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GRAPPLING DEVICE

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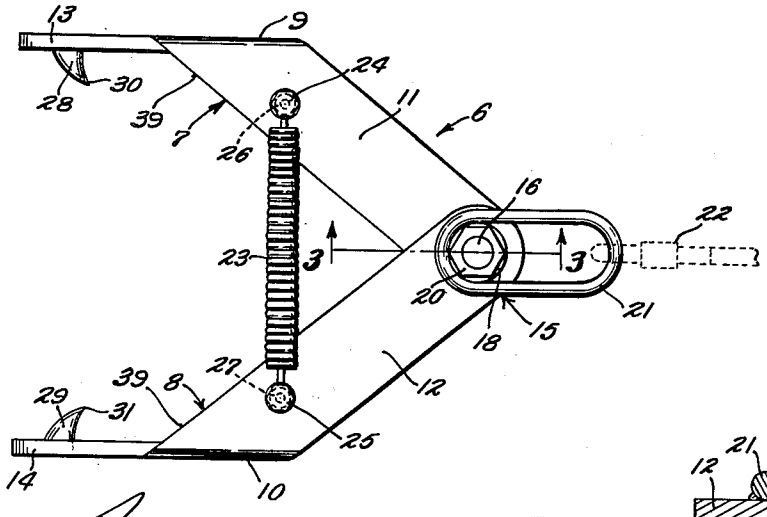


Fig. 1

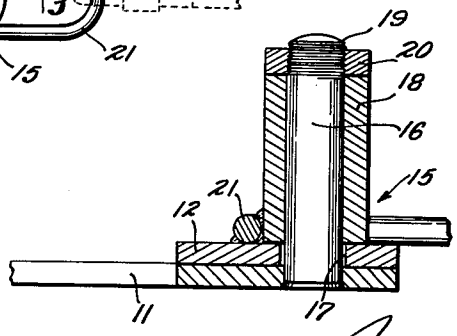


Fig. 3

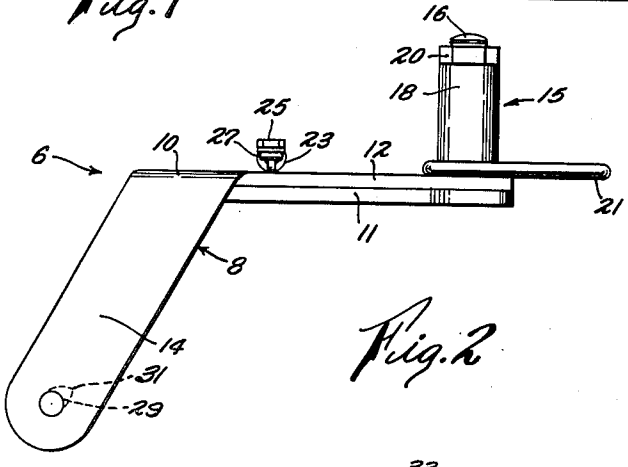


Fig. 2

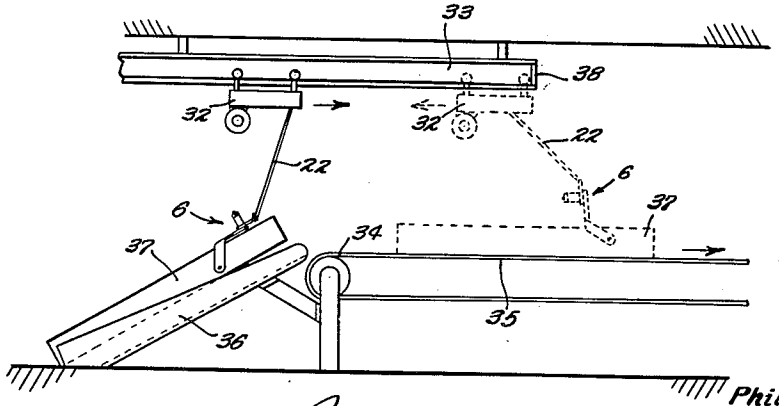


Fig. 4

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GRAPPLING DEVICE

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5 Claims. (Cl. 294—106)

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This invention relates to grappling devices and is particularly directed to a self-releasing grappler that may advantageously be used with a reciprocating, overhead conveyor for moving heavy articles, such as railroad ties, timbers, or the like.

The principal object of this invention is to provide a grappler which has a pair of self-releasing jaw members that operate at right angles to, and below, the draft line for the article being moved thereby; the clamping action for the grappler being supplied by a contraction spring secured to and extending between said members.

Another object of the invention is to provide a grappler of the character described that has a jaw member formed to provide an article-to-member fulcrum point around which the jaw members may be pivoted to release them from the object, when a pull is exerted on the draft line in a direction opposed to the draft movement.

A further object of the invention is to provide a grappler which may be quickly applied to an object to be lifted and which is simple in construction and is strong and durable in use.

With these and other objects in view the invention consists in the novel combination of parts specifically set forth in the following specification and in the appended claims, reference being had to the accompanying drawings, wherein:

Fig. 1 is a top plan view of the grappling device.

Fig. 2 is a side elevation of the device illustrated in Fig. 1.

Fig. 3 is an enlarged section taken on line 3—3 of Fig. 1.

Fig. 4 is a diagrammatic view of a railroad tie conveying mechanism with my grappling device associated therewith.

With reference to the drawings my grappling device 6 comprises a pair of jaw members 7 and 8 constructed from long, stout metal plates which have diagonal bends 9 and 10 respectively formed intermediate their ends that provide flat arm portions 11 and 12 and substantially parallel side portions 13 and 14 respectively for the jaws. The flat arms are pivotally connected at 15 in face-to-face relationship at their forwardly disposed common ends, and, as most clearly illustrated in Fig. 3, a relatively long shaft 16 is fixed at its lower end to the arm 11 of jaw member 7 by welding, or the like, and extends at right angles therefrom to pass through an aligned opening 17 formed through the flat arm 12 of the jaw member 8. A sleeve 18 is fixed to the arm 12 for the reception of the shaft 16, the upper end of the shaft being threaded at 19 for cooperation with

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a nut 20, the latter of which bears against the upper end of the sleeve 18. The purpose of the long shaft 16 and the cooperating sleeve is to provide good bearing surfaces between the pivoted arms 11 and 12 of the grapple. The long shaft also serves as a convenient handle when applying the grapple to an object to be moved thereby.

The rear portion of an eye-link 21 encircles the sleeve 18 and preferably forms a part of the welded connection between the sleeve and the arm 12 in that one end of the link bears against and is welded to the arm and is also welded to the base of the sleeve. The end of a draft line 22 is threaded through and secured to the forward end of the eye-link by a suitable draft line connection.

A spring 23 extends between and is connected at its ends to the arms 11 and 12 of the jaw members and to this end bolts 24 and 25 are threaded in the upper faces of the arms and are each encircled by a ring or eye 26 and 27 formed on the ends of the spring 23. As illustrated in Fig. 1, the coils of this spring are normally in surface contact and maintain the jaw members at predetermined, spaced apart minimum distances. When the jaws are rotated away from each other around their common pivot, the spring is placed in tension which tends to urge the jaw members together toward clamping condition with an object positioned between the side portions 13 and 14 thereof.

The diagonal bends 9 and 10 in the jaw members 7 and 8 respectively are opposite each other and are substantially parallel so that the downturned sides 13 and 14 of the jaw members are in laterally spaced parallelism and at right angles to their respective arms 11 and 12. The lower ends of the sides 13 and 14 for the jaw members 7 and 8 are each provided with a spur or pointed prong 28—29 respectively which extends inwardly from the adjacent faces of said sides, and, as most clearly illustrated in Fig. 3, have their pointed ends 30 and 31 aimed in the general direction of the common pivot means for the jaw members.

The operation of my grappling device will be described in connection with a railroad tie conveying mechanism and it will be noted, with reference to Fig 4., that the grapple 6 is secured to the end of the draft line 22 which in turn is secured to a carriage 32 mounted for reciprocating movement on an overhead track 33. The track terminates above the receiving end 34 of an endless belt conveyor 35 which has a suitable,

inclined guide plate 36 positioned in front of the receiving end and in the path of a railroad tie 37 carried by the conveyor. It will be noted that my grappling device maintains the railroad tie in a predetermined position with the grappler straddling the uppermost portion of the forward end of the tie. This position is maintained because the draft line connection is located above and forwardly of the clamping device whilst the tie engaging spurs on the clamp jaw members have their tie entering points directed toward the clamp line connection and are spaced below and rearwardly of said draft line connection; said spurs being spring urged into the tie at right angles to the line of draft. The grappling device therefore deposits the tie upon the conveyor belt 35 in a position with its axis extending in the direction of travel of said belt, the device upon the uppermost surface of the tie, and the spur carrying side members 13 and 14 of the device straddling the sides of the tie. The forward speed of the belt 35 is preferably somewhat greater than the speed of the overhead carriage 32 whereby the speed differential in effect reverses the draft direction of the line 22 relative to the tie. As the carriage reaches a stop 38 on the track its movement and the actual movement of the draft line are fully reversed whilst the tie moves forwardly on the conveyor 35.

With reference to Fig. 4 it will be noted that when the draft line 22 becomes taut in the reverse direction, it will initially cause pivotal movement of the grapple around the spurs 28 and 29 whereby the forward portions of the arms 11—12 of the grapple move upwardly away from the tie at a greater rate than their rear trailing portions. This initial movement causes the trailing, inner edge portions 39—39 of the arms 11 and 12 to come in contact with the subjacent, marginal portions of the tie so that transversely aligned fulcrums are established between the grapple and tie around which the grapple rotates during its final releasing movement. Generally the initial pivotal movement of the grapple relative to the tie carries through approximately 15° before contact is made between the tie and the grapple arms at fulcrum points 39—39. Upon contact and further movement of the arms by the line toward the trailing end of the tie the sides 13—14 of the grapple are rotated counterclockwise (Figs. 2 and 4) around the points 39—39 thereby sliding the spurs upwardly in an arcuate path along the respective sides of the tie until they move beyond the upper edge of said sides and are disengaged therefrom whereupon the tie is released from the jaws of the grapple and is free to move upon the endless conveyor to its destination whilst the draft carriage returns in an opposite direction to pick up the next tie. The final rotational movement of the grapple around the points 39—39 is generally accomplished within a 70° arc whereby the entire release action of the grapple requires an upset movement of the arms 11—12 through approximately 85°.

It will be particularly noted with respect to the gripping and release functions of the grapple that the spurs 28 and 29 are directed inwardly from the respective sides of the grapple jaws 13 and 14 and that the spur points are aimed in the direction of the jaw pivot to which is also secured the grapple draft line connection. Also the spring 23 serves to initially position the grapple on the object to be lifted thereby and to some extent urges the points of the spurs into the body of the object. The pull exerted on the draft line accounts for the positive gripping action of the jaws in that the forward pull on the grapple causes the spurs to be forced into the body of the tie to a depth directly proportional to the pulling force exerted on the draft line. Upon final release movement of the grapple its rotation on the tie around the points 39—39 causes the spurs to move in an arcuate, transverse path with respect to the gripping direction of the spurred jaws whereby the spurs are readily disengaged from the tie body and move upwardly along the sides of the tie to disengaged positions beyond the upper surface of the tie.

What is claimed is:

1. A grappling device comprising a pair of jaw members, pivot means for connecting common ends of the jaw members, a draft line connection at the pivot means, each of said jaw members being in the form of a long plate having the outer portion turned downwardly on a diagonal bend line to a position substantially normal to its inner pivoted portion, spurs mounted on the ends of the downturned portions and extending inwardly from the adjacent faces thereof and having their pointed ends aimed in the general direction of the pivot means, and a spring extending between and having its ends fastened to the pivoted jaw portions.

2. A grappling device comprising a pair of jaw members, pivot means for connecting common ends of the jaw members, a draft line connection at the pivot means, each of said jaw members being in the form of a long plate having the outer portion bent on a diagonal line to a position substantially normal to the inner pivoted portion, spurs mounted on the ends of the downturned portions and extending inwardly from the adjacent faces thereof and having their pointed ends aimed in the general direction of the pivot means, a spring extending between, and having its ends fastened to each of the inner pivoted jaw portions, and said pivot means comprising a relatively long shaft fixed at its end to one jaw member and extending at right angles therefrom and passing through a hole formed in the other jaw member, a sleeve fixed at its end to the said jaw member for the reception of the shaft, and a nut threaded upon the shaft, and bearing against the sleeve.

3. A grappling device comprising a pair of jaw members pivotally connected at common ends and each in the form of a long plate having a diagonal, intermediate bend therein to provide a pair of spaced side members for the device, a prong extending inwardly from the adjacent face of each of the side members, and directed toward the locus of the pivotal connection for the jaw members, a draft line connection adjacent the pivotal connection of the jaw members, and resilient means operable at right angles to the line of draft for urging the jaw members together.

4. A grappling device comprising a pair of jaw members, pivot means connecting the members at their forward ends, said jaw members having arms diverging rearwardly from the pivot means and each having a downturned side member formed at the free end thereof, a prong extending inwardly from the adjacent face of each side member, and directed toward the locus of the pivot means for the jaw members, a draft connection for the jaw members connected to the device adjacent the pivot means, and a resilient

means connecting the jaw members for urging the jaw members together.

5. A grapple comprising two members pivotally joined in face-to-face relation and having terminal portions which are in confronting relation, each member being offset intermediate the pivot end of the terminal whereby when the pivot ends of the members are adjacent the surface of an object to be moved, the said terminals lie alongside the side faces of such object, each terminal having a spur thereon that points in the general direction of the pivot and also toward the spur on the other member whereby the spurs have a ratchet-like engagement with the object so that the spurs will grip the object when the grapple is pulled forwardly and be released from

said object when the grapple is rotated relatively to the object, and means for attaching a drag line to the grapple adjacent said pivot.

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