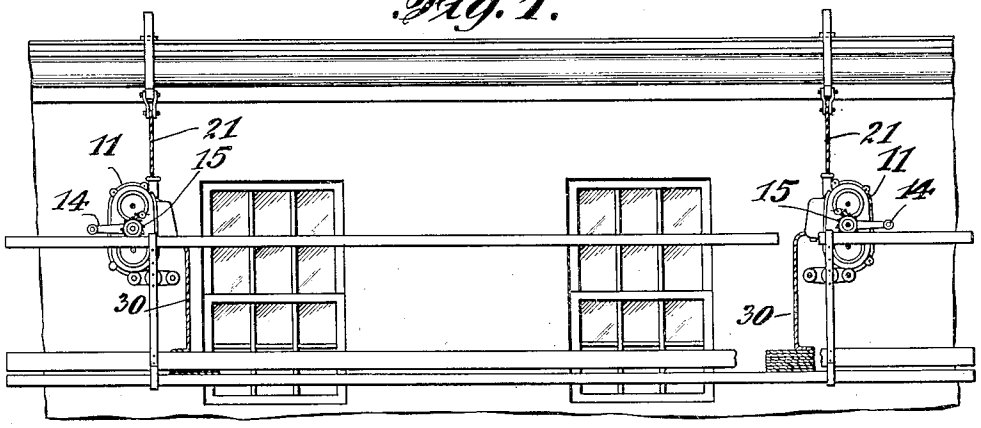
Aug. 28, 1928. 1,682,083

F. B. JOHNSTON

LIFTING APPARATUS

Filed Jan. 6, 1927 3 Sheets-Sheet 1

Fig. 1.



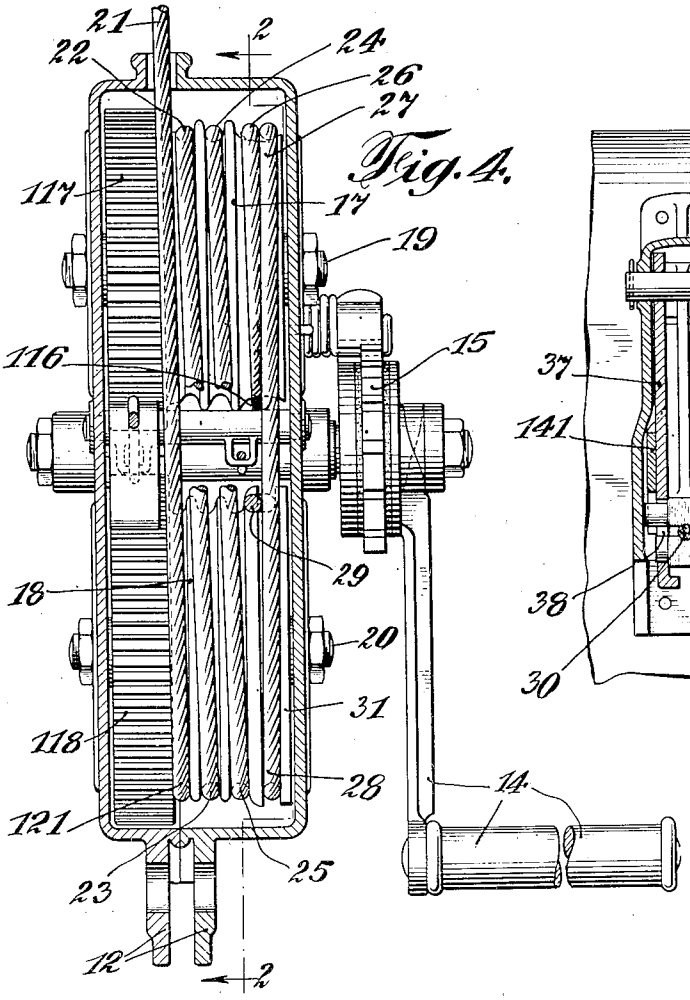
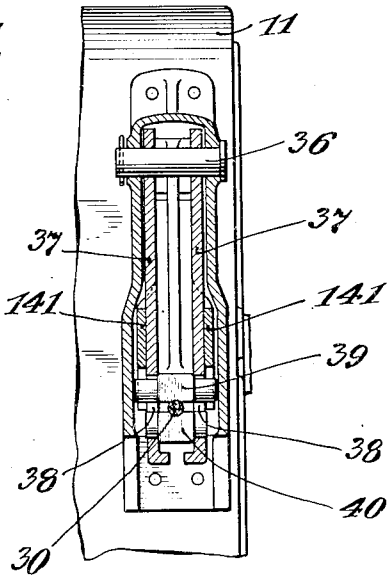


Fig. 4.

Fig. 5.



INVENTOR
Frank B. Johnston
BY C. P. Goepel
his ATTORNEY.

Aug. 28, 1928.

1,682,083

F. B. JOHNSTON

LIFTING APPARATUS

Filed Jan. 6, 1927

3 Sheets-Sheet 2

Fig. 2.

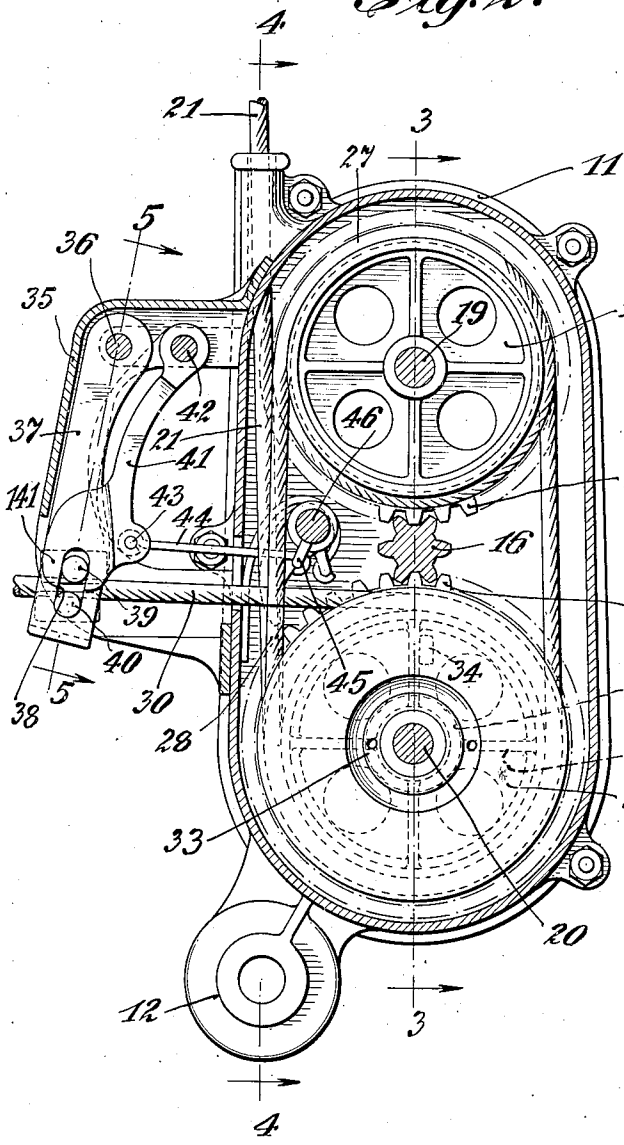
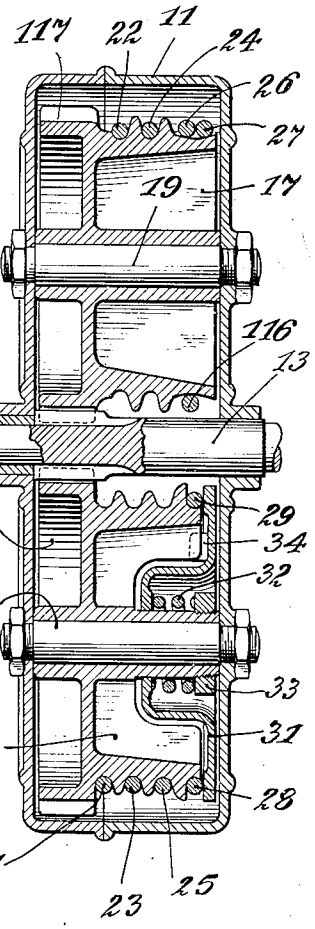


Fig. 3.



INVENTOR

Frank B. Johnston

BY C. P. Goepel

his ATTORNEY.

Aug. 28, 1928. 1,682,083

F. B. JOHNSTON

LIFTING APPARATUS

Filed Jan. 6, 1927 3 Sheets-Sheet 3

Fig. 6.

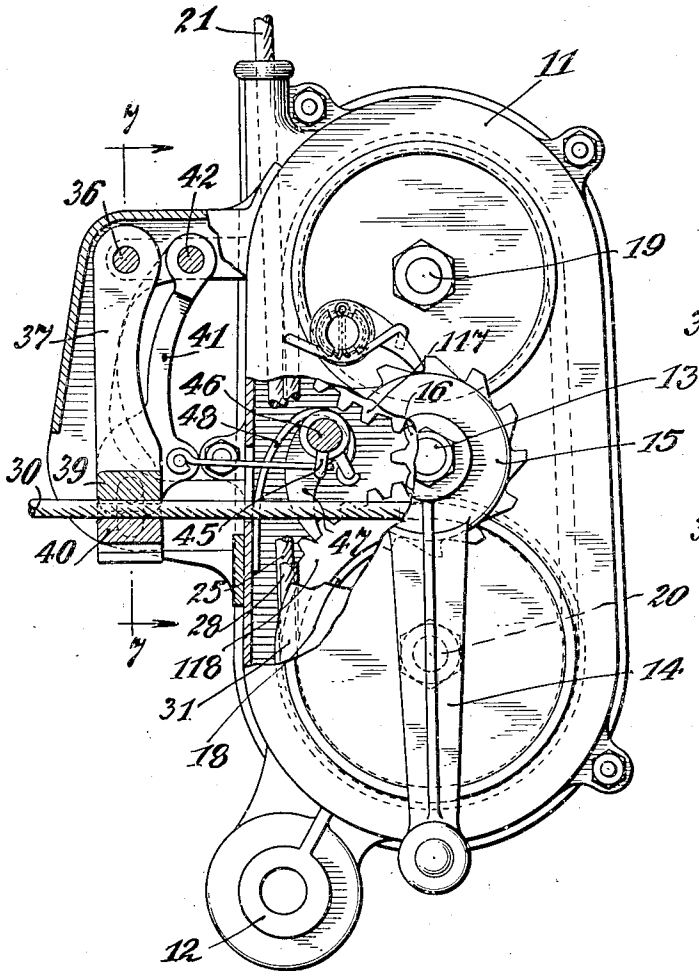
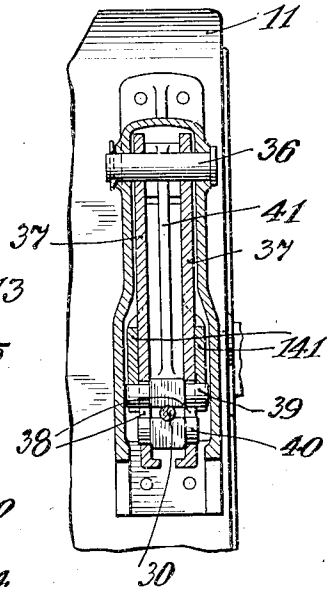


Fig. 7.



INVENTOR

Frank B. Johnston

BY C. P. Goepel

His ATTORNEY.

Patented Aug. 28, 1928. 1,682,083

UNITED STATES PATENT OFFICE.

FRANK B. JOHNSTON, OF ROSELLE PARK, NEW JERSEY, ASSIGNOR TO AMERICAN SAFETY DEVICE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

LIFTING APPARATUS.

Application filed January 6, 1927. Serial No. 159,273.

My invention refers to transportable lifting apparatus and in particular to such lifting apparatus as may be used in connection with scaffolding, where ropes or cables suspending from a roof or from some other high point of support carry a platform for the working men, and by corresponding actuation of the lifting apparatus this platform may be raised or lowered along the ropes or cables.

My invention consists further in providing such portable lifting apparatus for scaffoldings as can be operated either by the workman himself who is on the platform, by means of a crank which may be actuated by the workman on the platform or by a rope and pulley tackle to be operated from the ground or from somewhere else. An important particular of my invention consists in the arrangement of a safety device within my lifting apparatus, which safety device allows the rope or cable to pass through the apparatus only in one direction, but prevents it from slipping back in the other direction, by which arrangement accidents such as a sudden dropping down of the platform are made impossible, even if the workmen should lose control of the crank or other regulating means of the winding mechanism.

In carrying out the purposes in view I provide within a suitable casing two pulleys which are under control of a manually operated pinion, and around which the rope or cable is wound in several turns to provide the required frictional engagement for the operation of the said apparatus. Thereby the frictional resistance between the rope or cable and the one pulley is preferably increased by the arrangement of a spring pressed plate which presses on the rope or cable on this same pulley. In carrying out the above mentioned safety device I provide in my new and improved lifting apparatus two hinged arms with jaws forming a one way passage for the rope or cable but barring its passage in the other direction by jamming it between the jaws as soon as a back slipping movement swings the hinged arms to the other side. A further safety measure in my lifting apparatus consists in the arrangement of the toothing on one pulley in connection with a spring pressed ratchet adapted to engage this toothing and connections between the ratchet and the before mentioned hinged arms, which arrangement results in blocking the movement of the pulley as soon as the hinged arms of the safety device are not in the rope passing position.

To make clearer the principle of my invention and the ways of carrying it out, I have shown in the drawings a preferred embodiment, wherein the same reference numbers in the different figures indicate the same parts.

In the drawings, Figure 1 shows a side elevation of a part of a building provided with a movable scaffolding containing my improved lifting apparatus.

Figure 2 shows a vertical longitudinal section of the casing with the different parts contained therein partly in elevation, and partly in section.

Figure 3 is a vertical transversal section according to line 3—3 in Figure 2.

Figure 4 is a transversal vertical section according to line 4—4 in Figure 2.

Figure 5 is a transversal section according to line 5—5 in Figure 2.

Figure 6 is a partly cut side elevation corresponding to a certain extent to the longitudinal section of Figure 2.

Figure 7 is a transversal vertical section according to line 7—7 in Figure 6.

The casing 11 is composed of two parts assembled by bolts on their periphery, so as to form an easily dismountable box in which the members of the apparatus are arranged.

At the lower part of this apparatus there is a perforated split lug 12 in which can be placed an axle or a hook for suspending the load or for fixing the apparatus at a point, according to the use for which it is required.

At the end of an axle 13 carried by the casing is mounted a handle 14 and a ratchet gear 15 of the type of those generally used in lifting apparatus. This handle can be replaced by any chain arrangement as used in ordinary tackle.

The axle 13 carries a pinion 16 for actuating the grooved pulleys 17 and 18 which for this purpose are each provided with external teeth 117 and 118. These two pulleys are mounted loose on transverse axles 19 and 20 carried by the casing.

The metallic cable, actuated by the apparatus constituted in this way, is wound around the pulleys in the following manner: starting from the free end 21 which is attached to a fixed point and serves as a support for the apparatus, the cable 21 descends vertically, then

winds round the first groove of the pulley 18 at 121, (Figs. 3 and 4) and then rises slightly curved to wind round the first groove of the pulley 17 at 22.

As shown more particularly in Fig. 4, the cable is then wound on the pulley 18 at 23, then ascends again to the pulley 17 at 24 and descends to the pulley 18 at 25. Thence the cable ascends again and at 26 forms a complete turn round the pulley 17 at 116 which is at the lower part of this pulley. (See Fig. 3.) From the point 116 the cable is again wound up round a part of the pulley as shown at 27 and then re-descends to be wound almost completely round the groove of the pulley 18 where it is shown at 28, to leave finally at the upper part at 29 (Fig. 3). It leaves the apparatus at 30 in passing through two jaws of a safety device of which the action is explained below. The number of the grooves of the pulleys can be varied in dependence on the power to be applied to the apparatus.

The cable is drawn forward by the pressure exerted by a plate 31 on the parts 28 and 29 of this cable. This pressure is due to a spring 32 of which the tension is controlled by a nut 33 mounted on the hub of the pulley 18. The plate 31 is also carried by this hub; a pin 34 connecting the pulley 18 with the plate 31.

The safety device comprises a support 35 of the form shown fixed to the casing of the apparatus (Figs. 2 and 6). Two levers 37 are suspended on an axle 36 carried by the support. Each of these levers has a slot 38 in which engage the journals of two jaws, an upper 39 and a lower 40, between which passes the free end of the cable 30.

A lever 41 is suspended on an axle 42. This lever has an aperture at its lower part 141 surrounding the journals of the upper jaw 39. It carries also an axle 43 on which is a rod 44 terminating in a hook and controlling a stirrup piece 45. The stirrup is fixed on an axle 46 on the casing of the apparatus and supports a safety pawl 47 (Fig. 6). The pawl 47 is under permanent pressure of a leaf spring 48, which tends to press it into engagement with the toothing 118 of the pulley 18, thus blocking the latter against undesired reverse turning movement, whereas movement of the cable in the right direction (to the left in Figures 2 and 6) swings the lever 41 and the axle 46 so as to disengage the pawl 47 and to give the pulley 18 freedom for rotating movement.

The apparatus acts in the following manner: On actuating the handle the pinion 16 rotates at the same time the pulleys 17 and 18. The cable sets up frictional resistance in the grooves of these pulleys which in the application of my invention shown in Figure 1 draws up the apparatus and the platform and other load which it carries. In this movement the free end 30 of the cable leaves the apparatus toward the left, passing between the jaws 39 and 40. The friction of these jaws raises the whole of the system which pivots about the axes 36 and 42. The lever 41 raised in this way no longer rests on the journals of the jaw 39. The free end 30 of the cable can then leave freely (Figs. 2 and 5). At the same time the rod 44 acts on the stirrup 45 and disengages, by raising it, the pawl 47 from its engagement with the teeth of the pulley 18.

When the movement of the handle ceases the apparatus remains at rest by the action of the ratchet gear 15. Should any member break, the free end 30 of the cable tends to be drawn towards the right. In this movement the cable by friction draws the jaws also towards the right and consequently the levers 37 and the lever 41. The latter then rests on the jaw 39 (Figs. 6 and 7), and produces a pressure on this jaw, and consequently on the cable, which increases with the load.

The cable and the weight are then immovable. At the same time the rod 44 forced towards the right urges the stirrup 45 so that the pawl 47 falls by its own weight and by the pressure of the spring engages the teeth 118 of the pulley 18 which it arrests and forms thus a second automatic safety stop.

When lowering the platform supported by the lifting apparatus by turning the handle in the opposite direction to that of raising it, it is necessary to hold by hand the safety system device in the raised position.

The form and dimensions of the apparatus can be varied in accordance with the load to be manipulated. Instead of arranging the lifting apparatus on the platform itself as shown in the Figure 1, the arrangement may be just as well altered so as to fix the casing of the lifting apparatus somewhere on the ground and to guide the upper side of the cable 21 round a pulley somewhere on the topmost rigging of the house or the like and then down to any suitable fastening point on the platform.

My new and improved lifting apparatus may be further fixed with its split lug in any other position and may then be used as a jack for hoisting any kind of load or for other similar purpose.

I claim:

1. In a lifting apparatus as described, the combination of: a two shelled casing, two grooved pulleys mounted on parallel axes within the casing and each being provided with a gear, a manually operated pinion engaging with the gears of the pulleys, and a safety device consisting of a pair of levers pivotally supported by the casing in eccentric relation, and jaw members associated with the free ends of the levers, a cable encircling the pulleys and passing through said safety device, the jaw members being so disposed as

to permit of the passing of the cable between them in one direction, but to grip the said cable and prevent the opposite movement thereof.

2. In a lifting apparatus as described the combination of: a two shelled casing; two grooved pulleys mounted on parallel axes within the casing and being provided with a toothing; a manually operated pinion engaging with the toothing of the pulleys; a safety device consisting of two hinged arms with jaws forming a one way passage for a rope or cable but barring its passage in the other direction; a rope or cable encircling first the said pulleys and passed then through the said safety device; an adjustably spring pressed plate, pressing the rope or cable against the side of a groove of the one pulley.

3. In a lifting apparatus as described the combination of: a two shelled casing; two grooved pulleys mounted on parallel axes within the casing and being provided with a toothing; a manually operated pinion engaging with the pulleys; a safety device consisting of two hinged arms with jaws forming a one way passage for a rope or cable but barring its passage in the other direction; the said rope or cable encircling first the said pulleys and passing then through the said safety device; a checking control element acting in conjunction with one pulley to permit of its rotation in one direction, but causing complete stoppage when reversed, and the said element co-acting with the before mentioned hinged arms to bring the jaws thereof into gripping contact with the aforesaid cable.

4. In a lifting apparatus as described the combination of: a two shelled casing; two grooved pulleys mounted on parallel axes within the casing and being provided with a toothing; a manually operated pinion engaging with the toothing of the pulleys; a safety device consisting of two hinged arms with jaws forming a one way passage for a rope or cable but barring its passage in the other direction; a rope or cable encircling first the said pulleys and passed then through the said safety device; a spring actuated pawl adapted to engage the before mentioned toothing of the one pulley and connecting means between the jaw bearing arms and the spring actuated pawl, adapted to disengage the pawl from the toothing in the one end position of the said arms and cause engagement between the pawl and the toothing in the other end position of the said arms.

In testimony that I claim the foregoing as my invention, and have signed my name hereto.

FRANK B. JOHNSTON.