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(72) Inventor JACK FRANK COSTA

(54) CLIMBING JACK

(71) We, N. F. BROOKER PTY. LIMITED, a Company incorporated in the State of New South Wales, Commonwealth of Australia, of Gibbes Street, Chatswood, New South Wales, 2067, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to an improved climbing jack of the type adapted for use in moving loads along a rod, for example for raising sliding moulds of the type used in concrete casting, the jack being provided with top and bottom automatically operating chucks adapted to surround the rod to be climbed and by engagement therewith to prevent downward but not upward movement of the jack, the operation of the jack being effected by fluid pressure on a piston in a cylinder.

Known jacks of this type suffer from the disadvantage of costly replacement of parts as wear occurs.

The object of the present invention is to provide a jack of the aforesaid type which is not only less expensive in initial manufacture but requires on maintenance an absolute minimum of replacement parts. The object of the present invention is primarily secured by having a one-piece casing; i.e. without a detachable cylinder and having a removable cylinder lining sleeve in the end of the casing above the top chuck.

In a general form the present invention provides a climbing jack comprising a casing housing top and bottom automatically operating chucks adapted to surround a rod to be climbed and by engagement therewith to prevent downward but not upward movement of the casing, the bottom chuck being stationary in the casing, the top chuck being displaceable axially relatively thereto and the casing extending above the top chuck to form a cylinder wall to the upper end of which a cylinder head is secured, a spring normally urging the top chuck away

from the bottom chuck, and a piston mounted in a removable cylinder lining sleeve housed in said cylinder, the piston being displaceable relative to said cylinder by admission to said cylinder of a working fluid and arranged to then displace said top chuck towards said bottom chuck and compress said spring.

The invention will be better understood by reference to the following description of a preferred embodiment which is illustrated in the accompanying drawing which shows a typical sectional elevation thereof.

A one-piece casing 1 of cylindrical form is threaded externally at the bottom end, and internally at the top end. A bottom chuck 2 is positioned in the bottom end of the casing, and retained therein by a lifting lug nut 3. This chuck is not attached directly to the casing but bears against a shoulder or rebate formed in the casing. The lifting lug nut 3 not only retains the bottom chuck within the casing but also provides a means of load transfer during the lifting operation of the jack.

Mounted within the jack casing 1 between the bottom chuck 2 and a top chuck 4 is a chuck recoil spring 5. The top chuck is slidably positioned in the bore of the casing 1. The two chucks may be of any conventional form and as illustrated are of the type described in Australian Patent 151,024. The top chuck is retained in the casing by means of the chuck retaining ring 6. A cylinder lining sleeve 7 is removably housed in the casing above the top chuck and bears hard down on the chuck retaining ring 6. Fitted within the cylinder lining sleeve 7 is a piston 8. Oil seals 9 and 10 are fitted to the top of the piston 8.

A cylinder head 11 is securely screwed into the casing 1 and further "O" ring seals 12 are provided to prevent leakage.

Access to the cylinder of a working fluid is by means of a single fluid inlet 13 provided in the cylinder head.

The jack casing 1 is slotted at 14 to permit indicating studs 15 to be attached to the

top chuck 4. The indicating studs 15 project through the casing 1 and indicate the amount of piston displacement. They also co-act with a piston stroke adjustment ring 16 to limit the amount of piston displacement.

The jack is adapted to climb the jack rod 17 in the following manner. Normally, under the load on the lifting lug nut 3 the jack rod 17 is firmly gripped by the bottom chuck 2, preventing any downward movement of the jack on the rod. When fluid under pressure is forced through the inlet 13 the piston 8 and hence top chuck 4 are at first forced downwardly a short distance causing the balls of the top chuck 4 to be wedged into close gripping engagement with the jack rod 17. At the limit of this small downward movement of the top chuck 4, the fluid then exerts pressure on the underface of the cylinder head 11 and reverses the tendency of relative movement between the bottom chuck 2 and the rod 17 thus freeing the balls of the bottom chuck 2 of their grip on the rod 17 and the jack rises up the rod with the lifted load being supported by the top chuck by its exerting pressure on the rod 17. During this upward movement, the piston 8 and the top chuck 4 remain stationary and the recoil spring 5 is compressed as the bottom chuck 2 rises. When the fluid pressure is released at the end of the upstroke, the load is again taken by the bottom chuck while the spring re-locates the top chuck.

WHAT WE CLAIM IS:—

1. A climbing jack comprising a casing housing top and bottom automatically op-

erating chucks adapted to surround a rod to be climbed and by engagement therewith to prevent downward but not upward movement of the casing, the bottom chuck being stationary in the casing, the top chuck being displaceable axially relatively thereto and the casing extending above the top chuck to form a cylinder wall to the upper end of which a cylinder head is secured, a spring normally urging the top chuck away from the bottom chuck, and a piston mounted in a removable cylinder lining sleeve housed in said cylinder, the piston being displaceable relative to said cylinder by admission to said cylinder of a working fluid and arranged to then displace said top chuck towards said bottom chuck and compress said spring.

2. A climbing jack as claimed in claim 1 wherein said bottom chuck is retained within the casing by a lifting lug nut which is threadably mounted upon the bottom end of the casing.

3. A climbing jack as claimed in claim 1 or in claim 2 wherein said piston is affixed to said top chuck.

4. A climbing jack as claimed in any one of the preceding claims wherein the cylinder head is secured to said cylinder wall by means of a retaining ring which is threadably mounted on the upper end of said casing.

5. A climbing jack substantially as described and illustrated in the accompanying drawing.

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top chuck 4. The indicating studs 15 project through the casing 1 and indicate the amount of piston displacement. They also co-act with a piston stroke adjustment ring 16 to limit the amount of piston displacement.

The jack is adapted to climb the jack rod 17 in the following manner. Normally, under the load on the lifting lug nut 3 the jack rod 17 is firmly gripped by the bottom chuck 2, preventing any downward movement of the jack on the rod. When fluid under pressure is forced through the inlet 13 the piston 8 and hence top chuck 4 are at first forced downwardly a short distance causing the balls of the top chuck 4 to be wedged into close gripping engagement with the jack rod 17. At the limit of this small downward movement of the top chuck 4, the fluid then exerts pressure on the underface of the cylinder head 11 and reverses the tendency of relative movement between the bottom chuck 2 and the rod 17 thus freeing the balls of the bottom chuck 2 of their grip on the rod 17 and the jack rises up the rod with the lifted load being supported by the top chuck by its exerting pressure on the rod 17. During this upward movement, the piston 8 and the top chuck 4 remain stationary and the recoil spring 5 is compressed as the bottom chuck 2 rises. When the fluid pressure is released at the end of the upstroke, the load is again taken by the bottom chuck while the spring re-locates the top chuck.

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2. A climbing jack as claimed in claim 1 wherein said bottom chuck is retained within the casing by a lifting lug nut which is threadably mounted upon the bottom end of the casing.

3. A climbing jack as claimed in claim 1 or in claim 2 wherein said piston is affixed to said top chuck.

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