Feb. 23, 1965 R. G. JOHANSSON 3,170,244

DEVICE FOR ENSURING CONSTANT STEP LENGTH
IN STEP-BY-STEP HOISTING MECHANISMS

Filed April 3, 1962 2 Sheets-Sheet 1

FIG. 1.

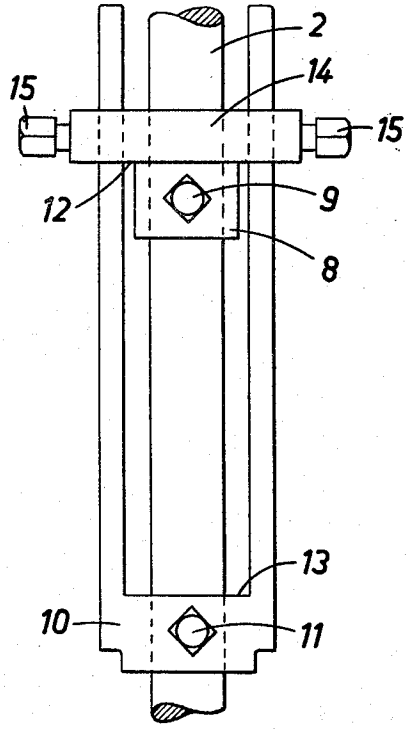


FIG. 3.

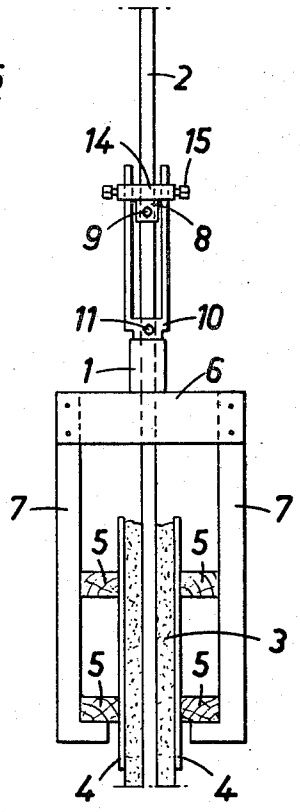
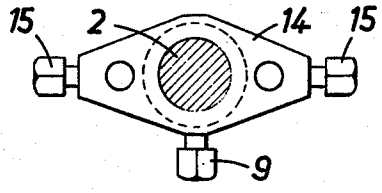


FIG. 2.



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FIG. 4.

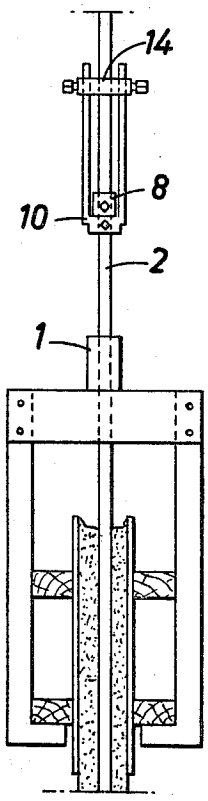
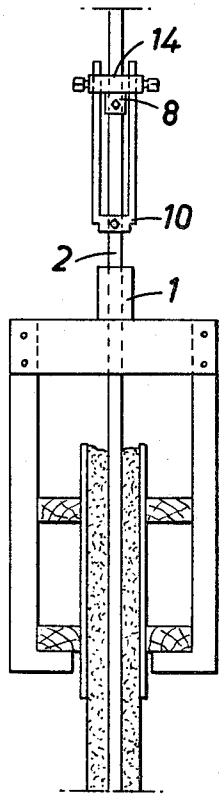


FIG. 5.



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United States Patent Office 3,170,244
Patented Feb. 23, 1965

3,170,244

DEVICE FOR ENSURING CONSTANT STEP LENGTH IN STEP-BY-STEP HOISTING MECHANISMS

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Filed Apr. 3, 1962, Ser. No. 184,880
Claims priority, application Sweden, Apr. 5, 1961, 3,546/61
2 Claims. (Cl. 33—180)

This invention is concerned with a device for ensuring constant step length in step-by-step hoisting mechanisms, so-called "climbing jacks."

These step-by-step climbing mechanisms are hoists, lifting jacks, etc. capable of moving stepwise along a rod. Each time the mechanism is subjected to an impulse of an upwardly directed force it will move one step, i.e. a certain length up along the climbing rod. The length of such steps may be constant or variable.

All the known step-by-step hoists of this type have the disadvantage that in cases where a constant step length is desired such an absolutely constant step length will not be obtained under practical working conditions, due to variations in load weight, etc., so that minor deviations from the desired constant value will occur. These deviations are particularly objectionable in cases where two or more hoists are employed for cooperating to lift a load such as for instance a slip mold, such deviations having a tendency of adding themselves to each other. Thus the lifting operation will require continuous control and corrections to avoid transgression of permissible tolerances. Such control can be effected only by skilled personnel having special experience of this type of work, and a good judgment.

It is an object of this invention to eliminate this drawback and to provide a device for ensuring a constant step length in a hoisting mechanism of the aforesaid step-by-step or "climbing jack" type. A further object of the invention is to provide such a step length control device which is easy to handle and can be operated by unskilled personnel.

According to the chief characteristic feature of the invention, the novel device comprises an adjustable stop member mounted on the climbing rod of the hoisting mechanism, and a bracket which is also mounted on said climbing rod to enclose said stop member while being displaceable between two positions, namely one position in which it rests on the stop member with an upper abutment portion or face, and one position in which it abuts against said stop member with a lower abutment portion or face and stops the movement of the hoisting mechanism.

A preferred embodiment of the invention is further illustrated in the attached drawings in which:

FIG. 1 is a side view and FIG. 2 a plan view of the step-control device according to the invention while FIGS. 3–5 illustrate the cooperation of the step-control device with a step-by-step hoisting mechanism to lift a slip mold, showing the device in different operating positions.

In the drawings, 1 designates a step-by-step hosting mechanism or "climbing jack," here shown only schematically. This jack is mounted to climb along a climbing rod 2 to thus hoist up a slip mold for casting a wall structure 3. Reference number 4 designates the sides of the mold, while 5 designates mold supporting belts, 6 a yoke member and 7 the arms or shanks of the yoke (FIG. 3).

A spacing or step control device as contemplated by the invention is mounted above the hoisting mechanism or jack 1 to ensure a constant step length in the upward movement of the mechanism. This control device

comprises (i) a stop ring 8 which is displaceable along rod 2 and adapted to be locked thereon by means of a locking screw 9, and (ii) a bracket 10 also displaceable along the climbing rod and adapted to be locked thereon by means of a locking screw 11. The bracket has upper and lower abutment faces 12 and 13 respectively, these faces being adapted to cooperate with the aforesaid stop ring 8. The hoisting step length will thus be equal to the distance between abutment faces 12 and 13 minus the thickness of ring 8. This distance may be a fixed value but in the embodiment illustrated it is variable since the upper abutment face 12 is provided on a cross-piece 14 which is movable up or down by means of screws 15 along the shanks of the U-shaped bracket 10.

This arrangement operates as follows: A spacing device is mounted onto each of the climbing rods 2 above the climbing jacks 1 positioned thereon, the distance between the abutment faces 12 and 13 having been pre-set so as to be equal in all the spacing devices thus mounted. Brackets 10 are set in contact with the climbing jacks 1 and locked in that position onto the climbing rods 2 by means of locking screws 11. Then the stop rings 8 are raised so as to abut against the upper abutment faces 12, and are locked in that position by means of their locking screws 9 (see FIG. 3). Next, the brackets 10 are unfastened and lifted so that their lower abutment faces 13 come into contact with stop rings 8, whereupon the brackets are locked in that position (FIG. 4). In this manner all the devices have moved up along a constant length on the climbing rods, thus enabling the jacks to climb along one and the same distance or length before they come into contact with the spacing devices. Now the lifting operation may be started, and during this operation the stop rings 8 are moved up successively until they again come into contact with the upper abutment faces 12 of the brackets. When the climbing jacks finally reach the brackets each jack is caused to stop its climbing movement. In small lifting apparatus, the spacing devices may serve as purely mechanical stopping means for the jacks or hoisting mechanisms while in bigger apparatus they must be adapted to actuate means for controlling the power supply to the hoisting mechanisms, e.g. shut-off valves, interrupting the supply of a pressure medium, electrical switches or equivalent means.

When all the jacks have terminated their climbing movement the brackets are again moved one step up, and the whole procedure is repeated until lifting has been effected to the desired level.

It will be appreciated that the invention is not in any respect limited to the preferred embodiment described above but that many modifications may be made, as will be readily understood by those skilled in the art, without transgressing the spirit and scope of the invention.

I claim:

1. A device for controlling the lifting movement of a hoisting mechanism adapted to climb stepwise along a climbing rod and for ensuring a predetermined lift length of said hoisting mechanism, said device comprising a ring displaceable along and adapted to be locked in selected positions on said climbing rod and having abutment faces on its underside and upper side, and a bracket having two side members and upper and lower edge members and provided with an interior abutment face at its upper edge, an interior abutment face at its lower edge, and an exterior abutment face at its lower edge, said bracket being displaceable along said climbing rod between a position in which it abuts with its upper interior abutment face against the upper abutment face of said ring to thus prevent the ring from being moved up, and a position in which said bracket itself is prevented from being moved up by abutment with its lower interior abutment face against the underside abutment face of said ring and in

which it is adapted to be locked, to thus prevent further advance of the upwardly climbing hoisting mechanism upon abutment of said mechanism against the exterior abutment face of said bracket.

2. A device according to claim 1 in which the upper edge member of said bracket is comprised of a planar cross-piece mounted releasably on the side members of said bracket so as to render the distance between said planar cross-piece and the lower edge of said bracket selectively variable.

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