy, hollow cylindrical objects, particularly coils of sheet metal, from an improved place of storage to a place of use; the provision of apparatus of this class adapted safely to facilitate the conveying of coils from vertical stacks to an apparatus wherein the coil is to be supported with its axis horizontal; the provision of apparatus of this class embodying a single hoist-line implement adapted to be suspended from a traversing hoist to raise, lower and convey a coil with the axis of the coil either vertical or horizontal; the provision of apparatus of this class embodying improved means for accurately centering said implement with respect to the axes of stacks of coils; and the provision of apparatus such as described which is safe and reliable in operation. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a vertical transverse section through a plant installation embodying the improved handling apparatus of this invention;

Fig. 2 is a horizontal section through the installation taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a central transverse section through a coil sling employed in connection with the handling apparatus of this invention, being taken on line 3—3 of Figs. 1 and 2;

Fig. 4 is an elevation of the hoist-line implement of this invention, parts being broken away and parts being shown in section;

Fig. 5 is a section taken on line 5—5 of Fig. 4;

Fig. 6 is a section taken on line 6—6 of Figs. 4 and 5;

Fig. 7 is a view of a portion of Fig. 4, illustrating certain parts in a different operating position;

Fig. 8 is a fragmentary exploded view of certain elements of the hoist-line implement;

Fig. 9 is a view of the hoist-line implement

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carrying a coil with the axis of the coil horizontal, the coil being shown in section; and,

Fig. 10 is a view of a device for maintaining the hoist-line implement in proper angular relation with respect to the hoist.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

The apparatus of this invention is described herein particularly with reference to its use in handling heavy sheet-metal coils, but it will be understood that it may be employed in handling coils or rolls of other materials, reels or the like, and even hollow cylindrical bodies of any nature, such as sections of pipe or the like.

The preferable mode of storing commercial coils of sheet metal is to arrange the coils vertically in stacks, the coils in each stack having their axes vertical and substantially in alignment for stability. This arrangement provides for maximum safety and most effective utilization of storage space. It is preferable to storing coils in piles on their sides since such piles are apt to collapse if their lateral supports are inadequate, and the heavy coils may cause severe injury to personnel and property in rolling outward on collapse of the pile. An objection to storing the coils in the preferred mode, however, has been the lack of suitable apparatus for conveniently and economically conveying the coils from their storage positions to their place of use. This invention provides novel apparatus for so conveying coils from such stacks and makes feasible and practical the storing of coils in the preferred mode.

Referring now to the drawings, Figs. 1 and 2 illustrate a typical installation wherein the handling apparatus of this invention is utilized. Vertical stacks S of coils C are disposed in a storage pit P adjacent an operating floor or dock D. An overhead traveling crane H spans the dock and the pit and is movable longitudinally thereover. Each coil rests on the platform of a coil sling F. The lowest sling in a stack rests directly on the floor of the pit and the platforms of the other slings in the stack rest on the upper end of the coil immediately below. The top coil in any stack is adapted to be lifted by means of the hoist-line implement 1 of this invention which is suspended from the hoist line of the crane and is adapted to grapple the sling for said coil in a manner to be described.

As illustrated in Figs. 1-3, coil sling F comprises a platform 3 of such configuration as to

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provide edgewise support for all the convolutions of the coil. The platform is made up of channel bars 5 secured together as by welding, and has a central opening 7. Extending upward from the platform is a hollow tapered spindle having a cap 9 at its upper end. The spindle is preferably made up of a number of bars 11 having their lower ends secured to the channel bars within the central opening of the platform and converging toward cap 9, to which their upper ends are secured. The cap 9 is a casting formed to provide an undercut rounded knob 13, the undercut surface 15 of which is adapted to be engaged by grappling hooks on the hoist-line implement 1 to be described.

The spindle of the coil sling extends through the eye of the coil carried on its platform and is of such height that the cap 9 and particularly knob 13 project above the coil. In the stacks S, the knob 13 of a coil sling is disposed within the central opening and hollow spindle of the sling immediately above (Fig. 1).

Referring now more particularly to Figs. 4-8, the hoist-line implement 1 is shown to comprise a C-shaped frame having an upper horizontal arm 17, a vertical side arm 19 and a lower horizontal cantilever arm 21. This frame is preferably made up of H-beam sections. Welded to the upper arm 17 is an eye 23 providing means for suspension of the frame from the hook of the crane hoist.

At the free end of the cantilever arm 21, the web of the H-beam section is cut away on a bevel, as indicated at 25. The lower flange of the arm is cut away as indicated at 27. A pivot pin 29 carried in an aperture in the web of the arm 21 projects equally from opposite sides thereof. This pin provides means for the pivotal mounting of a grappling device comprising a pair of grappling hooks 31 and 33 depending from the pin. The pin 29 is directly vertically under eye 23 so that the hooks are vertically aligned with the eye.

Hook 31 comprises a generally semicylindrical body having its flat face 35 cored out, as indicated at 37, to provide a semiannular hooking ledge 39. Transversely spaced, apertured lugs 41 and 43 are integrally formed at the upper end of the hook. Hook 33 similarly comprises a generally semicylindrical body having its flat face 45 cored out, as indicated at 47, to provide a semiannular hooking ledge 49. Transversely spaced, apertured lugs 51 and 53 are integrally formed at the upper end of hook 33. The pin 29 extends through the apertures in all of the aforesaid lugs and the arrangement is such that the hooks 31 and 33 are gravity-biased normally to depend vertically with their flat faces 35 and 45 in engagement, and with ledges 39 and 49 forming a complete annular hooking ledge. The lugs 41 and 53 are disposed on one side of the web of the arm 21 and the lugs 43 and 51 are disposed on the other (see particularly Fig. 6).

The lower ends of the hooks 31 and 33 are countersunk, as indicated at 55, to provide camming surfaces which are adapted to cooperate with the rounded knob 13 of a coil sling F to spread the hooks apart when they are initially lowered upon the knob. When the hooks are lowered to the point where ledges 39 and 49 clear the undercut surface 15 of knob 13, they pivot inward toward each other to hook the ledges under the surface 15 so that the sling and coil thereon may be lifted and conveyed with the axis of the coil vertical.

The curved interior walls of the hooks 31 and

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33 in the cored-out portions 37 and 49 form camming surfaces adapted to cooperate with knob 13 to spread the hooks apart when they are further lowered from the position of Fig. 4 to the position of Fig. 7. The implement 1 is provided with means for latching the hook in this spread-apart, retracted position so that the implement may be raised away from the coil sling and coil thereon after the sling has been deposited in a desired location.

The aforesaid latching means comprises latching levers 57 and 59 for hooks 31 and 33, respectively. These levers are pivoted intermediate their ends on a pin 61 mounted in the web of the arm 21 adjacent its beveled end 25. The forward end of lever 57 is formed as a latch hook 63 adapted to engage a latching tooth 65 formed on lug 43 to latch the hook 31 in a retracted position. The forward end 67 of lever 59 is adapted to engage a latching tooth 69 formed on lug 53 to latch the hook 33 in retracted position.

The levers are under the control of a solenoid 71, their rearward ends being linked to the plunger 73 of the solenoid by spring links 75. The coil of the solenoid is mounted on the under side of the upper flange of arm 21 and is adapted to be energized through a power supply connection 76 including a plug 77 adapted to be plugged into an electric outlet in the hoist block to be described. The levers are connected to operate in unison by a bridge piece 78.

When the solenoid is deenergized, the plunger 73 drops out of the solenoid coil against a stop 79 to pivot the levers 57 and 59 clockwise to retract their forward ends from teeth 65 and 69 to permit hooks 31 and 33 to close under their gravity bias. When the solenoid is energized, plunger 73 is drawn into its coil (Fig. 7) and levers 57 and 59 are pivoted until the engage the lugs 43 and 53. As the implement 1 is lowered to spread the hooks 31 and 33 apart (Fig. 7) the forward ends of the latching levers ride on the periphery of the lugs until they snap into latching position with respect to teeth 65 and 69 under the bias of the spring links 75. Fig. 7 illustrates the levers in latching position.

The hoist-line implement 1 also includes means for indicating to the operator whether or not the hooks are properly closed so that they will hook the knob 13. This indicating means includes a signal lamp 81 on the upper arm 17 of the C frame connected in series in a circuit 83 with a battery 85 and a pair of push button switches 87 and 89 mounted on the frame. Switches 87 and 89 are individually controlled by levers 91 and 93 mounted for pivoting and sliding movement on a pin 95 carried in the web of cantilever arm 21. Switch 87 and lever 91 are mounted on one side of the web and switch 89 and lever 93 are mounted on the other. Levers 91 and 93 are provided with slots 97 and 99, respectively, through which pin 95 extends.

The forward end 101 of lever 91 cooperates with a tooth 103 formed on lug 41 so arranged as to move lever 91 to the left, as viewed in Figs. 4 and 7, as the hook 31 pivots from its retracted position of Fig. 7 to its closed position of Fig. 4. Lever 91 is biased to slide to the right so that its end 101 remains in engagement with tooth 103 and is also pivotally biased into engagement with the periphery of lug 41 by a tension spring 105, one end of which is attached to the rearward end of the lever, the other of which is attached to the arm 21 at 107.

The forward end of lever 93 is formed as a

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hook 109 cooperating with a tooth 111 formed on lug 51 so arranged as to move lever 93 to the right, as viewed in Figs. 4 and 7, as the hook 33 pivots from its retracted position of Fig. 7 to its closed position of Fig. 4. Lever 93 is biased to slide to the left so that its hook 109 remains in engagement with tooth 111 and is also pivotally biased into engagement with the periphery of lug 51 by a tension spring 113, one end of which is attached to the rearward end of the lever, the other end being attached to the arm 21 at 115.

The levers 91 and 93 are provided with fingers 117 and 119, respectively, for operating the push buttons 121 and 123 of switches 87 and 89, respectively. The switches are arranged with their push buttons extending in opposite directions so that the finger 117 of lever 91 will operate push button 121 in moving to the left and the finger 119 of lever 93 will operate push button 123 in moving to the right (Figs. 4 and 7). It will be clear that when the hooks 31 and 33 are in the closed position of Fig. 4, levers 91 and 93 have moved respectively to the left and right to push in the buttons of both switches and complete the circuit 83 to light lamp 81. If the hooks 31 and 33 are in any position other than closed, or if one hook is closed and the other for some reason is not, the signal lamp will be off and the operator will thus be informed that the hooks have not engaged knob 13 properly to lift a sling and the coil thereon.

A housing 125 is preferably provided at the outer free end of cantilever arm 21 for the hooks 31 and 33, the solenoid 71, and the other elements at this end of the arm. This housing comprises side plates 127 having apertures 129 with their upper edges welded to the upper flange of arm 21. These plates 127 carry the pin 29 in the apertures 129. The housing also includes a welded end closure plate 131 and welded side closure plates 130. It is open at its top, bottom and left end, as viewed in Figs. 4 and 7. A guard ring 133 is secured to the bottom edges of plates 130 as by welding. Cotter pins 135 retain the pin 29 in place within the apertures of plates 127 and lugs 41, 53, 43 and 51. The aforesaid stop 79 is mounted within the housing 125.

The distance between the upper flange of lower cantilever arm 21 and the lower flange of the upper arm 17 of the frame and the cross-section of the lower arm 21, hooks 31 and 33, and the housing 125 in a plane transverse to the length of the arm 21 are such that the arm 21 may be entered into the eye of a coil having its axis horizontal (Fig. 9) and the hoist-line implement 1 employed to lift, lower and convey coils in this fashion. A counterweight 137 is preferably provided on the outer free end of arm 17 to counterbalance the load on the arm 21, which may be either a sling and coil vertically depending from the hooks 31 and 33, as in Fig. 1, or a coil being carried horizontally, as in Fig. 9.

The hoist-line implement 1 is adapted to be suspended from the hook 139 of the crane hoist block 141 carried by hoist line 143 suspended from the trolley hoist 145 of the traveling crane H. The trolley 145 is movable transversely on the bridge 147 of the crane from positions over the pit P to positions above the dock D. The crane bridge 147, as will be understood, is movable longitudinally of the installation on tracks 149. Movement of the bridge 147 and of the trolley 145 on the bridge, and operation of the hoisting winch or the like on the trolley, are under the control of suitable push button switch

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means 151, 153 and 155, respectively, in control box 157 suspended by cable 159 from the bridge. This cable is suspended from an outrigger 161 on the bridge so that the control box is out of the way of the hoist-line implement 1 as it is moved over the dock from the pit. Further detail of the construction of the crane and its controls is omitted since they are well known in the art.

The control box 157 also includes a switch 163 for remote control of the solenoid 71 of the hoist-line implement 1. The plug 77 of the power supply connection 76 is plugged into an electrical outlet 165 in the hoist block 141, connection being made from this outlet through an electrical power supply cable 167 to a power line including switch 163. Suitable take-up means (not shown) to compensate for the raising and lowering of the hoist block may be provided for cable 163, as will be readily understood.

Assuming that a coil C is to be lifted from a stack S in the pit P and conveyed to an apparatus on the dock D wherein it is to be mounted with its axis horizontal, the operator manipulates switch means 151 to move the crane bridge 147 longitudinally of the pit to the point where the hoist block 141 and the grappling hooks 31 and 33 are laterally aligned with the knob 13 of the coil sling F bearing the coil to be lifted. The operator walks along the dock as the bridge travels to maintain control of the switch means. He then manipulates switch means 153 to cause the trolley 145 to travel on the bridge to the point where the hoist block and the hooks 31 and 33 are centered over said knob.

The installation includes novel means for facilitating the above operation so as to assure rapid, accurate centering of the hooks over the knob of the sling to be lifted. As illustrated in Fig. 2, each stack of coils is centered on a spotting point X on the floor of the storage pit. These points X are arranged in rows longitudinally and transversely of the pit. A signal lamp 171 (Fig. 1) is mounted on the crane bridge 147. This lamp is in a circuit 172 (Fig. 2) including a push button switch 173 mounted on the end of the bridge. This switch is so located as to be operable by any one of a series of cams 175 which are fixed on the wall 177 and which are spaced apart distances corresponding to the longitudinal spacing of the spotting points X. The arrangement is such that the push button of switch 173 is pushed inward by a cam whenever the hoist block 141 is in alignment with a transverse row of spotting points X.

Another signal lamp 179 is mounted on the trolley 145. This lamp is in a circuit including a push button switch 181 mounted on the trolley. This switch is so located as to be operable by any one of a series of cams 183 which are fixed on the crane bridge 147 and which are spaced apart distances corresponding to the transverse spacing of the spotting points X. The arrangement is such that the push button of switch 181 is pushed inward by a cam 183 whenever the hoist block is in alignment with a longitudinal row of spotting points X.

From the above, it will be clear that in spotting the grappling hooks above the knob of a particular coil sling, the operator causes the bridge 147 to travel rapidly until the hoist block 141 and hooks 31 and 33 are substantially aligned with the transverse row of stacks in which the particular sling lies, then inches the bridge until the signal lamp 171 lights, indicating that the hooks are accurately transversely aligned with

the knob of the sling. He then causes the trolley to travel rapidly on the bridge until the hooks are adjacent the longitudinal row of stacks in which the particular sling lies, then inches the trolley until the signal lamp 179 lights, indicating that the hooks are accurately centered over the knob of the sling.

It will be understood that the above centering operations are carried out with the hoist-line implement 1 well above the stacks of coils. After the hooks 31 and 33 have been centered over the sling to be lifted, the operator manipulates switch means 155 to lower the hooks upon the knob 13 of the sling. As the hooks are lowered upon the knob, their countersunk camming surfaces 55 engage the knob and the hooks are thereby spread apart. The frame is lowered until the hooking ledges 49 and 39 clear the undercut surface 15 of the knob, whereupon the hooks are gravity-biased to the closed position of Fig. 4. In this position the ledges 39 and 49 are hooked under the surface 15 of the knob so that the sling may be lifted. If the hooks are properly closed, signal lamp 81 will be lighted, as previously explained, indicating to the operator that it is safe to proceed to lift up the sling and coil thereon. If the lamp 81 is not lighted, the operator is informed that he should not proceed to lift up the sling, and he then further lowers the implement 1 to cause the hooks to spread apart due to engagement of camming surfaces 37 and 47 with the knob 13 (Fig. 7), then raises the frame to permit the hooks properly to close.

As illustrated in Fig. 2, it is preferable that the frame of the hoist-line implement be at an angle of 45° to the longitudinal and transverse rows of stacks to permit the stacking of the coils as closely together as possible for the most effective utilization of storage space. The frame is maintained in this angular relation by means of a retainer 185 for the swivel hook 139 on the hoist block 141. This retainer comprises a slotted plate 187 mounted on the hoist block by means of stirrups 189. The hook 139 is retained in one or the other of slots 191 in the plate, these slots intersecting at right angles to each other and being at an angle of 45° to the vertical plane through the axis of rotation of the sheave in the block (Fig. 10).

After the sling and the coil thereon has been lifted out of the pit to a sufficient height to clear the dock D, the bridge 147 and the trolley 145 are traversed to bring the sling and coil above a coil turner T on the floor of the dock (Fig. 1). This coil turner is particularly described in our copending application for Apparatus For Turning Coils or the Like, Serial No. 699,260, filed September 25, 1946 now Patent No. 2,564,436, dated August 14, 1951. For the purposes of this disclosure, it is considered sufficient to point out that the coil turner comprises a pivoted carrier 193 for receiving the sling and coil thereon and turning the coil from a vertical to a horizontal position. The carrier includes pivotally mounted arms 195 which are laterally retractable after the coil has been turned to horizontal position so that the sling may be pulled out of the eye of the coil.

After the sling with the coil thereon has been deposited on the arms 195 of the coil turner, the frame is further lowered to cause the hooks 31 and 33 to spread apart due to engagement of camming surfaces 37 and 47 with knob 13 (Fig. 7). The operator then manipulates solenoid control switch 163 to energize solenoid 71

to cause latching levers 57 and 59 to pivot counterclockwise. This latches the hooks in retracted position, as previously described, and permits the frame to be raised to the dotted line position of Fig. 1 free of the sling. The operator must maintain switch 163 closed until the hooks 31 and 33 are lifted above knob 13, and may then release it.

When the coil has been turned to horizontal position and the sling removed, the frame 1 is manipulated to enter the cantilever arm 21 into the eye of the coil, as illustrated in Fig. 9. The coil is then lifted from the coil turner cradle and conveyed to the apparatus wherein it is to be mounted with its axis horizontal, lowered into place, and the frame manipulated to withdraw arm 21 from the eye of the coil.

In view of the above, it will be seen that the single hoist-line implement 1 may be employed to convey a coil with the axis of the coil either vertical or horizontal. The entire procedure for conveying a coil from the storage pit to the apparatus in which the coil is to be mounted for use may be safely and rapidly carried out by a single operator with no heavy manual labor required. This makes it feasible to store coils in vertical stacks as described.

It will be understood that the coils will be received at the pit P already mounted on the slings F and that the apparatus herein disclosed may be utilized for conveying the coils from the vehicles on which they are delivered to their positions in the stacks S. If the coils are received without slings, it is contemplated that the coils shall be deposited horizontally on the coil turner T, or a similar one, slings inserted therein, the coils then turned to vertical position and lifted and conveyed to the stacks.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. Handling apparatus for hollow coils and the like comprising a C-shaped frame, means on the upper arm of the frame for suspending it from the hook of a hoist, a pivot pin extending transversely through the lower arm of the frame, and a pair of grappling hooks pivoted on the pin and depending therefrom, said hooks being cooperable to grapple hook-engaging means on a sling for carrying a coil or the like with its axis vertical, said arms being spaced apart sufficiently and the lower arm and hooks being of such cross-section in a plane transverse to the length of the lower arm that the lower arm together with the hooks may be entered into the hollow of a coil or the like for carrying it with its axis substantially horizontal, said hooks being normally biased to a closed sling-grappling position but being movable to retracted sling-disengaging position upon being lowered further into engagement with a sling, and a pair of latching levers, one for each hook, pivoted on the lower arm and engageable with the hooks for latching the hooks in retracted position.

2. Handling apparatus for hollow coils and the like comprising a C-shaped frame, means on the upper arm of the frame for suspending it from the hook of a hoist, a pivot pin extending

transversely through the lower arm of the frame, and a pair of grappling hooks pivoted on the pin and depending therefrom, said hooks being co-operable to grapple hook-engaging means on a sling for carrying a coil or the like with its axis vertical, said arms being spaced apart sufficiently and the lower arm and hooks being of such cross-section in a plane transverse to the length of the lower arm that the lower arm together with the hooks may be entered into the hollow of a coil or the like for carrying it with its axis substantially horizontal, said hooks being normally biased to a closed sling-grappling position but being movable to retracted sling-disengaging position upon being lowered further into engagement with the sling, a pair of latching levers, one for each grappling hook, pivoted on the lower arm and engageable with the grappling hooks for latching them in retracted position, said latching levers being pivoted for movement between latching and releasing positions, and solenoid-controlled means carried by said lower arm for holding the levers in latching position.

3. Handling apparatus for hollow coils and the like comprising a C-shaped frame, means on the upper arm of the frame for suspending it from the hook of a hoist, grappling hooks pivoted on the lower arm of the frame and depending therefrom, said hooks being co-operable to grapple hook-engaging means on a sling for carrying a coil or the like with its axis vertical, said arms being spaced apart sufficiently and the lower arm and hooks being of such cross-section in a plane transverse to the length of the lower arm that the lower arm together with the hooks may be entered into the hollow of a coil or the like for carrying it with its axis substantially horizontal, said hooks being normally biased to a closed sling-grappling position but being movable to retracted sling-disengaging position upon being lowered further into engagement with a sling, and latch means carried by the lower arm of the frame and engageable with the hooks for latching the hooks in retracted position.

4. Handling apparatus for hollow coils and the like comprising a C-shaped frame, means on the upper arm of the frame for suspending it from the hook of a hoist, a pair of grappling hooks pivoted on the lower arm of the frame and depending therefrom, said hooks being co-operable to grapple hook-engaging means on a sling for carrying a coil or the like with its axis vertical, said arms being spaced apart sufficiently

and the lower arm and hooks being of such cross-section in a plane transverse to the length of the lower arm that the lower arm together with the hooks may be entered into the hollow of a coil or the like for carrying it with its axis substantially horizontal, said hooks being normally biased to a closed sling-grappling position but being movable to retracted sling-disengaging position upon being lowered further into engagement with a sling, and a pair of latching levers, one for each hook, pivoted on the lower arm and engageable with the hooks for latching the hooks in retracted position.

5. Handling apparatus for hollow coils and the like comprising a C-shaped frame, means on the upper arm of the frame for suspending it from the hook of a hoist, a pivot pin carried by the lower arm of the frame, and a pair of grappling hooks pivoted on the pin and depending therefrom, said hooks being co-operable to grapple hook-engaging means on a sling for carrying a coil or the like with its axis vertical, said arms being spaced apart sufficiently and the lower arm and hooks being of such cross-section in a plane transverse to the length of the lower arm that the lower arm together with the hooks may be entered into the hollow of a coil or the like for carrying it with its axis substantially horizontal, said hooks being normally biased to a closed sling-grappling position but being movable to retracted sling-disengaging position upon being lowered further into engagement with a sling, and a pair of latching levers, one for each hook, pivoted on the lower arm and engageable with the hooks for latching the hooks in retracted position, and solenoid-controlled means carried by the lower arm for holding the levers in latching position.

STANLEY F. JACKES.
RAY H. SHEETS.

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