March 26, 1946. J. E. LILL 2,397,186

WINCH BRAKE

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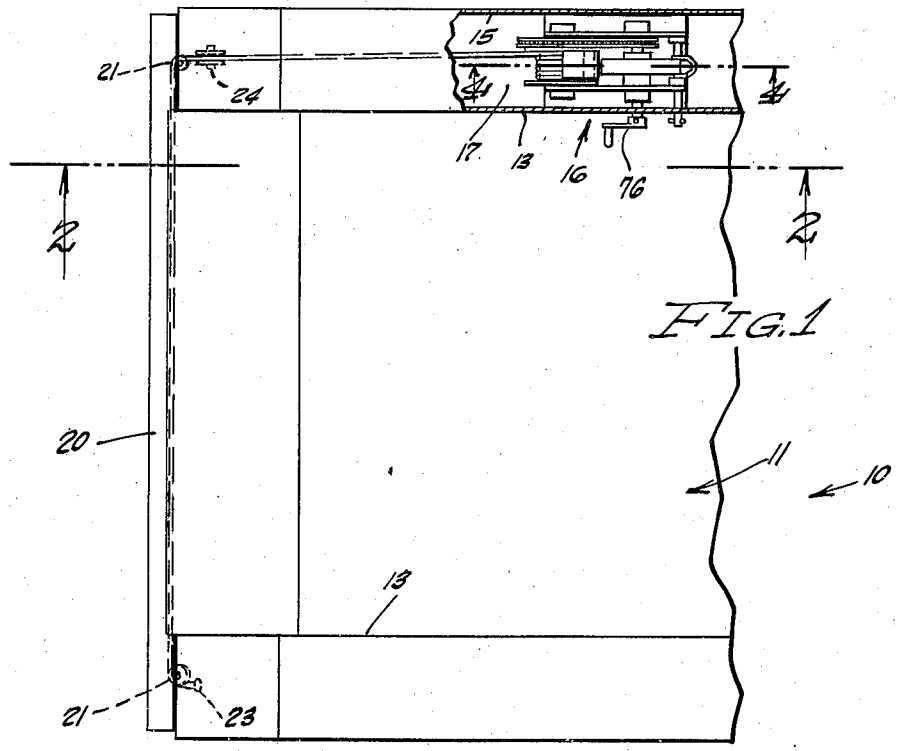


FIG. 1

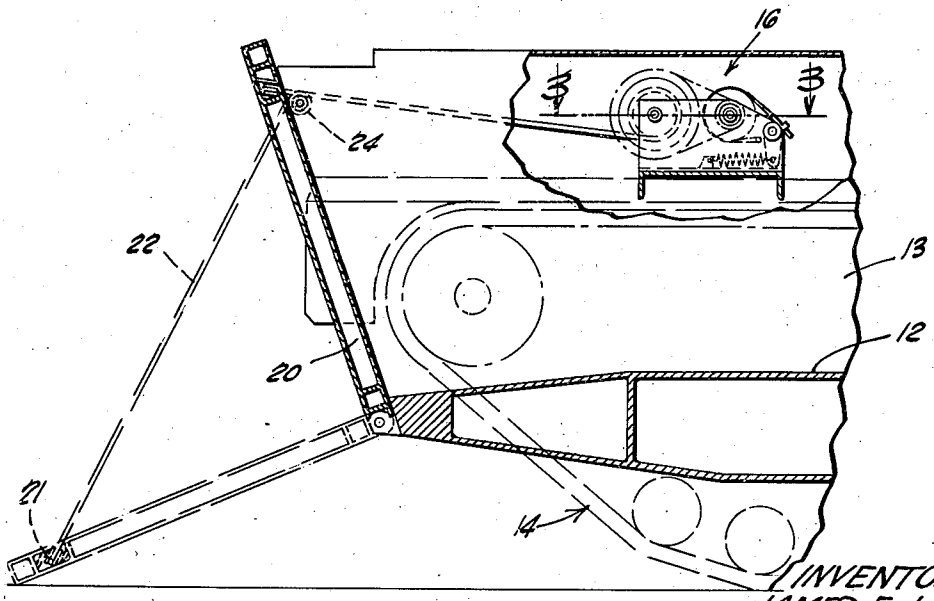


FIG. 2

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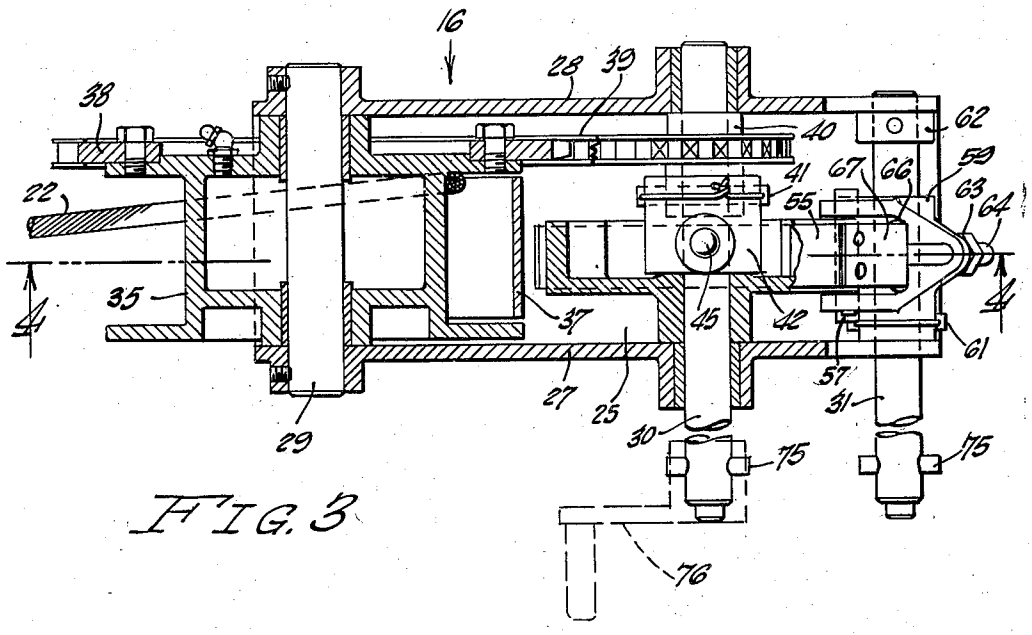


FIG. 3

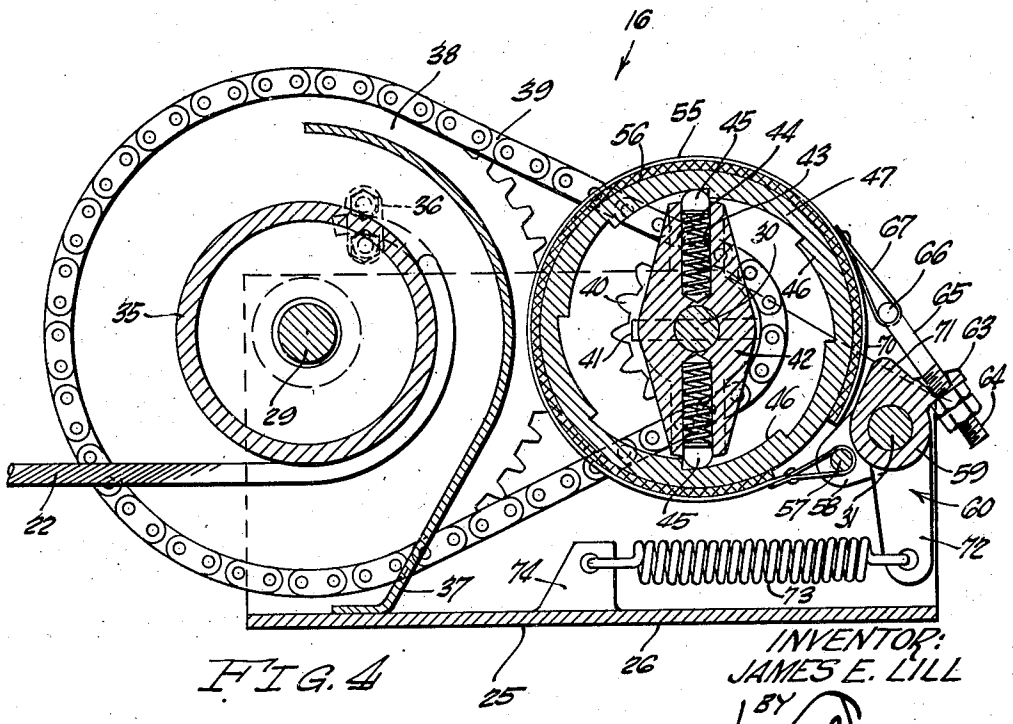


FIG. 4

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Patented Mar. 26, 1946 2,397,186

UNITED STATES PATENT OFFICE

2,397,186

WINCH BRAKE

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Application September 4, 1944, Serial No. 552,685

2 Claims. (Cl. 188—82)

This invention relates to winches and is particularly useful as a hand operated winch.

While adaptable for many uses my invention was designed for manually controlling the opening and closing of a heavy door or the like in which the control cable at least partially supports the door.

It is an object of my invention to provide an improved winch.

Another object is to provide a manually actuated winch which holds a load when the operator ceases to actuate the winch to lift said load but which can be controlled to lower said load without the operator having to actuate the winch in reverse.

The manner of accomplishing the foregoing objects, as well as further objects and advantages, will be made manifest in the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a diagrammatic view of an amphibian incorporating a preferred embodiment of the invention.

Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1 and illustrating the manner in which the invention controls the opening and closing of a door of said amphibian.

Fig. 3 is an enlarged sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken on the line 4—4 of Figs. 1 and 3.

Referring specifically to the drawings, the amphibian 10 with which the invention is shown as incorporated, includes a hull 11 having a bottom 12 and sides 13 on which are mounted track laying mechanisms 14. Upper portions of the sides 13 have outer walls 15 and the winch 16 of my invention is preferably mounted in the space 17 between the side 13 and the outer wall 15 on the port side of the amphibian 10.

The amphibian structure also includes a gate or door 20 which is hinged at its lower edge on the bottom 12 and forms a water tight seal with said bottom and with the sides 13 of the amphibian when in closed position as shown in full lines in Figs. 1 and 2. The door 20 has pulleys 21 and a cable 22, one end 23 of which is attached to one of the sides 13, the cable then passing around the pulleys 21 and up over a pulley 24 in the opposite side 13 from which the cable 22 extends to the winch 16.

By operation of this winch the door 20 may be swung at will between its upper closed position, as shown in full lines in Figs. 1 and 2, and its lower open position in which it is shown in broken lines in Fig. 2.

The winch 16 includes a U shaped frame 25 having a base 26, and side walls 27 and 28, the latter providing suitable bearings for shafts 29, 30 and 31.

Freely rotatable on the shaft 29 is a cable drum 35 to which the cable 22 is fastened by a clamp 36. Fixed on the base 26 is a guard 37 for retaining the cable 22 coiled on the drum 35.

Fixed on one side of the drum 35 is a sprocket 38 which is connected by a chain 39 to a pinion sprocket 40 on the shaft 30. Also mounted on the shaft 30 and fixed thereto with the sprocket 40 by a pin 41, is a ratchet dog member 42. This member has bores 43 containing springs 44 which yieldably press hardened balls 45 outwardly against ratchet teeth 46 provided internally in a brake drum 47 which is freely rotatably mounted on the shaft 30.

Extending around the brake drum 47 is a brake band 55 having a friction lining 56, the lower end of said band looping about a pin 57 supported by ears 58 on the hub 59 of a brake operating member 60 which is fixed on the shaft 31 by a pin 61. This shaft also has a collar 62 to assist in preventing longitudinal movement of the shaft 31. The member 60 has a short arm 63 for receiving a threaded shank 64 of a T-bolt 65. The bolt head 66 fits into a metal loop 67 which is secured to an upper portion of the brake band 55.

It is to be noted that in Fig. 4 an end section 70 of the brake band extends beyond the connection of the brake band with the loop 67 so as to lie between the brake drum 47 and a cam 71 formed on the hub 59. Also formed on this hub is a spring arm 72, opposite ends of a contractile spring 73 being connected to this arm and to a lug 74 provided on the base 26.

Adjacent extending ends of shafts 30 and 31 are provided with pins 75 which are adapted to be selectively engaged by a hand crank 76 in the operation of the winch 16.

Operation

The bolt 65 is generally adjusted so that the spring 73 is under tension, thereby tightening the brake band 55 and holding the lining 56 thereof snugged against the outer cylindrical surface of the brake drum 47. When the door 20 is in an upper position as shown in full lines in Figs. 1 and 2, it is held in this position by friction between the lining 56 and the drum 47 preventing rotation of this drum. The cable 22 is wound on the cable drum 35 in such a direction that the

balls 45 engage the ratchet teeth 46 and thus prevent the shaft rotating and the unwinding of the cable from the drum 35.

When it is desired to open the door 20, the handle 76 is placed on the shaft 31 and this shaft rotated to stretch the spring 73 and relax the brake band 55 to permit the brake drum 47 to be rotated by the ratchet dog member 42. When the brake band 55 is thus relaxed, the weight of the door 20 unwinds the cable 22 from the cable drum 35. By control of the shaft 31 the door then may be allowed to swing downwardly any desired distance. Whenever rotational pressure on the shaft 31 is released so as to allow the spring 73 to again constrict the brake band 55 on the drum 47, the unwinding of the cable 22 from the cable drum 35 will be stopped.

Cam 71 is provided so that if the handle 76 should be on the shaft 31 and someone should accidentally fall against it so as to give an excessive rotation to the shaft 31, this cam will engage the end section 70 of the brake band 55 and press this against the drum 47 so that accidental rotation of the latter, for more than a very slight distance, would be prevented.

The claims are as follows:

1. In a winch, the combination of: a cable drum; a drive shaft connected to said drum for rotating the same; a brake drum rotatably mounted on said shaft; a brake band gripping said brake drum; a band actuating shaft; means yieldably rotating said band shaft to snug said brake band onto said brake drum, said band shaft being reversely rotatable to relax said band on said brake drum; ratchet means interposed between said shaft and said brake drum to allow said shaft to rotate freely relative to said brake drum only in a given direction; and means responding to an excessive rotation of said band shaft in a direction to relax said brake band to cause said band to be pressed against said brake drum and thereby resist rotation of said brake drum.

2. In a winch, the combination of: a cable drum; a drive shaft connected to said drum for rotating the same; a brake drum rotatably mounted on said shaft; a brake band gripping said brake drum; a band actuating shaft; means yieldably rotating said band shaft to snug said brake band onto said brake drum, said band shaft being reversely rotatable to relax said band on said brake drum; ratchet means interposed between said shaft and said brake drum to allow said shaft to rotate freely relative to said brake drum only in a given direction; and a cam provided on said band shaft and positioned adjacent said band so that excessive rotation of said band shaft in a direction to relax said brake band causes said cam to press said brake band against said brake drum and thereby resist rotation of said brake drum.

JAMES E. LILL.