

[54] **FORM JACK AND HOIST CONNECTOR
FOR STRIPPING AND LIFTING A
MASONRY CASTING FROM A FORM**

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[51] Int. Cl.² **B22D 29/08; B66C 1/42**

[58] Field of Search... 294/68, 67 R, 67 BC, 67 DA, 294/81 R, 90, 97, 106; 164/401, 403, 404, 405, 407, 408; 425/436 R, 425 RM

[56]

References Cited

UNITED STATES PATENTS

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[57]

ABSTRACT

A form jack and hoist connector is described for use in freeing a concrete or similar masonry casting from a trough-like form in which it has been cast, whereby the form is stripped in the action of hoisting the casting for transfer of it to a point of storage or use. Castings such as those forming pre-built monolithic external cellar stairwells for attachment to subgrade foundation walls, unitized entrance landings and stairs, and the like, are typical of the kind of large heavy structures to be handled by the novel form jack. The jack consists of a central beam with projecting arms pivoted at each end. An integral eye or other means of attachment to a hoist rig is provided at the center of the beam. The free ends of the pivoted arms are adapted to be supported on portions of the form structure itself to serve as fulcrum points for leveraging the casting out of the form. Attachment means are provided intermediate the pivot point and free end of each arm to engage and lift the casting as the central beam member is hoisted, simultaneously prying the casting from the form in this lifting process.

7 Claims, 5 Drawing Figures

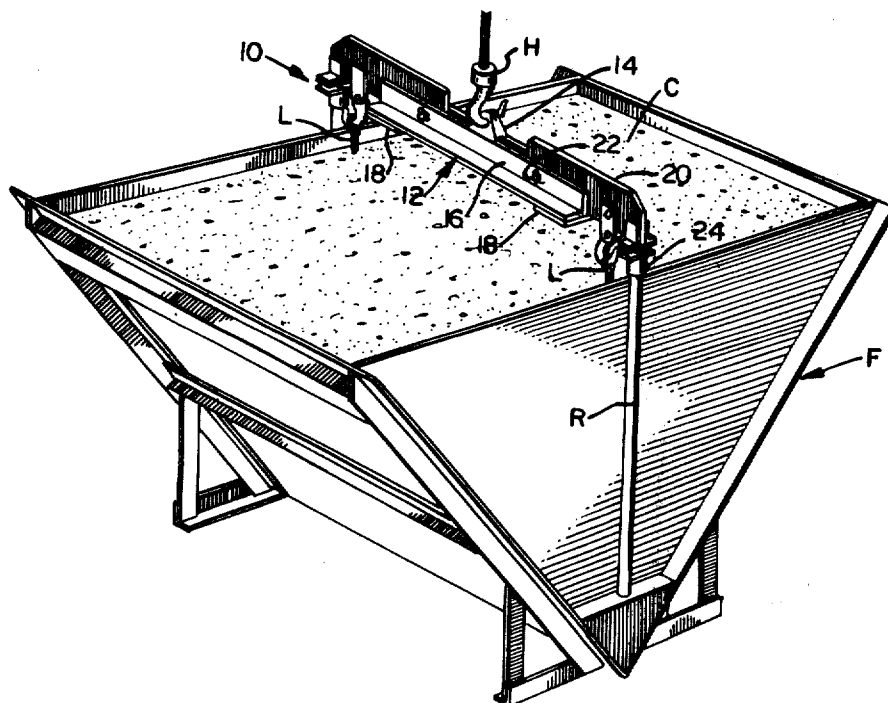


FIG. 1

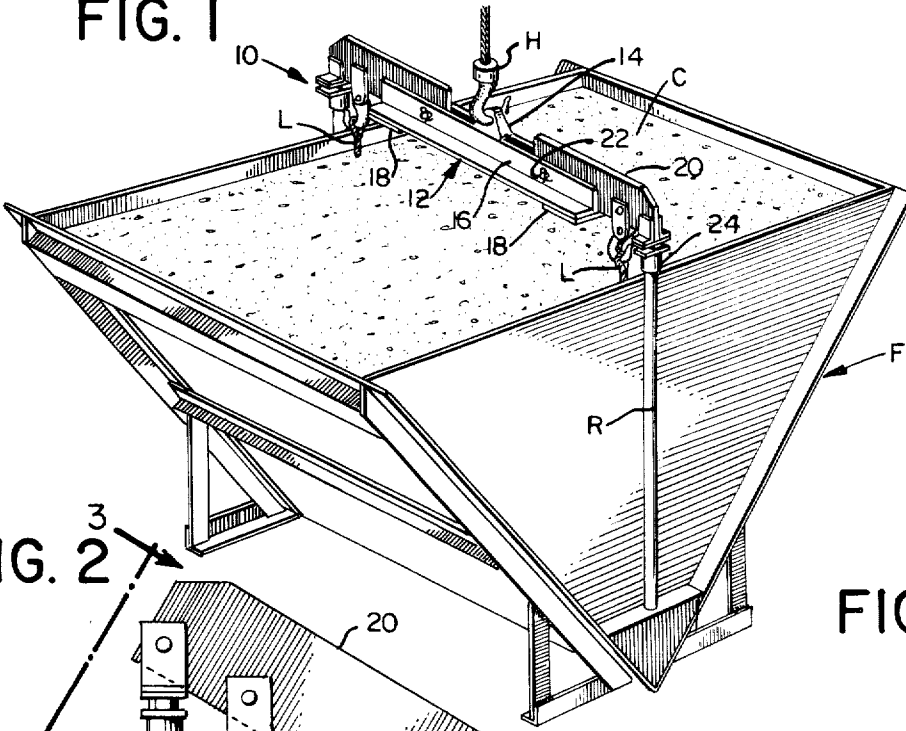


FIG. 2

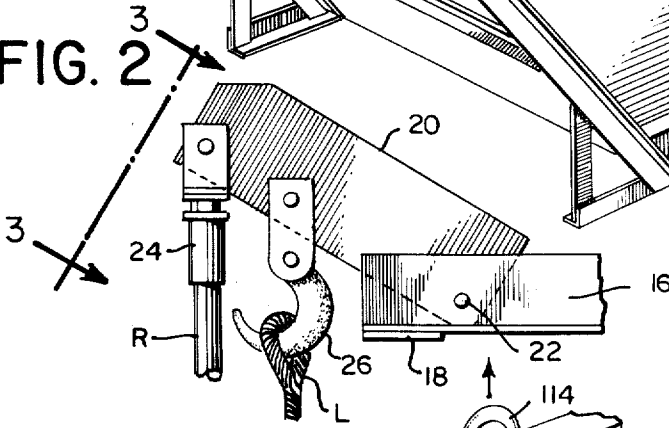


FIG. 3

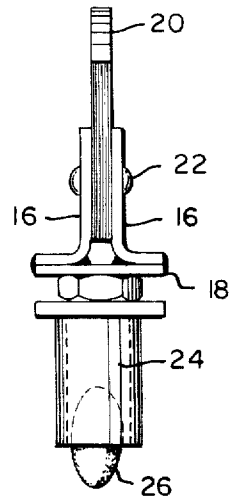


FIG. 4

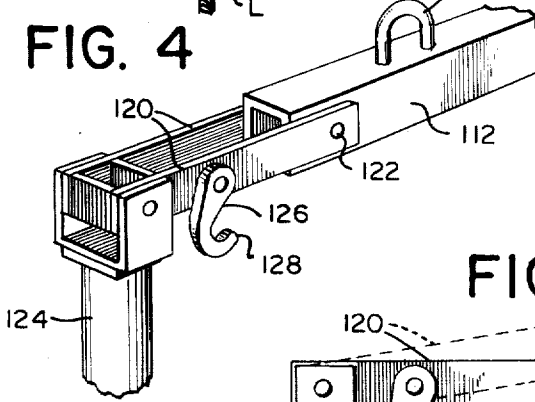
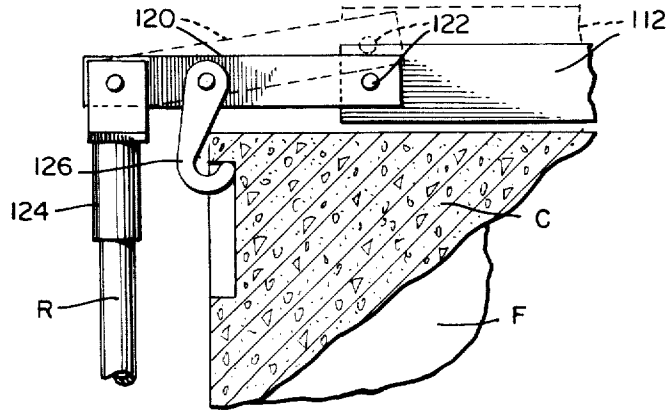


FIG. 5



FORM JACK AND HOIST CONNECTOR FOR STRIPPING AND LIFTING A MASONRY CASTING FROM A FORM

FIELD OF THE INVENTION

The invention here relates to a device for facilitating the stripping of heavy cast masonry structures from open-top forms in which they have been cast; and more particularly, to a form jack which engages a casting and uses the form itself as a leverage bearing point or fulcrum in the process of hoisting the casting, whereby to pry the casting free of the form in the initial lifting or hoisting of it for transfer to a point of storage or placement on a transport vehicle.

BACKGROUND OF THE INVENTION

Heavy masonry structures are commonly fabricated as monolithic castings at a central processing plant, and are then transported individually as needed to a construction site for erection. Typical of such structures are external cellar stairwells such as those described in U.S. Pat. No. 3,307,308. These are precast of poured concrete in open-top trough-like forms such as the forms described in U.S. Pat. No. 3,310,275. The forms are relatively large and expensive and must accordingly be designed for repeated reuse. In order to withstand the loading stresses and rough usage, the forms are of extremely heavy metal construction. The assembly of them in preparation for casting and the subsequent stripping of them from the cast product is time-consuming, requires considerable manual labor, and increases the possibility of damage to the components of the form or loss of bolts, clamps or other fastening elements used in holding the form in assembled condition.

A principal objective of this invention accordingly is to facilitate the removal of heavy precast concrete structures from the forms in which they have been cast. Other objectives include those of reducing the amount of manual labor required in this operation, and also of reducing the possibility of damage to or loss of form components in the assembling/disassembling operations. It is a further purpose of the invention to simplify the manner of attaching a hoist to such precast structures so that they can be manipulated more safely while being moved to and installed at a construction site.

SUMMARY OF THE INVENTION

A hoist accessory is provided comprising a form jack having a central beam member with provision for attachment thereto of a cable hook or other hoisting equipment. An arm is pivoted to each end of the central beam, each such arm having a free end projecting axially beyond the end of the beam. The span formed by the beam and cooperating arms is made slightly greater than the width of the face of the cast structure to be lifted so that the free ends of the arms overlie the sides of the form. The free ends of the arms are each provided with a bearing pad or equivalent formation which permits it to be rested on some portion of the form which is to be stripped from the casting, whereby to provide a stationary fulcrum point for the respective arm as the central beam member is raised. Attachment means, such as a hook or jaw member is disposed adjacent the outer end of each arm on the underside thereof for making attachment or engagement with the casting to permit it to be lifted. In the initial stage of the

hoisting operation, with this attachment means engaging the casting, the fulcrum points at the free ends of the pivoted arms are disposed slightly above the longitudinal axis of the central beam member. Thus, as the jack is lifted, the central beam member pivots the inner ends of the arms upwardly relative to the outer fulcrum points, thereby prying the concrete casting upwardly relative to the form. Once the surface contact at the interface between the form and casting has been broken, the form is freed from the casting and the latter may be hoisted for transfer to a storage point or to a transport vehicle. On setting the casting down, the form jack can then be disengaged from the casting.

The invention is described in more detail in connection with the embodiments illustrated in the accompanying drawings in which

FIG. 1 is a perspective view in side elevation showing a concrete cellar stairwell casting being stripped from the sheet metal form in which it was made, using the novel form jack;

FIG. 2 is a fragmentary view of the jack showing one of its arm in articulated position preliminary to hoisting;

FIG. 3 is an end elevational view looking in the direction of arrows 3—3 of FIG. 2;

FIG. 4 is a fragmentary perspective view of a modified form of form jack showing a different type of means for engaging and lifting a casting; and

FIG. 5 is a fragmentary view in side elevation showing the form jack of FIG. 4 in position to lift a casting from its form.

In FIG. 1 there is illustrated a trough-like plate or reinforced sheet metal form F of the type shown for example in U.S. Pat. No. 3,310,275 for use in casting a monolithic concrete subgrade cellar entry stairwell. Concrete is poured into the open upper face of the form F and allowed to set to produce a finished casting C, only the upper face of which appears in the drawing. Attachment loops L are imbedded in this upper face during the pouring or before the concrete has set, loops L being disposed slightly inwardly of opposite side walls of the casting C at the approximate mid- or balance point of the casting. Loops L permit attachment of the form jack, indicated generally at 10 in the drawing, for the purpose of separating casting C from form F and hoisting the casting free of the form.

Form jack 10 is composed of a central beam member 12 having an eye 14 or similar attachment means rigidly secured at the mid-point of the beam to receive a hoist hook H attached by cable to a winch or other device for lifting the casting. As here shown, form jack 10 is built up from two heavy angle irons 16, in back-to-back spaced juxtaposition (see FIG. 3), being held in such relation by web plates 18 welded to the under-faces and running transversely of the angle irons at either end.

An arm 20, comprising a heavy elongated metal plate, is received between the upright legs of angle irons 16 at the opposite ends of the central beam member. Each of arms 20 is pivotally connected to beam 12 by pins 22 and projects axially beyond the respective end of the beam. In the arrangement described, arms 20 are free to pivot upwardly relative to the longitudinal axis of beam 12 but cannot pivot below that axis because of abutment against webs 18.

At the outer free end of each arm 20, a bearing pad 24 (shown as a socket member in this instance) is se-

cured to the underedge of the arm. This is adapted to make bearing contact on a portion of form F so as to constitute a vertically stationary fulcrum point, as will be described more fully presently, for arms 20. A rod R positioned along each side face of form F is here illustrated as the fulcrum support, and its projecting upper end is received in socket 24 with a loose or sloppy fit. Such support rod arrangement is convenient, but any other rigid support member or portion of form F can be made to serve the purpose.

A hook 26 is carried by each arm 20, spaced intermediate the respective bearing pad 24 and end of beam 12. Hooks 26 are adapted to engage loops L in the upper face of the casting.

In preparing to hoist the casting from the form, form jack 10 is placed on the upper face of the casting with hooks 26 passing through loops L and bearing pads 24 resting on support rods R. Preliminary to hoisting, the relative position of the parts is shown more particularly in FIG. 2, in which it is seen that arms 20 are pivoted slightly upwardly from longitudinal alignment with central beam 12. When lifting force is applied to hoist hook H, central beam 12 pivots the inner ends of arms 20 upwardly on pads 24 about the fixed fulcrum points provided by the rods. Leverage is thus applied to hooks 26 which is transmitted through loops L to pry the casting free of its form. Only a slight movement of the casting relative to the form is necessary to break the interface contact between the casting and form. Once this has occurred, casting C can be lifted free without further need for jacking or leverage action, and jack 10 thereafter serves merely as a hoist beam structure from which the casting is suspended during transfer of it to a storage point or transport vehicle.

In the modified structure shown in FIGS. 4 and 5, the principle of operation of the form jack is identical with that described above, but a slightly different arrangement is provided for effecting engagement between the casting and the form jack.

In this instance the means for engaging the casting comprises a pair of pivoted dogs 126, one on each arm 120, taking the place of the corresponding hooks in the structure described above. Each dog 126 is pivotally secured to an arm 120 to hang downwardly below the lower edge thereof. Each dog is formed with a claw 128 which serves as a means for engaging the casting.

In order to use the arrangement shown in FIGS. 4 and 5, provision must be made in form F for removing a small panel of the form wall at the center near the upper edge on each opposite side after the concrete has hardened. The arrangement is such that not only can the panel be withdrawn easily after the casting has hardened, but it also serves to form in the side wall of the casting a depression with an overhanging lip which can be engaged by the claw of the corresponding dog 126 of the form jack.

When the casting is to be withdrawn from the form, jack 110 is placed on the top of the casting, with its bearing pads 124 resting on support rods R or equivalent at opposite sides of the form. Arms 120 in this condition are pivoted slightly upwardly at their outer ends above the longitudinal axis of central beam 112. In this condition, dogs 126 tend to swing down by gravity to make engagement with the casting and the dog pivot is so located that as the jack is raised, claws 128 are forced into clamping engagement with the sides of the casting beneath the overhanging lips formed by the recesses (see FIG. 5 dotted line showing). In some cases it may be necessary in this arrangement to allow for lateral movement of rods R; in which case, the rods need not be permanently secured to the side faces of the form. Continued lifting force applied to jack 110 prys or levers the casting free of interfacial contact with the form, thereby stripping the form from the casting in the process of hoisting it.

What is claimed is:

1. A form jack for stripping a finished masonry casting from a form in which is has been poured, said jack comprising in combination:

a central beam member having attachment means centrally thereof for engagement by a hoist;

a pair of arms, each such arm being pivoted at its inner end to an end of said beam and projecting axially outward of such beam end;

bearing means at the projecting free end of each arm for making bearing engagement with a portion of the form to be stripped from the casting; and

attachment means on each arm, located intermediate its respective free end bearing means and end of said central beam, for engaging and supporting the casting.

2. A form jack as defined in claim 1, wherein one of said beam and arm members is provided with a projection which prevents the arm member from pivoting below the level of the beam axis, while permitting free pivotal movement above such axis.

3. A form jack as defined in claim 2, wherein said beam has a lower flange member, and said arms are each pivotally connected to said beam above said lower flange member inwardly of the end thereof.

4. A form jack as defined in claim 1, wherein said bearing means at the free end of each arm is a jack pad.

5. A form jack as defined in claim 1, wherein said bearing means at the free end of each arm is a post member extending downwardly for engagement with a portion of the form to be stripped from the casting.

6. A form jack as defined in claim 1, wherein said attachment means on each arm is a pivoted hook.

7. A form jack as defined in claim 1, wherein said attachment means on each arm is a pivotable dog jaw.

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