May 8, 1956 J. STEWART 2,744,637

WINCHES

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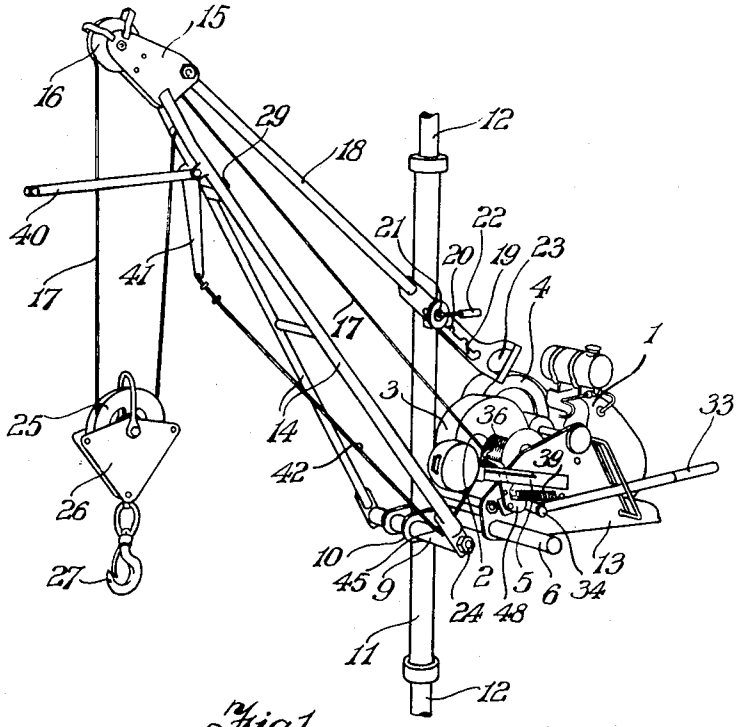


Fig. 1.

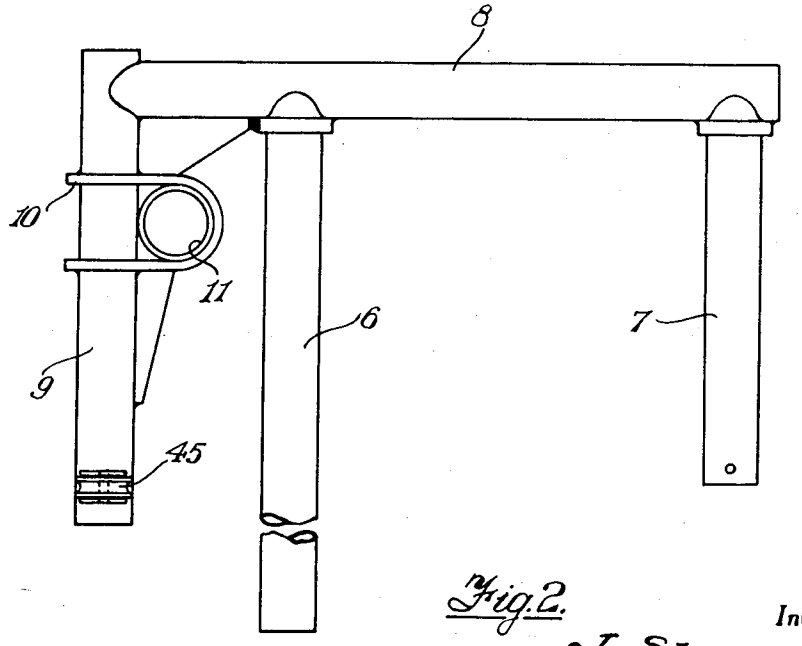


Fig. 2.

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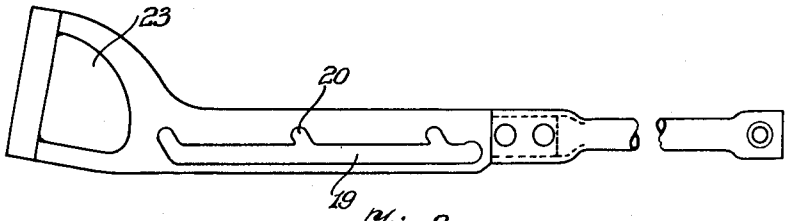


Fig. 3.

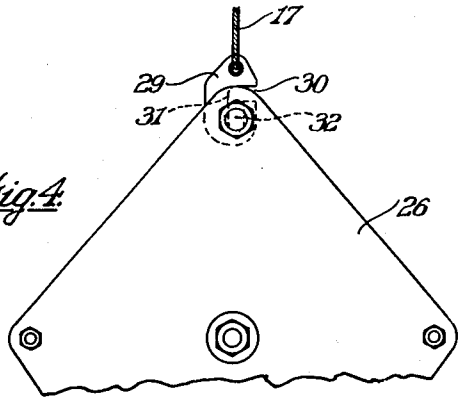


Fig. 4.

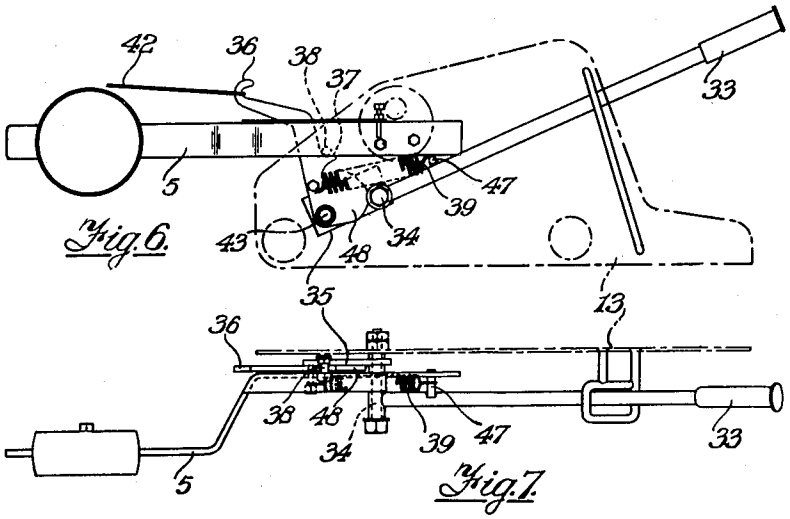


Fig. 6.

Fig. 7.

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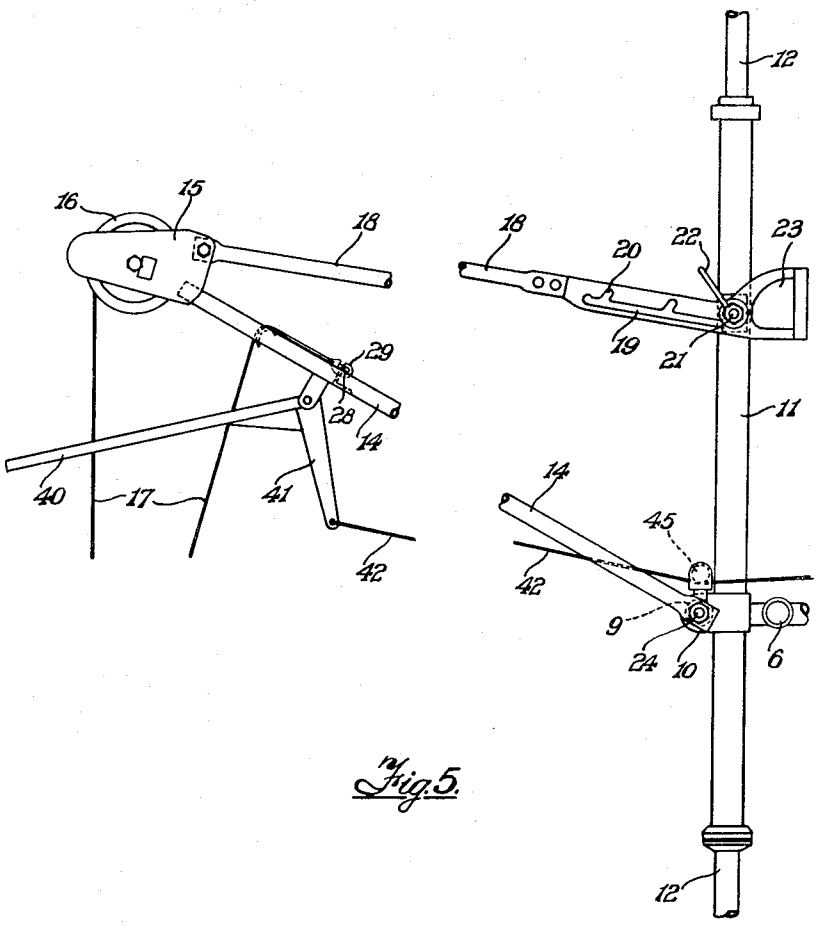


Fig. 5.

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United States Patent Office 2,744,637 Patented May 8, 1956

2,744,637

WINCHES

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Application December 2, 1952, Serial No. 323,547

Claims priority, application Great Britain December 12, 1951

4 Claims. (Cl. 212—61)

This invention relates to power operated winches and to the kind wherein the power drive is transmitted to a winding drum through the intermediary of a friction drive including one component whose axis of rotation is capable of displacement by hand operated means to render the winch operative.

The object of the present invention is to provide improvements applicable to winches of the general character above described, such improvements being designed to increase the usefulness of the winch by enabling it to be fixedly or adjustably mounted and also to provide the winch with safety devices and automatic means to prevent overwinding.

According to the invention a winch of the kind described includes means for mounting it for rotational adjustment about a vertical support, a jib carried by said support and rotatable with the winch as a unit, and trip mechanism for automatically stopping the operation of the winch when a load reaches a pre-determined height.

According to one form of the invention a winch of the kind above described includes a supporting bracket, a cylindrical sleeve carried in said bracket and adapted to be rotatably mounted on a steel scaffolding component or the like around which the winch can be moved, and a jib hingedly mounted on said bracket and connected to the said sleeve by means which enable the degree of inclination of the jib to be adjusted.

Reference will now be made to the accompanying drawings in which:

Fig. 1 is a perspective view of a winch constructed and mounted according to the invention,

Fig. 2 is a plan view of the bracket for supporting the winch,

Fig. 3 is a detail view showing the means employed for adjusting the position of the jib of the winch,

Fig. 4 is a fragmentary view of the hoist pulley block,

Fig. 5 is a fragmentary elevation of the jib,

Fig. 6 is a detail view of the device for stopping the operation of the winch when a load has reached a predetermined height, and

Fig. 7 is a plan of the device shown in Fig. 6.

In the construction illustrated the winch comprises a bracket, shown in detail in Fig. 2, upon which is supported a power unit **1** (Fig. 1), conveniently an internal combustion engine, a three-speed driving mechanism, a winding drum **2**, and a friction wheel **3** for transmitting power to the drum **2**. The winding drum **2** is mounted in known manner in eccentric bearings to enable its axis of rotation to be displaced and move the friction wheel **3** into or out of driven engagement with an external friction pinion **4** operated by the power unit **1**. The winding drum **2** and the friction wheel **3** which are co-axially mounted to rotate together are normally maintained inoperative by means of a weighted lever **5** connected to the eccentric bushing of the winding drum, and moved into operative position by means of a hand lever **33**.

The winch unit as above described can be used as a stationary winding, hauling or lifting apparatus by anchoring the supporting bracket to a fixed support but this bracket is also constructed to enable the winch to be used in other conditions. The supporting bracket which is conveniently of tubular construction is shown separately in Fig. 2 and comprises two transverse members **6** and **7** each connected at one end to a longitudinal member **8**. This in turn is connected to a third transverse component **9** upon which is mounted by means of a stirrup **10** a cylindrical sleeve **11** which can be passed over a standard tubular steel scaffolding component **12**, as shown in Fig. 1, or over any other cylindrical element capable of passing through the sleeve **11**. The members **6** and **7** support the winch by passing through the side frame members **13** of the winch shown in Fig. 1, the component **6** being of greater length so as to provide a handle by which the winch can be traversed laterally around its support. Embodied in the sleeve **11** are ball bearings to enable the bracket and winch to be swivelled through 360° to bring a jib connected to the bracket component **9** into the position required for operation.

The jib includes two arms **14** connected at their upper ends to cheeks **15** which support the bearings for a pulley **16** over which the winch cable **17** passes. The jib also includes an upper arm **18** whose upper end is pivotally connected to the cheeks **15** and is capable of occupying three separate positions in relation to the sleeve **11**. To provide for adjustment into any one of the three positions the jib arm **18** is formed near its lower end with a longitudinal slot **19** (Fig. 3) said slot having three recesses **20** along its upper edge. A clamping bolt **21** passes through the slot **19** and engages in one of the recesses **20**, a handle **22** being provided to enable the clamp to be slackened when adjustment in the position of the jib is necessary. The rear end of the jib arm **18** is provided with a handle **23** whereby when the clamping bolt **21** is slackened the jib arm can be moved to bring any one of the recesses **20** into engagement over the clamping bolt **21** after which the handle **22** is operated to lock the assembled parts in position.

The lower ends of the two arms **14** of the jib are hingedly connected at **24** to the ends of the component **9** of the support. The cable **17** is connected to the winding drum **2**, passes over the pulley **16** at the head of the jib and also passes around a pulley **25** mounted in a block **26** from which a lifting hook **27** depends and the end of the cable **17** is detachably connected at a point **28** near the upper ends of the converging arms **14** of the jib. This end of the cable **17** has attached to it a hook **29** (see Fig. 4) whose form includes an entry slot slot **30** in one vertical edge, the said slot communicating with a vertical recess **31** arranged at right angles to the slot. For direct lifting purposes the hook **29** is adapted to be connected to the head of the pulley block **26** as shown in Fig. 4, the head of this pulley block being provided with a pin **32** extending transversely between its side plates. The pin **32** is formed with diametrically opposed flats on its sides which are engaged by the walls of the recess **31** in the hook which, therefore, has to be turned through an angle of 90° to reach its operative position. This arrangement prevents accidental disconnection of the hook even when the cable is slack. When a two-fall rig is required the hook **29** is passed beneath the pulley in the pulley block **26** and the hook engaged with a transverse member **28** extending between the lower arms **14** of the jib, the transverse member being shaped in the same manner as the pin **32** already described to prevent accidental disconnection of the hook. The hook connection for the cable as above described constitutes a safety device as in transferring the cable from the pulley block **26** to the jib or vice versa it is not necessary to remove the refasten

the devices which secure the hook to the end of the cable.

The winch is constructed so that when left unattended the drive to the winding drum is automatically disconnected but means are also provided by the present invention for disconnecting the drive automatically should the load be raised to within a predetermined distance of the jib. The eccentric bushing which carries the spindle of the winding drum **2** is connected to the weighted lever **5** which is lifted to put the winch into operation. This operation is effected by means of the hand lever **33** movable about a fixed pivot **34** upon which is also mounted a plate **35** having a pawl **48** mounted thereon movable around a pivot **43**. The pawl **48** has a shoulder **37** which engages beneath a projection **38** on the weighted lever, and is maintained normally in such engagement by means of a spring **39**. The upper end of the pawl terminates in a hook **36** to which the end of a trip cable **42** is connected. When the hand lever **33** is depressed the engagement of the shoulder **37** with the projection **38** lifts the weighted lever **5** to cause rotational movement of the eccentric bushing and bring the winding drum into driven position in which it remains so long as pressure is maintained on the hand lever **33**. If the load is raised beyond the predetermined limit, a trip arm **40** carried by the jib arms **14** is rocked and being part of a bell crank lever, its other arm **41** is also rocked to exert a pull on the trip cable **42**, whose other end is connected to the hook **36** of the pawl **48** thereby removing the shoulder **37** from engagement with the projection **38** and allow the weighted lever **5** to fall and thereby stop the operation of the winch. The trip cable **42** passes beneath a pulley **45** mounted on the bracket component **9** and passes therefrom to its connection to the pawl **48**. The spring **39**, whose other end is anchored at **47** to the arm **33**, restores the trip mechanism to normal position after the weighted lever **5** has fallen.

I claim:

1. A portable jib crane comprising a bracket embodying a plurality of horizontal components, means for mounting a power unit, friction transmission, and winding drum upon some of said components, a vertical post, a vertical sleeve carried by one of said bracket components adapted for engagement over the vertical post, a jib hingedly mounted on the bracket component which carries the sleeve, means adjustably connecting the head of said jib to the said sleeve, a pulley mounted at the head of said jib over which the hoist cable passes directly to the winding drum, an eccentric bushing for the winding drum, a weighted lever for causing partial rotation of said bushing to move the winding drum between operative and inoperative positions, an arm pivotally mounted on the jib and in operative connection with the said weighted lever, the said arm being engaged and rendered operative by a load reaching a predetermined height, and a pawl arranged to support the weighted lever while the winch is operative but which is rocked by movement of the said arm to release the weighted lever to fall and move the winding drum to inoperative position.

2. A portable jib crane comprising a bracket embodying a plurality of horizontal components, means for mounting a power unit, friction transmission, and winding drum upon some of said components, a vertical post, a vertical sleeve carried by one of said bracket components adapted for engagement over the vertical post, a jib hingedly mounted on the bracket component which carries the sleeve, means adjustably connecting the head of said jib to the said sleeve, a pulley mounted at the head of said jib over which the hoist cable passes directly to the winding drum, an eccentric bushing for the winding drum, a weighted lever for causing partial rotation of said bushing to move the winding drum between its operative and inoperative positions, a projection on the weighted lever, a pawl adapted to engage the projection, a bell crank lever pivotally mounted on the jib, a cable connecting the bell crank lever to said pawl, the pawl being adapted to engage the projection on the weighted lever to render the winch operative, and the said bell crank lever being engaged and rocked by an ascending load to release the pawl and permit the weighted lever to fall and move the winding drum to inoperative position.

3. A portable jib crane of the kind described including a supporting bracket, a cylindrical sleeve carried in said bracket and adapted to be rotatably mounted on a vertical post around which the winch can be moved, a jib hingedly mounted on said bracket and connected to the said sleeve by means which enable the degree of inclination of the jib to be adjusted, said supporting bracket comprising two parallel members connected at one end and adapted to be passed through apertures in the winch frame, and a third component arranged parallel to the other two to the ends of which the lower components of the jib are hingedly connected, the said third component being also connected to said cylindrical sleeve.

4. A portable jib crane comprising a power unit, friction transmission means and a winding drum all mounted upon a winch frame, a bracket adapted to be rotatably mounted upon a fixed support, said bracket comprising two horizontal parallel members adapted to be passed through apertures in the said winch frame and a third member parallel to the other two, jib components hingedly mounted on said third member, a jib component adjustably connected to said sleeve, a pulley carried at the head of all of said jib components, a winding cable connected at one end to said winding drum and passing over said pulley, a hook at the free end of said cable embodying an angular recess formed to prevent accidental detachment when said hook is connected to a load lifting pulley or to a component of the jib, a trip device defining the upper limit of load travel and pivotally mounted on the jib, and a cable connecting said trip device to means for stopping the operation of the winch.

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