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2,679,430

SELF-DISENGAGING CLAMPING DEVICE

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FIG. 1.

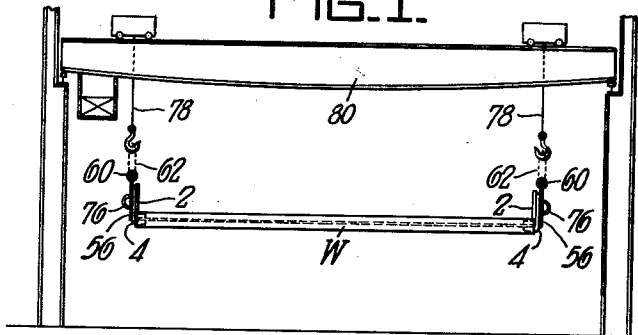


FIG. 5.

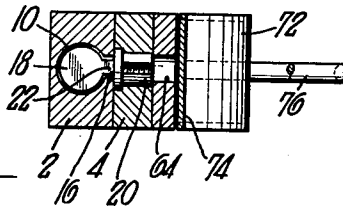


FIG. 2.

FIG. 3.

FIG. 4.

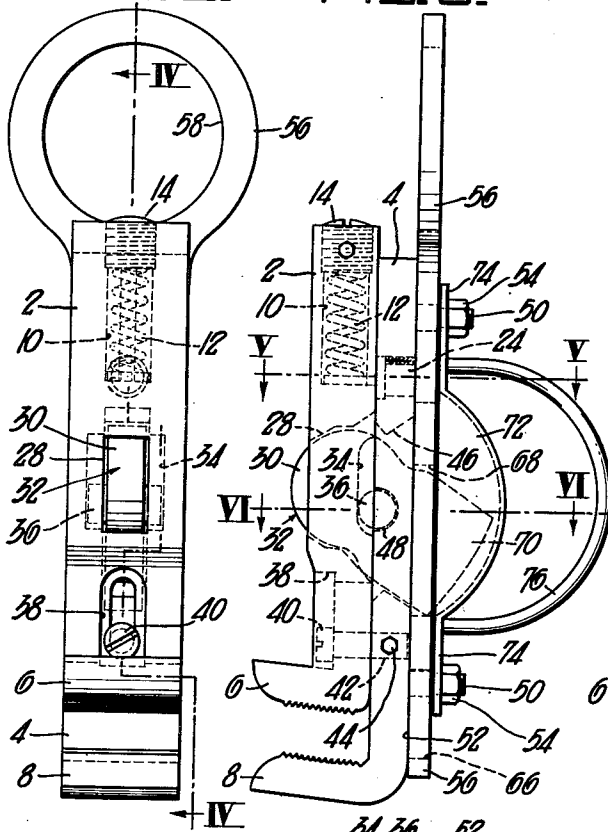
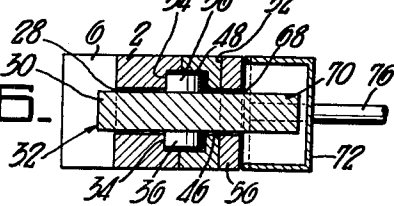


FIG. 6.



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SELF-DISENGAGING CLAMPING DEVICE

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3 Claims. (Cl. 294-103)

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The present invention relates to a self-disengaging clamping device for supporting elongated articles while being handled by an overhead crane.

Products common to a structural mill, such as beams, channels, angles, etc. are delivered from the rolling mill to presses for straightening, then to saws for cutting to desired lengths, and finally from the saws to the shipping yard where they are stored or loaded in railroad cars for shipment. The structural pieces are each handled individually during their movement after rolling.

Up to the time of my invention these elongated pieces were handled by a two-trolley crane having a chain sling and an L-shaped hook suspended from the ends of each trolley. This method of handling was hazardous to the workmen in the area because of the ever-present danger of the hooks pulling out and dropping the load. The operation became especially hazardous when lighter pieces were being handled due to the "whipping action" caused by the movement of the crane. If the load bumped into an obstacle in transit, one or both of the hooks would become disengaged and cause the load to drop.

It is accordingly an object of my invention to provide a lifting clamp that will securely grip the articles being handled.

Another object of my invention is to provide a lifting clamp whose grip action increases as the weight of the load increases.

A further object of my invention is to provide a lifting clamp that will automatically disengage from the load when it is lowered at its destination.

A still further object of my invention is to provide a self-disengaging lifting clamp which is rugged in construction, easily and inexpensively maintained, light in weight, and is constructed with a minimum number of moving parts.

These and other objects will become more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a side elevation of a crane shown lifting a structural beam with clamping device of my invention;

Figure 2 is a front elevation;

Figure 3 is a side elevation;

Figure 4 is a vertical sectional view taken on the line IV-IV of Figure 2;

Figure 5 is a cross sectional view taken on the line V-V of Figure 3; and

Figure 6 is a cross sectional view taken on the line VI-VI of Figure 3.

Referring more particularly to the drawings,

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reference numeral 2 indicates an upper, movable clamp member slidably mounted on a lower, relatively stationary clamp 4. The clamps are provided with serrated coacting jaw portions 6 and 8, respectively, which extend laterally from the bottoms thereof. Movable clamp 2 includes a vertical, bored portion 10 in which is contained a spiral compression spring 12. Cylinder 10 is internally threaded at its upper end to accommodate a set screw 14 which holds the spring 12 in place. A vertical slot 16 is provided through the wall of the cylindrical portion 10 for receiving the flattened disc end 18 of a guide pin 20. In assembly, the guide pin 20 is turned so that the disc 18 is in vertical upright position and can be inserted through the slot 16 into the cylinder 10. When the disc 18 is in the cylinder, it is returned to horizontal position to lock the pin in position and also serve as a bearing surface for the spring 12. The neck portion 22 of the pin fits slidably in the slot 16 and acts as a guide up and down the vertical slot 16 with the disc 18 compressing and releasing spring 16 as the jaws close and open. The cylindrical end 24 of the pin is held in place in an opening in the lower clamp 4 by a locking screw 26.

An elongated opening 28 is provided through the central portion of the upper clamp 2 for receiving the rounded, cam-like end 30 of a lever member 32. The contour of the opening 28 follows the shape of the end 30 and provides bearing surfaces therefor. A grooved track 34 which extends normal to the opening is provided therein to limit the travel of the trunnions 36 of the lever member 32.

A vertically elongated opening 38 extends through the lower portion of the clamp 2 just above the jaw 6 to accommodate the head of a bolt 40 which passes therethrough. Bolt 40 is threaded into an opening 42 in the clamp 4 and locked therein by a set screw 44. The bolt-head together with the pin 20 serves to hold the two clamp members together while the vertical opening 38 and the slot 16 permit relative vertical movement therebetween as the jaws are opened and closed.

A centrally located, elongated opening 46 is provided in the lower stationary clamp 4 for accommodating the midportion of the lever 32. A semi-circular groove 48 within the opening 46 serves as a bearing mounting for the axle 36 of the lever 32.

Two stud bolts 50 are integrally attached to clamp 4 extending at right angles to the back face 52 thereof, one adjacent the top and the

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other near the bottom. The stud bolts 50 together with nuts 54 hold a suspension bar 56 in slidable engagement with clamp 4. An eye 58 is provided at the upper portion of the bar 56 for engaging a link member 60 through which a sling chain 62 can be threaded, as best seen in Figure 1. Two elongated slots 64 and 66 through the bar 56 accommodate the upper and lower stud bolts 50. Another elongated slot 68 is centrally located between the slots 64 and 66 to accommodate the rectangular rearward end 70 of the lever 32 and provide bearing surfaces for the same. End 70 of the lever projects outwardly from the slot 68 and is protected by a cover 72 which is provided with an arcuate center portion to permit free rotation of the lever 32 and two flattened end portions 74 having holes there-through through which stud bolts 50 are inserted. The cover is held in position by the nuts 54.

An arcuately shaped handle 76 may be attached to the cover 72 for guiding the device when it is being attached to the end of an object to be handled.

In operation, the lifting clamp of my invention is suspended from each trolley 78 of a two-trolley crane 80 by means of the sling chain 62 which is threaded through the link member 60 which is attached to the eye 58 of each of the suspension bars 56. The article to be handled, such as an H beam W is placed between the jaws 6 and 8 of each lifting device. As the crane starts to lift, the suspension bar 56 is moved upward causing the lever 32 to rotate on its axle 36 in a counterclockwise direction thus forcing the cam end 30 of the lever, which is held within the elongated opening 28, to push the upper clamp 2 down on the end of the beam W and grip it firmly between the two jaws 6 and 8. At the same time while the guide pin 20 is rigidly held within the threaded opening 26 of the lower clamp 10, the disc 18 is forced upward in the cylinder 10, the neck portion 22 of the pin 20 riding in the slot 16, thereby compressing the spring 12. Thus the heavier the article being handled the greater the gripping action of my lifting device. When the load is lowered at its destination, spring 12 is released forcing the disc 18 to the bottom of the cylinder 10, causing the lever 32 to rotate clockwise, which immediately raises the movable upper clamp 2, thus opening the jaws 6 and 8 and, on a slight movement of the crane trolleys away from each other, releasing the load as the clamps fall free of the beam W.

While one embodiment of my invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. A lifting clamp comprising a suspension bar, a clamp member slidable thereon, a second clamp member slidable on said first mentioned clamp

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member, mounting means connecting said bar and said first clamp member together in slidable relation, second mounting means connecting said first clamp member and said second clamp member together in slidable relation, said members having coacting jaws extending laterally from one end thereof, respectively, and a lever pivoted on said first mentioned clamp member, a compression spring encased in one of said clamp members, bearing means abutting one end of said spring rigidly attached to and projecting from the other of said clamp members whereby said spring is compressed when a load is lifted by said clamp and said spring decompresses and moves said second clamp member relative to said first clamp member to open said jaws when the weight of a load is removed from said clamp, said bar and said second mentioned clamp member having spaced opposed bearing surfaces adapted to be engaged by said lever to move the jaw of said second clamp member toward the jaw of said first clamp member.

2. A lifting clamp as defined in claim 1 characterized by said suspension bar and said second mentioned clamp member having openings there-through the opposite sides of which form bearing surfaces for said lever.

3. A lifting clamp comprising a suspension bar, a clamp member slidable thereon, a second clamp member slidable on said first mentioned clamp member, mounting means connecting said bar and said first clamp member together in slidable relation, second mounting means connecting said first clamp member and said second clamp member together in slidable relation, a compression spring encased in an opening in said second mentioned clamp member, the wall of said second mentioned clamp member having a longitudinal slot therein adjacent said spring, a guide pin fixedly mounted on said first mentioned clamp member and extending therefrom through said slot into said second mentioned clamp member to form a bearing surface for one end of said spring, said members having coacting jaws extending laterally from one end thereof, respectively, and a lever pivoted on said first mentioned clamp member, said bar and said second mentioned clamp member having spaced opposed bearing surfaces adapted to be engaged by said lever to move the jaw of said second clamp member toward the jaw of said first clamp member.

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