

Dec. 14, 1943.

J. JACKSON

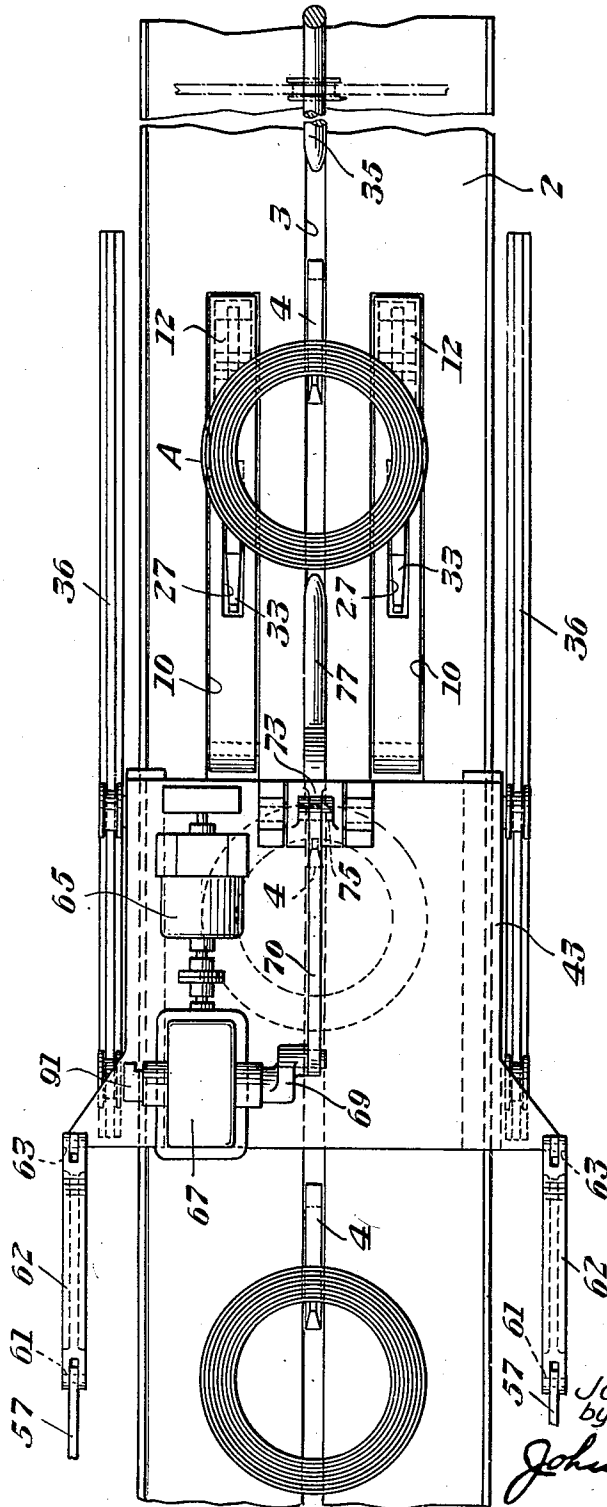
2,336,614

ROD BUNDLE TRANSFER DEVICE

Filed March 26, 1942

3 Sheets-Sheet 1

Fig. 1.



INVENTOR

JOHN JACKSON

by

John E. Jackson
his Attorney

Dec. 14, 1943.

J. JACKSON

2,336,614

ROD BUNDLE TRANSFER DEVICE

Filed March 26, 1942

3 Sheets-Sheet 2

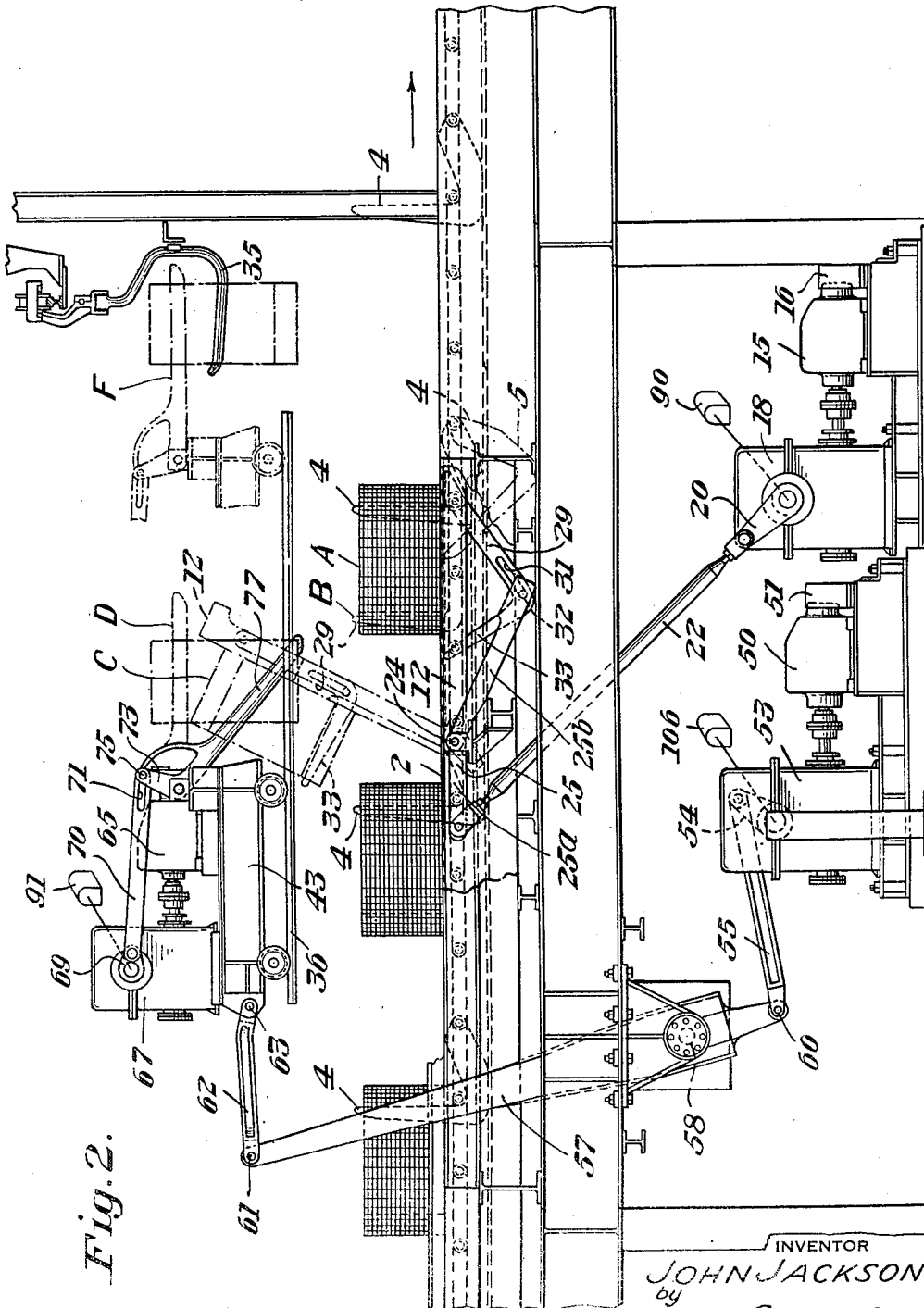


Fig. 2.

INVENTOR

JOHN JACKSON

by
John E. Jackson
his Attorney

Dec. 14, 1943.

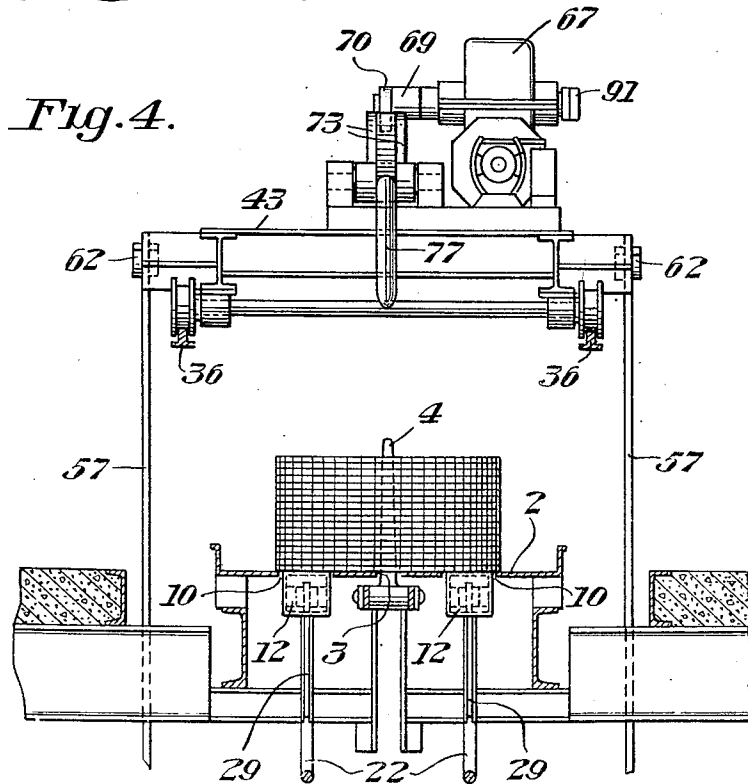
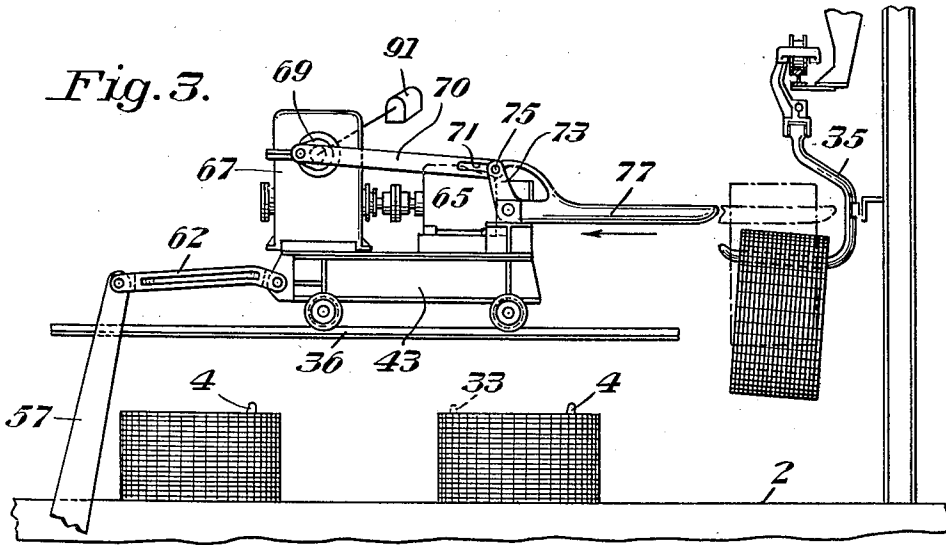
J. JACKSON

2,336,614

ROD BUNDLE TRANSFER DEVICE

Filed March 26, 1942

3 Sheets-Sheet 3



INVENTOR

JOHN JACKSON

by

John E. Jackson
his Attorney

UNITED STATES PATENT OFFICE

2,336,614

ROD BUNDLE TRANSFER DEVICE

John Jackson, Joliet, Ill., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey

Application March 26, 1942, Serial No. 436,343

1 Claim. (Cl. 198—20)

This invention relates to the transfer of coiled rod, and more particularly to rod bundle transfer devices which operate to move said bundles from a position in which their central apertures extend vertically into one which is at right angles thereto.

In the manufacture of rod, it emerges from a hot rod-rolling mill, and passes into apparatus which coils it into bundles while in a highly heated condition and then delivers the bundles horizontally over a bed with their central apertures or axes extending vertically. This delivery means is in the form of an intermittently operating drag conveyor, usually at floor level; and from this intermittently operating drag conveyor the bundles are transferred to a continuously operating hook conveyor for further cooling, inspection, trimming, and additional processing. In effecting the transfer of the rod bundles from the intermittently operating drag conveyor onto the continuously operating hook conveyor, it is essential that the top of the bundle as it lies on the intermittently operating drag conveyor (which is the last end to leave the hot rod-rolling mill) face outwardly on the continuously operating hook conveyor, thus enabling free access in trimming.

It is among the objects of the present invention to provide a relatively simple and inexpensive device for transferring the rod bundles from positions wherein their central apertures extend vertically, into positions which are right-angular thereto, the movement being such that what was formerly the top of the rod bundle becomes the trailing end thereof when moved into the said right-angular position.

Another object is the provision of a device of the class described which, besides being relatively simple and inexpensive to manufacture and operate, is also extremely durable in service.

The invention, then, comprises the features hereinafter fully described and as particularly pointed out in the claim, the following description and the annexed drawings setting forth in detail a certain illustrative embodiment of the invention, this being indicative of one of the number of ways in which the principles of the invention may be employed:

In said drawings:

Figure 1 is a fragmentary plan illustrating part of the apparatus of the present invention.

Figure 2 is a side elevation of the showing of Figure 1.

Figure 3 is a fragmentary elevation of a portion of the apparatus of Figure 2 and illustrating some

of the instrumentalities thereof in other phases of their operation.

Figure 4 is an elevational view illustrating in end elevation some of the elements of Figure 3. Referring more particularly to the drawings, the numeral 2 designates the bed of an intermittently operating drag conveyor. This bed 2 is provided with a longitudinal slot 3 through which drag hooks 4 project. These drag hooks 4 are driven in a suitable manner (not shown) and embody elongated portions which are adapted to extend vertically through the centers of the rod bundles being conveyed.

Adjacent the terminus of operation of the drag conveyor, the elongated portions 5 of the drag hooks 4 are withdrawn from the longitudinal slot 3 in the bed 2. At this end of the drag conveyor, extending in the same direction as the longitudinal slot 3 in the bed 2 and on either side thereof is a slot 10. Immediately beneath each of the slots 10 is a horizontally pivoted arm 12 adapted to move through the slot and in an arc toward the rod mill. The slots 10 and, accordingly, the arms 12 are closer together than the diameter of the rod bundles, and the bundles are adapted to be raised thereby in an arc with the top portions thereof moving toward the rod mill.

Immediately beneath the parallel arms 12 there is disposed an electric motor 15 having a conventional magnetic brake 16. The drive shaft of the motor 15 is connected to the driving shaft of an adjacently disposed speed reducer 18. At each end of the driven shaft of the speed reducer 18 there is secured a crank 20. Each of the cranks 20 is pivotally connected to a connecting rod 22.

The pivots, hereinafter designated 24, for the parallel arms 12, carry bell crank levers 25 which are shown in the full-line position of Figure 2 as having short horizontal portions 25^a and long downwardly depending portions 25^b.

Referring particularly to Figure 1, each of the arms 12 is provided with a short longitudinally extending slot 27. Beneath each of the slots 27 there is disposed a dog 29 comprising a V-shaped lever having one of its ends pivoted to the adjacent arm 12 and its free end 33 disposed for movement through the slot 27. These dogs 29 are more clearly shown in Figure 2.

The long downwardly depending portions 25^b of the bell crank levers 25 are adapted to engage, and accordingly raise and lower, the arms 12 through the operation of the electric motor 15.

The pivoted side of each of the dogs 29 is provided with a slot 31 and the downwardly depending portion 25^b of the adjacent bell crank

lever 25 carries a pin 32 which rides in the slot. This permits the protrusion of the free ends 33 of the dogs 29 through the slots 27 in the arms 12. Thus the rod bundle is not only lifted by the arms 12 and moved in an arc, but it is prevented from sliding off the arms 12 by means of the free ends 33 of the dogs 29.

As shown in Figure 2, a continuously operating hook conveyor is disposed to have its hooks move at approximate right-angles with respect to the direction of movement of the intermittently operating hook conveyor. This hook conveyor is provided with a number of hooks 35 which extend toward the drag conveyor.

As previously stated, it is among the objects of the present invention to move the raised rod bundle from the dotted-line position of Figure 2 onto one of the hooks 35 of the hook conveyor in such manner that the trailing end of the rod bundle is disposed on the outer side thereof. For this purpose there is provided the following construction and arrangement of instrumentalities:

Above and along either side of the bed 2 there is disposed a longitudinally extending track 36.

A four-wheeled carriage 43 is disposed on, and adapted for movement along, the tracks 36.

Reciprocating motion is given the upper four-wheeled carriage 43 by an electric motor 50 which is disposed beneath the bed 2. This electric motor 50 is provided with a conventional magnetic brake 51. The drive shaft of the motor 50 is connected to the driving shaft of an adjacently disposed speed reducer 53. At one end of the driven shaft of the speed reducer 53 there is secured a crank 54 which is pivotally connected to a connecting rod 55.

Immediately above the outer end of the connecting rod 55 there is disposed a substantially vertically extending lever 57 which is pivoted intermediate its ends, as shown at 58.

The lower end of the lever 57 is short and is pivotally connected, as shown at 60, to the outer end of the adjacent connecting rod 55. The upper end of the lever 57 is long and is pivotally connected, as at 61, to a link 62 which is, in turn, pivotally connected, as at 63, to the adjacent end of the four-wheeled carriage 43.

The four-wheeled carriage 43 carries an electric motor 65, the drive shaft of which is connected to the driving shaft of an adjacently disposed speed reducer 67. At one end of the driven shaft of the speed reducer 67 there is secured a crank 69, which is pivotally connected to a connecting rod 70.

The outer end of the connecting rod 70 is provided with a longitudinally extending slot 71 immediately adjacent which there is pivotally mounted a bell crank lever 73. The upper end of this bell crank lever 73 is bifurcated and provided with a pin 75 which rides in the slot 71 in the connecting rod 70. The lower end of the bell crank lever 73 is long and forms a prong 77 which is constructed and arranged to pick up rod bundles which have been elevated by the lifting arms 12 to the dotted-line position of Figure 2.

In operation:

A rod bundle is delivered by one of the hooks 4 of the intermittently operating drag conveyor to the position designated at A in Figures 1 and 2, at which point it rests on the bed 2 of the drag conveyor and the rod bundle lifting arms 12. The operation of the electric motor 15 is initiated in any suitable manner, whereupon the cranks 20 are caused to make one complete revolution, on completion of which the magnetic brake 16 is applied. This limited rotation of the cranks 20

is controlled by a limit switch 90 which is operated thereby. The rotation of the cranks 20 acting through the connecting rods 22 and the bell crank levers 25 first causes the dogs 29 to move to the position designated in dotted-lines at B in Figure 2. While in this position the free ends 33 of the dogs 29 are behind the rod bundle. At this time, the downwardly depending portions 25^a of the bell crank levers 25 are raised into contact with the rod bundle lifting arms 12, causing the outer ends of the latter to rise. The rod bundle will slide backwardly until it is resting against the free ends 33 of the dogs 29, whereby the rod bundle is carried to the position designated at C in Figure 2, whereby there is inserted in the central aperture of the rod bundle the prong 77 as shown in full lines in Figure 2.

At this point of operation, an interlock between the limit switch 90 and a limit switch 91 which is operated by the driven shaft of the speed reducer 67, initiates the operation of the electrical motor 65. This causes the prong 77 to be elevated to the horizontal dotted-line position D shown in Figure 2. At this point, the limit switch 91 stops the motor 65.

As the rod bundle is raised from the position C by the prong 77, the rod bundle lifting arms 12 will continue in their cycle and recede downwardly from their uppermost position to their original horizontal position. The free ends 33 of the dogs 29 then recede to rest in a position shown in full lines in Figure 2.

The operator then closes a manual switch when an empty hook 35 of the continuously operating hook conveyor reaches a predetermined position. At this point, there is operated in any suitable manner (not shown) the electric motor 50 which, through the connections referred to hereinbefore, advances the four-wheeled carriage 43, thereby moving the prong 77 from the horizontal position D shown in Figure 2 to the horizontal position F of the same figure, thus inserting the hook 35 into the rod bundle. The motor 65 is then operated to lower the prong 77 and thereby drop the rod bundle onto the hook 35. During this time, the electric motor 50 continues to run, driving the crank 54 past dead center, causing the four-wheeled carriage 43 to recede and carry with it the prong 77 in its lowered position. This motion of the four-wheeled carriage 43 withdraws the prong 77.

When the four-wheeled carriage 43 reaches its rearward position, a magnetic brake 51 stops the motor 50 and brings the four-wheeled carriage 43 to rest. An interlock of a limit switch 106 on the driving shaft of the speed reducer 53 with the limit switch 91 starts the motor 65 to return the prong 77 to its starting position. This completes the cycle of operation.

While I have shown and described one specific embodiment of my invention and a modification thereof, it will be understood that these embodiments are merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claim.

I claim:

Conveying apparatus for rod bundles comprising, in combination, a conveyor adapted to move the rod bundles in a substantially horizontal path with the axes thereof substantially vertical, a conveyor adapted to move said rod bundles in a path at substantial right angles with respect to the path of said first-named conveyor and with the axes thereof substantially horizontal, and

intermediately disposed means adapted to elevate said rod bundles from said first-named conveyor in an arcuate path with the upper convolutions of said bundles away from said second-named conveyor, a single reciprocable truck carrying a horizontally pivoted prong constructed and arranged to receive and support said rod bundles from said intermediate means and to transfer the same with their axes substantially horizontal into said second-named conveyor, means for elevating and lowering said prong, said prong being

5 adapted to support the rod bundles during the latter part of the movement in the arcuate path and during the movement of the reciprocable truck toward said second-named conveyor and means for actuating said lowering means to lower said prong at the end of said movement in order to deposit the rod bundles directly onto said second-named conveyor, and means for imparting reciprocatory movement to said reciprocable truck.

JOHN JACKSON.