May 20, 1952 N. E. WIKSTRÖM 2,597,691

JACK ADAPTED FOR MOVING LOADS ALONG A ROD

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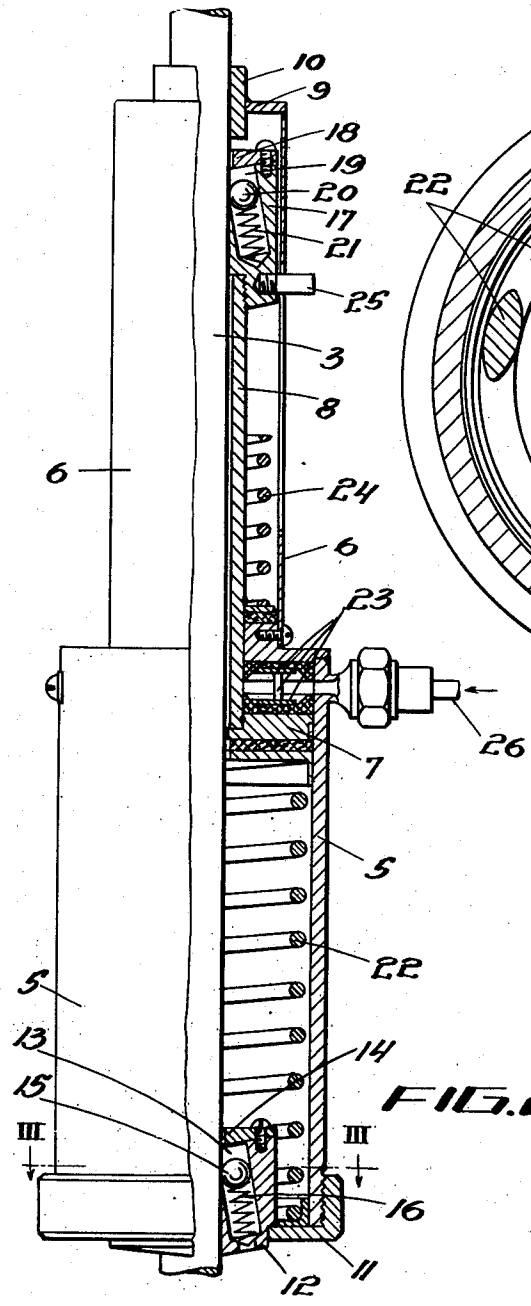


FIG. 2

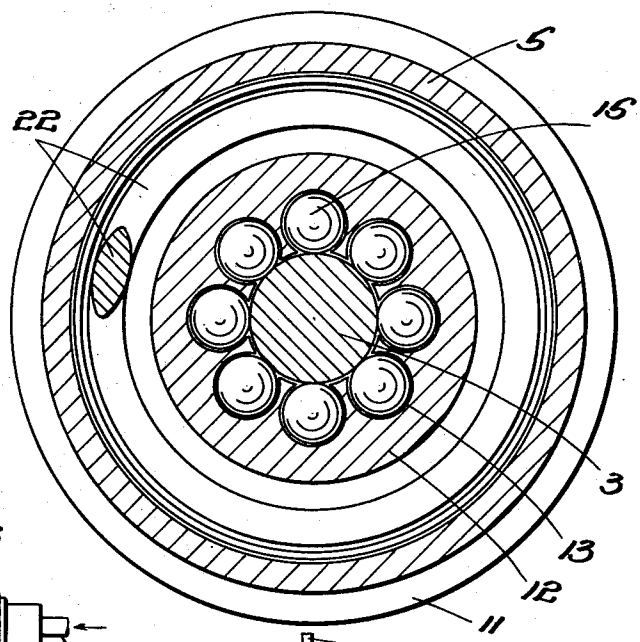


FIG. 3

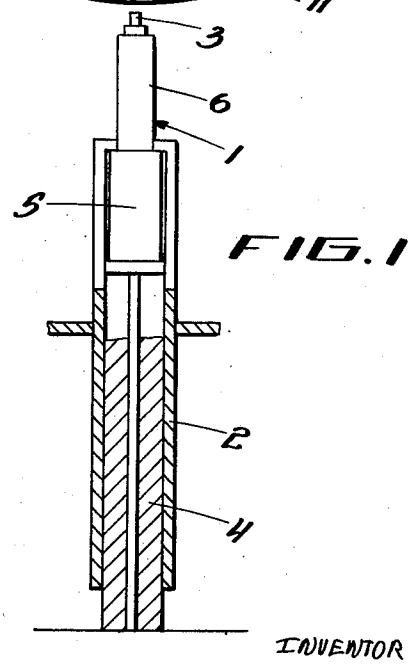


FIG. 1

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JACK ADAPTED FOR MOVING LOADS ALONG A ROD

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2 Claims. (Cl. 254—106)

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This invention relates to a jack adapted for moving loads along a rod, e. g. for raising sliding moulds used in concrete casting, which jack has two gripping devices adapted to be automatically interlocked with the rod when the respective gripping device begins to move in one direction along the rod, and to be automatically released from the rod, when the respective gripping device moves in the other direction, which is the direction of transport, each gripping device including a plurality of balls or rollers which are movable along a wall of a gripping device head converging towards the longitudinal axis of the rod in the direction of transport, and constantly lie applied against the rod by the action of resilient means.

Known jacks of this type have gripping devices with a plurality of ball rows, each including several balls, which rows extend in the longitudinal direction of the rod and are distributed around the rod, said balls being acted upon by a resilient means common to all balls in all rows. These known jacks have many disadvantages, among which there may be mentioned that, like the known gripping devices having gripping members formed as toothed jaws, the gripping devices are very sensitive to variations of diameter and curvature of the rod and that for this reason and due to the constructive length of the gripping devices which must be relatively long, the jacks are able to move the load a relatively short distance only between the changes of grip of the gripping devices.

The principal object of the present invention is to provide a jack construction avoiding the above-mentioned disadvantages of the known jacks of said type. Other objects of the invention will be clear to those skilled in the art from the following description of a preferred embodiment of the invention shown in the accompanying drawings, in which:

Fig. 1 diagrammatically shows the arrangement of a jack according to the invention when raising a sliding mould for concrete casting,

Fig. 2 shows the jack of Fig. 1 on an enlarged scale, partly in vertical projection and partly in section,

Fig. 3 shows a section on line III—III of Fig. 2.

In the preferred embodiment there is used a jack 1 according to the invention for raising a sliding mould 2 for concrete casting along a vertical circular rod or a so-called climbing rod 3 in a manner known per se. The climbing rod 3 which is cast into the wall 4 cast by means of the sliding mould 2, passes centrally through the jack 1 and the sliding mould 2 is suspended in a suitable manner from the top of a cylinder 5 included in the jack around a cylindrical housing 6 secured to the top of the cylinder.

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Movable in the cylinder 5 is a piston 7 having a piston rod 8 which enters the housing 6 from the top of the cylinder 5. The piston 7 has a central hole and the piston rod 8 is tubular for the passage of the rod 3. At the top the housing 6 has an end wall 9 with a central sleeve 10 for the passage of the rod 3 while the cylinder has a threaded cover 11 at its lower end. A gripping device to be described in the following is secured to the said cover 11 and is provided with a central hole for the passage of the rod 3.

The gripping device secured to the threaded cover 11 consists of a head in the form of a ring 12 in which there are provided (in this instance) eight bores 13, the centre axes of which converge upwardly towards the longitudinal axis of the rod 3, i. e. in the direction of transport of the jack. The bores 13 are closed at the top by means of an annular cover 14 screwed onto the ring 12, but are open adjacent the top over part of their lengths towards the inner side of the ring 12. Inserted in each bore 13 is a ball 15 which is pressed upwardly therein by a spring 16 whereby the ball will be held constantly applied against the rod. The balls 15 constitute a single ring of rolling wedge means as will be apparent from the mode of operation later set forth.

Attached to the upper end of the piston rod 8 which is movable in the casing 6 is a gripping device of the same type as that described above and having a ring 17, an annular cover 18, upwardly converging bores 19, balls 20 and springs 21 and here the balls 20 constitute a single ring of rolling wedge means.

Below the piston 7 there is arranged in the cylinder 5 a return spring 22 tending to move the piston back to its upper end position shown in Fig. 2 after a stroke thereof, said end position being determined by the piston abutting against an annular distance member 23 attached to the upper end wall of the cylinder 5. The housing 6 contains an additional return spring 24 which, during the latter part of the stroke of the piston 7 directed downwardly in relation to the cylinder, engages with the gripping device rings 17 and is compressed thereby for a purpose to be mentioned hereinafter. On the said ring 17 there is further fixed a pin or index 25 projecting from the housing 6 through a slot in order that it may be possible to determine the position of the piston 7 in the cylinder 5 from the outside.

The above jack operates in the following man-

ner. It is assumed in Fig. 2 that the piston 7 has just been brought back into its upper end position in the cylinder 5 and that the jack with its load is held applied to the rod 3 by the balls 15 of the gripping device of the cylinder being jammed between the wall portion of the bores 13 opposed to the rod 3 and the said rod 3.

When a pressure medium, e. g. pressure oil, is now delivered through a supply pipe 26 to the cylinder 5 between the top of the piston and the upper end wall of the cylinder, the piston 7 is depressed downwardly in relation to the cylinder 5 and the rod 3. When this downward movement starts, the balls 20 of the gripping device mounted on the piston rod are however jammed between the rod and the wall portions of the bores 19 in the ring 17, opposed to the rod, whereby the gripping device of the piston is arrested on the rod 3 and the piston 7 is prevented from moving downwardly in relation to the rod 3. On continued delivery of pressure medium to the cylinder 5, the cylinder will therefore be raised in relation to the rod 3 which is permitted by the gripping device of the cylinder since the balls 15 are thereby moved downwards in the bores 13 away from their jamming grip around the rod against the action of the springs 16. During the raising of the cylinder 5 and thus of the sliding mould 2 along the rod 3 the piston 7 compresses the return spring 22 and at the end of the stroke of the piston in relation to the cylinder 5 the additional return spring 24 is also compressed by the ring 17. When the piston has reached the lower end position of its stroke in relation to the cylinder 5, the pressure medium is discharged from the cylinder. To begin with, the cylinder 5 then tries to slide downwardly along the rod 3 but this motion is stopped almost immediately by the balls 15 of the gripping device of the cylinder being jammed against the rod 3, thus interlocking the cylinder with the rod. Instead the return springs 22 and 24 press the piston 7 upwardly with great force so that the balls 20 of the gripping device of the piston are released

from their jamming grip around the rod and the piston moves upwardly in the cylinder while discharging the fluid in the upper part of the cylinder. The additional return spring 24 aids in returning the piston during the first part of the movement only in order to help the spring 22 in releasing the balls 20 from their jamming grip around the rod 3. Then the parts again occupy the position according to Fig. 2 so that a new raise of the cylinder along the rod 3 can take place by supply of pressure medium through the pipe 26.

What I claim and desire to secure by Letters Patent is:

1. A jack for moving loads along a rod, comprising a cylinder, a piston movable in said cylinder by means of pressure fluid, one gripping device on said cylinder, and a second gripping device operatively associated with said piston, said two gripping devices automatically interlocking with the rod when the respective gripping device begins to move in one direction along the rod, and automatically releasing from the rod, when the respective gripping device moves in the other direction which is the direction of transport, said gripping devices including each only one single ring of rolling wedge means, circumscribing said rod and lying in a plane at right angles to the longitudinal axis of the rod, individual channel means on each of said gripping devices for separately mounting each of said rolling wedge means, said channel means having a wall opposing and converging towards the longitudinal axis of said rod in the direction of transport and along which the associated one of said rolling wedge means is adapted to roll into and out of wedging engagement with said rod, and a spring in each of said channel means urging the associated one of said rolling wedge means into engagement with said rod.

2. A jack according to claim 1, in which said rolling wedge means consist of balls.

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No references cited.