Nov. 22, 1949 A. L. FRANKS 2,489,022

BLOCK AND TACKLE LIFTING APPARATUS

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Fig. 1.

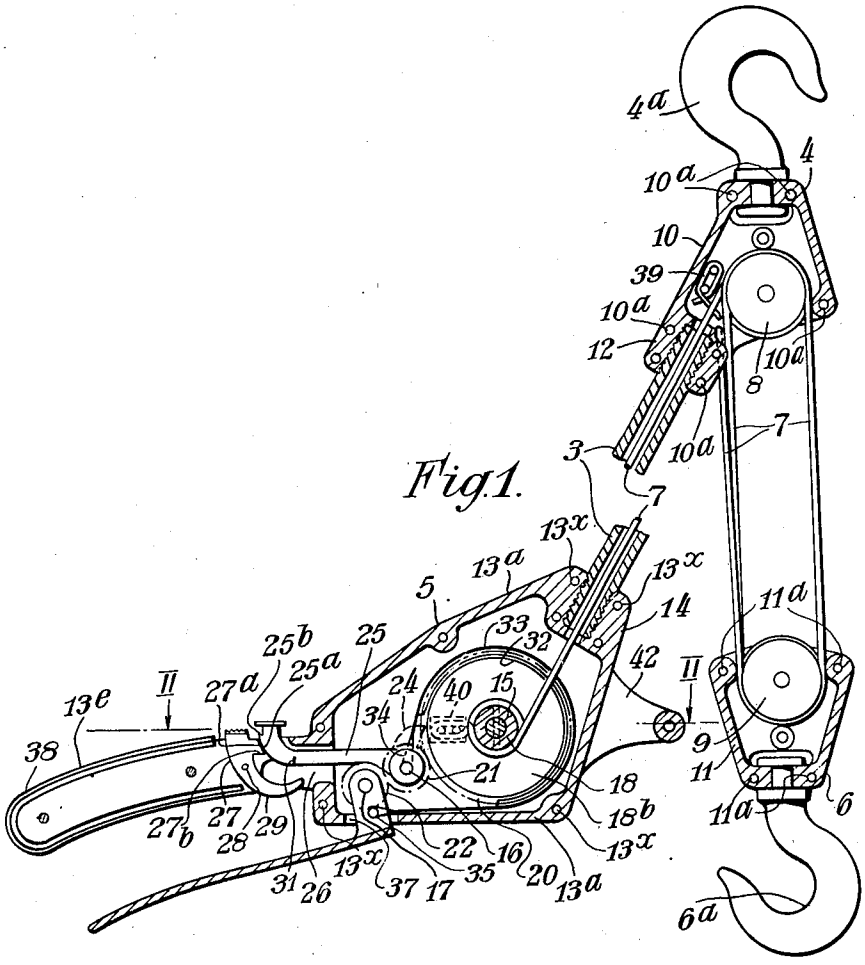
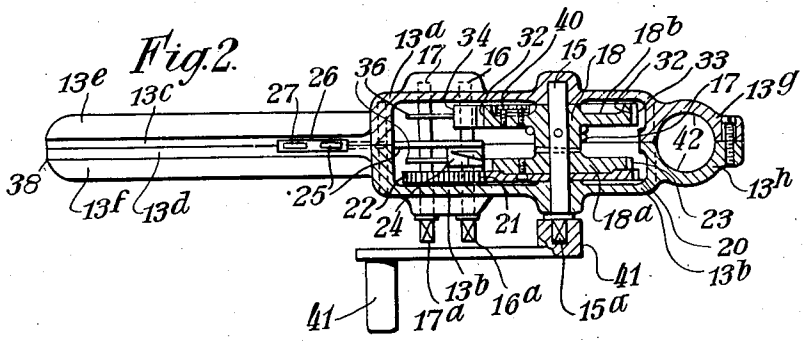


Fig. 2.



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BLOCK-AND-TACKLE LIFTING APPARATUS

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11 Claims. (Cl. 254—167)

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This invention relates to block-and-tackle lifting apparatus, one of its objects being to provide an improved apparatus which can readily be applied to an overhead support and suspended therefrom during use.

Another object of the invention is to provide improved means whereby the lifting apparatus may be operated from its lower end when applied and suspended as aforesaid.

Further objects of the invention include the provision of improved means for sustaining the load during lifting, for releasing the sustaining means to enable lowering of the load, and for controlling the speed at which the load is lowered.

The invention is hereinafter further described with reference to the accompanying drawing in which Fig. 1 is a vertical section of one embodiment of it in a multi-purchase tackle and Fig. 2 is a sectional plan on the line II—II in Fig. 1.

Referring to the drawing, 3 is a steel tube, 4 is a standing block mounted on the upper end of the tube 3, 5 is a winch mounted on the lower end of the tube, 6 is a running block complementary to the standing block 4 and 7 is the fall which passes around the sheaves 8 and 9 of the blocks 4 and 6, respectively. There may be any desired number of sheaves in the blocks 4 and 6.

The frame 10 of the standing block 4, which is conveniently made in halves secured together by screws 10*a*, is formed with an internally screw-threaded socket 12 into which the externally screw-threaded upper end of the tube 3 is screwed.

The frame 11 of the running block 6 is also conveniently made in halves which are secured together by screws 11*a*.

The frame 10 of the standing block 4 has mounted on it a swivel hook 4*a* by means of which the tackle can be suspended from an overhead support and the frame 11 of the running block 6 has mounted in it a swivel hook 6*a* for attachment to the load.

The winch 5 comprises a casing made in halves 13*a*, 13*b* secured together by screws 13*x*, and formed with an internally screw-threaded socket 14 into which the externally screw-threaded lower end of the tube 3 is screwed. In the winch casing are mounted three rotatable axles 15, 16 and 17, which extend through the casing at one side and are formed with squared ends 15*a*, 16*a* and 17*a*, respectively.

On the axle 15 is mounted a winding drum 18 the flange 18*a* of which has fixed on it a

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spur wheel 20 with which gears a pinion 21 fixed on the axle 16 and with which in turn gears a pinion 22 of different size fixed on the axle 17. The periphery of the drum flange 18*a* is formed as a ratchet or like wheel 23. With the wheel 23 co-acts a pawl 24 freely pivoted on the axle 16 and provided with an operating piece 25 which extends into and through a recess 26 formed between rearward extensions 13*c*, 13*d* of the half-casings 13*a*, 13*b*, respectively. With the operating piece 25 is associated a catch 27 pivoted in the recess 26 at 28. The catch 27 is formed with a tail 29 between which and the operating piece 25 is interposed a C-shaped spring 30 which is anchored in the operating piece at 31 and normally maintains the pawl 24 in engagement with the wheel 23 to prevent rotation of the drum 18 in an anti-clockwise direction as viewed in Fig. 1. The operating lever 25 and the catch 27 are formed with co-operative cam surfaces 25*a*, 27*a* and engaging parts 25*b*, 27*b*, respectively, whereby upon depression of the operating piece 25 the pawl 24 is first rocked on the axle 16 to disengage it from the wheel 23, following which the part 27*b* on the catch 27 snaps into engagement with the part 25*b* on the piece 25 to retain the latter depressed and the pawl clear of the wheel 23 to permit free rotation of the drum 18 in the aforesaid anti-clockwise direction.

The periphery of the flange 18*b* of the drum 18 is formed with a braking surface 32 which is encircled by a brake band 33. One end of the band 33 is anchored at 34 on the axle 16 and the other end is anchored at 35 on a brake lever 36 pivoted on the axle 17. The lever 36 is of more or less L-shape, the shorter arm of the lever being of U-formation and extending through an aperture 37 into the winch casing and its longer arm extending below the extensions 13*c*, 13*d* which latter have secured to them haft pieces 13*e*, 13*f*, respectively, to form a handle 38 which can be grasped to steady the tackle during use.

The standing end of the fall 7 is anchored at 39 on the frame 10 of the standing block 4. The running end of the fall passes down the interior of the tube 3, round the barrel of the winding drum 18, through a hole in the flange 18*b* of the drum and is anchored at 40 on the outer side of the flange.

In use the tackle is first suspended by engaging the suspension hook 4*a* with a suitable overhead support and the lifting hook 6*a* is attached to the load. The operator, while grasping the

handle 38 to steady the tackle, then rotates the winding drum 18 by means of a winding lever 41 which can be applied to the squared end of the axle 15 to rotate the drum directly or to the squared end of either of the axles 16 and 17 to rotate the drum through the corresponding reduction gear provided by the pinion 21 or the pinions 21 and 22, depending upon the weight of the load which latter is sustained during lifting by the engagement of the pawl 24 with the wheel 23. To lower the load the pawl 24 is disengaged from the wheel 23 by depressing the end of the operating piece 25 until the latter is held by the catch 27. The load can then be lowered under control by manipulating the brake lever 36 to actuate the brake band 33.

It will be apparent that as the running end of the fall 7 passes through the interior of the tube 3 the latter is always in compression and is not at any time subjected to much bending strain.

When the tackle is not in use the lifting hook 6a may be engaged with an eye 42, constituted by parts 13g, 13h formed on the winch half-casings 13a, 13b, respectively, and the fall 7 wound taut to prevent the fall and the lifting block from getting tangled.

The tackle is readily portable and the tube 3 serves as a pole for engaging the suspension hook 4a with an overhead support such as e. g. a roof tie or beam. Accordingly, the tackle is especially suitable for use in garages for such jobs as lifting engines out of motor vehicles, and in other cases where it requires to be used only at intervals.

If desired, the tube 3 may be made in two or more parts hinged together or otherwise arranged and adapted to be extended in line and locked when the tackle is to be used and to be folded together or telescoped to occupy reduced space when the tackle is not in use.

What I claim is:

1. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle.

2. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle and a catch for said piece.

3. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle, said piece and catch being at the upper part of said handle and said lever being below said handle.

4. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle, said drum having outer flange, said brake operating on one flange and said pawl operating on a ratchet formed on the other flange.

5. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle, a pair of countershafts parallel to said drum shaft and having reduction pinions meshing with each other and with a gear on said drum shaft, and means for alternately applying a winding lever to said shafts.

6. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle, a pair of countershafts parallel to said drum shaft and having reduction pinions meshing with each other and

with a gear on said drum shaft, and means for alternately applying a winding lever to said shafts, one end of said band being mounted on a countershaft.

7. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle, a pair of countershafts parallel to said drum shaft and having reduction pinions meshing with each other and with a gear on said drum shaft, and means for alternately applying a winding lever to said shafts, said pawl being mounted on a countershaft.

8. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle, a pair of countershafts parallel to said drum shaft and having reduction pinions meshing with each other and with a gear on said drum shaft, and means for alternately applying a winding lever to said shafts, said lever being mounted on a countershaft.

9. A portable block-and-tackle lifting device comprising a standing block having suspension means, a running block hung from said standing block by a fall, a tube through which the running end of said fall passes having the upper end anchored in said standing block, the axis of said tube forming an acute angle with the fall passing through said blocks when said blocks hang freely, a winch casing, the lower end of said tube anchored in said casing, a handle on the side of said casing opposite to said tube, a winding drum for said fall in said casing secured on a shaft extending through said casing, a brake band and a pawl-and-ratchet on said drum and a pawl operating piece and a brake lever for said elements extending in proximity to said handle, an eye on said casing extending toward said running block and means for attaching said block to said eye.

10. A portable block-and-tackle lifting device consisting essentially of a single standing block having means for attaching the same to a support, a fall extending vertically downward from said block, a running block in which the running end of said fall is mounted, a tube extending diagonally downward from said standing block, the axis of said tube forming an acute angle with the line passing through said blocks when said blocks hang freely, a winch casing at the lower end of said tube, a fall in said tube between said standing block and winch casing, a handle fixed to said casing and extending away from said running block, and winch mechanism in said casing connected to said fall, operating means for said mechanism adjacent to said handle extending from said casing and operable by the hand grasping said handle.

11. A portable block-and-tackle lifting device consisting essentially of a single standing block having means for attaching the same to a support, a fall extending vertically downward from said block, a running block in which the running end of said fall is mounted, a tube extending diagonally downward from said standing block, the axis of said tube forming an acute angle with the line passing through said blocks when said blocks hang freely, a winch casing at the lower end of said tube, a fall in said tube between said standing block and winch casing, a handle fixed to said casing and extending away from said running block, and winch mechanism in said casing connected to said fall, operating means for said mechanism adjacent to said handle extending from said casing and operable by the hand grasping said handle, said operating means including a winding drum operating piece and a brake lever.

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