Aug. 22, 1933. A. FAURE ET AL 1,923,780

LIFTING APPLIANCE

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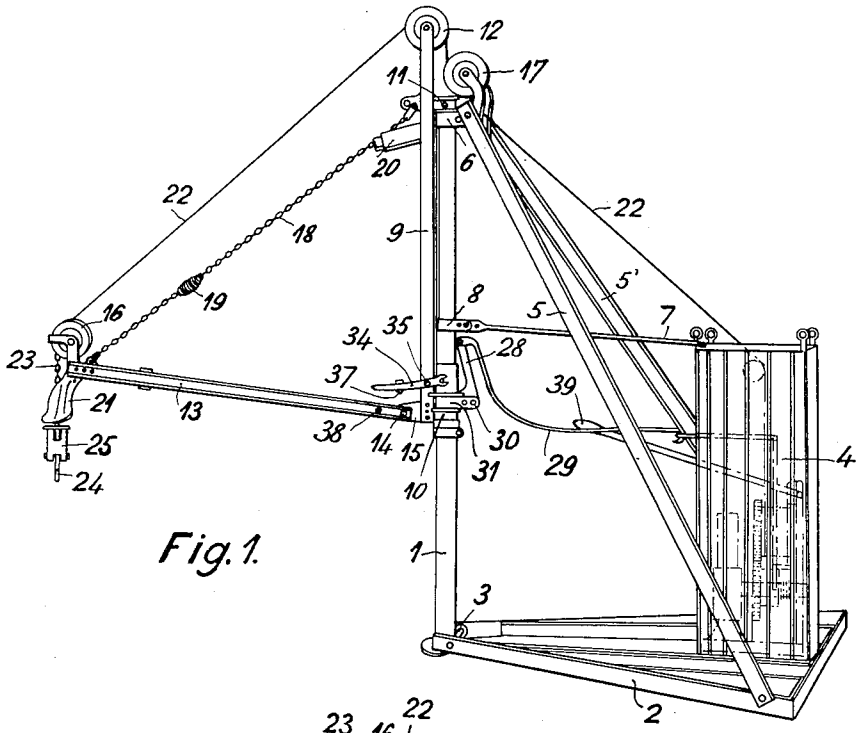


Fig. 1.

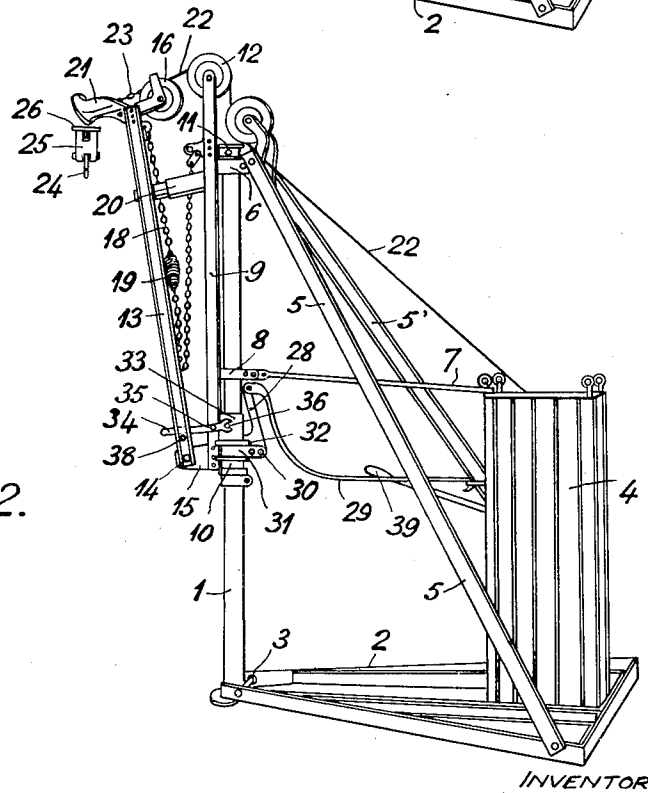


Fig. 2.

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LIFTING APPLIANCE

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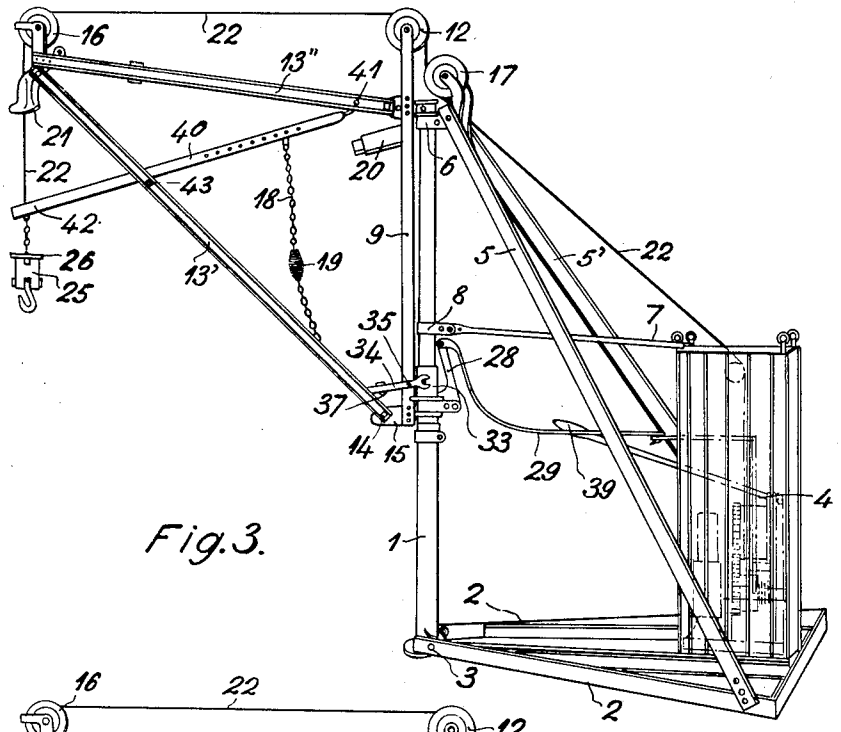


Fig. 3.

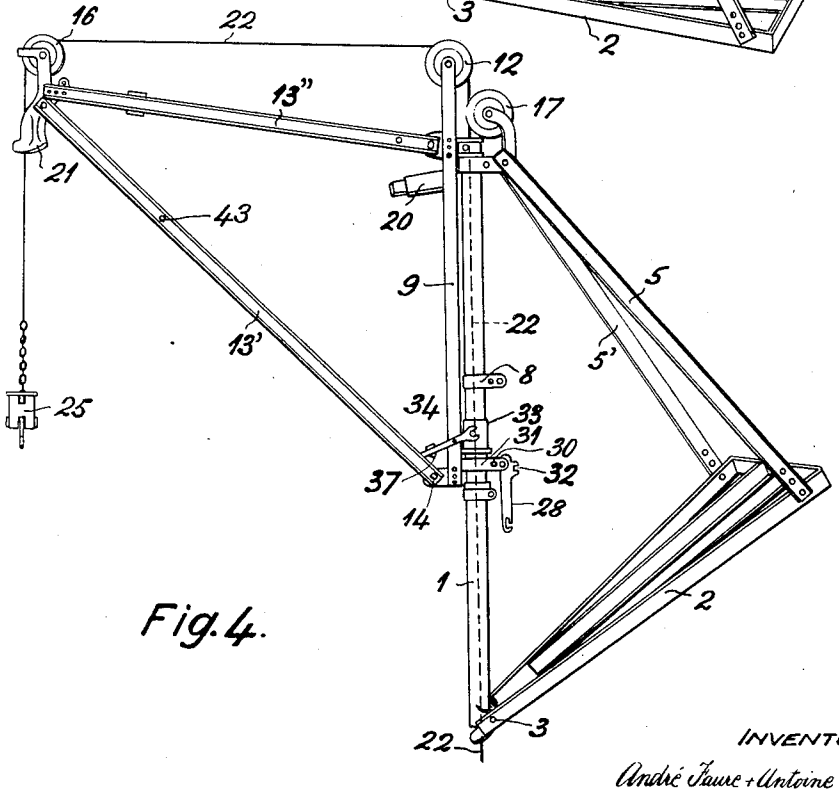


Fig. 4.

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LIFTING APPLIANCE

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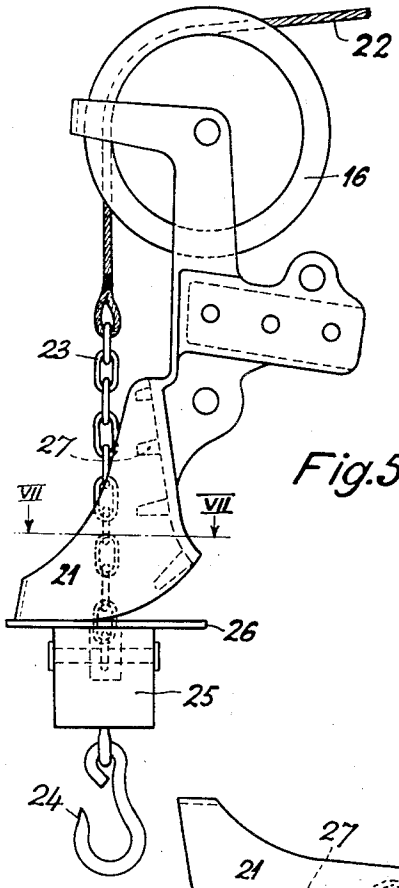


Fig.5.

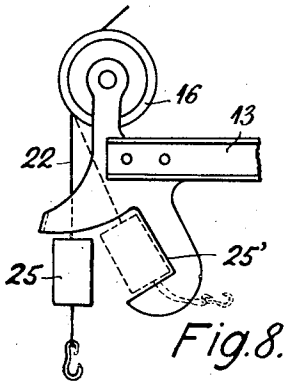


Fig.8.

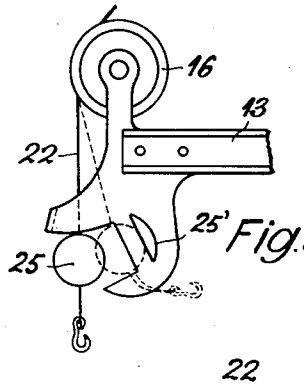


Fig.9.

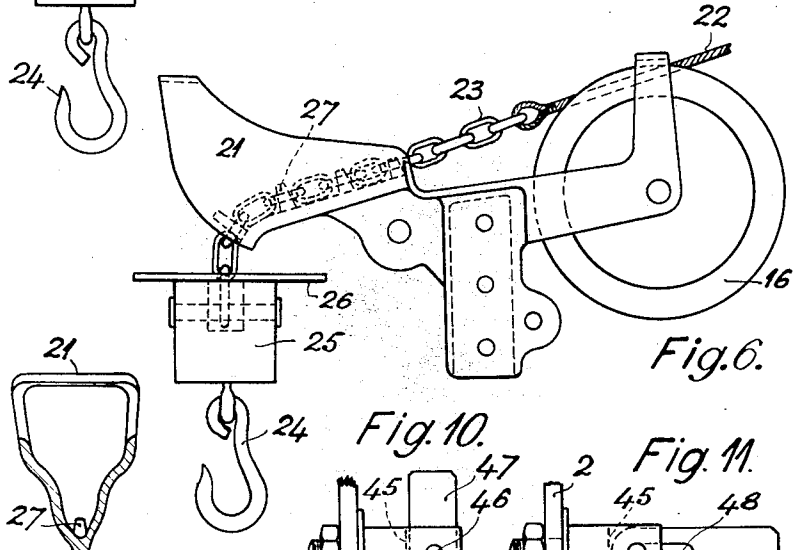


Fig.6.

Fig. 7.

Fig. 10.

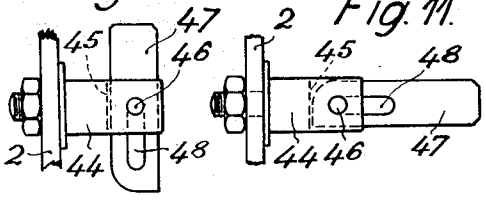


Fig. 11.

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Patented Aug. 22, 1933 1,923,780

UNITED STATES PATENT OFFICE

1,923,780

LIFTING APPLIANCE

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Application February 9, 1932, Serial No. 591,831, and in France February 21, 1931

4 Claims. (Cl. 212—58)

The present invention relates to a lifting appliance of the crane type of particularly adaptable nature. According to one feature of the invention, whereby the appliance is enabled to be adjusted over a considerable horizontal angle, there are provided a vertical post, a base frame tiltably pivoted thereto, an upright mounted close and parallel to the post so as to pivot about the axis thereof, a jib attached to said upright, and ties connecting said frame to the upper end of the post. According to another feature of the invention, whereby two arrangements of jib are possible there are provided a detachable rigid member carrying a pulley at its outer end connectible to the upper end of an upright for use as a tie bar in combination with another member secured to the lower end of the upright to form a rigid jib, and pivotable to the lower end of the upright for use as a luffing jib, and a resilient flexible member for limiting the descent of the luffing jib and for use as a link in automatic declutching means coming into operation at a certain level of lift in the case of the fixed jib. The invention comprises further features described below and pointed out in the claims.

The accompanying drawings illustrate an example of the invention.

Figure 1 is a perspective view of the lifting appliance, with the jib in its lowest position.

Figure 2 is a similar view with the jib in its uppermost postion.

Figure 3 shows the appliance arranged with a fixed jib.

Figure 4 shows the appliance with its base frame arranged for resting upon an inclined plane such for example as the slope of a roof.

Figures 5 and 6 are enlarged details of Figures 1 and 2 respectively.

Figure 7 is a section on VII—VII of Figure 5.

Figures 8 and 9 show detail modifications.

Figures 10 and 11 are side views of a further detail.

A vertical tubular post or pivot 1 receives at its lower end a base frame 2 swivelling on the pin 3. This frame serves to receive a mass adapted to act at as counterweight; this may consist of the winding gear 4' accommodated in a box 4 as shown. Oblique tie bars 5 and 5' connect the upper end of the post or pivot to the base frame through a collar 6, thus ensuring rigidity of the whole. The assembly is completed by a tie 7 connected at one end to the post 1 by a collar 8 and at the other end to box 4. An upright 9 placed close and parallel to the post can turn about the axis of the latter by means of collars 10 and 11 which attach it thereto. At the top this upright terminates in a loose pulley 12 arranged so that the axis of the post passes tangentially through its throat. In Figures 1 and 2 a detachable rigid member 13 is pivoted on the pin 14 carried by the bracket 15 in the vertical plane defined by the pivot 1 and the upright 9. The bracket 15 which is also rigid with the base of the upright can turn about the pivot. The three parts, pivot, upright and member 13 are thus always in the same vertical plane, which plane can however turn around the vertical axis of the post. Towards its free end the member 13 is provided with a loose pulley 16. A third loose pulley 17 is carried on the collar receiving the upper ends of the tie bars and is also arranged so that the axis of the post is tangential to its throat. A chain 18 elastically connects, owing to an extending spring 19, the upright 9 with the outer end of the member 13 which here serves as a luffing jib. A damping device 20 buffers if necessary the movement of the jib at the end of the lift, particularly in the case of winding up without load or with a light load.

At its outer end the jib is also provided with a channel or mouthpiece 21 through which passes the winding rope or cable 22 terminating in several links of chain 23. The latter carries at its free end the load hook 24 through the intermediary of a counterweight 25 itself covered by a plate 26 of sufficient size to prevent its entry into the channel or mouthpiece. Teeth or hooks 27 are preferably provided in the base of the throat of the channel which when the jib is in its uppermost position mesh with the links and prevent any sudden and untimely slipping of the cable, but with a suitable shape of cross-section of the mouthpiece frictional grip alone can be relied upon.

Figure 5 shows the mouthpiece at the instant when during winding up the cable the plate has abutted against its mouth; the winding continuing the jib rises until the position of the mouthpiece shown in Figure 6 is reached.

Figures 8 and 9 show by way of example two modified embodiments of the mouthpiece. In these figures the counterweight 25 lodges in a recess 25' when the jib is in its uppermost position as indicated by the dotted lines.

The lifting appliance is completed by an automatic declutching device constituted by an arm 28 pivoted at one end to a rod 29 connected to the winding gear and at the other upon the pin 30 carried by the collar 31 rigid with the pivot 1. The arm 28 engages the shoulder of a sleeve 33 adapted to slide along the post, by means of a fork 32. A finger 34 pivoted at 35 upon the upright 9 and at 36 to the sleeve 33 is provided with a projection 37 which in the case of a luffing jib, towards the end of the lift is engaged by the pin 38 carried by the jib 13.

The operation of the lifting appliance arranged as in Figures 1 and 2 is very simple and is effected as follows:

For lifting, the arm 28 is moved to the clutched position and the winding gear being set in action, the cable raises the counterweight 25 and its plate 26 eventually comes into contact with the mouthpiece 21 (Figure 1). The winding continuing, the jib pulled by the cable 22 pivots about the axis 14 until it comes into the position shown in Figure 2. The load is thus at the end of the lift. Just before this, the projection 37 engages the pin 38 causing the finger 34 to turn on its pivot 35. The collar 33 is slid downwardly and its shoulder engaging the fork 32 swings the arm 28 towards the post which thus automatically effects declutching and stops the winding.

During lowering of the load, the brake on the winding drum for the cable is controlled by the lever 39 to regulate the movement. The jib returns to the position of Figure 1.

In Figure 3 the appliance is shown arranged to operate with a fixed jib. A jib member 13' which is made longer than the moving one referred to above is fixed at its lower end at 14 to the bracket 15. It is maintained fixed in the position of the figure by the tie bar 13'', for which purpose the original movable jib 13 carrying the mouthpiece 21 and pulley 16, is used. An arm 40 pivoted at one end at 41 on the tie bar, terminates at its other free end in a buckle 42 through which passes the cable 22. A stop 43 provided at a convenient height on the jib 13' prevents this arm from falling below a suitably chosen oblique line. The chain 18 provided with the extending spring 19 previously used to limit the descent of the jib, now connects a suitable point on this arm to the free end of the finger 34 of the automatic declutching device.

This arrangement operates as follows:

When under the action of the winding gear the cable brings the plate 26 covering the counterweight into contact with the buckle, and continues to be wound up, the arm 40 is carried upwards by pivoting about its end 41. When the lifting movement is to be terminated the chain 18 is pulled, therefore causes the finger 34 to turn about its axis 35, which, causing the sleeve 33 to descend, ensures automatic declutching.

The movement of descent is controlled as mentioned above by use of the brake lever 39 of the cable winding drum.

In the modified mode of use shown in Figure 4, and where for example the appliance is mounted on the slope of a roof, the motor or other winding gear remains on the ground. In this case the cable 22 is, between the loose pulleys 12 and 17, directed along the common tangent of the throats of these two pulleys, that is to say along the axis itself of the post 1.

It will be understood that when the driving member is not mounted on the frame or chassis stability against overturning is obtained by a suitable counterweight or load.

The tie bars 5 and 5' are fixed to the base frame 2 and to the upper collar 6 of the post 1 by any suitable means, and for example by a keying device such as shown in Figures 10 and 11. This device comprises a pivot 44 rigid either with the base frame 2 or the collar 6, in which is provided a slot 45 crossed by a pin 46. A key 47 provided with slot 48 is free on the pivot 46 and along its slot. It can therefore be placed either in continuation of the pivot as in Figure 11 for putting the tie bar in place or removing it, or at right angles to the pivot as in Figure 10 to maintain the tie bar in position after it has been put in place.

What we claim is:—

1. In a lifting appliance the combination of a vertical post, a base frame tiltably pivoted thereto, an upright mounted close and parallel to the post so as to pivot about the axis thereof, a jib attached to said upright, and ties connecting said frame to the upper end of the post.

2. In a lifting appliance the combination of a tubular post, a base frame hinged thereto, an upright mounted close and parallel to said post so as to be swingable about the axis of said post, a loose pulley mounted on the upper end of said upright in such position that the axis of said post is tangential to the throat thereof, a jib mounted upon said upright in the plane defined by said upright and the axis of said post, a loose pulley on said jib, a lifting rope passing over both said pulleys, a winding gear for said rope, means for declutching said winding gear, a sleeve sliding on said post forming an element of said declutching means, and means actuated by said rope for sliding said sleeve to effect declutching when said rope has been wound up by a determined amount.

3. In a lifting appliance the combination of a tubular post, a base frame hinged thereto, an upright mounted close and parallel to said post so as to be swingable about the axis of said post, a loose pulley mounted on the upper end of said upright in such position that the axis of said post is tangential to the throat thereof, a jib pivoted to the lower end of said upright to luff in the plane defined by said upright and the axis of said post, a loose pulley and a mouthpiece on said jib, a lifting rope passing over both said pulleys and through said mouthpiece, means on said rope too large to enter said mouthpiece, a resilient flexible member connected between said jib and a fixed point to limit the downward movement of said jib, winding gear for said rope, declutching means for said winding gear, a sleeve sliding on said post forming an element in said declutching means, means actuated by said jib when it approaches its uppermost position for sliding said sleeve to effect declutching, and means in said mouthpiece for holding said rope against slipping when said jib approaches its uppermost position.

4. In a lifting appliance the combination of a post, a base frame hinged thereto, tie bars connecting said post and said frame, an upright mounted close and parallel to said post so as to be swingable about the axis of said post, a jib member secured to the upper end of said post, a strut connected to the outer end of said jib member and to the lower end of said upright, a loose pulley mounted on the outer end of said jib member, a lifting rope passing over said pulley, a winding gear for said rope, means for declutching said winding gear including a member slidable on said post, a lever on said upright adapted to actuate said slidable member, a bar hinged to said jib member, means upon said rope adapted to engage the outer end of said bar, and a flexible member connecting said bar to said lever.

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