

Oct. 27, 1964

F. C. LEACH

3,154,338

RAIL LIFTING DEVICE

Filed May 3, 1962

2 Sheets-Sheet 1

Fig. 1

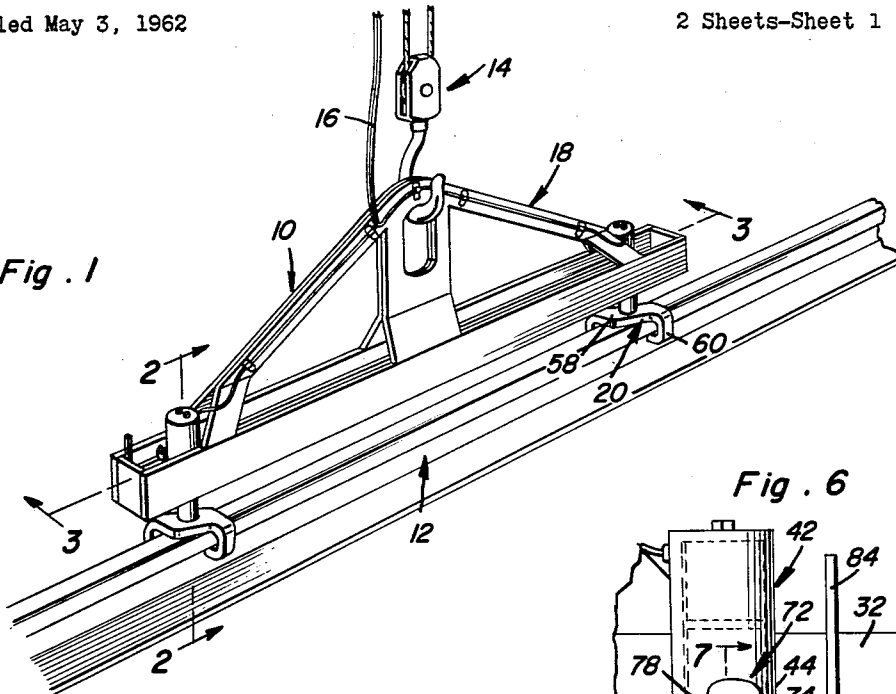


Fig. 6

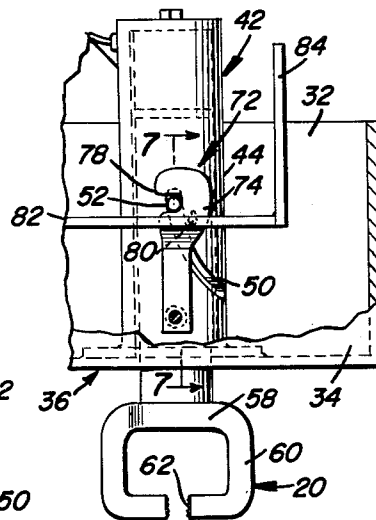


Fig. 5

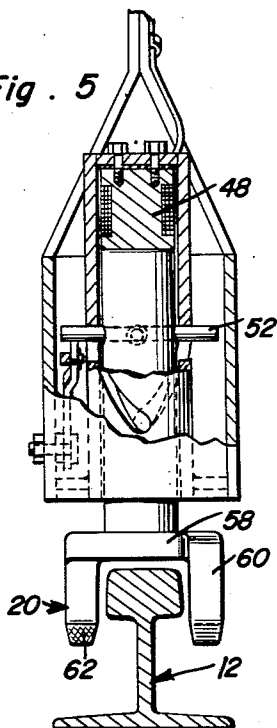


Fig. 2

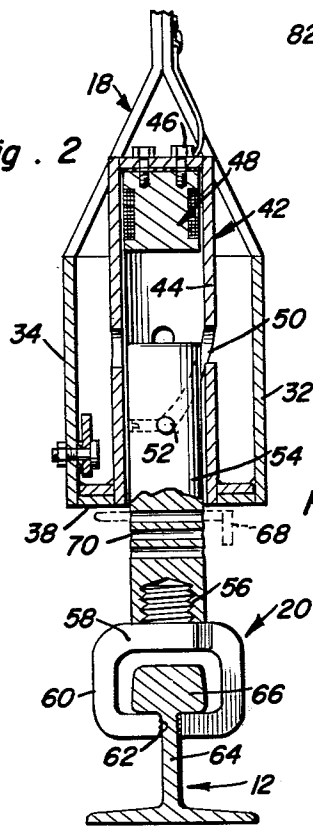
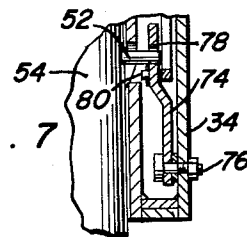


Fig. 7



Flavius C. Leach
INVENTOR.

BY *Almonce A. O'Brien*
and Harvey B. Jackson
Attorneys

Oct. 27, 1964

F. C. LEACH
RAIL LIFTING DEVICE

3,154,338

Filed May 3, 1962

2 Sheets-Sheet 2

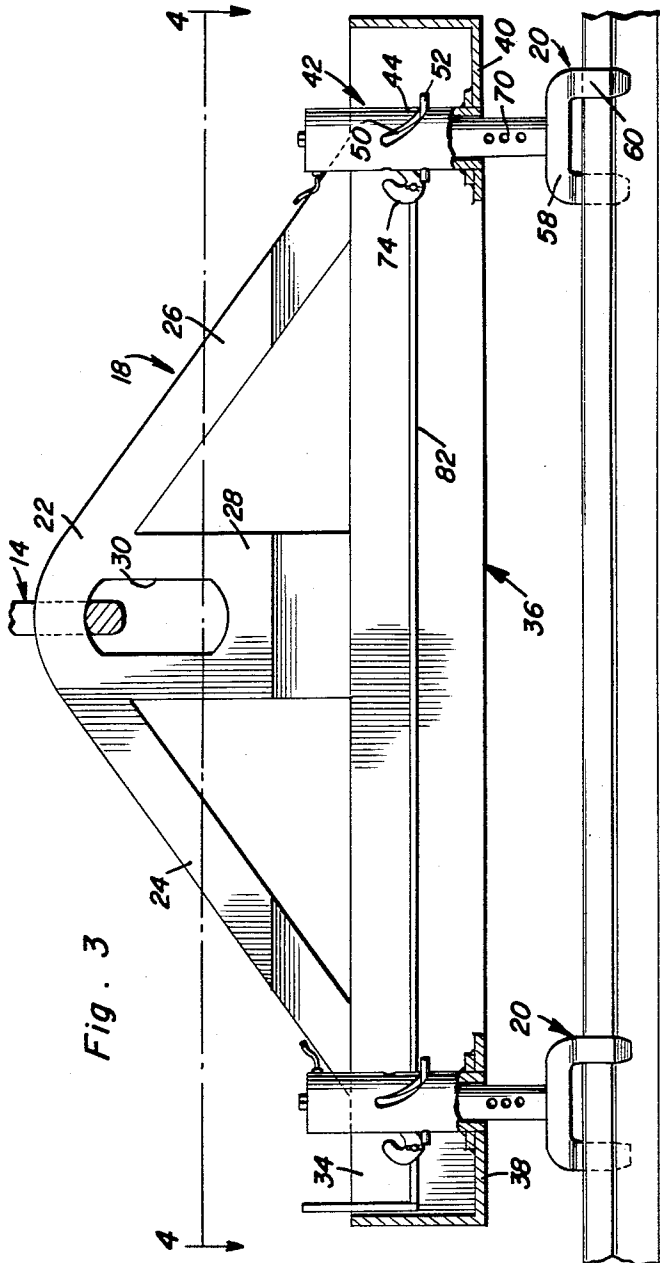


Fig. 3

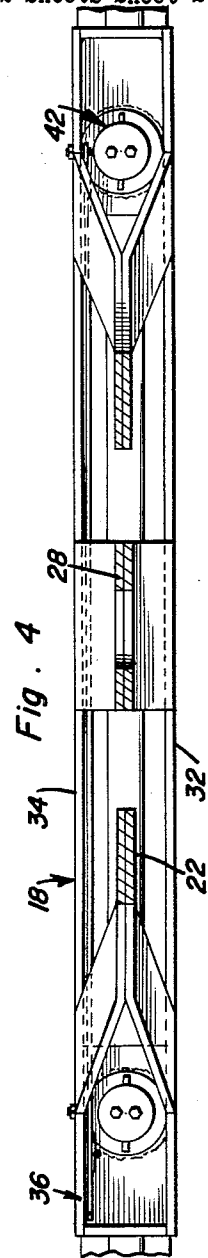


Fig. 4

Flavius C. Leach
INVENTOR.

BY *Thomas W. Brown*
and *Harvey B. Jackson*
Attorneys

1

3,154,338

RAIL LIFTING DEVICE

Flavius C. Leach, 1900 Pollard Road, Ashland, Ky.,
assignor of fifty percent to Regis L. Pelphey,
Ashland, Ky.

Filed May 3, 1962, Ser. No. 192,218
4 Claims. (Cl. 294—88)

This invention relates to a work handling device and more particularly to a device for lifting structural members such as rails.

A primary object of the present invention is to provide a new and useful type of load lifting device featuring a clamping jaw member having no relatively movable parts and yet operative to grip a load for lifting thereof in a positive and reliable manner.

Another object of the present invention is to provide a load lifting and handling device involving jaw members which are angularly displaced about an axis parallel to the direction of lift for gripping the load.

A further feature of the present invention involves the mounting of a jaw member in a carrier assembly for limited slidable movement with respect thereto and means for angularly displacing the jaw member with respect to a vertical axis in response to such limited slidable movement for gripping or releasing a load. The load handling device further includes remotely controlled means for retracting the jaw member to a released position and selectively operated locking mechanisms for locking the jaw members in a retracted position and limiting movement of the jaw members in a retracting direction when desired.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the load handling device of the present invention in an operatively engaged position with a rail member as the workpiece being handled.

FIGURE 2 is a sectional view taken substantially through a plane indicated by section line 2—2 in FIGURE 1.

FIGURE 3 is a sectional view taken substantially through a plane indicated by section line 3—3 in FIGURE 1.

FIGURE 4 is a sectional view taken substantially through a plane indicated by section line 4—4 in FIGURE 3.

FIGURE 5 is a sectional view similar to that of FIGURE 2 but illustrating the device in a load release condition.

FIGURE 6 is a partial rear elevational view of a portion of the load handling device with parts broken away and shown in section, the load handling device corresponding to the load release condition illustrated in FIGURE 5.

FIGURE 7 is a partial sectional view taken substantially through a plane indicated by section line 7—7 in FIGURE 6.

Referring now to the drawings in detail, it will be observed from FIGURE 1, that the load handling device generally referred to by reference numeral 10 is shown engaged with a workpiece in the form of a rail section 12. Lifting of the rail 12 is accomplished by engagement thereof through the load handling device 10 suspended for example by the hook of a block and tackle device 14 which may be connected to some overhead crane mechanism. Also extending away from the load handling de-

2

vice 10 is an electrical conductor cable 16 for the purpose of controlling the load handling device 10 from some remote location. The load handling device thus includes a carrier assembly generally referred to by reference numeral 18 which mounts adjacent opposite ends thereof, a pair of load engaging jaw members generally referred to by reference numeral 20.

The carrier assembly 18 as more clearly seen in FIGURES 3 and 4, includes a pair of handle portions 22 which are welded together forming downwardly diverging arm portions 24, 26 interconnected with a vertically disposed central portion 28 forming a slot opening 30 for receiving the hook portion of the block and tackle device 14. The lower ends of the portion 24, 26 and 28 of the handle 22 diverge outwardly for connection to parallel spaced elongated side members 32 and 34 of a housing assembly 36 having bottom plate portions 38 and 40 adjacent opposite ends thereof interconnecting the side members 32 and 34. The bottom plate members 38 and 40 support thereabove a pair of jaw mounting assemblies generally referred to by reference numeral 42. Referring now to FIGURE 2 in particular, it will be observed that each of the jaw mounting assemblies 42 includes a tubular member 44 secured to the bottom plate member in parallel spaced relation between the elongated side members 32 and 34. The tubular member 44 is open at the bottom for projection thereof of the jaw assembly 20. The upper end of the tubular member 44 is closed and supports there below by means of a pair of fastener elements 46, an electromagnetic coil device 48 remotely controlled and energized by an electrical source of power through the conductors in the electrical cable 16. Finally, a spiral cam slot 50 is formed in the tubular member 44 for cooperation with a follower pin element 52 secured to the jaw member 20 and projecting through the spiral slot 50.

The jaw members 20 each include a cylindrical shank portion 54 which is slidably and rotatably received within the tubular member 44 of the jaw mounting assemblies 42. Connected to the lower end of the shank portion 54 in any suitable manner as for example by the threaded connection 56, is a transversely extending portion 58 disposed perpendicular to a longitudinal vertical axis through the shank portion 54. Connected to the opposite ends of the transversely extending portion 58 radially remote from the longitudinal axis through the shank portion, are load engaging portions 60 which are provided with more closely spaced load gripping surfaces 62. It will therefore be apparent, that when the jaw member 20 is rotated about the vertical longitudinal axis extending through the shank portion 54 by 90° between the positions illustrated in FIGURES 2 and 5 respectively, the load engaging surfaces 62 will be displaced from a confronting position in engagement with the web portion 64 of the rail 12 below the rail head portion 66 to a confronting position on opposite sides of the rail 12 clearing the head portion 66 thereof. Thus, it will be apparent that the jaw member 20 will be angularly displaced by 90° in response to slidable movement of the shank portion 54 within the tubular member 44 because of the camming action of the spiral groove 50 on the follower pin 52 which extends transversely through the shank portion 54. The jaw member 20 is therefore arranged to be angularly displaced from an upwardly retracted position as illustrated in FIGURE 5 to an extended position as illustrated in FIGURE 2, the relative sliding movement which so occurs being limited by engagement of the follower pin 52 with the lower end of the spiral slot 50. It will also be observed, that when the shank portion 54 of the jaw member 20 is in the upward retracted position, it may be held in this position by energization of the electromagnetic

coil device 48. Further, when the jaw member 20 is in its lower extended position, upward movement in a retracting direction may be limited by insertion of a limit element 68, shown dotted in FIGURE 2 within any one of a plurality of transverse apertures 70 which extend through the shank portion 54 of the jaw member.

Referring now to FIGURES 6 and 7 in particular, it will be observed that when the shank portion of the jaw member is in its retracted position, the follower pin 52 will project through the spiral slot 50 adjacent the upper end thereof in a direction substantially perpendicular to the side walls 32 and 34 of the housing assembly 36. In this position of the follower pin 52 and jaw member 20, a selectively operated mechanical lock assembly generally referred to by reference number 72 may be applied for holding the jaw members in their retracted positions so that the electromagnetically operated coil devices 48 may be de-energized. The lock assembly 72 therefore includes a pair of locking lever elements 74 pivotally mounted adjacent each end of the carrier assembly 18 on the rear side wall 34 by means of a pivot bolt assembly 76. An upper inwardly offset portion of the lock lever 74 includes a locking slot 78 arranged to engage the follower pin 52 when the locking lever is in a vertical position. The locking lever elements 74 are therefore interconnected by pins 80 to a bar member 82 one end of which is provided with an upwardly projecting portion 84 for selective actuation thereof. It will therefore be apparent, that both locking lever elements 74 may be simultaneously displaced from a horizontal position as illustrated in FIGURE 3 to a vertical position as illustrated in FIGURE 6 for locking the jaw members 20 in their retracted positions by engagement with the follower pins 52 thereof.

From the foregoing description, operation and utility of the load handling device will be apparent. It will therefore be appreciated, that in use the load handling device 10 may be positioned over any workpiece such as the rail 12 with its jaw members held in retracted position by energization of the electromagnetic coil device 48 so that the load engaging portions 60 of the retracted jaw members may be positioned on opposite sides of the work member 12 as illustrated in FIGURE 5. Thereafter, the electromagnetic coil devices 48 may be de-energized so that when the carrier assembly 18 is lifted upwardly, the jaw members will move downwardly with respect to the carrier assembly 18, by an amount limited by the follower pin 52 engaging within the spiral slot 50 so as to also angularly displace the jaw members by 90° about a longitudinal axis through the shank portions 54. Angular displacement of the jaw members will bring the confronting grip surfaces 62 against the web portion 64 of the rail member 12 below the head portion 66 as illustrated in FIGURE 2. Continued lifting of the carrier assembly 18 will tend to urge the jaw members 20 in the direction in which it was extended from the carrier assembly so as to prevent displacement in a retracting direction for release of the load 12 due to angular displacement of the jaw member as a result thereof. The load 12 may thereby be carried to a desired location and when lowered to a rest position easily released by the jaw members when the carrier assembly 18 is dropped downwardly thereon and the electromagnetic coil device 48 energized to hold the jaw members in retracted position when the carrier assembly is subsequently withdrawn. When not in use, the mechanical locking assemblies 72 may be applied as hereinbefore indicated for holding the jaw members in retracted position. Also, when it is desired to either positively prevent release of the load when in rest position or to limit the extent to which the jaw members are to be retracted, the limit element 68 as shown by dotted line in FIGURE 2

may be inserted within any one of the apertures 70 for such purpose. It will be further appreciated, that although a pair of jaw members have been illustrated and described with respect to the carrier assembly 18, any number of such jaw members and associated jaw mounting assemblies 42, including even one may be utilized depending upon the type and size of work to be handled. It will be still further appreciated, that the exact shape of the load engaging portion 60 of the jaw members 20 may be varied for engaging workpieces of different shapes in accordance with the principles of the present invention.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A work handling device comprising carrier means for transmitting a displacing force in one direction to a loaded workpiece, an elongated support member projecting outwardly from and mounted on said carrier means for oscillation about an axis relative to said carrier extending longitudinally of said support member between extended and retracted positions, and reciprocation along said axis, and including workpiece engaging means on its free end adapted to engage workpiece when said support member is in the extended position for transmitting said displacing force to said workpiece, coacting means carried by said carrier means and support means for oscillating said support member in direct response to reciprocation of said support member relative to said carrier means, means connected to said carrier means and operable to releasably retain said support member in said retracted position, said workpiece engaging means comprising an elongated transverse member extending transversely of and projecting outwardly from opposite sides of said free end, the opposite ends of said elongated transverse member including oppositely opening generally C-shaped load-engaging portions whose planes generally parallel said axis and which open in the direction of rotation of said support member effected by movement of the latter to the extended position.

2. The combination of claim 1 including selectively operable lock means mounted on the carrier means and engageable with the support member when in a retracted position for holding the support member against movement relative to said carrier means.

3. The combination of claim 2 including means mounted on said support member for selectively limiting relative movement thereof toward the retracted position.

4. The combination of claim 1 including selectively operated lock means mounted on the carrier means and engageable with the support member in a retracted position for holding the support member against movement relative to the carrier means, and means mounted on said support member for selectively limiting relative movement thereof toward the retracted position.

References Cited in the file of this patent

UNITED STATES PATENTS

344,222	Thomas	June 22, 1886
1,031,964	Reinehr	July 9, 1912
1,817,233	Bumgardner	Aug. 4, 1931
1,956,231	Thomas	Apr. 24, 1934
2,087,877	Ralston	July 20, 1937
2,634,156	Crimmel	Apr. 7, 1953