Jan. 6, 1948. E. L. VARNER 2,433,938

ELECTRICAL CONNECTION FOR CRANE HOOKS

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Fig. 1.

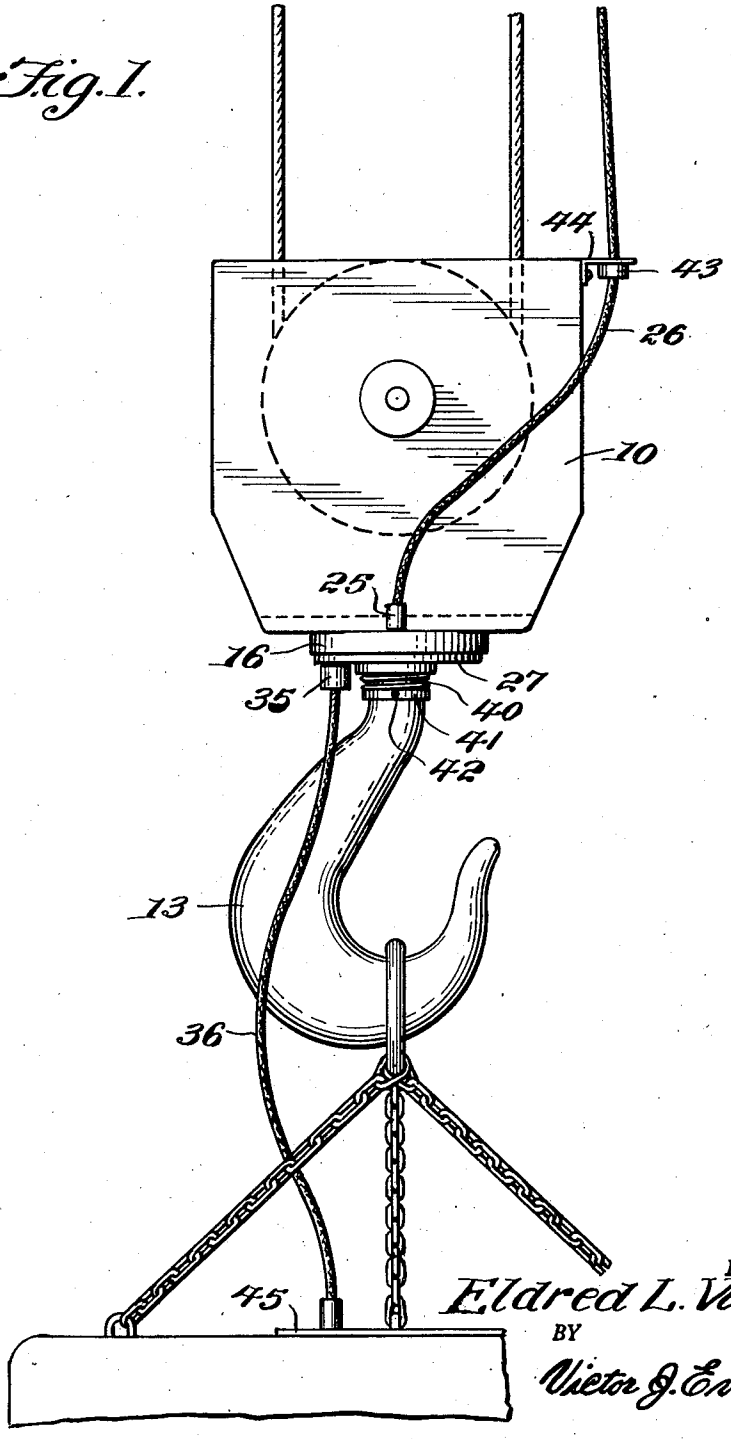

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Fig. 2.

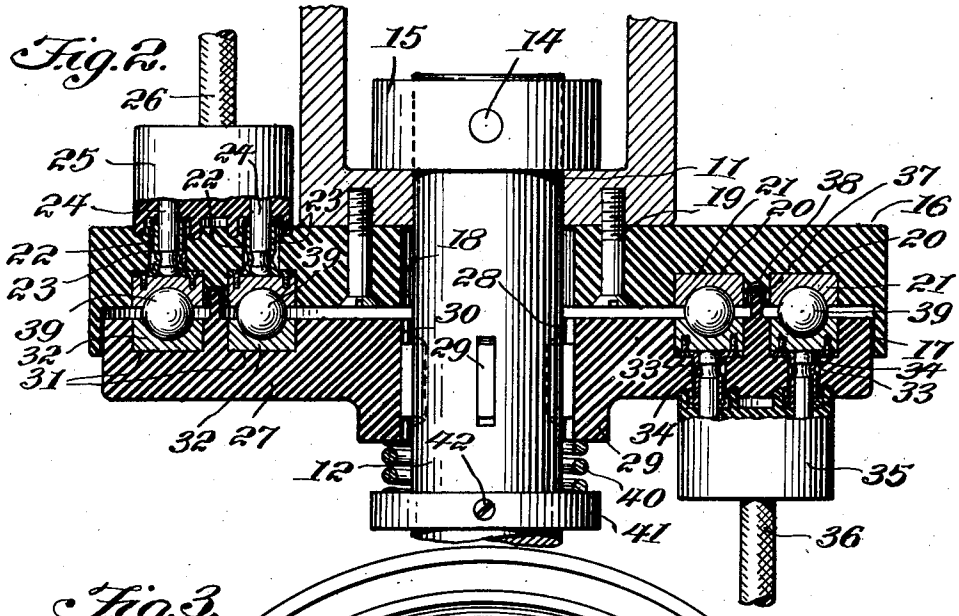
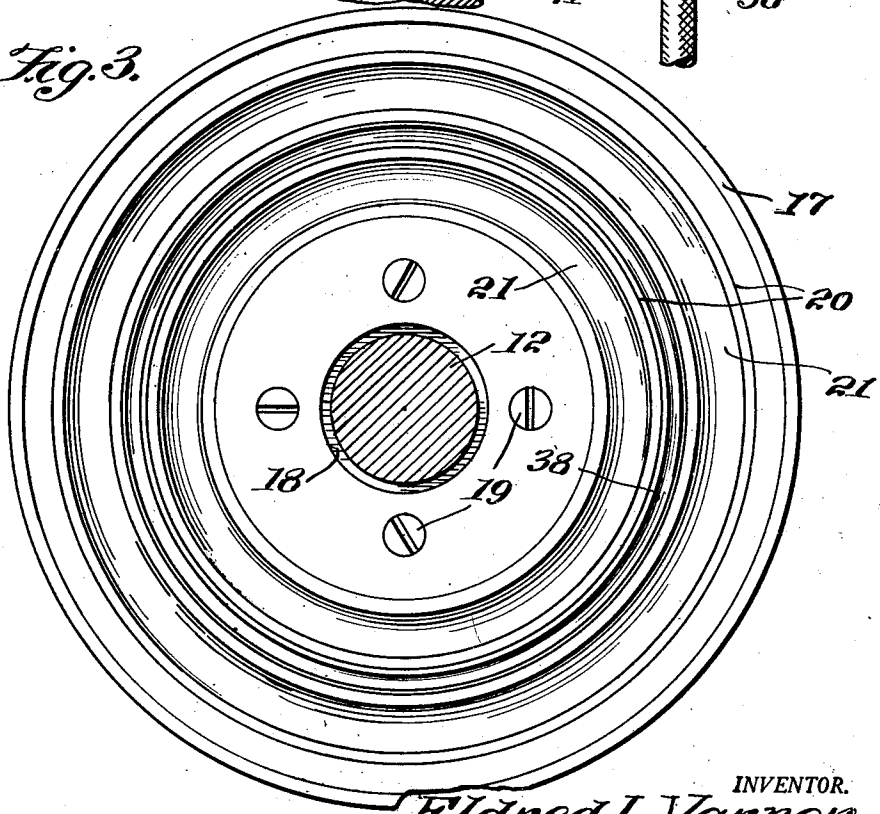


Fig. 3.



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Patented Jan. 6, 1948 2,433,938

UNITED STATES PATENT OFFICE

2,433,938

ELECTRICAL CONNECTION FOR CRANE HOOKS

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Application November 17, 1943, Serial No. 510,675

1 Claim. (Cl. 173—324)

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The present invention relates to improvements in electrical connections for crane hooks and has for an object thereof the provision of an electrical connection which can be directly connected to an electro-magnet suspended on and disposed for unlimited rotation with a crane hook.

Another object of the invention is to provide an electrical connection for crane hooks which will eliminate the danger of accidental breakage of the circuit through the electro-magnet by tension due to twisting of the conductor cable thereto by enabling the cable to turn with the load carrying magnet and the hook.

A further object of the invention is to provide an electrical connection for crane hooks which can be readily mounted in association with crane hooks of conventional construction.

A still further object of the invention is the provision of an electrical connection of the aforesaid character which is relatively compact in construction and efficient in use.

Other objects and advantages of the invention will become apparent as the description progresses.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate corresponding parts throughout:

Figure 1 is a side elevational view of a crane hook attached to an electro-magnet.

Figure 2 is an enlarged diametrical section through the electrical crane hook connection, and

Figure 3 is a plan view looking at the inner side of the upper section of the connection shown at Figure 2 with the shank of the hook extending therethrough.

Referring in detail to the drawings, wherein for the purpose of illustration is shown a preferred example of the invention, 10 designates a pulley frame of conventional construction having an opening 11 through the bottom thereof. Through the opening 11 is extended the straight round shank portion 12 of a crane hook 13, the upwardly projecting portion of the shank having fixed thereon, as by a hinge 14, a thrust collar 15 bearing on the bottom of the pulley frame to rotatably support the hook thereon.

To the underside of the frame 10 is fastened a connection section 16 embodying a flat plate which normally assumes a horizontal position. The plate 16 is advantageously in the form of a circular or disk member having an annular depending marginal flange 17 and is constructed of electric insulating material. At its center, the

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disk 16 is provided with a round opening 18 having a diameter exceeding that of the hook shank 12 so that the said shank may be loosely extended therethrough. As shown to advantage at Figure 2 this disk is rigidly connected to the pulley frame by countersunk screws 19 extended through the disk on a circle of greater diameter than and concentric with the opening 18 and having threaded connection with vertical screw threaded bores in the bottom of the frame. In the inner face of the disk 16 are formed a pair of annular grooves 20, in diametrically spaced positions concentrically of the disk axis. Each of the grooves 20 is advantageously rectangular in cross section and has tightly seated therein a correspondingly shaped contact ring 21 constructed of electric conducting material and having formed, in its outer face, a groove of approximately semi-circular cross section, similar to a ball bearing race ring. At radially spaced points the disk 16 is provided with a pair of transverse bores 22 providing openings between the top of each of the rings 21 and the upper face of the disk. In each of these bores are fitted a pair of diametrically opposed contact members 23 of angular form constructed of resilient conducting material having the inner ends electrically connected with the respective conducting rings 21 and the outer ends projecting above the disk. This socket forming construction is designed for connection with the prongs 24 of a plug 25 which may be of any preferred known construction making connection with the conducting wires of a cable 24. As shown at Figures 1 and 2, the plug 25 is positioned immediately outward of one side of the pulley frame 10.

A section 27 complementary to section 16 is disposed in face to face relation with the latter and embodies a disk shaped plate of insulative material having an exterior diameter slightly less than the diameter interiorly of the depending flange 16 of the upper section. This lower plate has a central bore 28 corresponding to the diameter of the bore 18 and in registration therewith, the bottom outer face advantageously having a boss 29 about said bore. In order to effect axially slidable but non-rotary connection of the bottom section 27 with the shank 12 of the hook it is splined to the latter as by the feathered keys 29 fitted in conventional grooves in the shank and engaging axial grooves 30 in the plate. In the top of the section 27 are formed a pair of annular concentric grooves 31 having annular conducting rings 32 seated therein corresponding to and in opposed registration with the ring 21 in

the upper section. The lower plate is also provided with bores 33 accommodating spring contacts 34 electrically connected with the contact rings 32 for connection of a prong carrying plug 35 attached to a cable 36, similar to the bores 22, spring contact 23 and pronged plug 25 associated with the top connection section. Between the seating grooves 31 the section forming disk 27 is formed with an annular upstanding rib 37 designed to project into a correspondingly positioned annular groove 38 in the disk 16, the rib 37 being formed of insulative material.

A multiplicity of contact elements 39 are mounted between and in contact with the complementary upper and lower contact rings 21 and 32 and may be in the form of spherical elements of conducting material such as ball bearings. These elements engage the concave grooves in the inner faces of the rings and are resiliently maintained in contact with the latter through the medium of a coil compression spring 40, held under compression between the boss 29 and a collar 41 fixed in encircling position about the hook-shank 12 by a set screw 42 below the boss.

As can be seen from Figure 1, the electrical connection has particular application to a crane hook employed in connection with an electromagnet lifting apparatus. Thus, the cable 26 leading from a source of electric current may advantageously be trained through a guide sleeve 43 of a bracket 44 attached to the pulley frame in order that the plug 25 thereof may be conveniently connected with the socket contacts 23 of the upper section of the connection. The cable 36 making electric connection with the lower conducting rings 32 may be suspended so that its opposite end makes electrical connection with the electro-magnet, generally indicated at 45. Such connection of the electrical conductors enables unlimited turning of the crane hook and the lifting magnet without danger of fouling the cables and effecting accidental disconnection. Thus, the danger incident to the unexpected release of the load by the magnet is effectively eliminated since the lowermost connection plate rotates with the hook to transmit current through the intermediacy of the contact elements 39 making connection with the upper section 16 having fixed connection with the pulley frame 10.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes relative to the material, size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claim.

Having thus described my invention, I claim:

An electrical connection, comprising a movable supporting member, a rotatable supporting member carried thereby, a circular plate made of insulating material secured to the movable supporting member and loosely surrounding the rotatable member, an annular flange projecting from the lower margin of the plate, contact rings mounted in the bottom face of the plate, means for connecting conducting wires with the rings, a complementary shaped plate disposed in face to face relation with and below the first mentioned plate within the annular flange, contact rings in the top face of the lower plate in corresponding relation with the rings in the upper plate, a plurality of spherical shaped contact elements interposed between the rings of the plates, plug engaging socket contacts connected with the rings of the first said plate and said complementary shaped plate, and adapted to receive prongs of plugs that extend outwardly of said plates in opposite directions therefrom, at right angles thereto, means for mounting the lower plate on the rotatable supporting member against rotation and vertically movable thereon, and spring means for forcing the lower plate towards the first mentioned plate.

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