

July 27, 1954

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2,684,833

SAFETY WINCH

Filed Feb. 18, 1952

2 Sheets-Sheet 1

FIG. 1

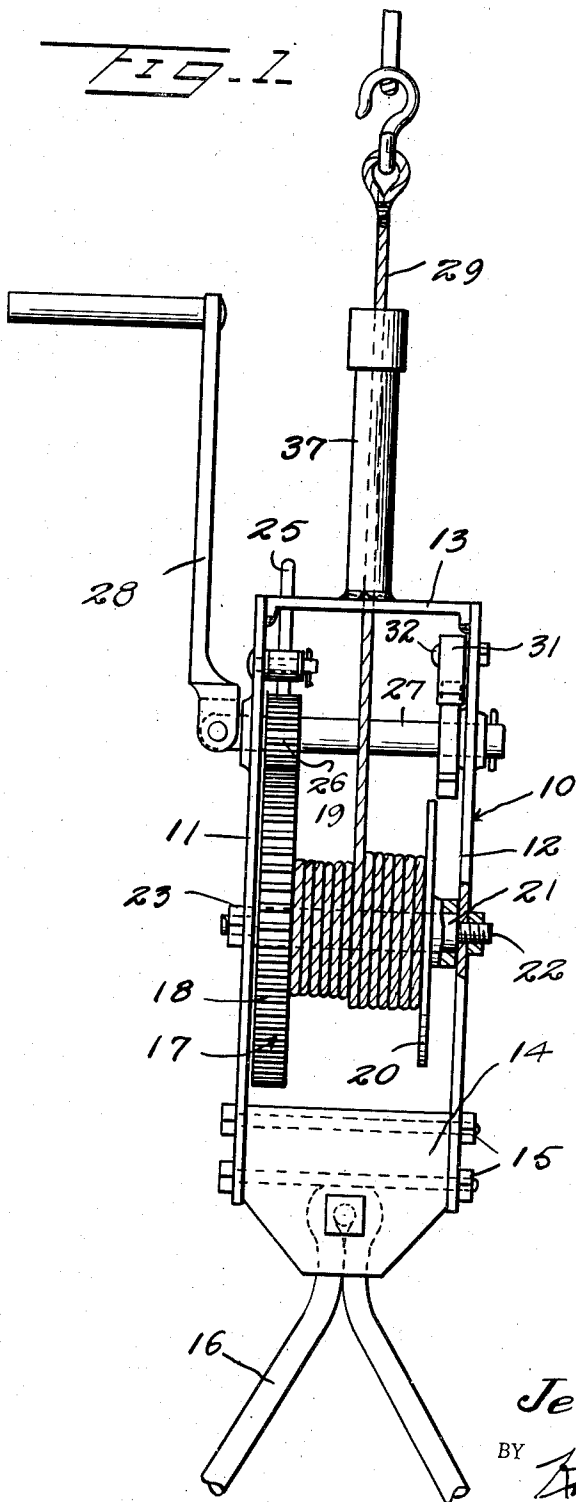
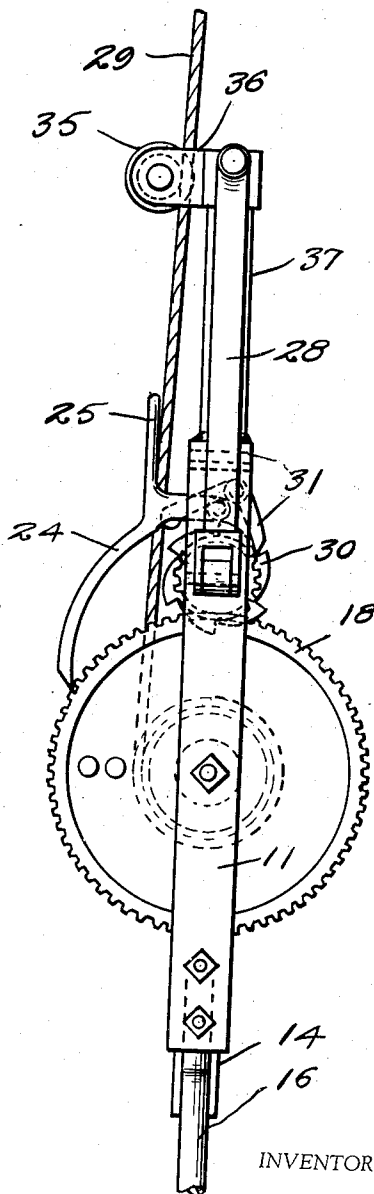


FIG. 2



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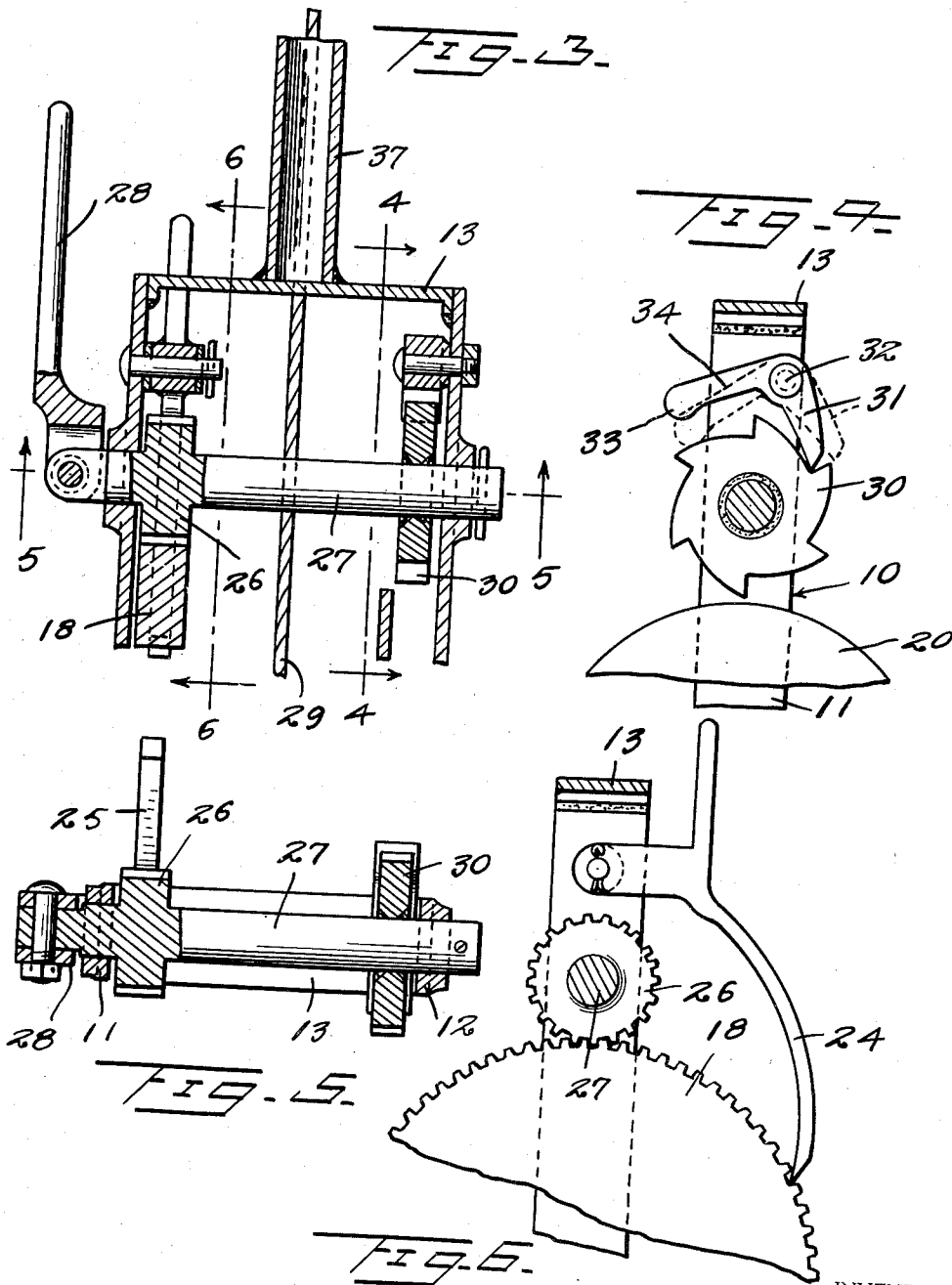
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# UNITED STATES PATENT OFFICE

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## SAFETY WINCH

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Application February 18, 1952, Serial No. 272,039

4 Claims. (Cl. 254-186)

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This invention relates to safety winches and winding drums.

In a scaffold winch there is provided a winding drum for the suspension cable with a ratchet means to prevent unwinding of the cable. It is an object of this invention to provide in a winch or winding drum structure a safety means whereby the winding drum is held against unwinding in the event the crank handle should be released so that the drum will be locked against unwinding.

Another object of this invention is to provide a safety lock for a winding drum which may be used with scaffold winches, elevator drums, davit winches or other winding drums, which is so constructed that the winding drum may be unwound at a relatively moderate speed with the hand of the operator grasping the crank handle, but in the event the winding drum should rotate at an excessive speed, the latter is immediately locked against further unwinding.

A further object of this invention is to provide a safety lock of this kind which is simple in construction and positive in action.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a detailed front elevation partly broken away and in section of a winch constructed according to an embodiment of this invention.

Figure 2 is a fragmentary side elevation of the device.

Figure 3 is a fragmentary vertical section through the device.

Figure 4 is a fragmentary sectional view taken on the line 4-4 of Figure 3.

Figure 5 is a sectional view taken on the line 5-5 of Figure 3.

Figure 6 is a sectional view taken on the line 6-6 of Figure 3.

Referring to the drawings, the numeral 10 designates generally a frame structure which is formed of parallel side members 11 and 12 connected together at their upper ends by a connecting bar 13. The lower ends of the side bars 11 and 12 are secured together by means of a hanger support 14, which is fixed between the side bars 11 and 12 by means of bolts 15. A platform hanger 16 of conventional construction is suspended from the support 14.

A cable winding drum generally designated as

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17 is rotatably disposed in the frame 10 and includes a relatively large spur gear 18, which is fixed to a tubular sleeve 19. A side wall 20 is secured to the sleeve 19 oppositely from the gear 18. A stationary shaft 21 having reduced threaded opposite ends 22 is disposed between the frame members 11 and 12, and nuts 23 are threaded on the ends 22 so as to hold the frame bars 11 and 12 in spaced parallel relation and also hold the shaft 21 against rotation.

A pawl 24 is rockably carried by the side frame bar 11 and engages the spur gear 18, which also constitutes a ratchet. The pawl 24 is provided with an upwardly projecting handle 25 disposed on the forward edge of the frame member 13, and the latter limits the rocking movement of the pawl 24 to a released position.

A small spur gear or pinion 26 is fixed to a driving shaft 27 journaled between the frame members 11 and 12, and gear 26 meshes with gear 18. A crank handle 28 is secured to one end of the shaft 27 so that the latter may be manually rotated to either wind or unwind a cable 29 from the drum 17. A ratchet wheel 30 is fixed to shaft 27, and a pawl 31 is rockably carried by a pivot member 32, which is fixed to and projects inwardly from frame bar 12. The pawl 31 is a safety pawl, and the latter is normally held against locking engagement with ratchet 30 by means of a cam 33, which is carried by a lever or arm 34 integral with pawl 31.

The cam 33 with lever 34 is adapted to normally ride over the teeth of ratchet 30 when the latter is rotated in an unwinding direction so that pawl 31 will, by reason of the weight of cam 33 and lever 34, be held against locking engagement with a tooth of ratchet 30. However, when ratchet wheel 30 is rotated at a predetermined speed, which speed is in excess of the normally unwinding speed of pinion 26, the cam 33 riding over teeth 30 will be rocked upwardly so that pawl 31 will be rocked downwardly into ratchet engaging and ratchet locking position. In other words, when crank 28 is rotated in an unwinding direction by the operator grasping the crank, pawl 31 will normally be held from locking engagement with ratchet 30 by weight of cam 33 and lever 34. However, the excessive speed of ratchet 30 will tend to swing cam 33 and lever 34 upwardly a substantial distance above the peaks of the teeth of ratchet 30 so that pawl 31 will be swung downwardly to locking engagement with the ratchet.

The cable 29 is extended upwardly to a suitable supporting structure and is guided above the

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frame 10 by means of a pulley 35 carried by a pair of ears 36 which are fixed to the upper end of an upright guide support 37. The guide support 37 is fixed to the upper frame bar 13.

I do not mean to confine myself to the exact details of construction herein disclosed, but claim all variations falling within the purview of the appended claims.

What is claimed:

1. A winch comprising a frame, a winding drum rotatable in said frame, a driven gear fixed relative to said drum, a drive shaft rotatable in said frame, a driving gear fixed to said shaft and meshing with said driven gear, a ratchet fixed to said drive shaft, a pawl rockably carried by said frame engaging said ratchet, and a pawl operator fixed to said pawl and extending angularly therefrom, said operator comprising an arm integral with said pawl and extending angularly therefrom, and a cam carried by said arm slidably engaging the teeth of said ratchet, said operator normally riding over the teeth of said ratchet and the weight of said operator gravitatingly holding said pawl against locking engagement with said ratchet, said operator upon reverse rotation of said ratchet at a speed above normal effecting rocking of said pawl to locking engagement with said ratchet.

2. A winch comprising a frame, a winding drum rotatable in said frame, a driven gear fixed relative to said drum, a drive shaft rotatable in said frame, a driving gear fixed to said shaft and meshing with said driven gear, a ratchet fixed to said drive shaft, a pawl rockably carried by said frame engaging said ratchet, and a pawl operator fixed to said pawl and extending angularly therefrom, said operator comprising an arm integral with said pawl and extending angularly therefrom, and a cam carried by said arm slidably engaging the teeth of said ratchet, said operator normally riding over the teeth of said ratchet and the weight of said operator gravitatingly holding said pawl against locking engagement with said ratchet, said operator upon reverse rotation of said ratchet at a speed above normal effecting rocking of said pawl to locking engagement with said ratchet, and a locking pawl carried by said frame engageable with the teeth of said driven gear.

3. A winch comprising a frame, a winding drum rotatably mounted in said frame, a driven gear which also constitutes a ratchet, fixed relative to said drum, a drive shaft rotatably mounted in said frame, a driving gear fixed to said drive

shaft and meshing with said driven gear, a pawl rockably mounted on said frame above said driving gear and having an operating arm for lifting said pawl, said pawl having a portion normally engaging the teeth of said driven gear and adapted to ratchet thereover, a ratchet wheel fixed to said drive shaft spacedly from said driving gear, and a safety pawl pivotally mounted intermediate its ends on said frame adjacent said ratchet wheel, said safety pawl having a weighted end portion normally lifting said pawl out of engagement with said ratchet wheel and resting on said wheel, said safety pawl having another portion to engage said ratchet wheel upon reverse rotation of said ratchet wheel at high speed to effect locking engagement with said ratchet wheel to thereby prevent unwinding of a cable from said drum.

4. In a winch, a frame, a shaft journaled in said frame, a winding drum mounted on said shaft for rotation in both winding and unwinding directions, an operating member having a positive motion-transmitting connection with said winding drum for imparting winding and unwinding movements thereto, a ratchet wheel positioned for rotation with said drum, a pawl pivoted near its midpoint on said frame and above and in the plane of said ratchet wheel, said pawl having at one end a ratchet-engageable detent and at its other end a weight which normally rests upon the outer edge of the ratchet wheel and holds the detent out of locking engagement with the ratchet wheel, the pawl being moved about its pivot by action of the ratchet wheel on the weighted end of the pawl, upon rotation of the drum in an unwinding direction at a speed in excess of a predetermined speed, to a position in which the detent is in locking engagement with the ratchet wheel.

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