United States Patent

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[33] Canada
[31] 040,652

[54] MAGNET SPREADER BAR
4 Claims, 4 Drawing Figs.

[52] U.S. Cl. 294/65.5, 294/81
[51] Int. Cl. B66c 1/04, E21b 31/06
[50] Field of Search ..... 294/65.5, 65, 67.1, 81, 81 SF, 67 DC

[56] References Cited

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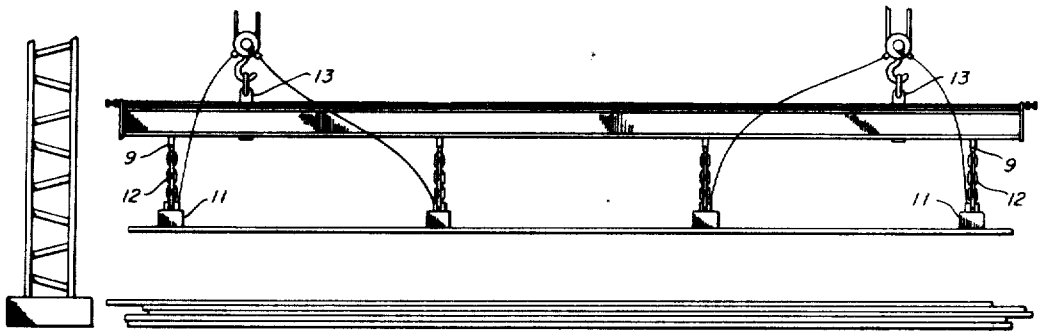
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Primary Examiner—Evon C. Blunk
Assistant Examiner—Douglas D. Watts
Attorney—Fetherstonhaugh & Co.

ABSTRACT: An electromagnet carrier for use in lifting elongated metallic objects in which the long axes of the magnets may be oriented to be at right angles to the axis of the plate when elongated steel plates are raised and the long axis of the magnets may be rotated to be parallel with the long axis of the article when lifting long narrow flexible items. Movement of the magnets is accomplished by bringing a long rod associated with the magnet into contact with the gantry column of the crane causing the magnets to rotate to the desired position.



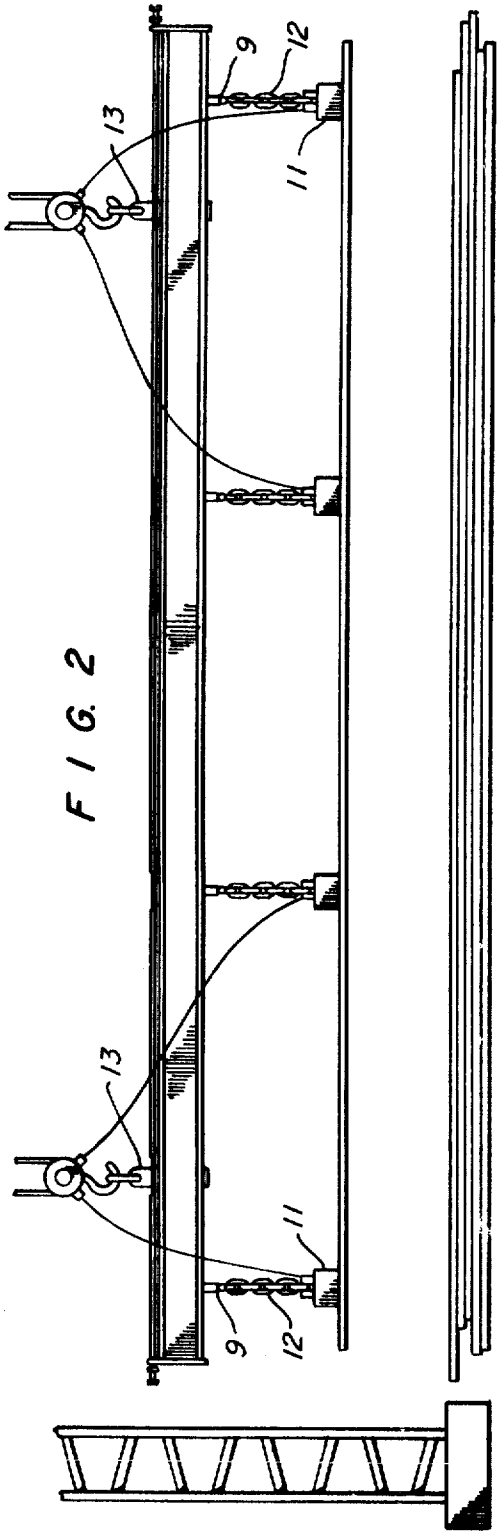


FIG. 2

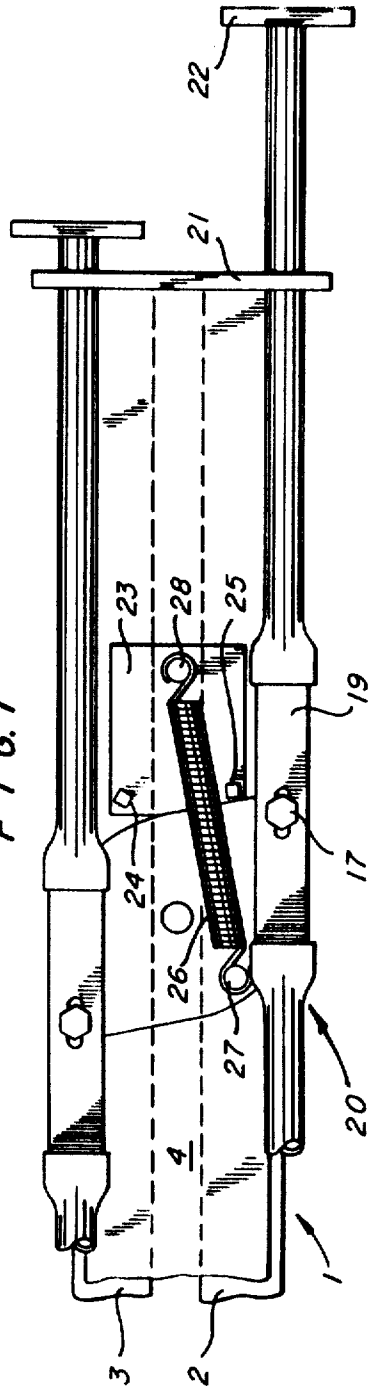


FIG. 1

FIG. 3

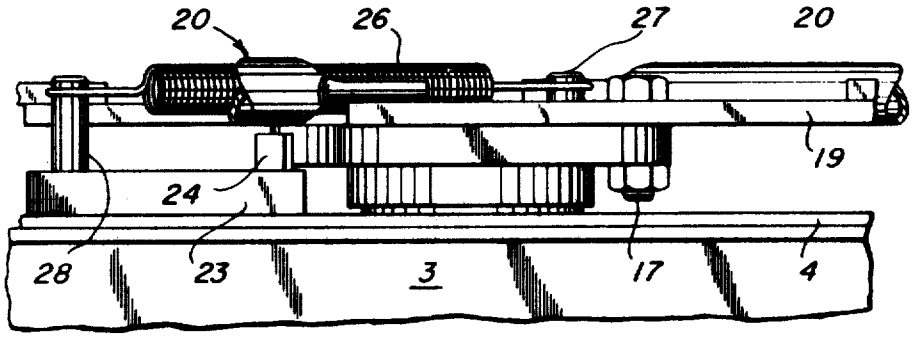
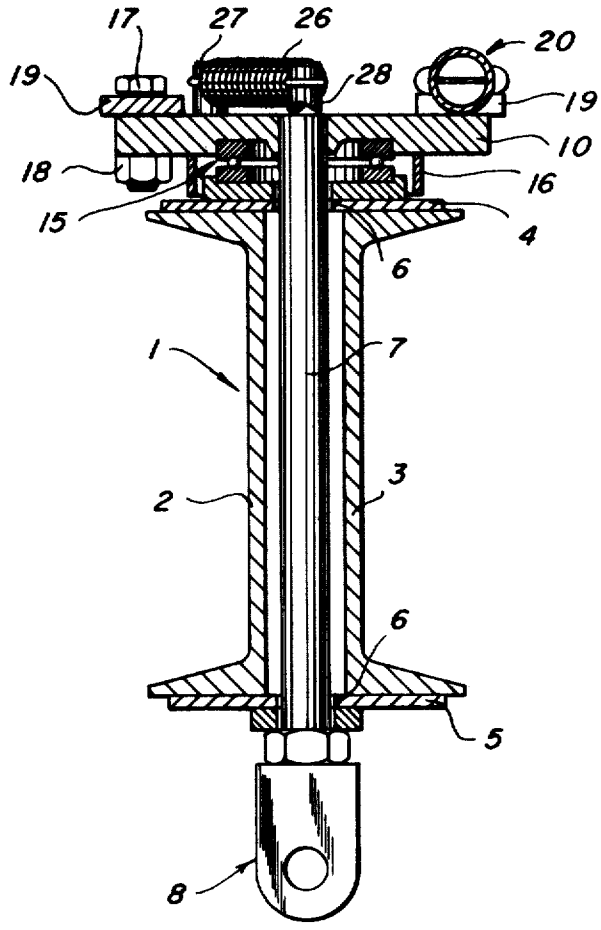

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FIG. 4


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MAGNET SPREADER BAR

BACKGROUND OF THE INVENTION

Electromagnet carrier arrangements are known in which a plurality of rectangular electromagnets are carried on a carrier beam in longitudinally spaced relationship. When lifting elongated steel plate by means of such an arrangement, the long axes of the magnets must be oriented to be at right angles to the long axis of the plate, otherwise the plate will peel off the magnets and be dropped. On the other hand, when lifting a long, narrow, flexible article, the long axes of the magnets must be oriented to be parallel with the long axis of the element. In other works, it is desirable to be able to pivot the magnets through an angle of 90° and hold them in either of the two positions mentioned, otherwise two separate arrangements are necessary. It has already been proposed to pivot the magnets by using a power unit installed on the beam but this entails the additional expense of the power unit itself, the power unit control, additional cables to supply power and additional cable takeup reels. It is an object of the present invention to provide a simple mechanical arrangement for altering the orientation of the magnets, using only the power already available, i.e., the power of the crane on which the magnets are mounted.

GENERAL DESCRIPTION OF THE INVENTION

Basically the invention comprises an electromagnet carrier arrangement comprising a beam, a plurality of magnet-carrying members extending vertically through aperture means in said beam, a plurality of plates mounted one on top of each of said members, bar means extending beyond the ends of said beam, means connecting said bar means eccentrically and pivotally to each of said plates whereby longitudinal movement of said bar means will effect pivotal movement of said plates and magnet-carrying members about the axes of said members, and stop means for limiting the pivotal movement of said plates.

It is preferred that the pivotal movement of the plates is limited to 90° and that the arrangement includes spring means attached to the plates to hold them resiliently against the stop means.

SUMMARY OF THE DRAWINGS

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view showing the arrangement in use for lifting a plate;

FIG. 2 is a plan view of one end of the arrangement;

FIG. 3 is a fragmentary side view of the arrangement; and

FIG. 4 is a transverse sectional view showing the internal construction of the arrangement.

DETAILED DESCRIPTION OF THE INVENTION WITH REFERENCE TO THE DRAWINGS

The illustrated arrangement comprises a beam **1** made up of two spaced channel girders **2** and **3** held in spaced relation by upper and lower plates **4** and **5** welded thereto and having apertures **6** therein at spaced intervals to permit passage through the beam of rods **7** of the magnet-carrying members **8**. The members **8** carry ring shackles **9** at their lower ends and are welded to plates **10** at their upper ends. Magnets **11** are suspended from rings **9** by means of chains **12**. The entire arrangement is carried by a crane (not shown) by conventional means including brackets **13** secured to the beam **1** and block and tackle assemblies **14**.

The plates **10** rest rotatably on the beam **1** via bearings **15** surrounded by skirts **16** which depend from the plates to protect the bearings. The plates, as shown, are substantially lozenge shaped and have apertures at their ends to receive bolts **17** which, in combination with nuts **18**, serve to pivotally secure flat bar sections **19** of rods **20** to the plates. The rods **20** extend beyond upstanding brackets **21**, secured to the ends of beam **1**, and terminate in cylindrical bumper discs **22**.

Rectangular plates **23** are secured to the top of beam **1** adjacent plates **10** and are provided with stops **24** and **25** which serve to limit pivotal movement of plates 10° to 90°. A plurality of springs **26** are provided, each of which extends between an upstanding pin **27** on a plate **10** and a like pin **28** on a plate **23**, pin **28** being arranged medially of the beam **1** and pin **27** being arranged midway between the ends of plate **10** and on the side thereof remote from plate **23** so that the spring will urge the plate against either stop **24** or stop **25** when it is moved over dead center.

In operation, if the crane operator has to switch from lifting plates to lifting long narrow articles, he must obviously change each of the magnets from the position shown in FIG. **1** to a position at right angles thereto. To achieve this he simply manipulates the crane controls to bring one of the outer bumpers **22** against a gantry column, such as that shown at **29** in FIG. **2**, to move the associated rod **20** longitudinally relative to the beam **1**, this, of course, causing the plates **10** and magnet-carrying members **8** to rotate about the axes of the members **8**. Once the plates have been rotates past dead center the springs **26** will take over and bring the plates against the stops **24** and resiliently hold them there, thus holding the magnets with their longitudinal axes parallel with the longitudinal axis of the beam **1**. Of course, if the operator then has to switch to handling plates again, he simply carries out a similar maneuver, either with respect to the bumper at the other end of the same rod or the bumper at the same end of the other rod.

What I claim is:

1. An electromagnet carrier apparatus for use in lifting steel plate and long flexible steel bar stock comprising a beam, a plurality of bar members extending through apertures in said beam, an elongated electromagnet suspended from each of said bar members, a plurality of plates mounted one on top of each of said bar members, a pair of extension bars disposed above and parallel with the said beam, means for connecting said extension bars eccentrically and pivotally to each of said plates such that longitudinal movement of the said extension bars with respect to the said beam will cause pivotal movement of the said plates and rotation of the connected bar members about their axes, and stop means for limiting the pivotal movement of the said plates, the said bar members and suspended magnets.

2. An electromagnet carrier apparatus as claimed in claim **1**, including spring means attached to said plates for urging said plates resiliently against said stop means.

3. An electromagnet carrier apparatus as claimed in claim **1**, wherein said stop means are mounted on said beam to limit pivotal movement of said plates to 90°.

4. An electromagnet carrier arrangement as claimed in claim **2** wherein said stop means are mounted on said beam to limit pivotal movement of said plates to 90°.