April 1, 1941. J. M. O'MALLEY 2,237,160

HANDLING OF ROD BUNDLES OR THE LIKE

Filed Aug. 18, 1939 3 Sheets-Sheet 1

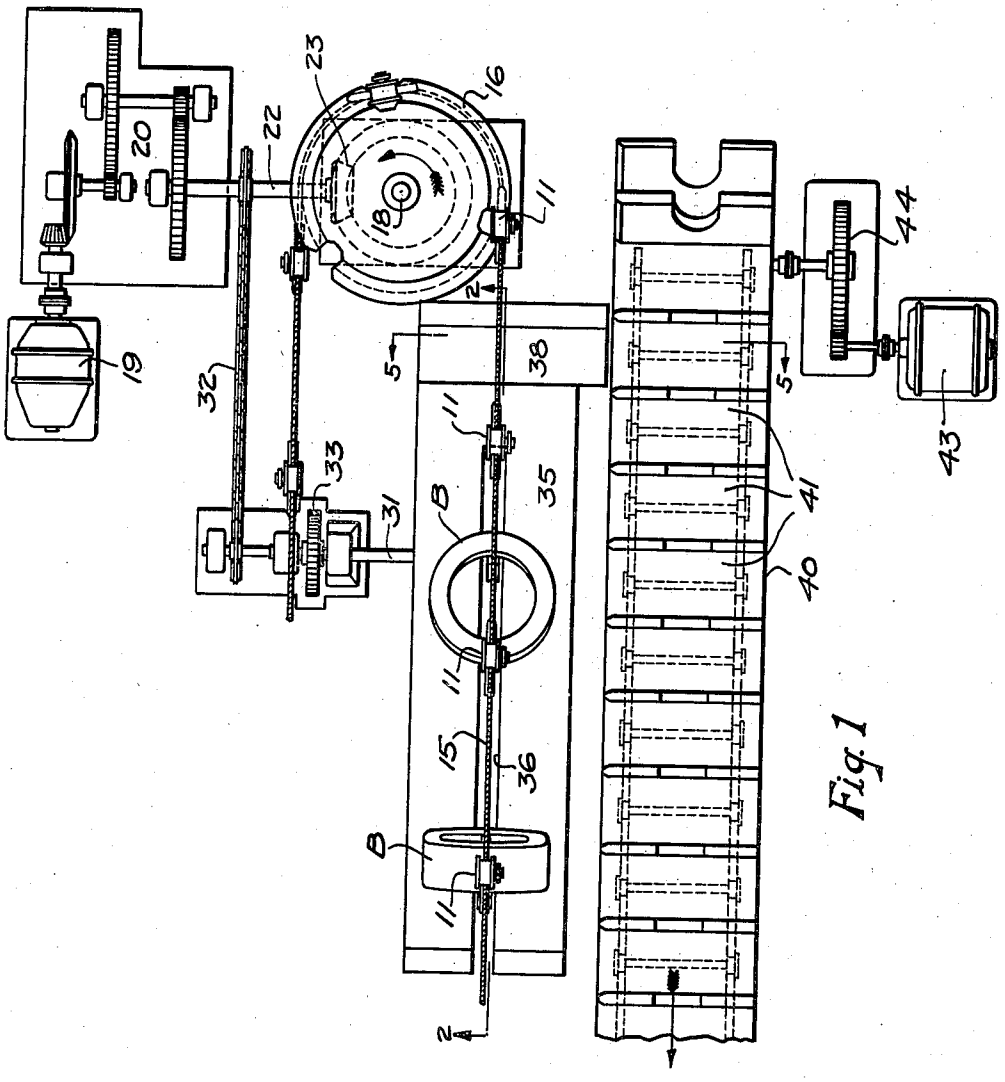


Fig. 1

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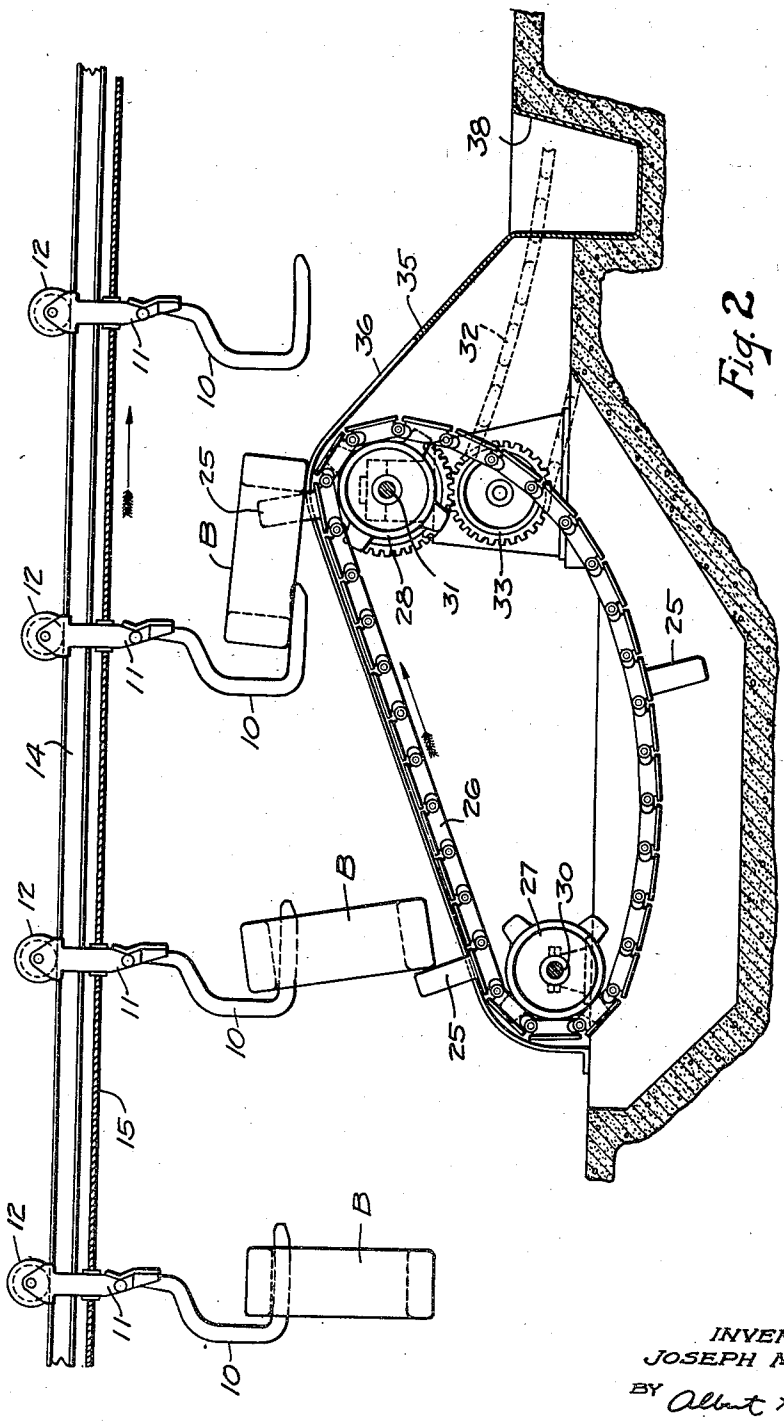


Fig. 2

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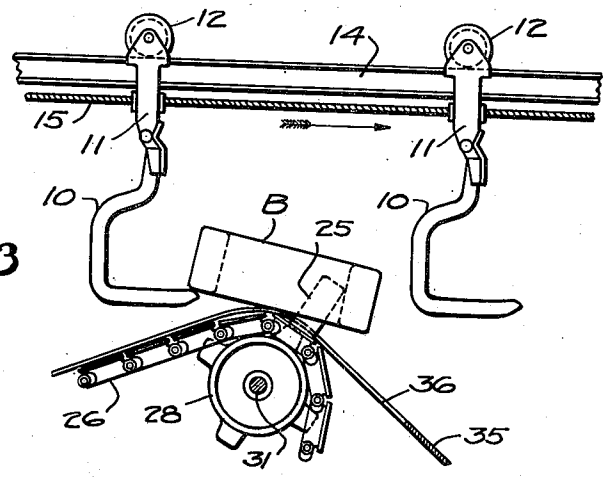


Fig. 3

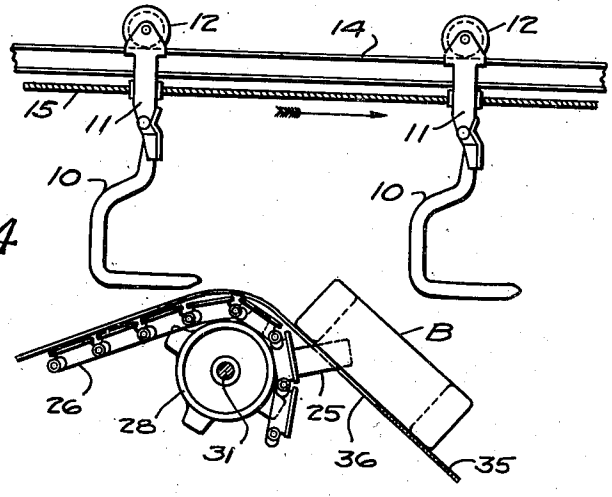


Fig. 4

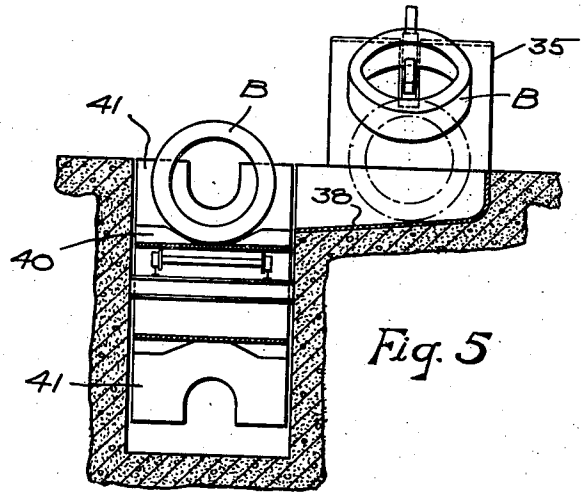


Fig. 5

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UNITED STATES PATENT OFFICE

2,237,160

HANDLING OF ROD BUNDLES OR THE LIKE

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Application August 18, 1939, Serial No. 290,872

6 Claims. (Cl. 198—20)

This invention relates to the handling of rod bundles or the like, and more particularly to the construction and arrangement of apparatus for removing rod bundles and similar annuli from a moving conveyor.

In rod mills it is the practice to coil the rods into annular bundles which are placed on a coil conveyor and then transferred to a so-called "hook carrier" which comprises a series of suspended hooks upon which the bundles are hung with their axes substantially horizontal. These hooks travel continuously at a rather slow speed, with their points extending forwardly in the direction of movement. While various mechanisms have been proposed heretofore for removing the bundles from the hooks, these prior arrangements have in general been complicated, expensive and unreliable, with a tendency to disarrange the convolutions of the bundles. Consequently it is still the common practice to utilize manual labor for this operation.

It is accordingly the main object of the present invention to provide, in combination with a hook carrier, a simple, inexpensive and dependable apparatus for removing rod bundles or similar annuli therefrom.

It is a further object of the invention to combine with a hook carrier a mechanism of a rugged and dependable nature arranged to remove rod bundles or similar annuli therefrom and to place them in such positions as to facilitate subsequent handling.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

Referring to the drawings illustrating one embodiment of the invention and in which like reference numerals indicate like parts—

Fig. 1 is a top plan view of an apparatus for handling rod bundles;

Fig. 2 is a view in section on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view similar to Fig. 2, showing the apparatus in a different phase of the operating cycle;

Fig. 4 is a view similar to Fig. 3, showing the apparatus in a still different phase of the operating cycle; and

Fig. 5 is a view in section on the line 5—5 of Fig. 1.

The embodiment illustrated comprises a hook carrier including a series of hooks 10 arranged to move in a substantially horizontal path with their points extending forwardly in the direction of travel. For this purpose each hook is suspended from a bracket 11 thereabove which is provided with a wheel 12 arranged to roll along a horizontal rail 14 (Fig. 2). A horizontal flexible cable 15 extends beneath and parallel to the rail, this cable being suitably connected to the brackets 11. The cable is moved horizontally to impart movement to the hooks, and for this purpose the cable passes around a sheave 16 (Fig. 1) of well-known construction mounted on the upper end of a vertical spindle 18. This spindle is rotated by means of an electric motor 19 which is connected to the spindle by means of gearing 20, a horizontal shaft 22, and bevel gearing 23. The hooks 10 serve to support bundles B of wire-rod, or similar annuli, which depend from the hooks in a well-known manner and are transported forwardly in the direction of their axes. For clearness of illustration, the rail 14 has been omitted from Fig. 1.

When the bundles reach a predetermined location they are removed from the hook carrier by an automatic mechanism which serves to swing the lower portion of each bundle forwardly and upwardly at a speed sufficient to drag the bundle forwardly from its hook, whereupon the bundle is moved downwardly and forwardly to allow the hook to pass above the same. For this purpose I provide a series of upwardly extending dogs 25 (Fig. 2) arranged to travel beneath the hooks 10 in an upwardly and forwardly sloping path and at a speed appreciably exceeding that of the hooks. These dogs are three in number in the embodiment illustrated, and they are mounted on an endless chain 26 which passes around two sprocket wheels 27 and 28 mounted on horizontal shafts 30 and 31 respectively. The wheel 28 is located upwardly and forwardly with respect to the wheel 27, so that the upper run of the chain will be inclined in the desired manner. The dogs 25 are actuated in timed relation with the hook carrier, and for this purpose they may be driven by the same motor 19 which drives the hook carrier. As shown in Fig. 1, the shaft 22 is connected to the sprocket wheel shaft 31 by means of a chain and sprocket drive 32 and gearing 33. The various parts are so constructed and arranged that as each hook 10 arrives at a predetermined position in its forward travel, one of the dogs 25 will move beneath the same to engage the lower portion of the depending bundle from the rear while the bundle is depending freely from the hook, as shown in Fig. 2. As the dog continues to move upwardly and forwardly

at a speed exceeding that of the hooks, the lower portion of the bundle will be lifted and the bundle will be dragged forwardly from the hook.

After the bundle has been removed from its hook 10, the dog 25 is withdrawn from the bundle. For this purpose a plate 35 is provided which slopes forwardly and downwardly from the upper sprocket wheeel 28, this plate having a central slot 36 therein through which the dogs 25 may extend. Preferably the plate 35 extends downwardly and rearwardly along the upper run of the chain 26, to prevent any loose convolutions in the bundles B from becoming entangled in the chain. It will be apparent that after each bundle has passed beyond the highest point in the plate 35, above the sprocket wheel 28, the bundle will slide forwardly along the plate by gravity as shown in Fig. 4, and the dog 25 will pass downwardly out of the bundle without interference.

After the bundles have left the dogs 25 they can be handled in various ways. In the preferred construction illustrated, a transverse trough 38 is provided to receive the bundles as they slide down the plate 35. This trough slopes downward laterally, as shown in Fig. 5, toward a conveyor 40 having a series of pockets 41 (Fig. 1) to receive the bundles. This conveyor may be driven by a suitable motor 43 connected thereto by gearing 44. By starting and stopping the motor 43, the conveyor 40 can be advanced the width of one pocket 41 as soon as each bundle has been deposited thereon. When several bundles have accumulated on the conveyor they can all be removed at the same time by a hair-pin hook or other well-known device.

The operation of the invention will now be apparent from the above disclosure. The motor 19 actuates the hook carrier and causes the hooks 10 to travel at a uniform speed with the bundles B depending therefrom. This same motor will drive the chain 26 and the dogs 25 in timed relation with the hook carrier. Upon arrival of each bundle above the chain 26, one of the dogs 25 will engage the lower portion of the bundle from the rear and carry it upwardly and forwardly, dragging the bundle forwardly from the hook to the position shown in Fig. 3. The bundle will then slide forwardly on the plate 35 by gravity, as shown in Fig. 4, and the dog will move downwardly below the plate, allowing the bundle to slide forwardly into the trough 38. From the trough the bundle will roll laterally into one of the pockets 41, and the conveyor 40 will be advanced by means of the motor 43 to bring the next pocket into line with the trough 38. The bundles can be removed from the conveyor 40 in groups by any suitable and well-known means.

The entire construction is relatively simple and inexpensive to manufacture, and thoroughly reliable in operation. There will be substantially no disarrangement of the convolutions in the bundles, and the necessity for manual labor will be eliminated.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a hook carrier having a series of suspended hooks arranged to travel with their points extending forwardly in the direction of movement and serving to convey rod bundles or similar annuli which depend therefrom with their axes substantially horizontal, a device located beneath the path of the hooks, and means to move the device into contact with the rear of the lower portion of a bundle while the bundle is depending freely from its hook and then upwardly and forwardly at a speed exceeding that of the hooks, the said device serving to swing the lower portion of the bundle to a position in front of the upper portion thereof and to drag the bundle forwardly from its hook.

2. In combination with a hook carrier having a series of suspended hooks arranged to travel with their points extending forwardly in the direction of movement and serving to convey rod bundles or similar annuli which depend therefrom with their axes substantially horizontal, a series of dogs located beneath the path of the hooks, and means to move the dogs in succession into contact with the rear of the lower portions of the bundles while the bundles are depending freely from the hooks and then upwardly and forwardly at a speed exceeding that of the hooks, the dogs serving to swing the lower portions of the bundles to a position in front of the upper portions thereof and to drag the bundles forwardly from the hooks.

3. In combination with a hook carrier having a series of suspended hooks arranged to travel with their points extending forwardly in the direction of movement and serving to convey rod bundles or similar annuli which depend therefrom with their axes substantially horizontal, an endless element located beneath the path of the hooks, a series of dogs secured to the element, and means to drive said element in timed relation with the hook carrier and move the dogs in succession into contact with the rear of the lower portions of the bundles while the bundles are depending freely from the hooks and then upwardly and forwardly at a speed exceeding that of the hooks, the dogs serving to swing the lower portions of the bundles to a position in front of the upper portions thereof and to drag the bundles forwardly from the hooks.

4. In combination with a hook carrier having a series of suspended hooks arranged to travel with their points extending forwardly in the direction of movement and serving to convey rod bundles or similar annuli which depend therefrom with their axes substantially horizontal, an endless element located beneath the path of the hooks and having an upper run which slopes upwardly and forwardly, a series of dogs secured to the element, and means to drive said element in timed relation with the hook carrier and move the dogs in succession into contact with the rear of the lower portions of the bundles while the bundles are depending freely from the hooks and then upwardly and forwardly at a speed exceeding that of the hooks, the dogs serving to swing the lower portions of the bundles to a position in front of the upper portions thereof and to drag the bundles forwardly from the hooks.

5. In combination with a hook carrier having a series of suspended hooks arranged to travel with their points extending forwardly in the direction of movement and serving to convey rod bundles or similar annuli which depend therefrom with their axes substantially horizontal, a series of dogs located beneath the path of the hooks, means to move the dogs in succession into contact with the rear of the lower portions of the bundles while the bundles are depending freely from the hooks and then upwardly and forwardly at a speed exceeding that of the hooks, the dogs serving to swing the lower portions of the bundles to a position in front of the upper portions thereof and to drag the bundles forwardly from the hooks, and a plate located beyond the dogs in a position

to receive the bundles after they leave the hooks, the plate sloping downwardly and forwardly at a comparatively steep angle so that the bundles will slide down the same by gravity and thereby escape from the path of the hooks.

6. In combination with a hook carrier having a series of suspended hooks arranged to travel with their points extending forwardly in the direction of movement and serving to convey rod bundles or similar annuli which depend therefrom with their axes substantially horizontal, an endless element located beneath the path of the hooks and having an upper run which slopes upwardly and forwardly, a series of dogs secured to the element, means to drive said element in timed relation with the hook carrier and move the dogs in succession into contact with the rear of the lower portion of the bundles while the bundles are depending freely from the hooks and then upwardly and forwardly at a speed exceeding that of the hooks, the dogs serving to swing the lower portions of the bundles to a position in front of the upper portions thereof and to drag the bundles forwardly from the hooks, and a plate located beyond the endless element in a position to receive the bundles after they leave the hooks and formed with a slot through which the dogs may pass downwardly, the plate sloping downwardly and forwardly at a comparatively steep angle so that the bundles will slide down the same by gravity and thereby escape from the path of the hooks.

JOSEPH M. O'MALLEY.