June 14, 1938. C. F. BUENTE 2,120,639

CARRIER

Filed Oct. 3, 1936 2 Sheets-Sheet 1

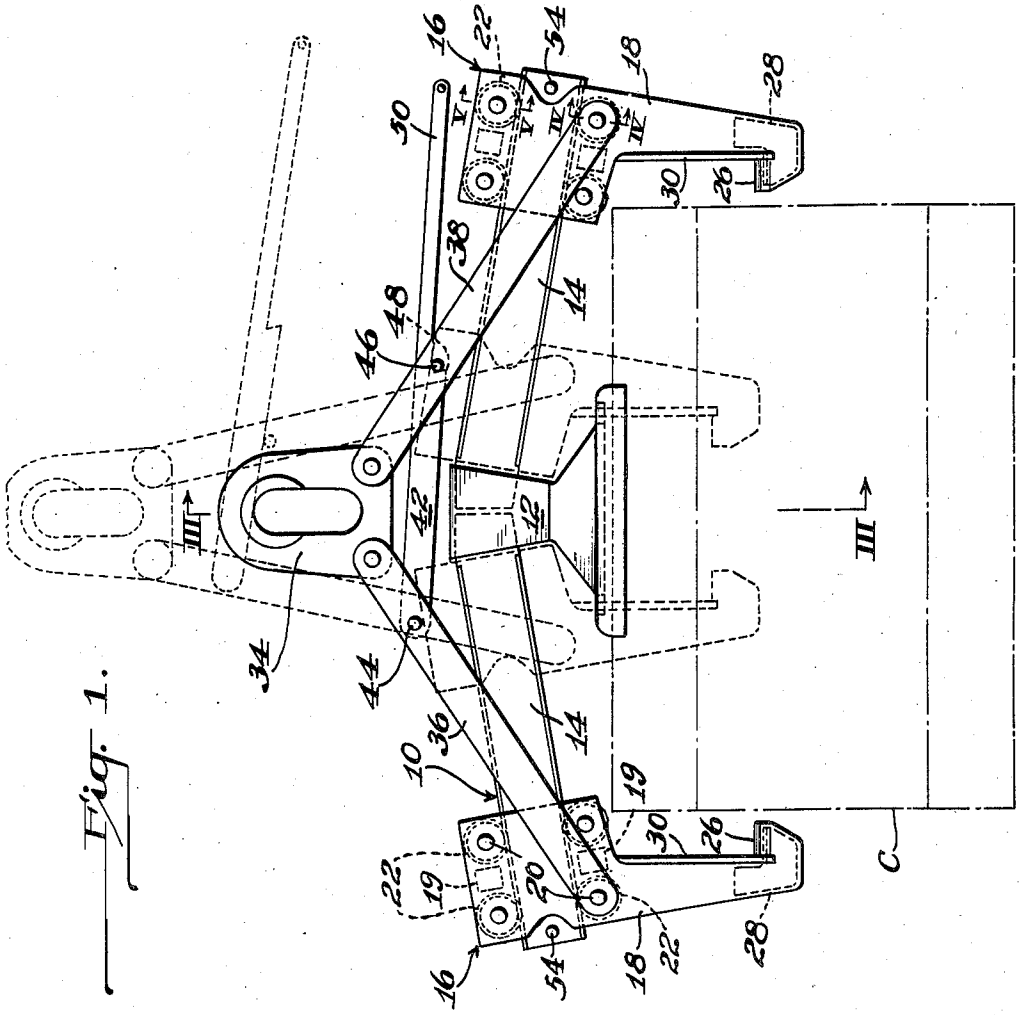


Fig. 1.

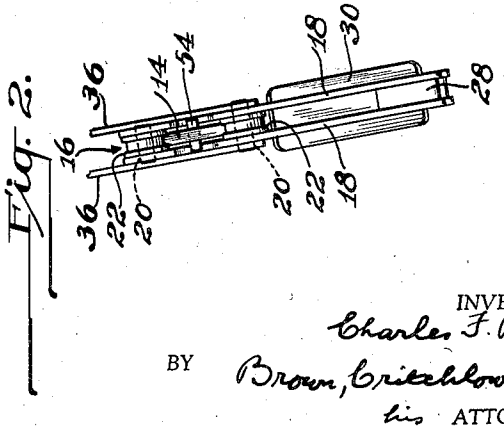


Fig. 2.

WITNESSES

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Fig. 3.

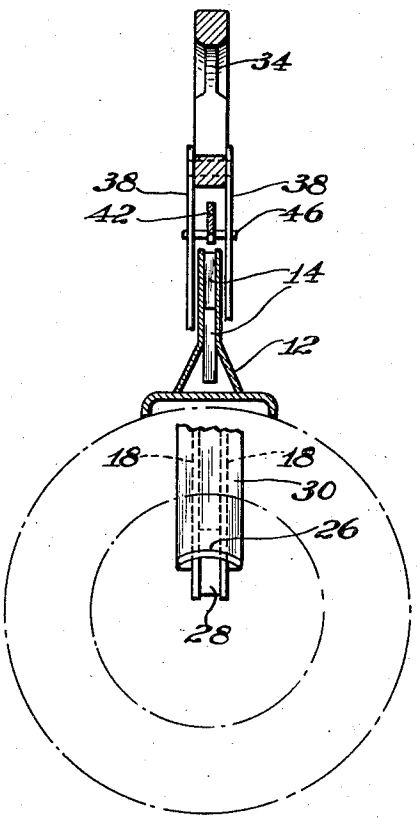


Fig. 4.

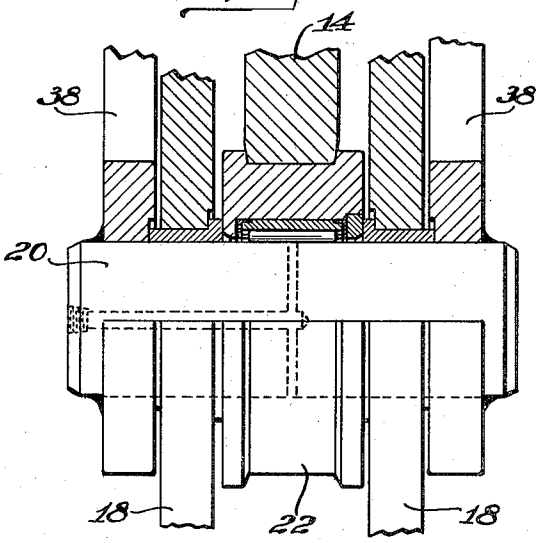
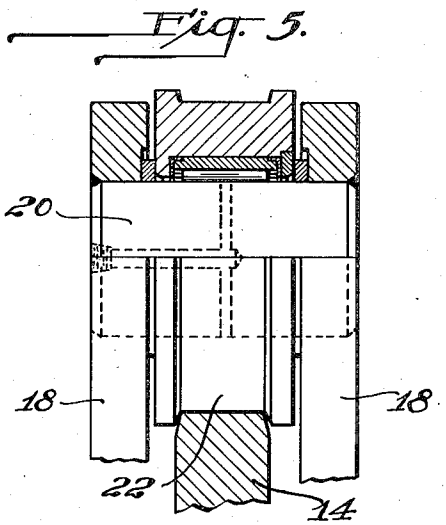


Fig. 5.



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UNITED STATES PATENT OFFICE

2,120,639

CARRIER

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Application October 3, 1936, Serial No. 103,915

13 Claims. (Cl. 294—106)

This invention relates to grapple mechanism and more particularly to improved apparatus for picking up and carrying coils of metal strip or the like.

Heretofore apparatus for carrying coils has been provided but this has been open to the objection that coils of varying widths and diameters can not be readily handled or can not be handled at all. Furthermore, known apparatus is ordinarily relatively complicated and expensive, is not easily manipulated, or damages the coils.

It is the general object of my invention to avoid and overcome the foregoing and other difficulties of known grapple mechanism used, for example, to carry strip metal coils by the provision of improved apparatus of relatively simple but sturdy construction which is easily manipulated in complete safety by the ordinary workman to handle coils of widely varying widths, diameter, and thickness.

Another object of my invention is to provide coil-carrying mechanism which functions to automatically release a coil when the coil is deposited in the desired position.

The foregoing and other objects of my invention are achieved by the provision of apparatus comprising a frame having a central pedestal with aligned arms secured to the pedestal and extending outwardly and downwardly thereof. An inwardly facing jaw is slidably mounted on each arm for movement to and from the pedestal. The jaws are moved outwardly of their sloping supporting arms by their own weight as will be understood. Links pivotally secured to the jaws are pivotally connected at their free ends to a shackle adapted to receive the crane hook or other means normally lifting the apparatus and the coil. Lifting the shackle moves the jaws toward each other and toward the pedestal so that a coil positioned between the jaws is clamped thereby and picked up by the apparatus, as will be understood. Incorporated in the structure are latch means normally pivotally secured to one link and extending into releasable engagement with the other for holding the jaws apart when desired. In setting a coil carried by the apparatus down in a desired position once the coil has stopped moving the continued downward movement of the shackle moves the jaws apart and near the end of this movement the latch means automatically engages to hold the jaws in their most extended position. Thus the crane can immediately lift the carrier away from the coil without a workman operating the carrier.

In the accompanying drawings Fig. 1 is a side elevation of one embodiment of apparatus incorporating the principles of my invention; Fig. 2 is a partial end view of the apparatus of Fig. 1; Fig. 3 is a vertical transverse cross-sectional view taken on line III—III of Fig. 1; Fig. 4 is a cross-sectional view taken on line IV—IV of Fig. 1 and illustrating details of the pivotal connection between a jaw and the operating links; and Fig. 5 is a cross-sectional view taken on line V—V of Fig. 1 and showing in detail the manner of slidably mounting the jaw upon an arm of the frame member.

While the principles of my invention are broadly adapted to the construction of grapple mechanism adapted for substantially any use, they are particularly applicable to apparatus for carrying strip metal coils, as for example in a rolling mill, before, between or after hot or cold rolling operations. Accordingly, my invention has been specifically illustrated and will be described in conjunction with the handling of metal coils. It should be understood, however, that wire coils, barrels, cylinders, or other means may be carried by the apparatus with little or no change in construction except perhaps the shape of the jaw member.

In the embodiment of my invention illustrated the numeral 10 indicates generally a frame which is ordinarily formed to include a pedestal 12 to which are secured aligned outwardly and somewhat downwardly extending arms 14. The particular angle that the arms make with the horizontal is ordinarily about 10° or so that the outer end of each arm is just above the lower surface of the pedestal 12 as will be evident from a consideration of Fig. 1.

Slidably mounted on each arm 14 is a jaw member, indicated as a whole by the numeral 16, which may take a plurality of forms but in the particular embodiment of the invention illustrated comprises side plates 18 spaced apart by blocks 19 a sufficient distance to allow the arm 14 to move therebetween. Journaled on shafts 20 fixed between the side plates 18 are rollers 22 which are formed with grooved peripheries engaging with the top and bottom surface of each arm 14 as particularly evident from Figs. 1 and 5. By using two rollers 22 at the top and two at the bottom of the arm 14 each jaw member 16 has a very sturdy slidable mounting on the arm.

The side plates 18 of each jaw member 16 are formed with an inwardly directed portion to which is welded a curved plate 26 which forms the surface of the jaw member which engages with the inner periphery of the metal coil "C" indicated in the drawings by dot and dash lines. Completing the construction of the lower portion of each jaw member I provide an L-shaped block 28 which is welded or otherwise secured between the lower ends of the plates and which extends beneath the curved plate 26 to additionally strengthen it. A face plate 30

is also welded or otherwise suitably secured to the inner side of the lower portion of the side plates 18 and this is adapted to abut against the end of the coil "C" to limit the inward movement of the jaw member against the end of the coil as hereinafter more fully described.

The mechanism for moving the jaw members 16 toward and from the pedestal 12 and thus toward and from each other includes clevis or shackle 34 adapted to receive a crane hook whereby the carrier can be lifted. Pivotally secured to the shackle 34 are two sets of links 36 and 38. The links 36 extend to and are pivotally secured to one jaw member, as is best illustrated in Fig. 4, by extending one of the shafts 20 to receive the ends of the links. The other set of links 38 is pivotally secured to the other jaw member 16 in a similar manner.

It is part of my inventive concept to provide the carrier apparatus just described with latch means for automatically but releasably holding the jaw members 16 in their most extended or widest open position. Relatively simple means to accomplish the desired result comprise a latch 42 which is pivotally secured as at 44 to and between the links 36. The latch 42 extends slidably above a pin 46 mounted between the links 38 which pin engages with a notch 48 formed on the latch 42 when the jaw members are almost at the end of their outward movement on the arms 14. The latch 42 is formed with an operating handle 50 whereby the latch mechanism can be manually operated by a workman when desired.

The inward movement of the jaw members 16 on the arms 14 is limited by engagement of the members with the pedestal 12 which may be centrally slotted to allow the greatest possible inward movement of the jaw members. The outward movement of the members is limited by the provision of stops such as pins 54 mounted on the ends of the arms 14.

It is believed that the operation of the carrier will be evident from the foregoing description and the accompanying drawings. However, briefly summarizing, when it is desired to pick up a coil the carrier supported upon a crane is normally in the full line position illustrated in Fig. 1 with the latch 42 engaged behind the pin 46. The carrier is lowered down over the coil until the pedestal 12 engages with the coil in a top central position. The workman then raises latch 42 through operating handle 50 to disengage notch 48 from pin 46 and the carrier is lifted at which time the jaw members 16 move inwardly on arms 14 until face plates 30 engage with the ends of the coil. Continued vertical movement of the shackle 34 by the crane moves curved plates 26 into engagement with the inner periphery of the coil and the coil is bodily raised.

The coil is then carried by the traveling crane to a desired destination and the carrier is lowered until the coil engages with the floor or other support upon which it is being placed. Continued downward movement of the crane hook and shackle 34 moves the curved plates 26 away from the inside periphery of the coil and causes the pedestal 12 to engage with the top central portion of the outer surface of the coil. Continued movement downward of the shackle 34 moves the jaw members 16 out to the ends of the arms 14 until they contact with the stops 54. Just prior to the contact of the jaw members 16 with the stops 54 the latch 42 engages with a pin 46 so that the carrier can immediately be raised without attention by a workman on the floor and can be moved where desired to perform any subsequent coil-carrying operations.

It will be seen that the objects of my invention have been achieved by the provision of relatively sturdy, safe, simple, and easily operated apparatus for carrying coils and the like without damage thereto. As specifically shown in Fig. 1, the apparatus is adapted to handle coils of widely varying widths, as, for example, from 24 inches to 78 inches. The full line position illustrates the apparatus in its fully extended position where it is adapted to handle a relatively wide coil and the dotted lines indicate the apparatus in substantially its narrowest position where it is adapted to handle a relatively narrow coil. The apparatus is relatively inexpensive and can be operated by the ordinary workman without special training.

While as generally indicated above the apparatus can be used for other purposes than the handling of metal coils, it should be particularly understood that the apparatus can be adapted to the handling of flat sheets or other cast or rolled metal bodies by the provision of different or modified jaws. I likewise contemplate the provision of a double frame having two sets of aligned arms each set carrying a pair of jaw members so that in all four jaw members are provided. In this modification of my invention particularly adapted to the handling of sheets or rectangular bodies the frame is, of course, integral and the two sets of jaw members can be interconnected so that each pair can be mounted for simultaneous movement.

While in accordance with the patent statutes one embodiment of my invention has been illustrated and described in detail, it should be understood that my invention is not limited thereto or thereby but is defined in the appended claims.

I claim:

1. A coil carrier comprising a frame including a central pedestal, aligned arms secured to the pedestal and extending outwardly and slightly downwardly therefrom, an inwardly facing jaw slidably mounted on each arm for movement to and from the pedestal, a crane shackle, links pivotally secured to one jaw and pivotally connected to the shackle, links pivotally secured to the other jaw and pivotally connected to the shackle, and a latch pivotally secured to one set of links and extending into releasable engagement with the other set of links for holding the jaws apart near their most extended position, said latch being automatically set during the release of a coil by lowering the shackle toward the pedestal which engages with the top of the coil.

2. A carrier apparatus comprising a frame including a central pedestal, aligned arms secured to the pedestal and extending outwardly and downwardly thereof, an inwardly facing jaw slidably mounted on each arm for movement to and from the pedestal, and normally held by its own weight at the outward end of its supporting arm, a crane shackle, a link pivotally secured to one jaw and pivotally connected to the shackle, a link pivotally secured to the other jaw and pivotally connected to the shackle, and a latch pivotally secured to one link and extending into releasable engagement with the other for holding the jaws apart when desired.

3. A carrier comprising a frame including a central pedestal, substantially horizontal aligned arms secured to the pedestal and extending outwardly therefrom, an inwardly facing jaw slidably mounted on each arm for movement to and from

the pedestal, a crane shackle free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the shackle, a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the shackle so that movement of the shackle to and from the frame effects outward and inward movement respectively of the jaws, and latch means for releasably holding the jaws apart when desired.

4. A carrier comprising a frame including a central pedestal, substantially horizontal aligned arms secured to the pedestal and extending outwardly therefrom, an inwardly facing jaw slidably mounted on each arm for movement to and from the pedestal, a crane shackle free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the shackle, and a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the shackle so that movement of the shackle to and from the frame effects outward and inward movement respectively of the jaws.

5. A carrier mechanism comprising a frame including substantially horizontal aligned arms extending outwardly thereof, an inwardly facing jaw slidably mounted on each arm for movement to and from each other, a crane shackle free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the shackle, a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the shackle so that movement of the shackle to and from the frame effects outward and inward movement respectively of the jaws, and a latch pivotally secured to one link and extending into releasable engagement with the other for holding the jaws apart near their most extended position.

6. A carrier mechanism comprising a frame including substantially horizontal aligned arms extending outwardly thereof, an inwardly facing jaw slidably mounted on each arm for movement to and from each other, a crane shackle free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the shackle, a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the shackle so that movement of the shackle to and from the frame effects outward and inward movement respectively of the jaws, and a latch holding the jaws apart near their most extended position.

7. A carrier mechanism comprising a frame including substantially horizontal aligned arms extending outwardly thereof, an inwardly facing jaw slidably mounted on each arm for movement to and from each other, a crane shackle free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the shackle, and a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the shackle so that movement of the shackle to and from the frame effects outward and inward movement respectively of the jaws.

8. In combination a frame, inwardly facing jaws slidably mounted on the frame for movement to and from each other, a crane block free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the block, a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the block so that movement of the block to and from the frame effects outward and inward movement respectively of the jaws, and a latch pivotally secured to one link and extending into releasable engagement with the other for holding the jaws apart near their most extended position.

9. In combination a frame, inwardly facing jaws slidably mounted on the frame for movement to and from each other, a crane block free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the block, a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the block so that movement of the block to and from the frame effects outward and inward movement respectively of the jaws, and a latch holding the jaws apart when desired.

10. In combination a frame, inwardly facing jaws slidably mounted on the frame for movement to and from each other, a crane block free for movement to and from the frame, a rigid link pivotally secured directly to one jaw and pivotally connected directly to the block, and a rigid link pivotally secured directly to the other jaw and pivotally connected directly to the block so that movement of the block to and from the frame effects outward and inward movement respectively of the jaws.

11. In combination, a frame including aligned oppositely inclined portions, an inwardly facing jaw slidably mounted on each inclined portion for movement to and from the central part of the frame but normally held by its own weight at the outer end of its arm portion, a shackle, linkage pivotally secured to one jaw and pivotally connected to the shackle, linkage pivotally secured to the other jaw and pivotally connected to the shackle, and a latch pivotally secured to one set of linkage and extending into releasable engagement with the other for holding the jaws apart when desired.

12. In combination, a frame including aligned oppositely inclined portions, an inwardly facing jaw slidably mounted on each inclined portion for movement to and from the central part of the frame but normally held by its own weight at the outer end of its arm portion, a shackle, rigid linkage pivotally secured to one jaw and pivotally connected to the shackle, and rigid linkage pivotally secured to the other jaw and pivotally connected to the shackle.

13. A grapple comprising a frame, jaw members mounted on the frame for movement toward and from each other to clamp a load therebetween, a hook, means for connecting the jaw members and the hook together so that when the hook is lifted the jaw members are moved towards each other with a clamping action, means associated with the aforesaid apparatus assembly for automatically locking the arms in substantially their fully open position, and means associated with the frame and adapted to engage with the load after it has been deposited and functioning to operate the locking means whereby the grapple can be raised without the jaws engaging the load.

CHARLES F. BUENTE.