United States Patent [19]

Hoffman

[11] **3,868,091**

[45] **Feb. 25, 1975**

[54] **PORTABLE WINCH**

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[52] **U.S. Cl.** **254/164,** 74/142

[51] **Int. Cl.** **A63b 61/04**

[58] **Field of Search** 254/167, 164, 186, 154; 74/142, 155

[56] **References Cited**

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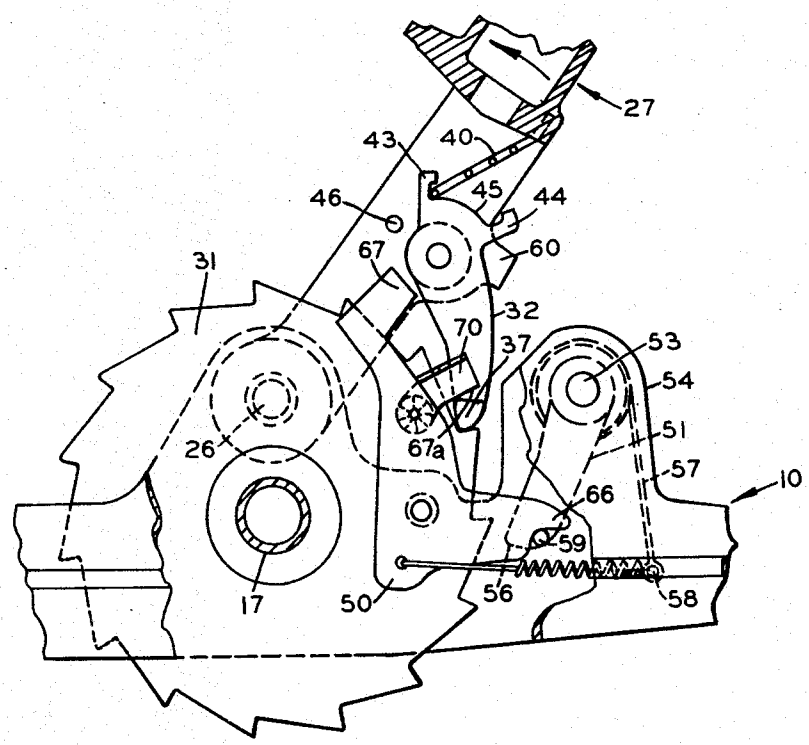
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Primary Examiner—Robert J. Spar
Assistant Examiner—Kenneth Noland
Attorney, Agent, or Firm—Mahoney, Miller & Stebens

[57] **ABSTRACT**

A portable hand-operated ratchet-type winch including a feed pawl and a stop pawl, the feed pawl being selectively set for rotation of the drum in a forward or reverse direction. A cam is provided which assists in engaging the feed pawl to cause it to act as a stop pawl with the ratchet in a reversing direction and then to disengage the stop pawl to permit the reversing movement of the drum under control of the feed pawl. The cam is adjustable to selectively provide for a minimum reversing movement or a maximum reversing movement.

7 Claims, 10 Drawing Figures



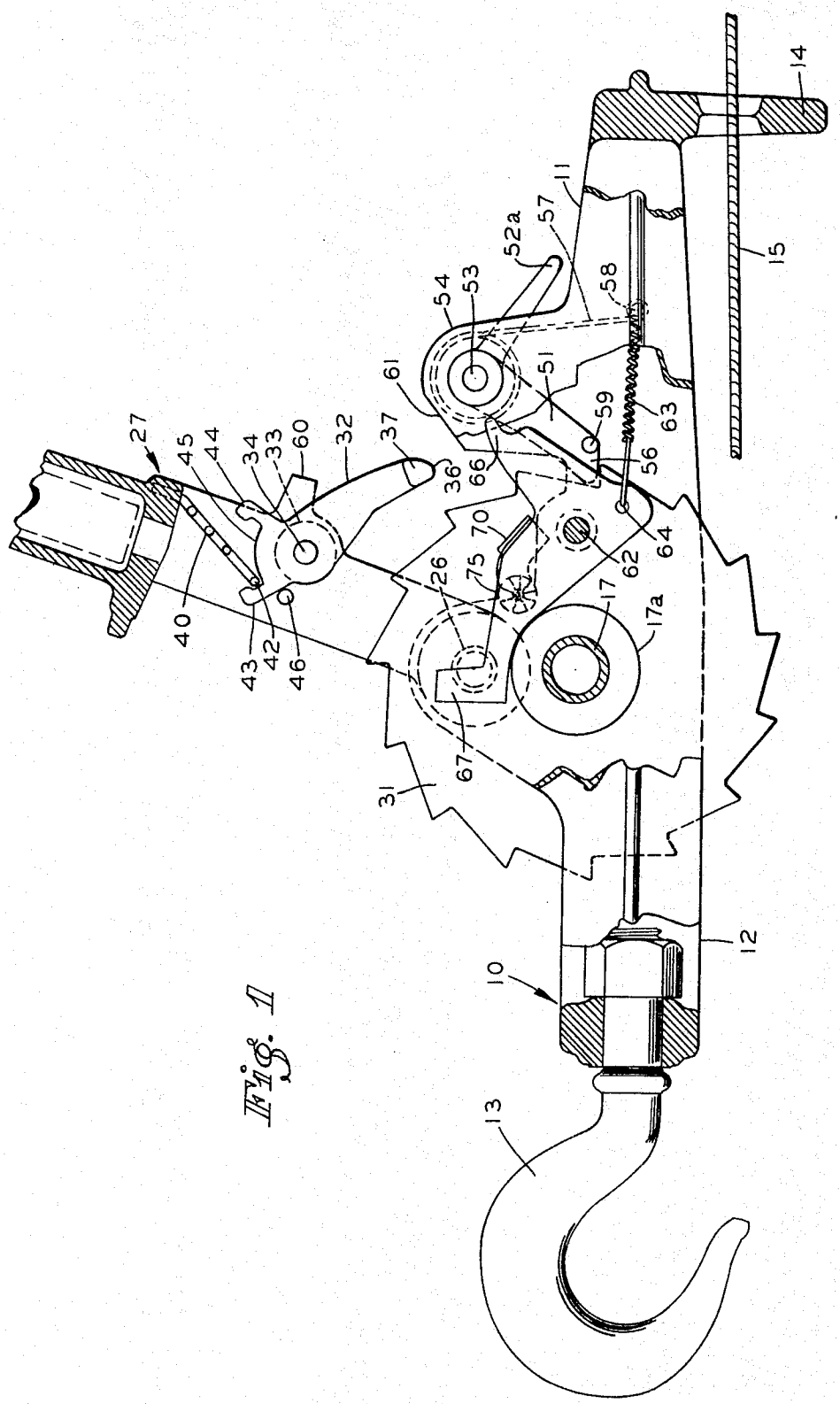

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FIG. 1

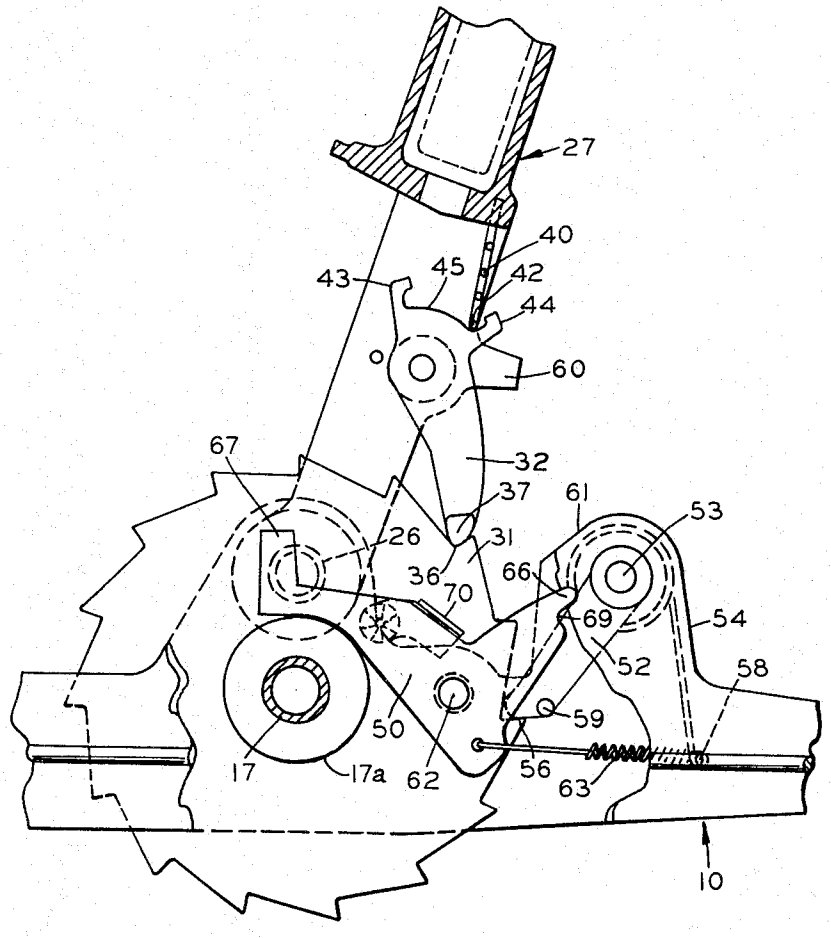


Fig. 1a

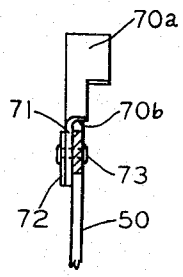


Fig. 3

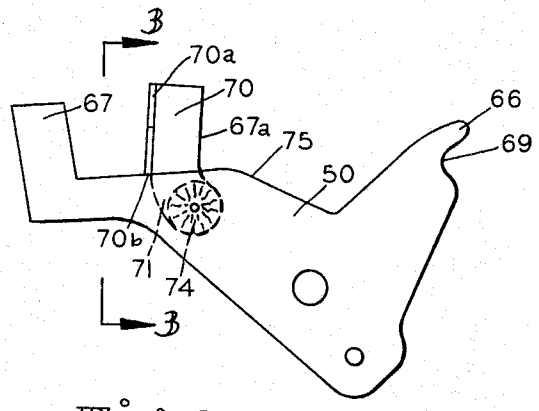


Fig. 2

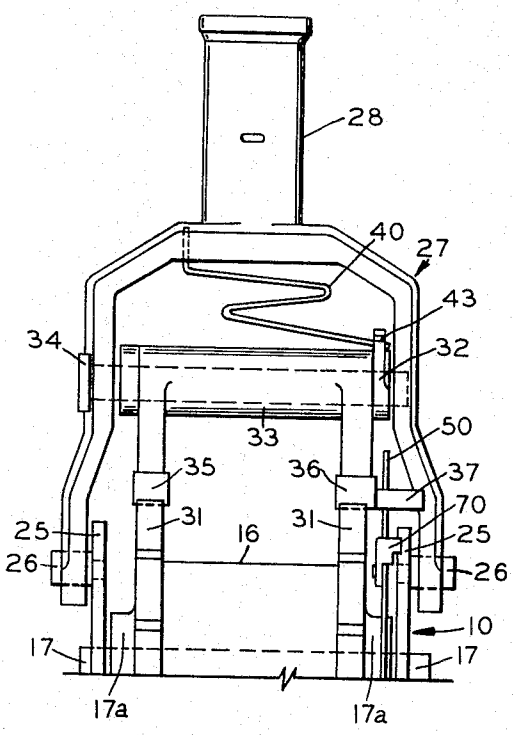

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Fig. 4

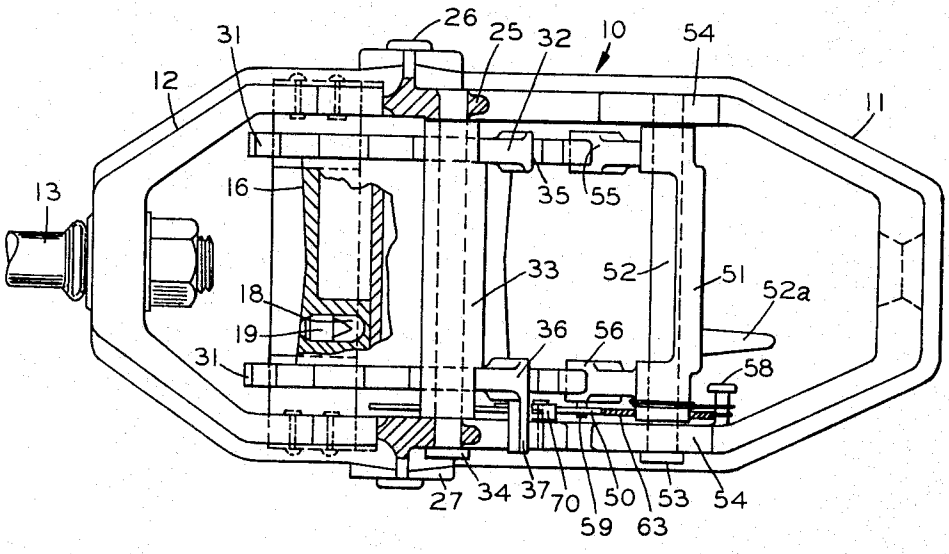

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Fig. 5

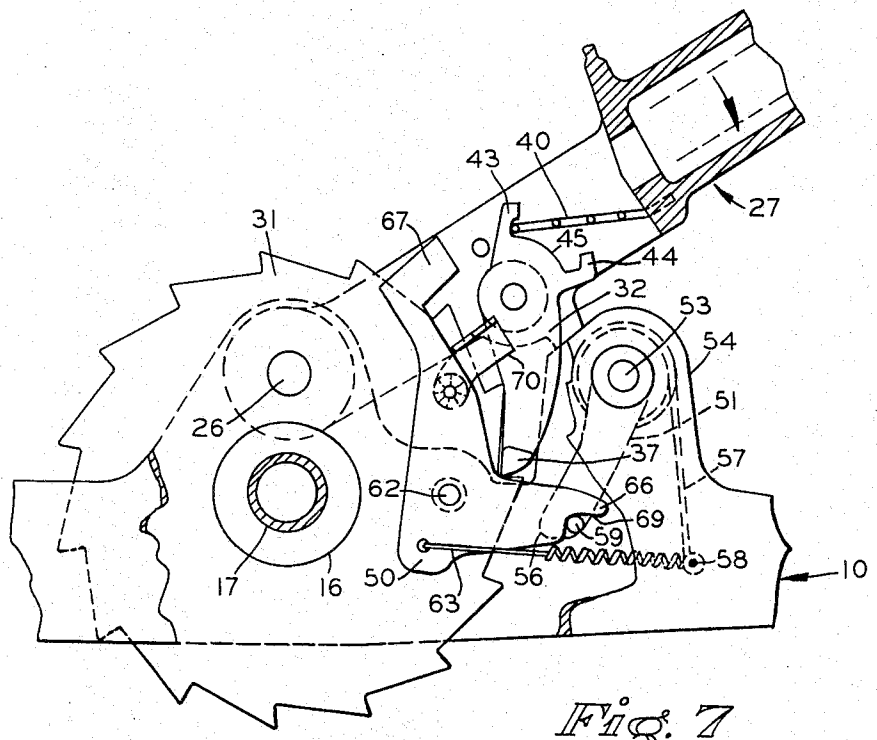

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Fig. 7

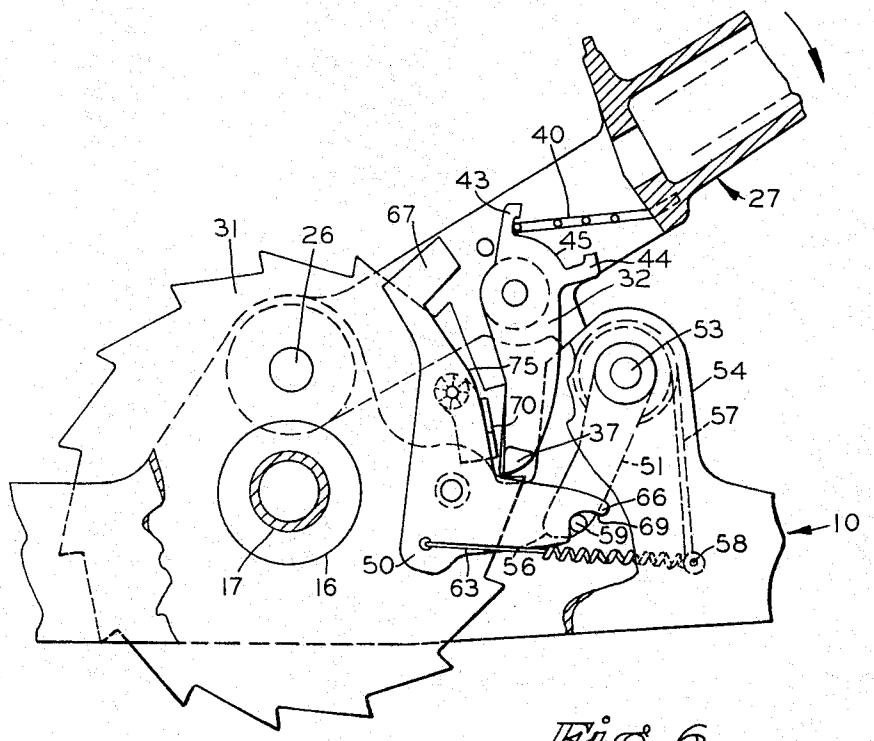

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Fig. 6

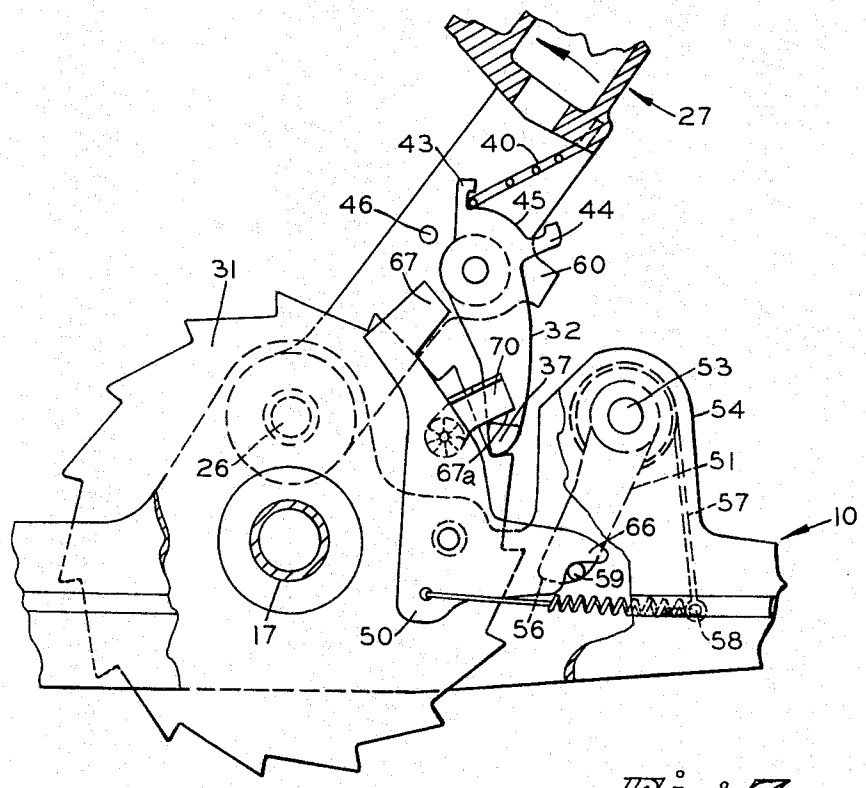

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Fig. 7a

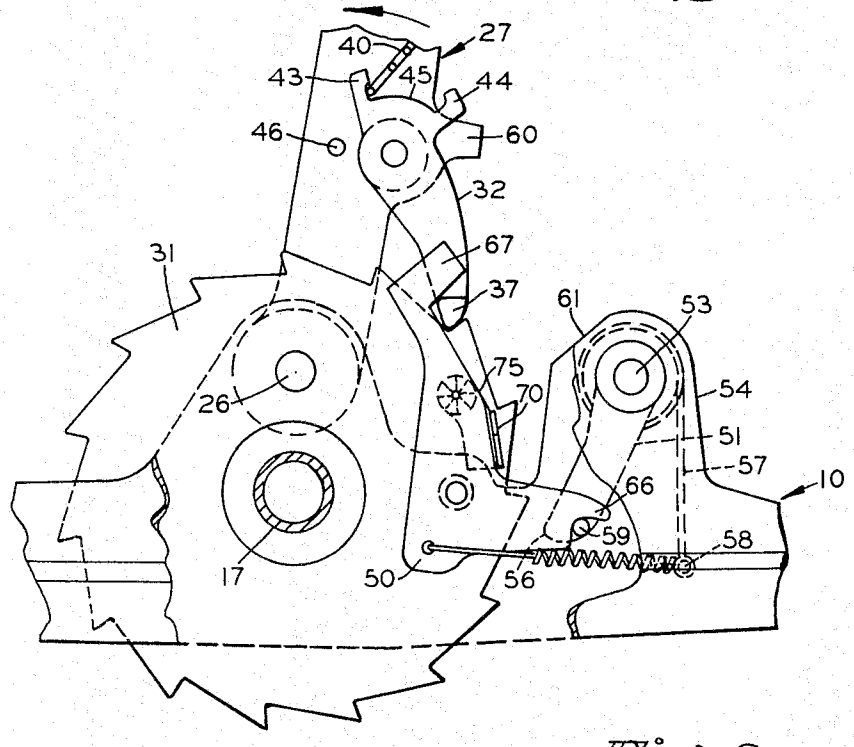

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Fig. 6a

PORTABLE WINCH

BACKGROUND OF THE INVENTION

My invention relates to a portable winch. It has to do, more specifically, with a portable hand-operated reversible winch or windlass. The type of portable winch to which my invention is applicable is commonly known commercially as a power puller and hoist.

Winches of this type basically include a rotatable cable spool or drum which is rotated in a cable winding direction by means of an oscillatory lever through the medium of pawl and ratchet mechanism associated with the lever and drum. Reversing mechanism is associated with the ratchet mechanism to provide for adjustment of such mechanism to permit reverse rotation of the drum in a cable unwinding direction.

According to the invention disclosed in my U.S. Pat. No. 2,890,857, of June 16, 1959, I provided a winch which included a rotatable drum having pawl and ratchet mechanism which was actuated by oscillation of an associated lever or handle to rotate the drum. The pawl and ratchet mechanism included a feed pawl and a stop pawl. A simple spring arrangement was provided for setting the feed pawl for rotation of the drum in a forward or cable winding direction or in a reverse or cable unwinding direction. To cause the feed pawl to function in a forward or a reverse direction a single simple cam was associated with the drum. This single cam not only functioned to assist in engaging the feed pawl to cause it to act as a stop pawl with the ratchet in a reversing direction but also served immediately thereafter to disengage the stop pawl to permit the reversing movement of the ratchet and drum under control of the feed pawl. That cam in no way restricted oscillation of the lever and did not need to bear the load on the lever and drum during either the forward or reverse operation of the drum and, therefore, would not become distorted.

The reversing cam disclosed in said patent was designed to permit reversing movement of the ratches and drum, under control of the feed pawl, in movements of one tooth of the ratchet wheel. In some instances, it is desirable to provide for a faster reversing action.

The present invention provides a winch of the general type disclosed in my prior patent but which is provided with an improved reversing cam which is selectively adjustable to provide a reversing action of the ratchet wheel in increments either corresponding to one tooth of the ratchet wheel or two or more teeth of the ratchet wheel. Thus, the cam will be adjustable to provide for a slow reversal or a more rapid reversal as determined by the load on the winch.

BRIEF DESCRIPTION OF THE DRAWINGS

The best mode contemplated in carrying out this invention is illustrated in the accompanying drawings in which:

FIG. 1 is a longitudinal vertical sectional view taken through the winch, showing the feed pawl and reversing cam in drum-reversing positions.

FIG. 1*a* is a partial sectional view similar to FIG. 1 but showing the feed pawl and reversing cam in drum-advancing positions.

FIG. 2 is a side elevational view of the reversing cam removed from the winch.

FIG. 3 is a vertical sectional view taken along line 3—3 of FIG. 2.

FIG. 4 is a partial end elevational view of the winch.

FIG. 5 is a plan view, partly cut away, of the winch.

FIG. 6 is a partial section similar to FIG. 1 showing the action of the reversing cam and feed pawl when the reversing cam is set to permit maximum reversing, the feed pawl acting as a stop pawl in this condition.

FIG. 6*a* is a view similar to FIG. 6 but showing the feed pawl in the position it occupies after maximum reversing.

FIG. 7 is a view similar to FIG. 6 but showing the reversing cam set to permit minimum reversing.

FIG. 7*a* is a view similar to FIG. 6*a* with the reversing cam set to permit minimum reversing.

With reference to the drawings, I have illustrated in FIGS. 1 and 5 the general structure of the winch or power puller and hoist in which my invention is embodied.

This winch includes a frame **10** of elongated form which is of substantially rectangular outline but has the converging ends **11** and **12.** The end **12** is provided with an anchoring hook **13** for anchoring the frame to a suitable support whereas the end **11** is provided with a depending cable guide **14** through which the cable **15,** which is to be wound on the winch, is passed. This cable may be part of a block and tackle arrangement for pulling or raising a suitable load. It is to be understood that although I refer to a cable, my winch is applicable to pulling on a rope or even a chain or other flexible member which can be wound on the drum of the winch.

Transversely disposed within the frame **10** and mounted for rotation on the frame is the spool or drum **16.** Thd drum **16** is provided with trunnions **17** which are rotatably disposed in bearing openings in the sides of the frame **10.** Directed chordally (FIG. **5**) through the drum **16** is a socket **18** for receiving the end of the cable. This end of the cable is anchored in the socket by means of a pointed anchoring plug **19.**

Above the bearing openings for the drum trunnions **17,** the frame **10** is provided with the upstanding yoke bearings **25.** These bearings receive the pivots **26** which are provided for the yoke **27.** The yoke **27** straddles the frame **10** with its lower ends disposed outside the adjacent bearings **25.** The yoke **27** is provided with a socket **28** for receiving the lower end of a handle or lever.

It will be noted best from FIGS. **1** and **1***a* that the yoke pivot points **26,** which are the fulcrum for the yoke **27,** are disposed eccentrically relative to the axis of trunnions **17** of the drum **16.**

On each end, the drum is provided with an integral ratchet wheel **31.** For cooperating with this ratchet wheel, the yoke **27** carries the feed pawl **32.** This feed pawl is a double pawl so that it will cooperate with both ratchet wheels **31** and includes a central transverse sleeve **33** (FIG. **4**) through which is passed a pivot pin **34** that extends through openings formed in the sides of the yoke **27.** One arm of the pawl is provided with a narrow tooth **35** for engaging the teeth of the associated ratchet wheel **31** and the other arm is provided with a wide tooth **36** which engages the teeth of the associated ratchet wheel **31** but which also extends outwardly therebeyond to provide a cam-engaging extension **37.**

In order to set the feed pawl **32** in either of two positions, an off-center spring, arrangement is provided as shown best in FIGS. **1** and **4.** In one position, the feed pawl will be set to engage the teeth of the ratchet

wheels 31 for rotation of the drum in a forward or cable winding direction and in the other position, the pawl will be set to permit reverse rotation of the drum in a cable unwinding direction. This spring includes a wire spring 40 which is bent in a flat plane and is pivoted inside the yoke for pivotal movement in a plane at right angles to the plane of bend of the spring. The free end 42 of the spring is disposed between a pair of lugs 43 and 44 which project radially from the pawl 32, the pawl being provided with a cam surface 45 of arcuate form between the lugs and with which the spring end 42 resiliently engages.

When the spring 40 is swung to the off-center position shown in FIG. 1*a*, the end 42 thereof engages the lug 44 of the pawl and springs the pawl clockwise, as viewed in FIG. 3, to cause the pawl to engage the teeth of the ratchets 31 so that when the yoke is swung towards the right, the drum 16 is rotated in a cable-winging direction. On the other hand, when the off-center spring 40 is swung in the opposite direction to engage the lug 43 of the pawl, as shown in FIG. 1, the pawl is rotated in a counterclockwise direction, as viewed in this FIG. until the lug 43 strikes a stop pin 46 which is provided on the adjacent side of the yoke 27. This will swing the pawl teeth 35 and 36 away from the teeth of the ratchet wheels 31 to permit the yoke 27 to swing to the right, as viewed in FIG. 1, without having the pawl teeth 35 and 36 engage the ratchet wheels 31 until towards the end of the stroke, when the reversing cam 50 functions in a manner to be explained later.

In addition to the feed pawl 32, I have provided the stop pawl 51 which normally prevents reversing movement of the ratchet wheels 31, as indicated in FIG. 1*a*. This pawl 51, comprises a tubular or sleeve section 52 through which a pivot pin 53 passes. The end of this pin 53 is disposed in upstanding bearings 54 provided on the sides of the frame 10 in longitudinally spaced relationship to the upstanding yoke bearings 25. This pawl 51 is double pawl and is provided with teeth 55 and 56 on its arms for cooperating with the teeth of the ratchet wheels 31 so as normally to prevent reverse movement of the drum. A torsion spring 57 is anchored to the frame at 58 and surrounds the sleeve 52 of the pawl to which it is anchored so as to serve to normally swing the pawl towards the ratchet wheels 31 to engage the pawl teeth 55 and 56 with the ratchet teeth to prevent reverse rotation of the drum. The pawl sleeve 52 is provided with a radially extending handle 52*a* by means of which the stop pawl may be manually disengaged from the ratchet wheels 31 by overcoming the force exerted by the spring 57. Associated with the pawl tooth 56 is an outwardly projecting cam-engaging lug 59, indicated in FIGS. 1 and 1*a*.

It will be noted best from FIGS. 1 and 1*a* that the yoke 27 carries a stop lug 60 at each side thereof which will engage with a stop edge 61 formed on the upstanding pawl bearing 54 at the corresponding side of the frame 10. These stops will provide a positive means for limiting the swinging of the yoke 27 clockwise, as viewed in FIG. 1*a*, which is the direction in which it is swung during the forward advancing of the drum 16 to wind the cable.

The reversing cam 50, previously referred to, is part of a simple cam plate assembly which is mounted at one side of the frame 10 between one of the yoke bearings 25 and the adjacent end of the drum 16. The cam plate 50 is pivoted at 62 to the frame and is normally swung into contact with the trunnion bearing 17*a* on the corresponding end of the drum 16 as shown in FIGS. 1 and 1*a*, by means of a tension spring 63 which is connected to the lower end of the cam plate at 64 and which is anchored to the side of the frame 10 at the pin 58.

The cam plate 50 is of the particular shape shown in FIG. 2, being mainly of triangular form. It is provided with an upwardly extending cam lug 66 at one extreme, to the right of FIG. 2, which will act to release the stop pawl 51 from the ratchet wheels 31. It is further provided with an upstanding cam lug 67 at its other extreme, to the left, which will function to return the cam to a position to permit reengagement of the stop pawl 51, as will be explained in detail later. The lug 66 is provided with an outer notch 69. Inbetween the lugs 66 and 67 is a notch which has an inner angular edge 75. Pivoted to the cam plate 50 for vertical swinging movement is an auxiliary cam member 70. The pivoting is by means of a tongue portion 71 which is gripped between a surface of the plate 50 and a washer 72, held in clamped relationship by means of a rivet 73, as shown in FIG. 3. Engaging surfaces of plate 50, tongue 71 and rivet 73 may be knurled or roughened, as indicated schematically at 74, to increase frictional contact to aid in holding member 70 in selectively adjusted position. The member 70 is provided with a lateral flange 70*a* having a narrowed shoulder 70*b* at its inner extremity. When the member 70 is swung upwardly, the shoulder 70*b* will contact the edge 75 of plate 50 (FIG. 2) and will accurately locate the member 70 in an upstanding position where its upstanding lug edge 67*a* will be substantially parallel to the upstanding lug 67, this being the operative position of the member 70. However, member 70 can be swung downwardly to an inoperative position where flange 70*a* will be flat on the edge 75 of the cam plate 50.

In the operation of the winch, assuming the cam member 70 is swung inwardly into inoperative position, as shown in FIGS. 1 and 1*a*, maximum reversing will result when the reversing cam functions. However, if the spring 40 is set as shown in FIG. 1*a*, the reversing cam 50 will not function.

With the spring 40 so set, the teeth 35 and 36 of the feed pawl 32 will be held in resilient contact with the teeth of the ratchet wheels 31. Consequently, as yoke 27 is swung in a clockwise direction, as viewed in FIG. 1*a*, the drum 16 will be rotated in a cable-winding or forward direction. The yoke 27 will swing in the forward direction until the stops 60 thereon contact the stops 61 on the frame 10. During this swinging action, the adjacent tooth 36 and cam-engaging extension 37 thereof, provided on the feed pawl 32, will miss the upstanding cam lug 67 on the reversing cam 50. However, the extension 37 will eventually engage the cam lug 66 and rotate the cam 50 clockwise slightly and the notch 69 of the cam lug 66 will engage the pawl lug 59 on the stop pawl 51, so as to release the stop pawl from the ratchet wheels 31, but the feed pawl 32 will be in engagement with the ratchet wheels 31 at this time. This motion of the cam at this time is a lost motion as it performs no desired function during the pulling stroke of the yoke 27. However, this lost motion will not occur, as the operator becomes experienced with operation of the machine and stops swinging the yoke 27 short of the point where the feed pawl 32 contacts the cam 50. Shortly after rotation of the cam 50, the stops 60 and 61 engage with each other to limit movement of the

lever **29.** It will be noted that during this pulling movement of lever **29,** the pawl extension **37** will miss the stop **61** at the corresponding side. Reverse swinging movement of the yoke **27** will cause the extension **37** to engage the cam lug **67** and return the cam to its original position. Thus, unrestricted movement of the yoke **27,** during the pulling action, will be permitted by the reversing cam **50** and oscillators of these members will move the drum **16** in a forward pulling or cable-winding direction.

To reverse the rotation of the drum **16,** it is merely necessary to reset the spring **40.** The spring is moved to the position shown in FIGS. **1** and **6.** This will throw the teeth of the feed pawl **32** outwardly away from the teeth of the ratchet wheels **31.** Consequently, when the yoke **27** is swung clockwise, as viewed in FIG. **1,** the feed pawl will not engage the ratchet wheels **31.** At this time, the stop pawl **51** is still in engagement with the ratchet wheels **31** to prevent reverse rotation of the drum **16,** it being understood that there is a load on the cable **15** which has been wound on the drum. The feed pawl **32** will not engage the ratchet wheels **31** again until the tooth extension **37** of the pawl engages the inclined stop surface **61** at the same side which will force it inwardly over the edge of the cam lug **66** with which it will engage. Due to the outward position of the pawl **32,** the extension **37** will first engage the cam lug **66** adjacent its outer end and will therefore rotate it about its pivot **62,** and as the yoke **27** continues to swing, the extension **37** will follow the edge of the lug **66** inwardly causing the teeth of the feed pawl to engage with the ratchet wheels **31.** The edge of the cam lug **66** assists in causing the teeth of the feed pawl **32** to engage with the ratchet wheels **31,** but basically the inclined stop surface **61** of the frame and the adjacent vertical edge of the corresponding bearing **54** of the frame would guide the extension **37** and force the teeth of the feed pawl to engage the ratchet wheels **31** at the desired point even if the cam were not there. After the teeth of the feed pawl **32** engage the ratchet wheels **31** and cause the feed pawl to pick up the load, the cam **50** will continue to rotate until its lug **66** engages the stop pawl lug **59** and swings the stop pawl teeth **55** and **56** out of contact with the ratchet wheels **31.** The cam **50** will be rotated, by engagement of the extension **37** with the adjacent edge of the cam lug **66,** about the pivot **62** until the notch **69,** provided in the opposite edge of the cam lug **66,** receives the lug **59** on the pawl **51** which will serve to lock the cam in the position shown in FIG. **6.** At this time, the stop pawl **51** will be completely disengaged from the ratchet wheels **31.** However, since the teeth of the feed pawl **32** were forced into engagement with the ratchet wheels **31** and the feed pawl picked up the load before the stop pawl **51** was disengaged from the ratchet wheel, the feed pawl will now serve as a stop pawl to prevent reverse motion of the drum **16** until the yoke **27** is swung in the opposite direction. At this time, the yoke **27** will be in the stopped position shown in FIG. **6.** Engagement of extension **37** with surface **61** is at its lower extremity.

If the yoke **27** is now swung in a counterclockwise direction, as viewed in FIGS. **1** and **6,** the reverse movement of the feed pawl **32** will eventually cause the extension **37** thereof to engage to cam lug **67,** as shown in FIG. **6***a*, and swing the cam **50** counterclockwise about the pivot **62** thereby unlocking it and permitting the stop pawl **51** to again engage the ratchet wheels **31.** However, before this engagement, the ratchet wheels **31** will have reversed to the maximum extent of the two teeth. The feed pawl **32** cannot move away from the cam **50** holding the stop pawl **51** away from the ratchet wheels **31** without first releasing the cam and permitting the pawl **51** to lock the ratchet wheels **31** again before the feed pawl is released from the ratchet wheels **31.**

With the member **70** or secondary cam of reversing cam **50** swung downwardly into inoperative position as indicated above, the maximum reversing action is accomplished and this has been specified as amounting to two teeth in each reversing movement of the yoke **27.** However, it should be understood that this can be increased by variations in the cam and sprocket wheel relationship. To set the reversing cam for minimum reversing action, the member **70** should be swung upwardly into the cam notch to the upstanding position shown in FIGS. **7** and **7***a*.

With the member **70** set as indicated for minimum reversal, if the yoke **27** is swung to the right or clockwise, as viewed in FIG. **6,** the cam **50** will function exactly as described with reference to FIG. **7.** It will be noted that projecting member **70** is so located that it will not interfere with the pawl tooth extension **37** engaging the inclined stop surface **61** and eventually moving into contact with the edge of the cam lug **66** as indicated in this FIG. Upon opposite or counterclockwise movement of the yoke **27,** as viewed in FIG. **7***a*, the cam **50** will function the same as described with reference to FIG. **6***a*, except that the tooth extension **37** will eventually strike the edge **67***a* of member **70,** rather than lug **67** and swing the cam **50** counterclockwise, thereby permitting the stop pawl **51** to again engage the ratchet wheels **31.** However, before this engagement, the ratchet wheels **31** will have reversed to the minimum extent of one tooth, determined by the setting of the member **70** in operative position.

My winch provides for simple positive and foolproof reversing action in conjunction with a double leverage construction. The double leverage results from the fact that the yoke **27** and the feed pawl **32** are pivoted at the pivots **26** which are located on a different spaced axis from the axis of the trunnions **17** on which the ratchet wheels **31** and drum **16** are mounted. The leverage of the pawl **32** acting against the ratchet wheels **31** and the leverage of the drum **16** against the cable **15** thereby multiply the mechanical advantage of the winch. The reversing mechanism is extremely simple comprising a spring-held single cam and one adjustable bias spring. This cam, by a simple arrangement, can be set for maximum or minimum reversal action. The cam is pivoted about an axis independent of the drum axis and is so disposed that it will not interfere with the normal oscillation of the lever for rotating the drum in a forward direction. The cam is positive in action, however, when the feed pawl is biased into position to operate the reversing mechanism. The cam is not subject to any of the load applied to the drum and, therefore, will not be distorted by such force. Distortion is further prevented by the provision of the positive stops between the lever yoke and the frame. The cam is free and positive in action with good mechanical advantage in applying the force of the feed pawl, which actuates it, to the stop pawl, and good mechanical advantage when the stop pawl and associated spring are aiding in moving the cam out of locking position and when the cam

spring is holding the cam clear of the feed pawl during the forward movement of the drum. The cam action is absolute and positive. It is impossible to lose the load unless the machine breaks or the operator intentionally releases the load by manually lifting the stop pawl from the ratchet wheels.

Having thus described the invention, what is claimed is:

1. A winch of the type described comprising a rotatable drum having ratchet means associated therewith, a lever oscillatable to actuate said ratchet means to rotate the drum, said ratchet means comprising a ratchet wheel fixed to the drum, a feed pawl carried by the lever, means for adjusting the feed pawl on the lever to an advancing position where it engages the teeth of the ratchet wheel so that oscillation of the lever will rotate the drum in a forward direction or to a reversing position where it is spaced from the ratchet teeth so that oscillation of the lever will not rotate the drum in a forward direction but will permit reversal thereof, a stop pawl engaging the teeth of the ratchet wheel to prevent reverse rotation of the drum as it is advanced in a forward direction, fixed cam means adjacent the path of movement of the lever for engaging the feed pawl upon swinging of the lever in a forward direction only when the feed pawl is set at reversing position to engage the feed pawl with the ratchet teeth to cause it to function as a stop pawl for the reversing movement of the drum, and a cam movably mounted adjacent the ratchet wheel and positively engaged by said feed pawl upon the camming thereof by said fixed cam upon further swinging of the lever in said forward direction to positively move the movable cam into engagement with the stop pawl to thereby release the stop pawl from the ratchet teeth to permit such reversing movement under control of the lever and positively engaged by the feed pawl upon moving of the lever in a reverse direction to thereby return it to its original position, said movable cam having fixed cam portions spaced in the direction of swinging of said lever with which the feed pawl engages respectively in its forward and reverse movement, and a cam portion adjustably mounted on said movable cam intermediate said fixed cam portions for movement between an inoperative position where it will not be engaged by said feed pawl and an operative position where it will be engaged by the feed pawl upon reverse movement of the lever.

2. A winch of the type described comprising a frame, a drum rotatably mounted on the frame, a ratchet wheel fixed with the drum for rotation therewith, a lever pivoted to the frame for oscillation, a feed pawl pivoted to the lever for cooperating with the teeth of the ratchet wheel, means for adjusting the feed pawl on the lever about its pivot to an advancing position where it engages the ratchet teeth so that oscillation of the lever will rotate the drum in a forward direction or to a reversing position where it is spaced from the ratchet teeth so that oscillation of the lever will not rotate the drum in a forward direction but will permit reversal thereof, a stop pawl pivoted to the frame and normally engaging the ratchet teeth to prevent reverse rotation of the drum as it is advanced in a forward direction, a cam edge on the frame adjacent the path of movement of the lever serving as a stop member which engages the lever to limit swinging in a forward advancing direction and engaged by the feed pawl upon oscillation of the lever only when the pawl is set at reversing position to cause the feed pawl to engage the ratchet wheel and to function as a stop pawl for the reversing movement, and a cam rotatably mounted on the frame adjacent the ratchet wheel and positively engaged by the feed pawl when it is set in reversing position upon said oscillation of the lever to positively engage the stop pawl to release it from the ratchet wheel to permit such reversing movement of the drum under control of the lever said feed pawl having a cam-engaging portion which upon oscillation of the lever in one direction with the pawl in reversing position first engages the cam edge and then engages the rotatable cam and swings it in one direction about its pivot into engagement with the stop pawl for releasing it from the ratchet and upon swinging of the lever in the opposite direction engages the rotatable cam and returns it to its original position, said rotatable cam having a pair of radially-extending angularly spaced fixed lugs, one of which is engaged by the feed pawl when it is set in reverse position upon oscillation of the lever in drum-advancing direction and the other of which is engaged by the feed pawl upon oscillation of the lever in drum-reversing direction and an additional lug mounted on said rotatable cam intermediate said fixed lugs and selectively adjustable between an inner retracted position where it will not be engaged by said feed pawl and a radially-extending operative position where it will be engaged by the feed pawl upon reverse oscillation movement of the lever.

3. A winch according to claim 2 in which resilient means is provided for maintaining the rotatable cam in its original position and a locking lug carried by the stop pawl and adapted to be engaged by a locking notch in the edge of the rotatable cam when the cam is moved into engagement with the stop pawl.

4. A winch according to claim 2 in which said adjustable lug comprises a lug member pivoted to the rotatable cam adjacent an edge extending between said fixed lugs, and a stop shoulder on said lug positioned to permit inward swinging of said lug into an inoperative position at said edge but limiting outward swinging of said lug to an operative position extending radially from said edge.

5. A winch according to claim 4 in which said adjustable lug is pivoted to the cam by a pivot structure including friction creating surfaces tending to hold it in its selectively adjusted positions.

6. A winch according to claim 5 in which the adjustable lug includes a tongue pivoted to the cam for swinging movement, said tongue being connected to an outer lug portion which will extend beyond said cam edge when swung outwardly into its radially extending operative position, said lug portion having a lateral flange portion which will engage said edge when swung inwardly into inoperative position and an inner shoulder on said flange which will engage said edge when swung outwardly into operative position.

7. A winch according to claim 2 including means for locking the rotatable cam in the said position where it engages the stop pawl and releases it from the ratchet teeth, said means comprising interlocking portions on the said rotatable cam and the stop pawl, and means for releasing said interlocking portions, said last-named means comprising an extension on said feed pawl for engaging said cam upon swinging of the lever in a reverse direction to rotate said cam in the opposite direction to thereby permit the stop pawl to again engage the ratchet teeth.

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