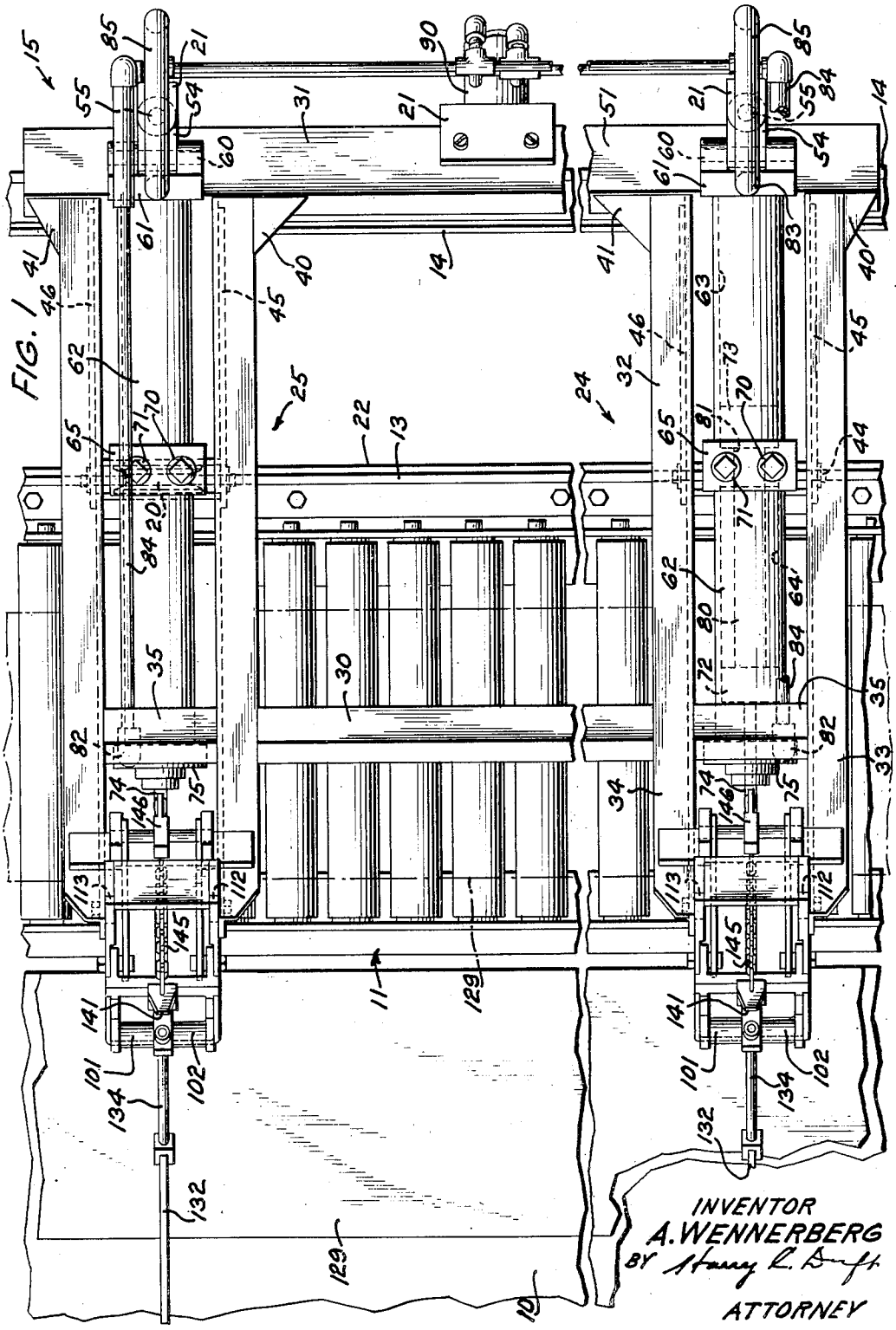
March 8, 1949. A. WENNERBERG 2,463,928

ARTICLE TRANSFERRING APPARATUS

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FIG. 1



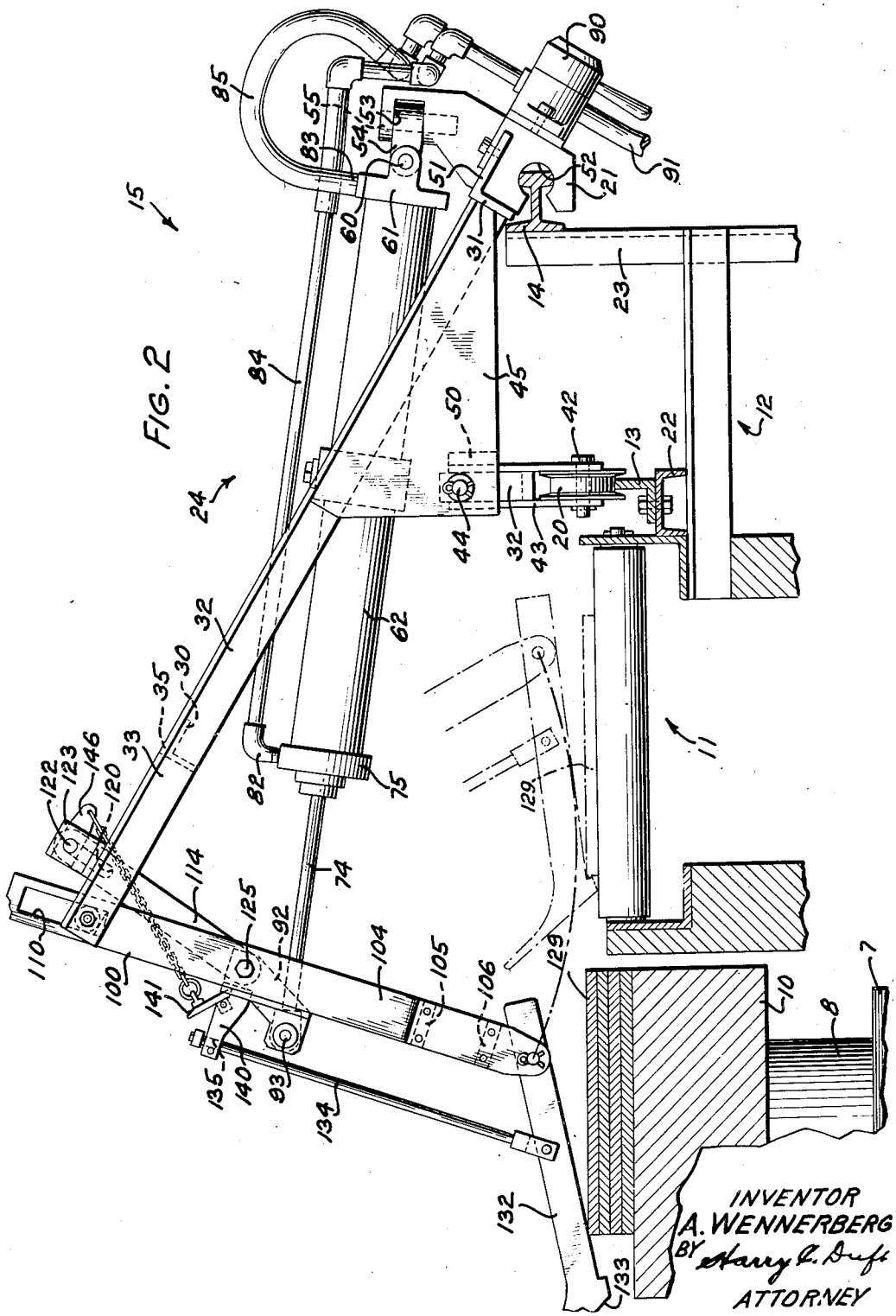
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FIG. 2



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FIG. 4

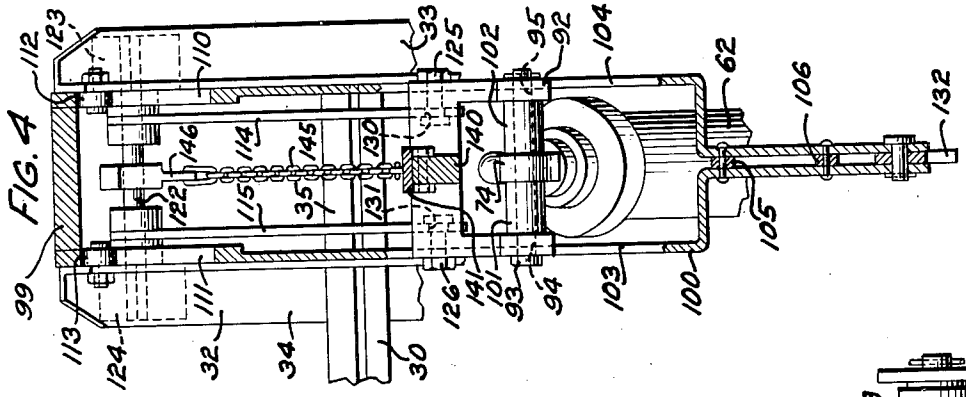


FIG. 3

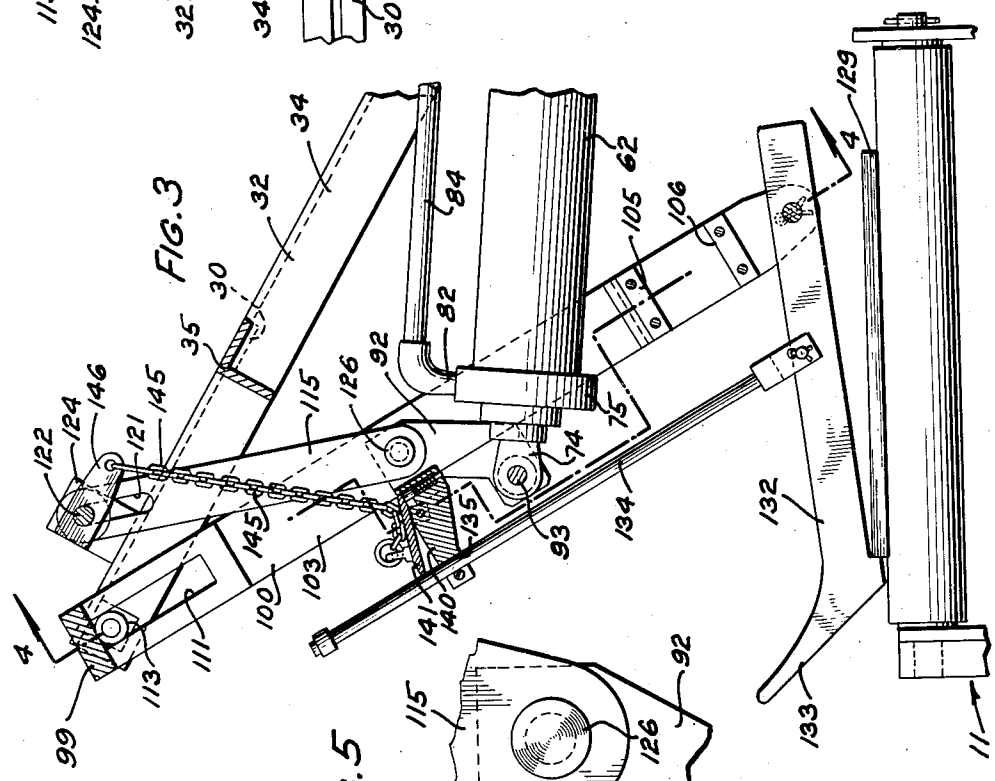
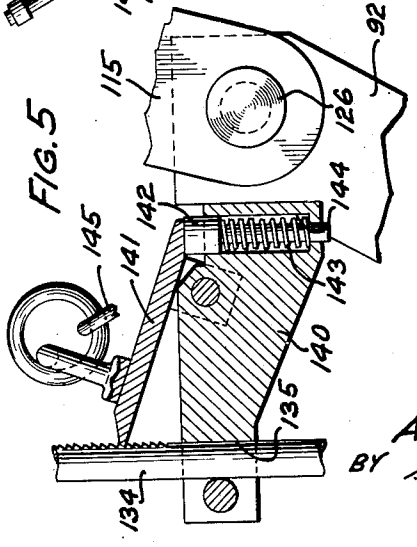


FIG. 5



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Patented Mar. 8, 1949

2,463,928

UNITED STATES PATENT OFFICE

2,463,928

ARTICLE TRANSFERRING APPARATUS

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Application September 1, 1945, Serial No. 614,017

11 Claims. (Cl. 198—221)

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This invention relates to article transferring apparatus and more particularly to metal bar transferring apparatus.

An object of this invention is to provide a new and efficient apparatus for transferring articles from one location to another.

In one embodiment of this invention, an apparatus is provided to move metal bars from a supply table to an adjacent conveyor, the apparatus comprising an article engaging hook reciprocated by the action of a piston rod linked to the hook through a lever pivoted at the lower end of a link pivotally suspended from the elevated end of an angularly extending boom mounted on a framework base adapted to be moved to the location of intended use by means of a roller and a guide block engaging a pair of parallel rails. In its operative stroke, the hook is moved at a relatively slow speed to prevent the bar from being thrown against the machine or possibly against the operator, whereas the hook is moved somewhat faster while moving it into position to engage the next bar. During the return stroke, the hook is carried in a raised position and dropped to engage a bar at the end of the stroke.

A complete understanding of the invention will be had by reference to the following detailed description taken in conjunction with the accompanying drawings, wherein

Fig. 1 is a plan view of the apparatus embodying the invention;

Fig. 2 is a side elevation of the apparatus showing the hook at the end of the forward stroke in a dropped position about to engage a bar of metal;

Fig. 3 is a fragmentary side view partly in section showing a portion of the apparatus at the end of the operational stroke;

Fig. 4 is an irregular sectional view of the apparatus taken on the line 4—4 of Fig. 3 in the direction of the arrows; and

Fig. 5 is an enlarged fragmentary sectional detail view of the mechanism that keeps the hook in an elevated position during the forward stroke.

Referring to the drawings, it will be seen that a stock supply table 10, being vertically adjustable by mechanical means such as a pneumatic or hydraulic cylinder 7 and piston 8, is positioned adjacent to a roller type conveyor 11 serving a rolling mill or other machine. Extending from and positioned parallel to the conveyor frame is an auxiliary framework 12 which provides support for two rails 13 and 14 serving to support and furnish a limited area of mobility to a carriage 15 movably mounted thereon by means of a combination of double flanged wheels 20 and sliding rail guide blocks 21. The rail 13 is made from an angle member which is bolted to an inverted channelled stringer 22, whereas the other rail 14 is the conventional flange type, the flange

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being bolted on spaced upright portions 23 of the auxiliary framework 12 so that the flange is substantially vertical, and the web of the rail is in a substantially horizontal plane, i. e. approximately at right angles to the customary position of a flange type rail.

The carriage 15 supports two identical transferring units 24 and 25 operated in parallel and rigidly connected to each other by cross members 30 and 31. Both units being identical in construction, only one will be described in detail.

Unit 24 (Fig. 1) is provided with a boom 32 comprising two parallel angularly disposed beams 33 and 34 which are held in a rigid spaced apart relation by an angle member 35 secured to the beams near their upper ends. At their lower ends, the beams are secured to the cross member 31 where the joints are reinforced by gussets 40 and 41. A wheel 20 (Fig. 2) is freely rotatable on a shaft 42 fixed between the arms of an inverted substantially U-shaped member 43, the yoke of which is pivotally mounted on a pin 44 carried by two substantially triangular plates 45 and 46 secured to the beams 33 and 34, thus permitting a limited amount of movement of the member 43. Undue displacement of the U-shaped member 43 is prevented by a lug 50 secured to the side plate 45.

A flange 51 of the cross member 31 is suitably cut out to receive the rail guide block 21 which is attached thereto, for example, by welding the edges of the block to the cross member. The guide block 21 is provided with a substantially keyhole-shaped notch 52 which engages the rail 14 to aid in holding the apparatus on the rails. A slot 53 is formed in the upper portion of the rail guide block 21 to receive a hinge member 54 which is pivotally secured to the guide block by a pivot pin 55.

The other end of the hinge member 54 is articulately joined by means of a hinge pin 60 to the rear cylinder head 61 of a pneumatic cylinder 62 which is divided into two opposing chambers 63 and 64 (Fig. 1) by an intermediate head 65 provided with two check valves 70 and 71 adapted to control fluid flow from one chamber to the other in opposite directions. A pair of pistons 72 and 73 are secured to a piston rod 74 which enters the cylinder 62 through the forward head 75, one piston 72 being disposed in the forward chamber 64 and the second piston 73 in the rear chamber 63. Between the pistons, an enlarged portion 80 of the rod 74 passes through an oil tight aperture 81 formed in the intermediate head 65. The spaces between the pistons 72 and 73 and the intermediate head 65 are filled with oil that flows from one chamber to the other through the check valves 70 and 71, upon reciprocation of the pistons. The check valves 70 and 71 are adjusted to retard the backward

stroke of the piston rod 74 and to provide a more or less free forward movement. The forward and rear cylinder heads 75 and 61 are provided with compressed air ports 82 and 83 which are connected through pipes 84 and 85, respectively, to a manually operable valve 90 that is connected to a compressed air line 91, whereby compressed air may be admitted into either chamber of the cylinder to actuate the piston in either direction. When air is being admitted to one chamber the valve 90 permits the other chamber to exhaust into the atmosphere.

The outer end of the piston rod 74 is pivotally connected to an irregularly shaped member 92 by means of a pin 93 (Fig. 4) which passes through the end of the piston rod 74 and through apertures 94 and 95 in the lower extending arms of the member 92 which is in turn secured to the side members 103 and 104 of a bifurcated lever 100. A pair of spacers 101 and 102, one on each side of the end of the rod, maintain the rod in proper alignment with respect to the lever. The two side members 103 and 104 are bent as shown in Fig. 4 and riveted together at their lower ends with spacers 105 and 106 between them. A spacing bar 99 is secured to the upper ends of the members 103 and 104. Rectangular apertures 110 and 111 are provided at the upper ends of the side members 104 and 103, respectively, to slidably engage rollers 112 and 113 mounted on the end of the beams 33 and 34 comprising the boom 32, producing the effect of a sliding fulcrum. The lever 100 is pivotally suspended from the boom 32 by a pair of links 114 and 115 having slots 120 and 121 at their upper ends to receive a stationary shaft 122 secured to a pair of short uprights 123 and 124 mounted on the beams 33 and 34 near the upper end of the boom 32. Distortion of the links 114 and 115 due to shocks, is prevented by these slots which furnish an added flexibility to the link suspension. A pair of headed stud shafts 125 and 126 fixed to the lever 100 extend through apertures 130 and 131 formed in the lower ends of the links 114 and 115 to tie the links to the lever.

An article engaging hook 132 is pivotally connected to the lower end of the lever 100 between the side members 103 and 104. The end of the hook 132 is provided with a runner 133 to assist it in passing over objects during its forward movement into position to engage a bar 129 which it is to transfer. During the forward or resetting stroke of the article engaging hook 132, it is held up by a detaining rod 134 (Fig. 3) which is guided in a pin-locked slot 135 in an arm 140 extending from the upper part of the member 92. The lower end of the rod 134 is pivotally connected to the hook 132 and the upper part of the rod is serrated (Fig. 5) for engagement by a detent 141 as the hook passes through the backward or operating stroke. The detent 141, which is pivotally mounted on the member 92, is urged to engage the rod by a plunger 142 acting under the force of a spring 143 both the plunger and the spring being disposed in a shouldered aperture 144 formed in the member 92. The detent has a chain 145 attached thereto, the other end of the chain being attached to a fixed arm 146 mounted on the shaft 122 near the upper end of the boom 32, the length of the chain being such that when the lever 100 is moved forward, a point will be reached where the slack is taken out of the chain, thereby raising the detent 141 and releasing the rod to allow the hook to fall over the edge of the bar 129 which is to be transferred.

During its forward movement the free end of the lever 100 describes a gradually changing arc with reference to the rollers 112 and 113 and retraces its path during the reverse movement.

In the operation of the apparatus, the piston 8 may be intermittently operated to elevate bars 129 to a position substantially in alignment with the upper surfaces of the rollers in the roller conveyor 11. Preferably, the bar to be transferred to the conveyor 11 from the supply table 10 is positioned with its bottom surface slightly above the upper surface of the rollers in the conveyor 11 so that it may be readily transferred from the position shown in full lines to the position shown in dot-and-dash lines (Fig. 2) by the hook 132. After the supply table 10 has been raised to the position where the bar 129 may be transferred to the conveyor 11, the valve 90 may be manipulated to cause compressed air to flow through the port 82, thus causing the piston rod 74 to move to the right (Fig. 2). The lever 100 being connected to the rod 74 is swung to the right through an arc having a gradually changing radius. During this movement, the bar 129 engaged by the hook 132 is transferred from the table 10 to the conveyor 11. It will be apparent that as this operational stroke nears its end, the rod 134 is raised and the serrated portions thereof are engaged by the detent 141. The hook 132 is returned to engage the next bar by manipulating the valve 90 to allow compressed air to flow through the port 83 into the rear chamber 63 of the cylinder thereby moving the rod 74 forward or to the left. The slack in the chain 145 is taken up so that the detent 141 is raised just before the end of this return stroke, thereby releasing the rod 134 and dropping the hook 132 to engage the next bar which is to be transferred.

What is claimed is:

1. An article moving apparatus comprising a supporting member, an article engaging member, means to cause said article engaging member to traverse a gradually changing arc, said means comprising a lever slidably pivoted on said supporting member and also pivotally connected to said article engaging member, a link pivotally suspended from said supporting member for pivotally supporting said lever, and a power operated piston connected to said lever to actuate the lever.

2. An article moving apparatus comprising a supporting frame, a depending member pivotally connected to said frame, a lever pivotally linked to said depending member, means associated with said frame and said lever to slidably guide said lever, an article engaging member pivotally connected to said lever, means connected to said lever for actuating the lever to reciprocate said article engaging member, means to carry said article engaging member in a raised position during the movement of said article engaging member in one direction of its reciprocation, and means to release said article engaging member at the end of said movement.

3. An article transferring apparatus comprising a supporting member, a link pivotally suspended from said supporting member, a lever pivotally connected to said link, means to guide said lever through a traverse of a gradually changing arc, an article engaging member having a camming surface and being pivotally connected to said lever, means to reciprocate said lever, means to regulate the velocity of the excursion of said reciprocating means, means to carry said article engaging member in a raised position during the forward portion of said excursion of said

reciprocating means, means to release said carrying means at the end of said forward movement, a rail, a wheel rotatably mounted on said supporting member to engage said rail, a second rail, and a rail guide block having surfaces in slidable engagement with said second rail, said rail guide block being secured to said supporting member.

4. An apparatus for transferring articles comprising an article engaging hook having a camming surface, a supporting member, a lever slideably pivoted to said supporting member, at one end of said lever and being pivotally connected to said article engaging hook, a link pivotally connected to said lever and slideably pivoted to said supporting member, means to oscillate said lever, means to regulate the velocity of said oscillation, means to carry said article engaging hook in a raised position during the movement in one direction of said oscillation, and means to release said carrying means at the end of said movement.

5. An article transferring apparatus comprising a supporting member, a link pivotally suspended from said supporting member, a lever pivotally suspended from said link, and slideably pivoted to said supporting member, a hook pivotally connected to said lever and having a camming surface, a pneumatic cylinder having two chambers, a piston disposed in one of said chambers, a second piston disposed in the other of said chambers, a piston rod connecting said pistons to said lever, means to actuate said pistons to reciprocate said piston rod, fluid disposed between said pistons, means to regulate the flow of said fluid between the chambers of said cylinder to control the velocity of said piston rod, a rail, a rail guide block having surfaces to engage said rail, said guide block being secured to said supporting member and articulately joined to said cylinder, a second rail, a wheel rotatably mounted on said supporting member to engage said rail, a rod having a serrated portion at one end and being pivotally connected to said hook, means to guide said rod, a detent, a spring pressed plunger to force said detent into engagement with said serrated portion of said rod during the movement in one direction of said reciprocation, and means to release said detent to release said rod at the end of the movement in the opposite direction of said reciprocation.

6. An article transferring apparatus comprising a supporting member, a link pivotally suspended from said supporting member, a lever pivotally suspended from said link and slidable with respect to said supporting member, an article engaging member pivotally connected to said lever, means to oscillate said lever in an arcuate path, means to regulate said oscillation so that the movement during the oscillation in one direction is faster than the movement in the opposite direction, means to carry said article engaging member in a raised position during the first said direction of said oscillation, means to release said carrying means at the end of said movement in said first direction, and means for carrying said supporting member in a fixed path.

7. An article transferring apparatus comprising a supporting member, a link having a compensating slot and being suspended from said supporting member, a lever having a slot at one end and being pivotally connected to said link, a roller rotatably mounted on said supporting member to engage the walls of the slotted portion of said lever to guide said lever through a gradually changing arc, an article engaging member having a runner and being pivotally connected to said

lever, means to oscillate said lever, means to regulate the velocity of said oscillation, means to carry said article engaging member in a raised position during the movement in one direction of said oscillation including a rod having a serrated portion and being pivotally connected to said article engaging member, a guide for said rod secured to said lever and a spring pressed pivotally mounted detent to engage the serrated portion of said rod, and means to raise said detent to release said rod at the end of the movement in said direction.

8. An article transferring apparatus comprising an article engaging member having a runner to permit it to glide over objects, a supporting boom, a downwardly extending lever pivotally suspended from the upper end of said supporting boom to carry said article engaging member, means to actuate said article engaging member in one direction, means to actuate said article engaging member in the opposite direction, means to regulate the velocity of the first said actuating means, means to regulate the velocity of the second said actuating means, holding means to lock said article engaging member in a retracted inoperative position during the movement in one direction, and means to release said holding means at the end of said movement.

9. A bar transferring apparatus comprising a bar engaging hook, a lever connected to said hook to actuate it, a pivot support for said lever, means for rocking said lever about its pivot, a latch means connected to the hook and lever to lock the hook in a predetermined position with respect to the lever when the lever is rocked in one direction, and means operable when the lever approaches the end of its movement in said one direction for operating said latch means to release said hook.

10. A bar transferring apparatus comprising a bar engaging hook, a lever connected to said hook to actuate it, a pivot support for said lever, means for rocking said lever about its pivot, means connected to the hook and lever to hold the hook in a predetermined position with respect to the lever when the lever is rocked in one direction, means operable when the lever approaches the end of its movement in said one direction for releasing said holding means, and means responsive to the movement of the lever in the opposite direction for rendering said holding means operable.

11. An article moving apparatus comprising a supporting member, an article engaging member, means to cause said article engaging member to traverse a gradually changing arc, said means comprising a lever slideably pivoted on said supporting member and also pivotally connected to said article engaging member, a link pivotally suspended from said supporting member for pivotally supporting said lever, and a power operated piston for actuating said lever connected to said lever at a point below said slideably pivoted connection.

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