No. 710,041. Patented Sept. 30, 1902.

E. B. CLARK, 2d.

DEVICE FOR LIFTING METAL PLATES.

(Application filed May 13, 1901.)

(No Model.)

Fig. 1.

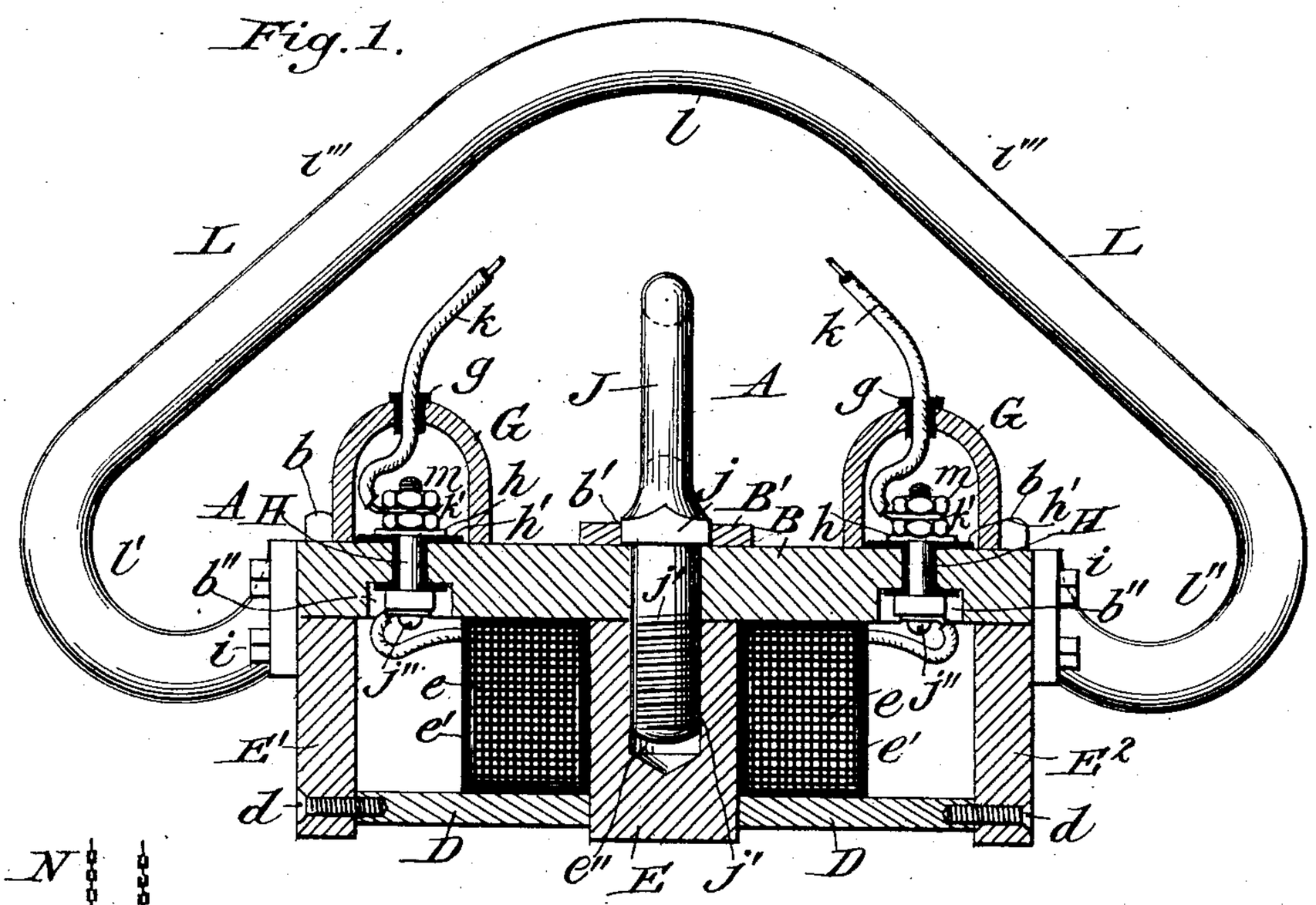
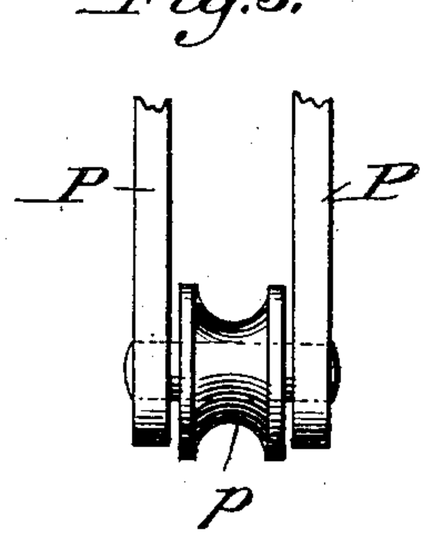


Fig. 5.



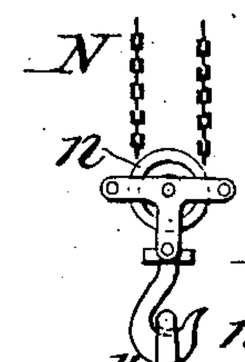


Fig. 4.

Fig. 3.

Fig. 2.

Witnesses

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EUGENE B. CLARK, 2ND, OF CHICAGO, ILLINOIS.

DEVICE FOR LIFTING METAL PLATES.

SPECIFICATION forming part of Letters Patent No. 710,041, dated September 30, 1902.

Application filed May 13, 1901. Serial No. 59,967. (No model.)

To all whom it may concern:

Be it known that I, EUGENE B. CLARK, 2nd, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Devices for Lifting Metal Plates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an electro lifting-magnet having a curved yoke and movable shackle adapted for picking up, transferring, and shifting metal plates or sheets from a horizontal to a vertical position or from a vertical to a horizontal position through the medium of a traveling crane or hoisting-machine.

The object of my invention is to provide, in a lifting-magnet, for lifting plates from a horizontal position, as in a car, and setting them up on edge in a vertical or upright position in a rack, or for lifting them from an upright position in the rack and laying them down in a horizontal position, as may be required.

The matter constituting my invention herein will be set forth in the claims.

The details of construction of my improved lifting devices for shifting metal plates are shown in the accompanying drawings, in which—

Figure 1 represents a transverse vertical section of a lifting-magnet with my curved yoke in elevation applied thereto. Figs. 2, 3, and 4 represent the magnet and my plate-shifting devices on a reduced scale in different positions and attached to the hoisting-chain and hook for illustrating the operation of the tipping or rolling shackle in raising plates from a horizontal position and stocking them on edge in a vertical position. Fig. 5 represents an elevation, on enlarged scale, of the link and roller which connect with the yoke of the magnet.

For the purpose of carrying out my invention I provide any suitable magnet with a curved yoke secured to its opposite sides and extending over the top thereof and apply to such yoke a link having a roller, which devices form together a tipping or rolling shackle. The link working on the yoke will be attached to the crane-hook for manipulating the magnet and shifting plates, as illustrated in the drawings. Any suitable magnet may be used; but I prefer the construction shown in the drawings, in which the magnet A is made with a soft-steel top plate B, to which the central core or pole-piece E and the two lateral pole-pieces E′ and E² are attached, as by screw-bolts *b b*. A lock-plate D′, having a square opening *b′* for receiving the square portion *j* of the eyebolt J, is also secured to the top plate B and serves for preventing the eye-bolt from turning after it has been screwed down into the central core. The brass bottom plate D has an opening for the central pole-piece E and is held in place by screws *d*, passing through the pole-pieces E′ and E², as shown in Fig. 1. The central core or pole-piece E is provided with a screw-threaded socket *e″*, into which is screwed the threaded end *j′* of the eyebolt J. By means of this long screw-threaded connection the eyebolt will be securely held in place and sustain any weight which can be lifted by the magnet. A worn eyebolt can also be readily removed and replaced without dismantling the magnet.

A copper wire *e*, having suitable insulation and a casing *e′* is placed around the central core or pole-piece E and is properly connected with the external lead-wires through the guard-caps G. These connections are made through the brass terminal posts H, which pass through openings in the top plate and are protected by insulating material *h′*. The lower end of each terminal post H is provided with a head which is seated in a recess *b″* in the top plate B. To the lower end of each post is connected a wire of the coil by means of the binding-screw *j″*. A brass washer *h* is placed over the insulating material *h′*, and above such washer and between the nuts is attached the terminal plate *k′* of the lead-wire *k*, the plate being held in place by the lock-nuts *m*. Over the top of each binding-post is placed a guard-cap G, of any suitable metal, having an opening at the top provided with an insulating-bushing *g* of hard rubber. The lead-wires *k* pass through the openings in the bushings *g* and are connected to the binding-posts H, as above described. End wires of the coil are permanently secured by binding-screws *j″* to the lower ends of the

posts H, where they will be so protected that they will not be broken or deranged. In case a lead-wire *k* is broken a new one can be quickly and conveniently connected to the post H by removing the guard-cap G.

For the purpose of facilitating the handling and manipulation of large metal plates I apply to my lifting-magnet certain devices forming a tilting or rolling shackle, as illustrated in Figs. 1 to 5, inclusive. To the opposite sides and at the middle of the magnet is secured the curved yoke L by means of screw-bolts *i*. This yoke is made with an upper middle curved portion *l*, inclined portions *l'''*, and the two lateral short curves or loops *l' l''* adjacent to the sides of the magnet, as clearly shown in Fig. 1. To this yoke is applied a roller *p*, connected by a pin or axle to the link P, which is engaged by the hook *n'*, depending from the hoisting-chain N and its pulley *n*. The yoke L and the roller *p* in the link P, connected as shown, form a tilting or rolling shackle for the magnet A, as illustrated in Figs. 2, 3, and 4. By means of this device the crane operator may at will pick up a plate from the horizontal position in such a way as to make it hang vertically or so as to make it hang horizontally. If he places the magnet in the center of the plate, when he hoists the plate will hang approximately in a horizontal position. If, however, he places the magnet near one edge of the plate O, as in Fig. 2, that edge will be raised with the magnet, leaving the other edge on the ground and tipping the plate at an angle to the horizontal, as shown in Fig. 3. The magnet will also tip, allowing the roller *p* to travel along one inclined part *l'''* of the yoke until it passes from the middle of the short curve or loop *l'* at one side of the magnet, as shown in Fig. 4. The hoisting operation being continued, the plate O finally hangs approximately in a vertical position, ready to be set up on edge in a rack, as shown in Fig. 4. It is customary at shipyards and other places where large numbers of plates are used to stock them on edge in suitable racks. For this purpose a magnet which will lift them from a horizontal position in a car and transfer them to an upright position in a rack is very desirable. A crane operator can easily manipulate a magnet having my yoke and rolling shackle to reverse the above-described operation when it is desired to remove the plates from the rack and lay them down in a horizontal position. In Fig. 2 the magnet is represented as being just applied to the plate O near its edge preparatory to lifting the same. In Fig. 3 the magnet is represented raised at such an angle that the roller *p* is about to roll on the inclined portion *l'''* of the yoke to the lateral loop *l'*. In Fig. 4 the roller *p* is shown in the loop *l'* of the yoke and the plate is about to be placed in the stock-rack.

The lead-wires *k k* will in practice have connections with a switch located in the operator's cage of the traveling crane for making and breaking electrical connection with the magnet in the operation of picking up or releasing metal plates, billets, and the like.

Though I have shown the yoke L with two lateral curved portions adjacent to the sides of the magnet, as being most convenient in operation, my invention is not confined to such specific details of construction. If the yoke be provided with a single lateral curve or bend and an inclined portion *l'''*, the movable shackle will be operative therewith to perform the above-described function.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a lifting-magnet, of a yoke secured thereto and having an upper curved portion above the magnet, an inclined portion and a lateral curved portion, and a movable shackle engaging with the yoke for facilitating the operation of handling metal plates, substantially as described.

2. The combination with a lifting-magnet, of a curved yoke and a tipping or rolling shackle therefor for facilitating the operation of lifting and stocking up metal plates vertically in a rack, or removing them from the rack and laying them down in a horizontal position, substantially as described.

3. The combination with a lifting-magnet, of a curved yoke secured to the opposite sides thereof, and having lateral loops adjacent to the magnet, and a roller held in a connecting-link, applied to said yoke to form a tipping or rolling shackle, whereby plates may be conveniently lifted from a horizontal position and set up on edge in an approximately vertical position, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EUGENE B. CLARK, 2ND.

Witnesses:
JOHN A. CARROLL,
CHARLES BENDFELT.