COIL PICKUP DEVICE

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ABSTRACT

A device for picking up an annular object or article such as a coil or wire or sheet metal and enabling the tipping of the annular article from its side to an upstanding orientation with the axis of the annular article being substantially horizontal. The device includes an L-shaped member having a support surface for engaging an inner circumference of the annular article with one end of the member being connected to a flexible belt or chain which extends over a pulley and is attached to a yoke which is detachably secured to the other end of the member.

11 Claims, 4 Drawing Figures
BACKGROUND OF THE INVENTION

The present invention is directed to a coil pickup device and particularly a device enabling the shifting of the orientation of the coil during lifting and lowering.

In many manufacturing facilities, coils of wire or coiled sheet metal are stored with the axis of the coil being in a vertical orientation. Since most of these coils are placed on unwinding devices and will enable the axis of the coil to shift between vertical and horizontal orientations during raising and lowering of the coil.

The present invention is directed to a coil pickup device which is attached to an annular article or object such as a coil of wire or sheet metal and enables the shifting of the orientation of the axis of the coil while being raised or lowered. The preferred embodiment, a member having a support surface and a shoulder for engaging the coil is connected to a flexible member passing over a pulley and terminating at the other end with a yoke which is detachably connected to the member. Accordingly, it is an object of the present invention to provide a device for handling annular articles which can engage the annular article disposed in any orientation.

Another object of the present invention is to provide a device for handling annular articles which enable the article in any position and will enable the axis of the article to shift between vertical and horizontal orientations during raising and lowering of the article.

Other objects, features and advantages of the invention will be readily apparent from the following description of the preferred embodiment thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

SUMMARY OF THE INVENTION

The present invention is directed to a coil pickup device which is attached to an annular article or object such as a coil of wire or metal strips and enables the shifting of the orientation of the axis of the coil while being raised or lowered. The preferred embodiment, a member having a support surface and a shoulder for engaging the coil is connected to a flexible member passing over a pulley and terminating at the other end with a yoke which is detachably connected to the member. Accordingly, it is an object of the present invention to provide a device for handling annular articles which can engage the annular article disposed in any orientation.

Another object of the present invention is to provide a device for handling annular articles which enable the article to shift between vertical and horizontal orientations during raising and lowering of the article.

The principles of the present invention are particularly useful in a pickup device generally indicated at 10 in FIG. 1 for handling an annular article generally indicated at 11 which is illustrated as a coil of sheet metal. Although the device is illustrated lifting a coil of sheet metal, the device 10 has utility in lifting coils of wire or other annular articles such as large annular rings.

The device 10 is formed of a body member 12, a yoke 13, flexible means 14 and a pulley means 15. The flexible means 14, which can be either a web or strip of any flexible material or a chain-type belt, is threaded over a roller 16 of the pulley means 15 and has one end 17 connected by a pivotal connection to the body member 12 and the other end 18 rotatably connected to the yoke 13. The pulley means 15 has a housing 19 for rotatably supporting the roller 16 and the housing has means, such as an aperture 20, for connecting to a lifting hook 21 of a lifting device such as an overhead crane.

The body member 12 has a flat L-shape configuration with a short leg or portion 22 and a long leg or major portion 23. For supporting the inner circumferential surface of the coil 11, the long leg 23 has a support surface 24 which terminates at one end in an upward shoulder 25 formed by the short leg 22. The short leg 22 is provided with an aperture 26 which is oblong and receives a clevis 27 which is connected by a connecting pin 28 to the one end 17 of the flexible means 14 to form the pivotal connection. On a surface 29, which is opposite the support surface 24, the major portion or long leg 23 is provided with a plurality of spaced slots 30 which are inclined to the surface 29 at an angle of approximately 60°. The slots receive a pin 31 of the yoke member 13 to detachably interconnect the yoke member 13 to the body member 12. As best illustrated in FIG. 3, the end of the major portion 23 of the body member 12 is provided with a handle formed by an aperture 32 having an oblong configuration.

The yoke 13, as best illustrated in FIG. 4, is formed of a pair of metal members 33,33. Each of the metal members 33,33 has a first portion 34 and an offset second portion 36, which is connected to the first portion by the intermediate portion 38. The two metal members 33,33 are assembled together with three pins which are the pins 31, a second pin 40 and third pin 41. To maintain the desired spacing between the member 33,33, the pins 31,40 and 41 are provided with spacers which are either integral or separate and to hold the yoke together the ends of the pins 31, 40 and 41 are provided with nuts which receive the nuts. As assembled, the first portions 34,34 are spaced apart by the pins 31 and 40 to form a rectangular shaped aperture 42 which telescopically receives the major portion 23 of the body member 12 during formation of the detachable connection. The second portions 36,36 are spaced apart in the assembled yoke 13 and are interconnected by the pin 41 which receives a hag 44 of the other end 18 of the flexible means 14.

To form a connection between the body member 12 and the yoke 13, the yoke is telescopically disposed over the major portion 23 and the pin 31 is placed in one of the slots 30 which enables adjustment in the connection of the yoke 13 and body member 12 to provide the necessary distance between the shoulder 25 and the yoke 13 for the width of the coil 11. With the pin 31 received in the slot 30, the distance between the pin 40 and the support surface 24 is of a sufficient amount to allow the yoke 13 to pivot on the pin 31 through an angle of approximately 90° or to pivot approximately 45° from the vertical position illustrated in FIG. 3. The pin 40 prevents further pivoting and as described hereinafter acts as a safety means to prevent disengagement of the pin 31 from the slot 30.

As illustrated in FIG. 2, a coil is usually stored on one of its sides 48 or 49 so that the axis of the coil is in a vertical orientation. To provide a space between the side 48 of the coil and a storage surface 50, which may be a floor, another coil or a pallet, the coil is usually laid on a spacer such as a board 51.

To lift and turn a coil stored on its side, the body member 12 of the device 10 is inserted between the coil 11 and storage surface 50 and positioned with the shoulder 25 engaging the side 48 of the coil and the support surface 24 engaging the inner circumferential surface of the coil. The yoke is then telescopically received on the major portion 23 and moved toward the side 49 of the coil and the pin 31 of the yoke 13 is inserted in one of the slots 30 which is selected to form the detachable connection with the necessary space between the yoke 13 and the shoulder 25. As assembled on the coil, the flexible means 14 is shifted on the roller 16 to have a long leg 14a extending to the body member 12 and a short leg 14b extending to the yoke 13.

During the lifting the coil or coil 11 will pivot on a point of contact 53 with the spacer 51 or floor 50 which point of contact is diametrically opposite from the point of engagement of the device 10. During the pivoting, the roller 16 rotates to allow changes in the lengths of the legs 14a and 14b as the coil is unspended with its axis being eventually moved or shifted to a substantially horizontal position. When in the upright position, the legs 14a and 14b will be substantially equal as illustrated in FIG. 1.
During lifting of a coil disposed on its side such as 48, the position of the yoke 13 is such that the lifting force applied thereto will tend to rotate the body portion 12 which helps start the rotation of the roller 16. As the roller rotates to equalize the lengths of the legs 14a and 14b, the yoke will pivot to the vertical position as illustrated in FIG. 3.

After lifting the coil 11, it can be placed on a coil handling device or on a unreeeling machine and then after the weight is taken off of the flexible means 14, the yoke can be disconnected from the body portion 12 by removing the pin 31 from the slot 30 and then shifting the yoke off of the leg 23. As mentioned above, the pin 40 is a safety device which prevents the yoke 13 from pivoting in the slot 30 to such an extent that the pin 31 might become disengaged with the slot 30 if the points of lifting were offset to one side by too great a distance.

The lifting or pick up device 10 can also be used for putting coils in a stacked or stored position resting on one of their sides. When using the device 10 to store coils, the coil is lowered until it makes contact with the supporting surface or spacers. Then the axis of the coil is shifted from the horizontal orientation to the vertical orientation with the flexible means 14 moving on the roller 16 to vary the lengths of the legs 14a and 14b. When the coil 11 is resting on its side such as 48, the yoke 13 is removed and then the body member is withdrawn.

Although minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted heron all such modifications as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A device for picking up and turning an annular object such as a coil of material comprising:
a pulley means having means for connecting the device to a lifting apparatus;
a body member having a support surface for receiving an inside circumferential surface of the annular object, said support surface terminating adjacent one end of the body member and an upstanding shoulder for engaging a side surface of the annular object;
flexible means received on said pulley means having one end connected to the body member adjacent the shoulder by a connection enabling rotational movement therebetween, said flexible means suspending the body member from the pulley means; and
a yoke member rotatably connected to the other end of the flexible means and having means cooperative with means on the body member for detachably interconnecting the yoke to the body member with a connection enabling limited rotation therebetween so that when the device is placed on an annular object with the body member engaging the inner circumferential surface thereof, the movement of the connections and the pulley means enables movement in the flexible means as the axis of the annular object shifts between a vertical and horizontal orientation during lifting and lowering thereof.

2. A device according to claim 1, wherein the connection between the body member and the yoke member comprises a pin on the yoke member received in a slot in the body member.

3. A device according to claim 2, wherein the body member is provided with a plurality of slots spaced therealong with each of the slots being adapted to receive the pin of the yoke member enabling the formation of the connection at various predetermined distances from the shoulder of the body member so that the point of connection between the yoke and body member can be adjusted to handle annular objects having different axial widths.

4. A device according to claim 2, wherein the yoke member includes means limiting the arc of rotation between the yoke and body member while connected together by the connection so that the pin of the yoke member will not accidentally be removed from the slot of the body member during handling of an annular object.

5. A device according to claim 1, wherein said body member is a flat L-shaped member with a short leg and major portion, said short leg forming the shoulder adjacent the support surface which is a surface of the major portion.

6. A device according to claim 5, wherein the connection between the one end of the strap means and the body member is formed by a clevis received in an oblong aperture formed in the short leg of the body member.

7. A device for picking up and turning an annular object such as a coil of material comprising:
a flat body member having an L-shape with a short leg and a major portion, said short leg forming an upstanding shoulder for an article support surface of the major portion, said major portion having at least one slot formed along an edge opposite to the article support surface,
pulley means having a roller and means for supporting the device from a lifting device;
flexible means having one end rotatably connected to the short leg of the body member with the connection enabling rotation therebetween, said flexible means being threadable through the pulley means for suspending the body member from the pulley means; and
a yoke member connected to the other end of the flexible means with a connection enabling rotation therebetween, said yoke member having an aperture for telescopically receiving the other end of the major portion, said yoke member having a pin member adjacent the aperture for being received in the slot to form a detachable connection allowing relative rotation between the yoke and body member so that while an annular object is being moved by the pickup device, the connections and the pulley means enable movement of the flexible means as the axis of the annular object shifts between vertical and horizontal orientation.

8. A device according to claim 7, wherein the slot in the body member extends in from the edge of the body member at an angle of less than 90° to the article support surface.

9. A device according to claim 8, wherein said angle is approximately 60°.

10. A device of claim 7, wherein the aperture of the yoke member is defined by a pair of side members spaced apart by a pair of spaced pins, one of said pair of spaced pins being the pin received in the slot to form the detachable connection and the other pin engageable with the article support surface of the body member to limit the angle of relative movement between the yoke and body member.

11. A device according to claim 7, wherein the body member has a plurality of slots spaced along the major portion, and the pin of the yoke member is selectively engaged in the slot, which slot provides the necessary distance between the shoulder and the yoke member to receive the particular annular article.

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