

- [54] **APPARATUS FOR LIFTING HEAVY OBJECTS**
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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 150,008, June 4, 1971, abandoned.
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 [58] Field of Search 294/82 R, 89, 93; 52/701, 52/704, 707, 709; 85/5 B, 66, 80, 81, 88; 238/367; 287/115; 403/315-319

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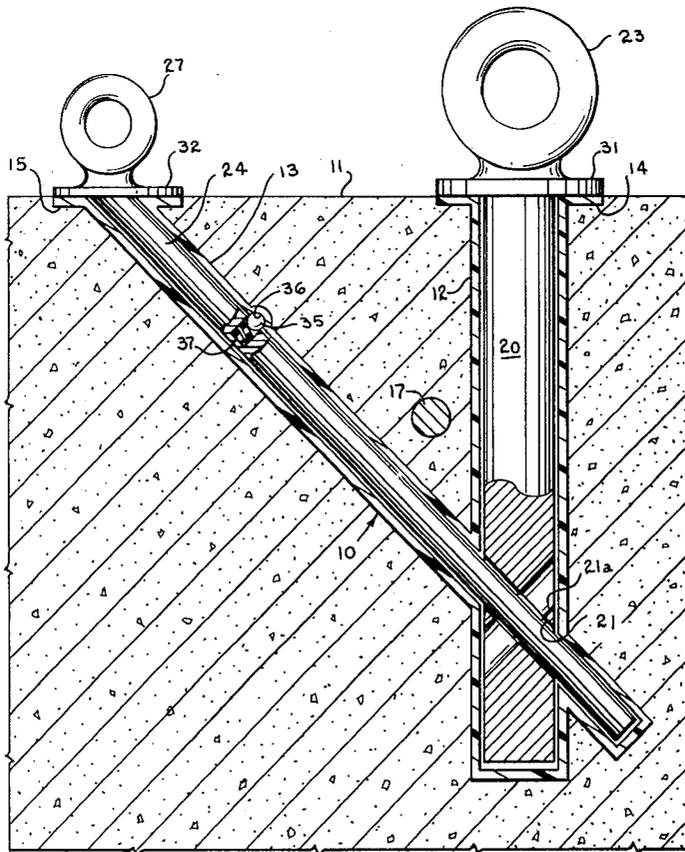
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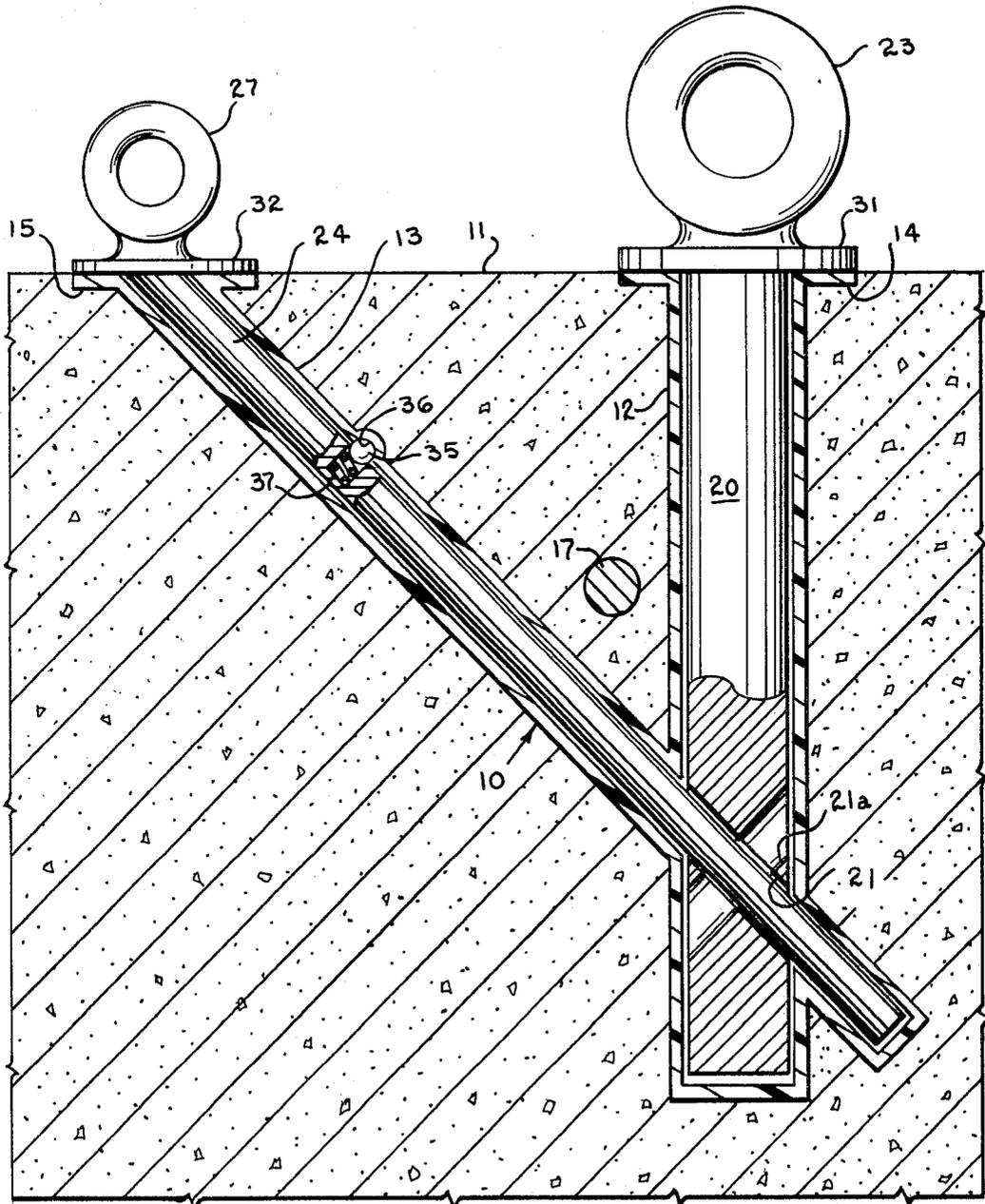
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[57] **ABSTRACT**

Apparatus for use in lifting heavy objects, such as concrete slabs, beams, columns, and the like, wherein a lift rod is inserted into a plastic sleeve, the lift rod being intersected by a lock rod, which is also disposed through a plastic sleeve, and which passes through an opening through the lift rod to lock the same in place within the object. The plastic sleeves are integral and are cast or molded within the object to be lifted. The sleeves may be made of materials other than plastic, such as metal or paperboard.

7 Claims, 1 Drawing Figure





APPARATUS FOR LIFTING HEAVY OBJECTS

REFERENCE TO EARLIER FILED APPLICATION

This application is a continuation-in-part of applicant's application Ser. No. 150,008, filed June 4, 1971, now abandoned of the same title.

SUMMARY OF THE INVENTION

The solution of the problem of lifting heavy objects, such as precast concrete slabs, columns, and beams has never been successfully solved. Such objects, which must be lifted after the making thereof, have been provided with various types of lifting accessories, none of which has been entirely successful.

According to the invention, the objects are provided with lifting devices which are not only entirely successful in use, but which are insertable for use and removable after use, and which may be reused for the lifting of other such objects.

In summary, the invention provides an imbedded plastic structure having one tubular passage directed straight into the object, and a second tubular passage at an angle directed from one side of the first tubular passage to intersect the same. A lifting rod is inserted into the first tubular passage, and a locking rod is inserted into the second tubular passage to pass through an angular opening through the lifting rod. The locking rod locks the lifting rod in place so that it may be used for the lifting of the object and for the positioning of the object in an ultimate structure.

After use, first the locking rod and then the lifting rod are removed, leaving the plastic structure within the object, and the lifting rod and locking rod may be reused for use in lifting another object. The plastic structure is non-protruding from the object and may be left in place as is, or may be filled in order to smooth off the surface of the object after use of the lifting apparatus.

Other objects and advantages of the invention will appear from the following detailed description of a preferred embodiment thereof, reference during the description being made to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

The single drawing FIGURE is a cross sectional view taken at the plane of the axes of the plastic sleeves of a preferred embodiment of apparatus according to the invention.

DESCRIPTIONS OF THE PREFERRED EMBODIMENT

Referring now to the drawing in detail, a molded plastic insert structure or element 10 is molded or cast within the concrete structure 11. Plastic insert element 10 includes a tubular sleeve portion 12 of circular cross sections which is intercepted angularly near its lower end by a tubular sleeve portion 13, also of circular cross sections. The two sleeves 12, 13 are integral, and have around their upper ends the protruding flanges 14, 15, respectively. The axis of tubular sleeve 13 intercepts the axis of tubular sleeve 12, and both are straight, so that rods may be inserted easily into the passages formed by the sleeves. Non-circular sleeves, e.g., oval, rectilinear, triangular, or other shapes of sleeves may be used.

In order that the tubular sleeve structure of element 10 may be reinforced in strength within the concrete object, one or more reinforcing rods 17 within the con-

crete object may be positioned about the plastic insert 10 so that the concrete structure around the insert element 10 will be reinforced and be of sufficient strength for the lifting of the object.

The insert element may be made of any suitable plastic material, such as the polyethylene plastics, the polystyrene plastics, Bakelite, or any other plastic or composition of sufficient rigidity to maintain the shape of the element, or of a metal such as aluminium, galvanized iron, or the like, or of paperboards or fiberboard or like composition. Any other suitable material may be used. Reinforcing or filler material may be used. Reinforcing rod or web formations may be included as desired, extending between the sleeves 12, 13.

In order that the plastic insert element 10 will remain in proper position during casting or molding of the concrete object 11, the flanges 14, 15 may be nailed or otherwise secured to forms for the concrete object. In this way, the plastic element is firmly held in place during the pouring and setting of the concrete, so that the plastic element will be properly positioned after setting of the concrete.

The lifting rod 20 is freely yet closely insertable within plastic sleeve 12. One or the other of the crossed angular bores or openings 21, 21a, of circular cross section, is readily positioned to be in the direction of angular tubular sleeve formation 13 by lining up one side of the eye 23 of lifting rod 20. After the lifting rod 20 is in place, the locking rod 24 is inserted into plastic sleeve 13 and passed through opening 21 or 21a of the lifting rod, depending upon which direction the lifting rod is turned. The locking rod 24 has at its upper end an eye 27 which is used for insertion and removal of the rod.

Lifting rod 20 has a flange formation 31 around its upper end beneath the eye 23, which is concentric with the rod. Rod 24 has a circular flange 32 around its upper end beneath the eye 27. Spring-biased ball detent 35 is urged into sleeve recess 36 by spring 37, and insures that rod 24 will not accidentally be dislodged, should the cast object be turned over or for other reason. This improves the safety of the apparatus. The flanges 31, 32 may be omitted, but they have some utility in that they indicate when the respective rods 20, 24 have been fully inserted into the plastic sleeves. After the two rods have been inserted as described, rod 20 may be engaged by eye 23, and the concrete object lifted and moved to its ultimate structural position. Thereafter, locking rod 24 may be removed, followed by removal of the lifting rod 20, by grasping of the respective eyes 27 and 23, so that both rods are removable for reuse or for reinsertion for lifting of the object at a later time.

With the rods removed, the outer surface of concrete object 11 is flat and smooth and has no projections resulting from the lifting apparatus herein described. The plastic sleeves 12 and 13 may be left open or may be filled with concrete or other material if desired in order to eliminate the openings from the side of the concrete object.

The cost of the lifting apparatus herein provided is very economical. The plastic insert is left in place within the concrete object and does not materially affect its ultimate strength and use, while the lifting and locking rods are removed for further use. The cost of the plastic inserts is relatively low so that their use results in only minor additional cost, yet their use affords

the utmost in convenience and reliability lifting and handling heavy concrete objects.

The sleeve structures and rods may be arcuately curved, instead of being straight. For example, the locking rod may be curved and be inserted into a similarly curved sleeve or passage, to intersect the lifting rod and its sleeve perpendicularly or at any selected angle. The lifting rod may also be curved.

While a preferred embodiment of the apparatus has been shown in the drawing and described, many modifications thereof may be made by persons skilled in the art without departing from the spirit of the invention, and it is intended to protect by Letters Patent all forms of the invention falling within the scope of the following claims.

I claim:

1. Apparatus for use in lifting objects of the type which are poured and set, comprising body means having first and second passages and designed for imbedding in an object which is poured and set, said second passage intersecting said first passage intermediate the length of said first passage, lift rod means insertable into said first passage and having a pair of crossed angular bores therethrough, each selectively alignable with said second passage and having connection means at its outer end, lock rod means having connection means at its outer end and being freely insertable into said second passage and into one of said crossed angular bores of said lift rod means to prevent removal of said lift rod means from said first passage, cooperating latch means on said lock rod means and in said second passage for positively retaining said lock rod means in said second passage whereby said lock rod means will not fall out of said second passage even though said object is rotated or inverted and whereby when said body means is imbedded within said object poured and set therearound with the rod-receiving ends of said first

and second passages open exterior of the object said cooperating latch means comprising a spring-biased ball detent means disposed in a cavity in said lock rod means and a recess disposed in the wall of said second passage for receiving said ball detent means and said rods are inserted and said lock rod means is latched in place as described, said lifting rod may be employed in lifting the object.

2. The combination of claim 1, said connection means at the outer end of said lift rod means comprising an eye formation alignable with said second passage to indicate when one or the other of said crossed angular bores is aligned with said second passage in position to receive said lock bar means therethrough.

3. The combination of claim 1, said body means being formed of plastic.

4. The combination of claim 3, said body means being in the form of intersecting sleeves forming said first and second passages therewithin.

5. The combination of claim 4, said body means having outwardly extending means around said sleeves for use in connecting said body means to a wall of a form within which said object is poured and set.

6. The combination of claim 5, said connection means at the outer ends of said lift rod means and lock rod means comprising eye formations, said apparatus including flange means around said lift and lock rods adjacent said eye formations adapted to abut the object when said rods are fully inserted into the respective sleeves.

7. The combination of claim 6, said connection means at the outer end of said lift rod means being alignable with said second passage to indicate when one or the other of said crossed angular bores is aligned with said second passage in position to receive said lock bar means therethrough.

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