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53

CROSS REFERENCE
Search Room

June 2, 1942. E. P. GRIME 2,284,958

SELF-HOLDING JACK

Filed Nov. 2, 1940

Fig. 1

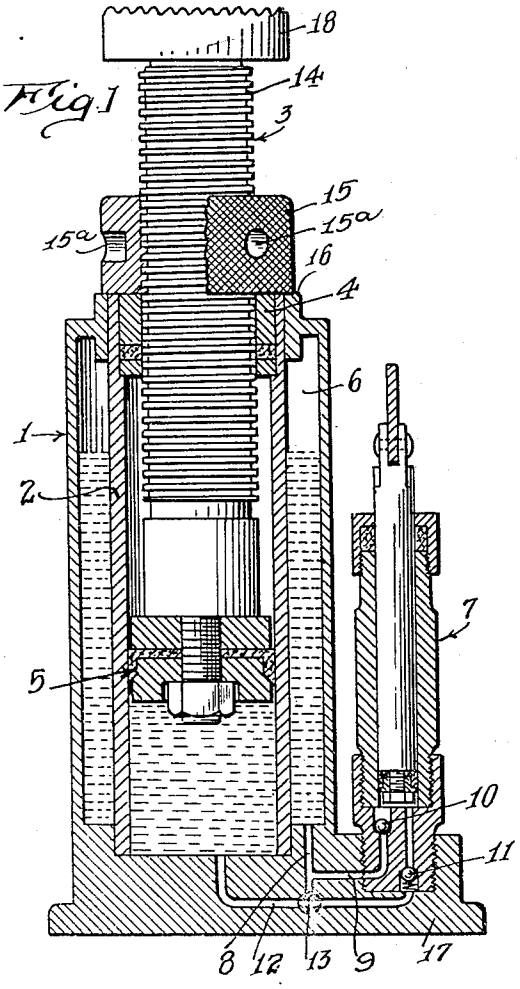
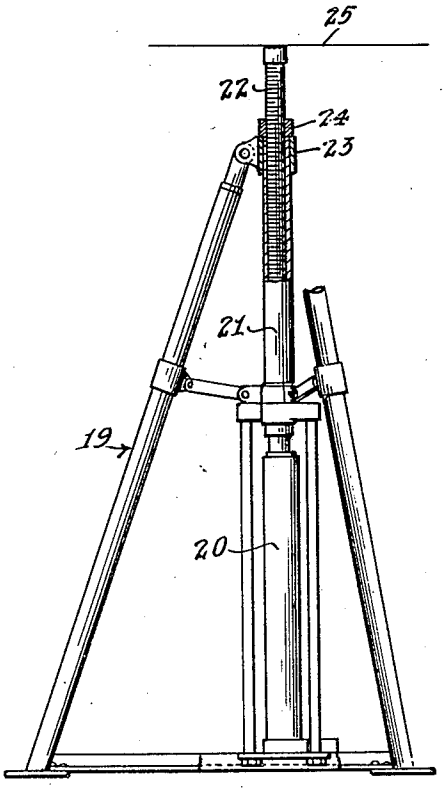


Fig. 3



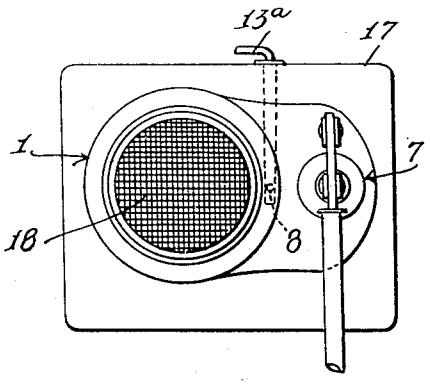


Fig. 2

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Patented June 2, 1942 2,284,958

UNITED STATES PATENT OFFICE

2,284,958

SELF-HOLDING JACK

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Application November 2, 1940, Serial No. 364,011

1 Claim. (Cl. 254—1)

This invention relates to power jacks or similar means capable of raising or supporting a load. Such jacks have many uses. The present invention is particularly useful when applied to fluid-operated jacks such as employed in various industrial operations, such for example, for supporting an airplane in an upright position.

One of the objections to a fluid-operated jack is that unless the fluid pressure is maintained in the power cylinder, the plunger of the jack will gradually recede from the position to which it has been advanced by the fluid pressure. One of the objects of this invention is to provide simple means for overcoming this objection.

One of the objects of the invention is to provide an adjustable jack which is particularly useful in connection with a tripod for operating as a shore for an airplane wing. Two such shores would be used, one under each wing of an airplane, to assist in supporting an airplane on the ground in its proper position, and so as to resist any tendency of the airplane to list due to wind action on the wings.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient self-holding jack.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Fig. 1 is a vertical section through a jack of simple construction embodying our invention.

Fig. 2 is a plan of the jack illustrated in Fig. 1, upon a smaller scale.

Fig. 3 is a side elevation of a tripod type of jack embodying the invention, certain parts being broken away, and others being shown in section.

In practicing the invention I provide a plunger guided so that it will be extended through the medium of fluid-actuated means. This plunger is formed on its exterior with convolutions to form circumferential supporting shoulders cooperating with the plunger. I provide a locking member having an opening with convolutions to register with the convolutions on the side of the plunger and mounted so that it can rest on a relatively fixed seat. This will support the plunger in its extended position regardless of whether the fluid pressure becomes reduced, as would happen by reason of a leaky valve or leaky packing.

In Fig. 1 I illustrate a simple embodiment of the invention comprising a casing or housing 1 for a cylinder or barrel 2, carrying a plunger 3 guided to slide through a bushing 4 and be extended by fluid pressure in the inner end of the cylinder under the piston 5 that is carried at the inner end of the plunger.

Any suitable means may be provided for supplying fluid under pressure to the cylinder 2. In the present instance the annular space between the cylinder wall and the casing wall, is utilized as a reservoir 6.

A hand pump 7, when operated, will withdraw operating fluid such as oil from the reservoir through the ducts 8 and 9, and past the inlet valve 10 on each up stroke of the pump. On each down stroke the fluid is forced past the spring-closed check valve 11 into the duct 12 that leads into the cylinder. At the junction of the ducts or passages 8 and 12, a three-way cock 13 is located. By turning the cock 13 by means of its handle 13*a* through 90° in a clockwise direction as viewed in Fig. 1, the ports in the cock can connect the passages 8 and 12 directly to permit the liquid to flow back freely to the reservoir.

The exterior of the plunger 3 is formed with convolutions preferably consisting of a continuous square thread 14 presenting shoulders, or a continuous helical shoulder. Cooperating with the convoluted plunger, I provide a locking member 15 in the form of a solid block with an opening to receive the plunger, and having convolutions to register with the convolutions on the side of the plunger.

When the plunger has convolutions in the form of a continuous thread, the locking member is in the form of a solid threaded nut. The thread of the nut fits the thread of the plunger.

After the plunger 3 has been advanced to raise or support the load, the nut 15 should be rotated so as to bring its inner face onto the seat 16, which, in the present instance, is the end of the housing or the barrel 2. The nut will then prevent any recession of the plunger from the position to which it has been extended, regardless of whether the liquid under the head 5 leaks past it or past the cock 13 or the check valves.

The ports for the liquid to flow in or out of the barrel, and other communicating ports, may be molded or drilled in the base 17 of the jack, as shown in Fig. 1.

The upper end of the jack may be provided

with the usual head 18 to engage the under side of the part to be supported.

In Fig. 3 I illustrate the invention applied to a tripod type of jack, in which a multiple legged frame such as a tripod 19 is provided, supporting a fluid-operated jack cylinder 20 in a central position directly under a plunger guide 21 in which a threaded plunger 22 is guided so that it can be extended upwardly above a sleeve 23 forming the upper end of the tripod. This sleeve forms a fixed seat for a locking member in the form of a nut 24 received on the thread of the plunger. This type of jack is useful when placed under an airplane wing indicated at 25, to assist in holding the airplane in an upright position. A pump, not illustrated, similar to the pump 7, can be employed with this tripod jack, or hose may be employed for conducting operating fluid to the cylinder 20.

The device illustrated in Fig. 3 embodying my invention, is very useful as a shore to be placed under the wings of an airplane to hold the same temporarily against listing. This is of practical advantage to hold an airplane in an upright position, that is being worked on in the factory; also as a temporary shore for keeping an airplane in an upright position on a landing field in case the wind is very strong, and particularly where the wind is coming from the side of the airplane.

Although these jacks have been described as hydraulic jacks, it is obvious that the invention is applicable to a jack plunger operated by compressed air or any other kind of power.

The nut 15 preferably has a knurled exterior so that it can be rotated down onto its seat by hand, and in order to enable the jack to be used as a mechanical screw jack if desired, the periphery of the nut is provided with spaced sockets 15a to receive a lever for rotating the nut. This gives the jack double utility.

Many other embodiments of the invention may be resorted to without departing from the spirit of the invention.

What I claim is:

In a power-jack to be used as a shore for supporting an airplane wing, the combination of a frame to be set under the wing, a fluid-operated cylinder and plunger located at the lower part of the frame, said plunger having a threaded extension extending above the frame, a plunger guide for the threaded extension secured to said frame, said parts cooperating to enable the plunger to be advanced by fluid pressure so that the upper end of the threaded extension is substantially in contact with the underside of the airplane wing, and a nut carried on the threaded extension operating to seat on the upper end of said frame adjacent the upper end of said plunger guide and capable of being rotated to raise the upper end of the threaded extension gradually and continuously to bring the same into firm contact with the underside of the airplane wing and to maintain the threaded extension in position regardless of leakage of fluid from the cylinder below the plunger.

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