May 27, 1941. N. C. BAIRD 2,243,664

BLOCK AND TACKLE LIFTING AND LOWERING DEVICE

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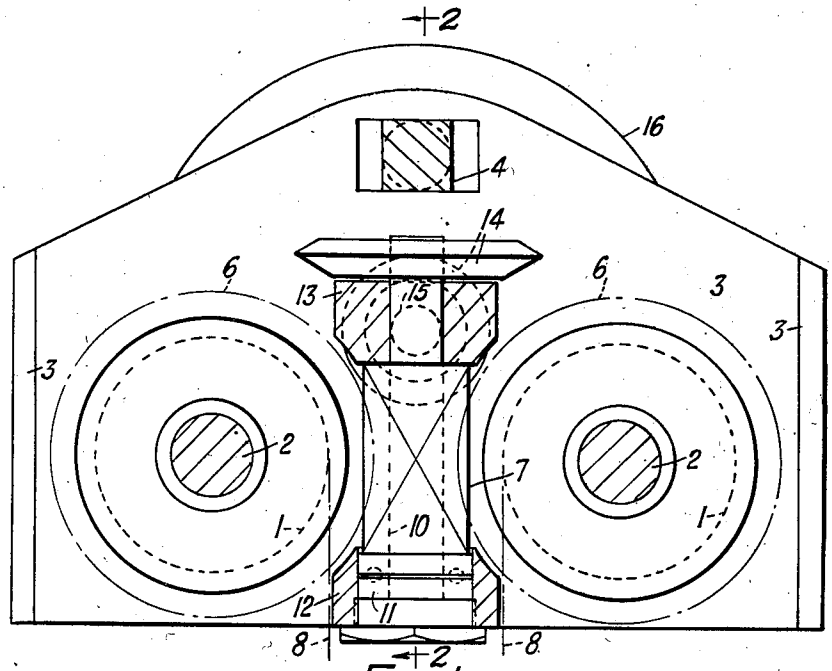


FIG. 1.

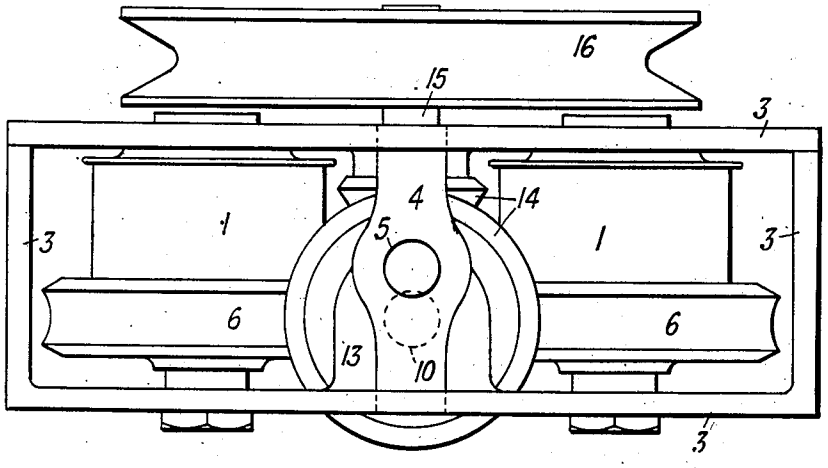


FIG. 3.

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BLOCK AND TACKLE LIFTING AND LOWERING DEVICE

Filed Aug. 23, 1939 3 Sheets-Sheet 2

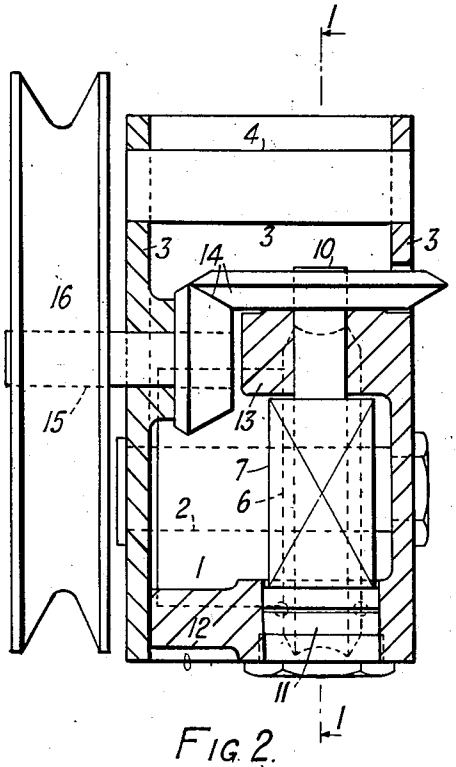


FIG. 2.

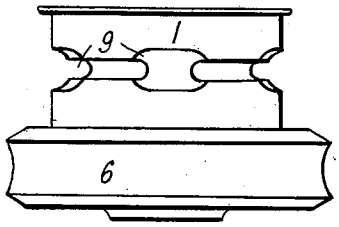


FIG. 4.

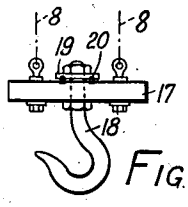


FIG. 5.

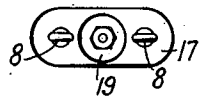


FIG. 6.

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May 27, 1941. N. C. BAIRD 2,243,664

BLOCK AND TACKLE LIFTING AND LOWERING DEVICE

Filed Aug. 23, 1939 3 Sheets-Sheet 3

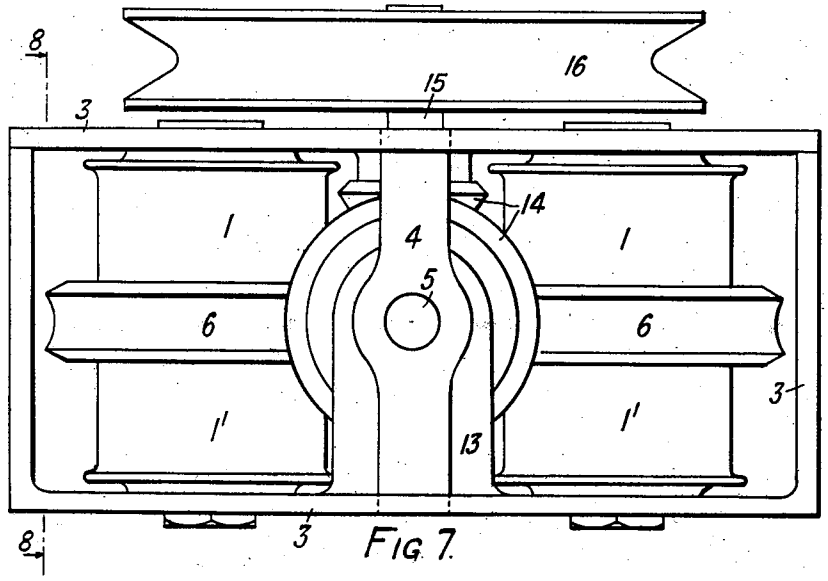


FIG. 7.

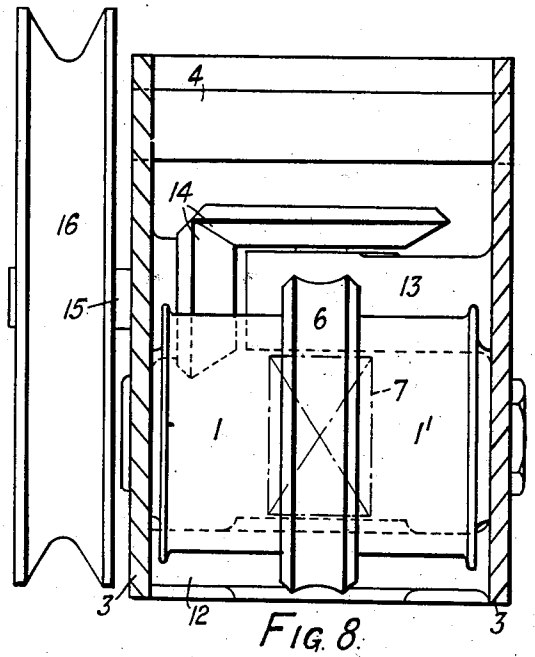


FIG. 8.

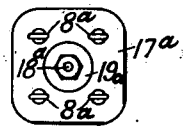


FIG. 9.

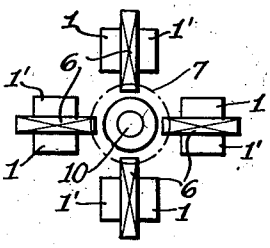


FIG. 10.

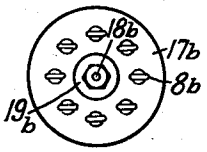


FIG. 11.

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Patented May 27, 1941

2,243,664

UNITED STATES PATENT OFFICE

2,243,664

BLOCK AND TACKLE LIFTING AND LOWERING DEVICE

Norman Charles Baird, Glasgow, Scotland, assignor to Albion Patents Limited, Glasgow, Scotland, a corporation of Great Britain and Northern Ireland

Application August 23, 1939, Serial No. 291,580
In Great Britain September 3, 1938

1 Claim. (Cl. 254—170)

The invention relates to an improvement in block and tackle lifting and lowering devices.

An object of the invention is to provide an improved block and tackle lifting and lowering device of simple construction in which the load is self-sustained.

A block and tackle lifting device, according to the invention, incorporates a pair of drums or pulleys carried by a block casing, a worm wheel integral with or secured to each drum or pulley, a worm adapted to drive both worm wheels and means for driving said worm.

The worm is secured on a vertical spindle provided with a bevel wheel adapted to be driven by a bevel wheel secured on a horizontal spindle provided with a driving wheel.

Each drum or pulley of the pair of drums or pulleys may be constituted by a double drum or pulley, each double drum or pulley incorporating two drums or pulleys secured to or integral with a worm wheel which is interposed between said drums or pulleys.

If desired, the block and tackle lifting device may incorporate four double drums or pulleys, each double drum or pulley being integral with or secured to a worm wheel which gears with a centrally arranged worm.

Figs. 1 and 2 of the accompanying drawings are respectively, sectional elevations taken on the lines 1—1 of Fig. 2, and 2—2 of Fig. 1 of a block and tackle lifting device according to an embodiment of the invention.

Fig. 3 is a plan view corresponding to Fig. 1.

Fig. 4 is a plan view of one of the drums or pulleys shown by Figs. 1, 2 and 3.

Figs. 5 and 6 are respectively an elevation and a plan view of a lifting plate for use in connection with the block shown by Figs. 1, 2 and 3.

Figs. 7 and 8 are respectively a plan view and a section taken on the line 8—8 of Fig. 7 of a modified block and tackle lifting device.

Fig. 9 is a plan view of a lifting plate for use in connection with the block shown by Figs. 7 and 8.

Fig. 10 is a diagram illustrating a further modification.

Fig. 11 is a plan view of a lifting plate for use in connection with the block shown by Fig. 10.

As illustrated by Figs. 1, 2 and 3, the block and tackle device of the invention may include two drums or pulleys 1 of the same diameter mounted on parallel axles 2 carried by a block casing which may be constituted by front, rear and side walls 3. The front and rear walls may carry a bar 4 formed with a hole 5 adapted to receive an eyebolt, link, hook or other device whereby the block may be suspended. Alternatively, the block, which presents a flat bottom may be supported by spaced girders or the like on which the flat bottom of the block may rest.

Each drum or pulley 1 is provided with a worm wheel 6. Both worm wheels 6 are adapted to be driven by a worm 7 located intermediate the worm wheels. A chain, rope or cable 8 may be secured to each drum 1 so as to be wound thereon and unwound therefrom on the rotation of the drums, in opposite directions, by means of the worm and worm wheel driving mechanism.

Alternatively, the chains 8 or the like, instead of being wound on the drums may be trained over the drums. An end of each chain may be anchored to the block.

As shown by Fig. 4, each drum may be formed with recesses 9 in which the links of the chains 8 may engage so as to prevent slip of the chains over the drums or pulleys.

The worm 7 may be secured on a vertical spindle 10 supported by ball or roller bearings 11 carried by a lower bracket 12 which may be formed integral with the front wall of the block casing. The upper end of the spindle 10 may be supported on a bracket 13 also formed integral with the front wall of the block casing. The spindle 10 may be driven by means of bevel wheels 14 and shaft 15 provided with a chain or rope wheel 16.

The lower ends of the chains 8 or the like may be secured to a plate member 17 (Figs. 5 and 6) which may be penetrated by the shank of a hook 18, eyebolt or other suitable device adapted to be attached to the load to be lifted.

Desirably, the upper end of the shank of the hook 18 or the like is provided with a washer 19 between which and the plate member 17 ball or roller bearings 20 may be provided.

According to the embodiment illustrated by Figs. 7 and 8, the block and tackle device may include two double chain-pulleys mounted on parallel axles 2 carried by the block casing. Each double pulley is provided with a worm wheel 6 and incorporates two single chain-pulleys 1, 1' having the worm wheel 6 interposed therebetween, the single pulleys 1, 1' being integral with the worm wheel 6 one on each side thereof.

The worm 7 gears with both worm wheels 6 as described with reference to Figs. 1, 2 and 3.

The upper end of the vertical spindle 10 may be provided with or formed as a hook whereby the block may be suspended. Alternatively and

as shown, the block may be provided with the bar 4.

If desired the upper end of the spindle 10 may be provided with a ball or roller bearing.

A lifting chain is attached to and wound on each pulley 1, 1', or trained over each pulley and the four chains may be attached to a plate 17a (Fig. 9) at equal distances from a lifting hook 18a or the like, the shank of which penetrates the plate 17a and is provided with a washer 19a between which and the plate 17a ball or roller bearings may be arranged. Conveniently and as shown by Fig. 9, the plate 17a is rectangular and a lifting chain 8a is attached thereto adjacent to each corner thereof.

Rotation of the driving pulley 16 effects rotation of the worm 7 which rotates the worm wheels 6 whereby the plate 17a is raised or lowered.

Fig. 10 illustrates diagrammatically an arrangement of four worm wheels 6 each provided with two pulleys 1, 1'. The four worm wheels 6 gear with a centrally located worm 7 carried by a vertical spindle 10.

A chain is trained over each chain pulley 1, 1'. These chains 8b, of which there are eight, may be anchored to the block casing and are connected to a plate member 17b (Fig. 11) at equal distances from a lifting hook 18b or the like the shank of which may be provided with a washer 19b between which and the plate 17b ball or roller bearings may be arranged.

What is claimed is:

A block and tackle lifting and lowering device comprising a block casing having front and rear walls connected by side or end walls, a pair of horizontally spaced spindles carried by the front and rear walls of said block casing, a drum or pulley rotatably mounted on each spindle, a worm wheel carried by each drum or pulley, a vertical spindle supported by brackets formed integrally with a wall of said block casing, a worm secured on said vertical spindle and gearing with said worm wheels, a horizontal spindle supported by the rear wall of said block casing, bevel wheels operatively connecting the said latter horizontal spindle and the said vertical spindle, a driving wheel carried by said latter horizontal spindle, and load supporting chains, ropes or cables trained over said drums or pulleys.

NORMAN CHARLES BAIRD.