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Broling et al.

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[54] LOW PROFILE TIE-DOWN WINCH

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[52] **U.S. Cl.**.....**105/369 A**, 105/368 T, 248/361 A

[51] **Int. Cl.**.....**B61d 45/00**, B60p 7/08

[58] **Field of Search**.....105/369 A, 368 T; 280/179 A; 248/361 A

[56] **References Cited**

UNITED STATES PATENTS

3,507,471	4/1970	Haynes, Jr. et al.	105/368 T X
3,374,008	3/1968	Blunden et al.	105/368 T
3,298,324	1/1967	Schwiebert	105/368 T
3,205,834	9/1965	Terlecky	105/368 T
2,205,273	6/1940	Radey	105/368 T
3,564,577	2/1971	Blunden et al.	105/369 A
3,589,304	6/1971	Haynes	105/369 A

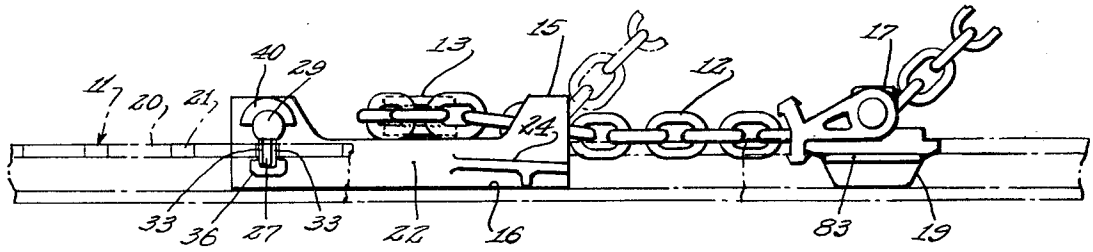
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[57] **ABSTRACT**

Low height tie-down ratchet winch for automobile rack cars arranged to increase the clearance between the winch and the vehicle tied down. The winch is adjustable along a channel having inwardly extending retainer flanges and facing locking notches carried in the flanges. The base for the winch has flanges extending in opposite directions from one end of the base beneath the retainer flanges of the channels and has a releasable locking lug at its opposite end, adapted to lockingly engage within a notch, to retain the base in position in the channel. A vertical axis winch block accessible from the top of the base is mounted in the winch block and is detachably retained thereto, as by a segment and notch connection between the base and a downwardly spaced flange portion of the winch block. A tie-down chain is secured to an arm extending from the winch block by a vertical pin, which may be removed without removing the base from its channel, or the winch block from the base. The chain extends under an idler in the form of an arched bar extending across the base, and where required, may extend under a second idler spaced from the base and independently held in position in the channel.

14 Claims, 10 Drawing Figures



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SHEET 1 OF 3

Fig. 1

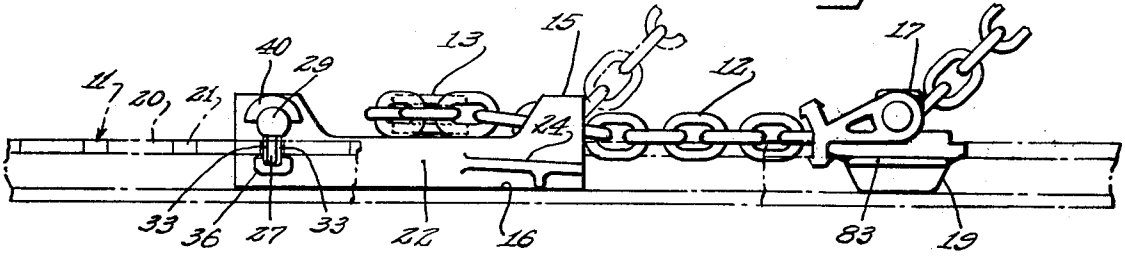


Fig. 6

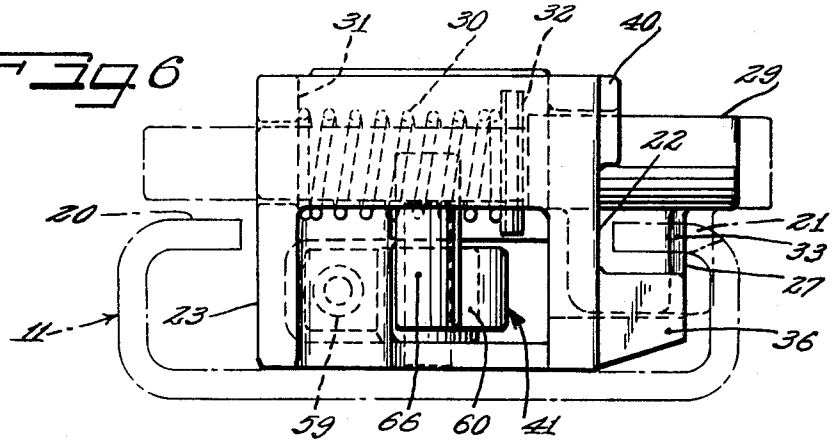
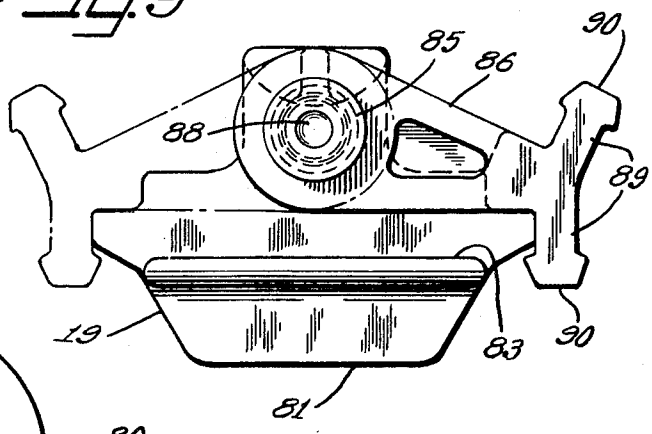


Fig. 9



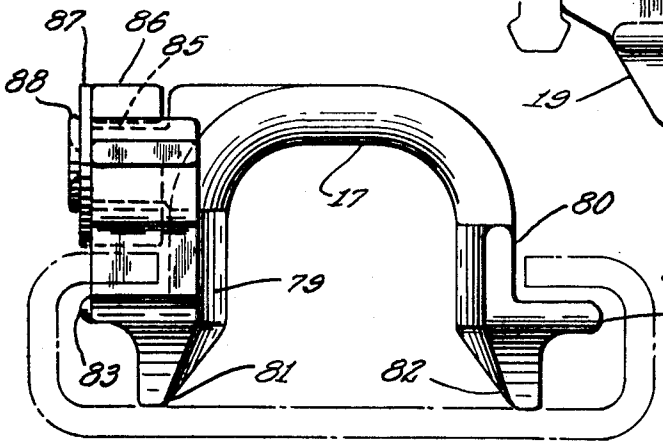


Fig. 10

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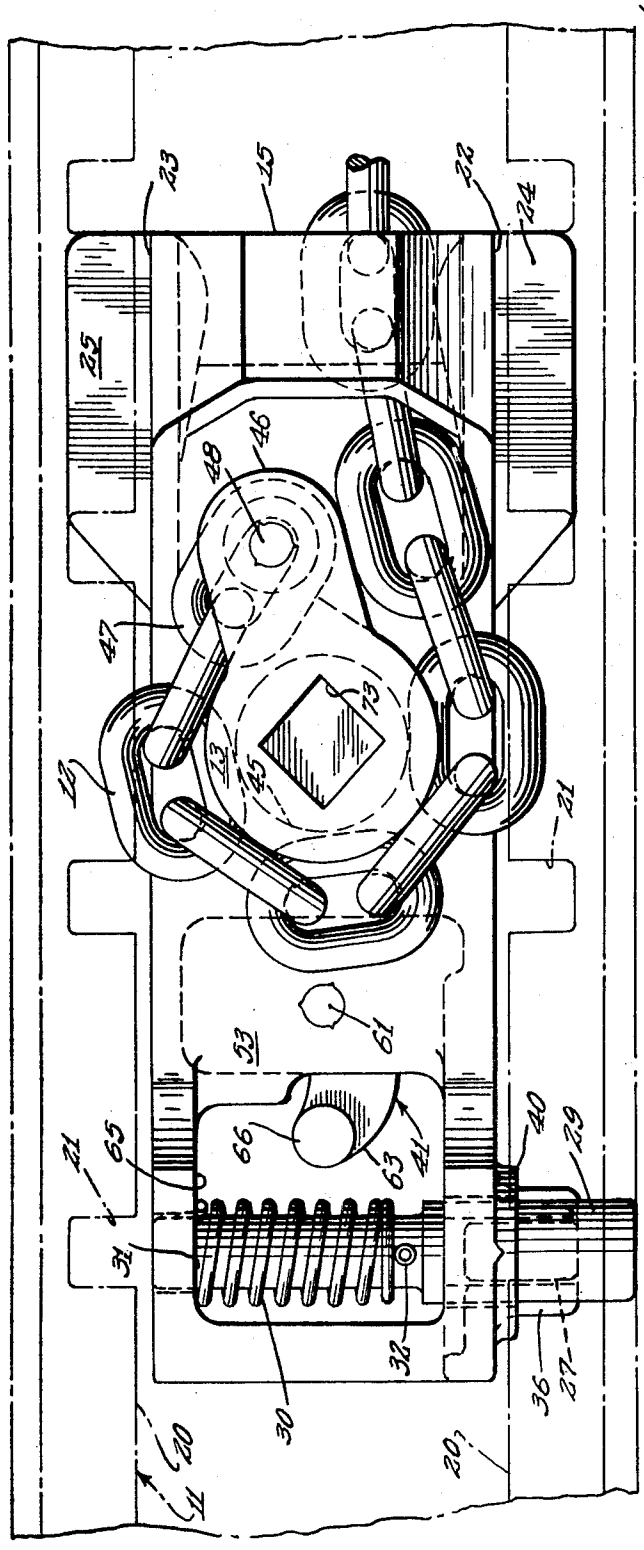


FIG. 2

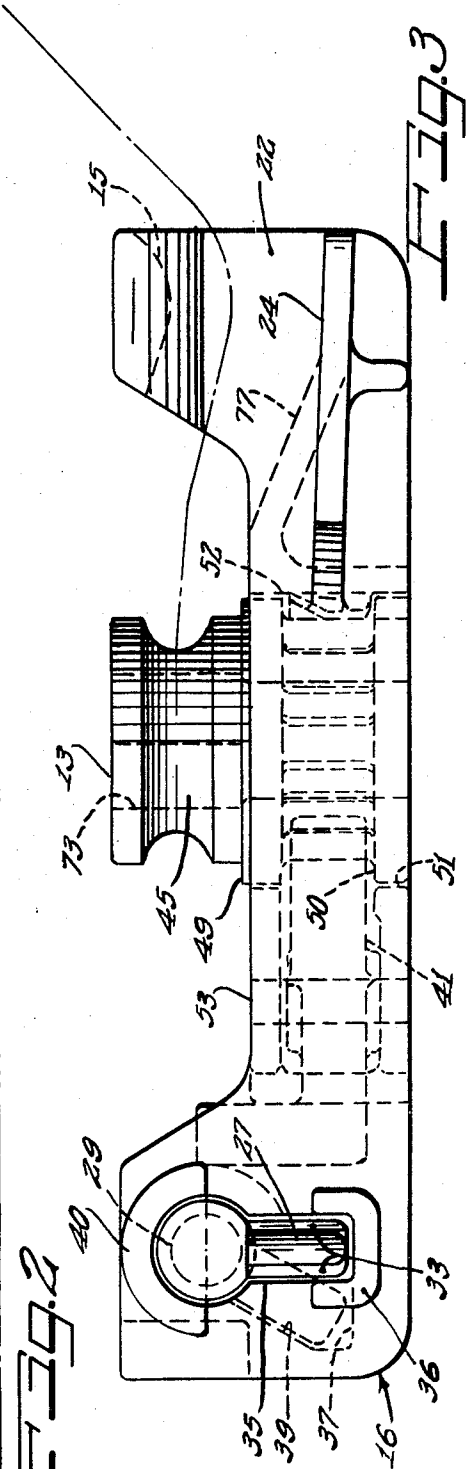


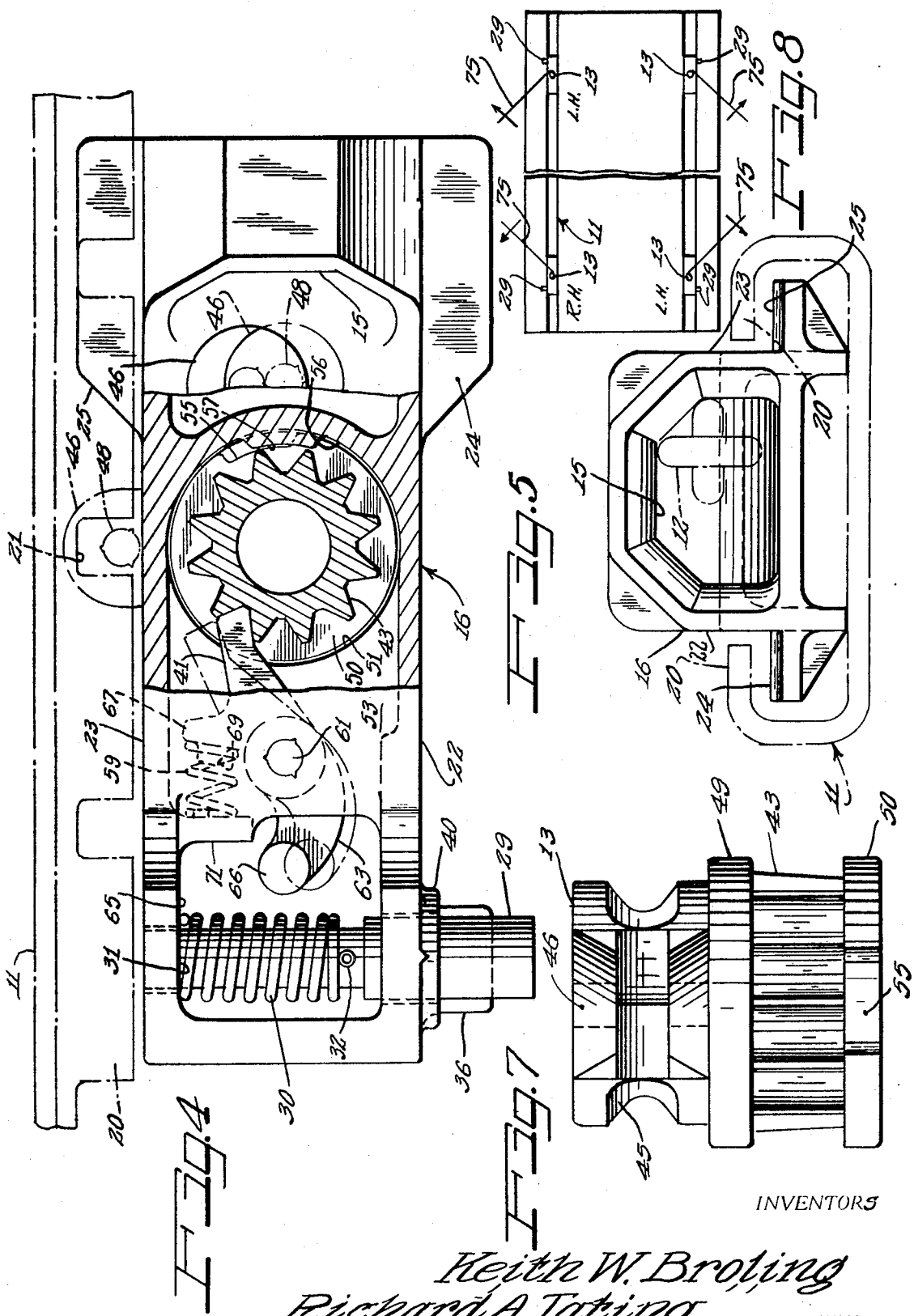
FIG. 3

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LOW PROFILE TIE-DOWN WINCH

SUMMARY AND OBJECTS OF INVENTION

Low height tie-down adapted for automobile rack cars in the general form of a capstan having a ratchet coaxial with the vertical axis winch block and arranged for easy chain replacement and removal of the winch block from its base, and having a quick releasable lock locking the base in position in its channel, releasable by the blow of a hammer and the like.

A principal object of the present invention is to provide an improved form of low height tie-down winch operable in existing rack cars and arranged with a view toward a maximum take-up of the tie-down chain and reduction in vertical height of the tie-down winch.

Another object of the invention is to provide an improved form of tie-down winch operable in the tie-down channels of rack cars, in which the winch may be released for repositioning along the channel by the blow of a hammer on the locking means therefor.

Still another object of the invention is to provide an improved form of winch type of tie-down in which the winch assembly is always visible from above, and the chain may be removed from the winch assembly while the tie-down is in its channel.

Still another object of the invention is to improve upon the low height tie-downs heretofore in use on rack cars by providing a registering lug and notch retaining connection between the winch block and its base, which is releasable by the simple operation of positioning the winch block with the chain in a completely released position, releasing the pawl from the ratchet for the winch block and then lifting the winch block and ratchet vertically above the base for the tie-down.

A still further object of the invention is to provide a low height tie-down and idler for the tie-down chain, which may be used with or without the idler, depending upon tie-down conditions.

Another object of the invention is to provide a simple form of low height tie-down particularly adapted for automotive rack tie-downs which may be positioned in a channel to tie-down a vehicle to a rack car, in which take-up of the tie-down chain is always in a direction away from the winch and car regardless of the position of the tie-down in the car.

Other objects, features and advantages of the invention will be readily apparent from the following description of a certain preferred embodiment thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a generally diagrammatic view of a tie-down winch constructed in accordance with the principles of the present invention showing the tie-down in side elevation and showing the tie-down chain extending through an idler spaced from the tie-down in the channel of the rack car.

FIG. 2 is a top plan view of the tie-down shown in FIG. 1, showing the retaining channel for the tie-down by dot-dash lines.

FIG. 3 is a view in side elevation of the tie-down shown in FIG. 2.

FIG. 4 is a fragmentary horizontal sectional view of the tie-down shown in FIG. 2 showing the ratchet in horizontal section and also showing the locking flange at the base of the rachet.

FIG. 5 is an end view of the tie-down winch shown in FIGS. 1 through 4, looking at the tie-down winch toward the chain and winch block.

FIG. 6 is an end view of the tie-down winch looking at the tie-down winch toward the opposite end thereof from the end shown in FIG. 5.

FIG. 7 is a detail end view of the winch block and ratchet showing the retaining flange at the bottom of the ratchet and the notch therein accommodating ready removal of the winch block and ratchet from the base for the tie-down.

FIG. 8 is a diagrammatic view illustrating the positioning of the tie-down winches on a rack car, so the take-up forces on the tie-down winches will always be in directions away from the tie-downs and car.

FIG. 9 is a view in side elevation of the idler shown in FIG. 1; and

FIG. 10 is an end view of the idler shown in FIGS. 1 and 9.

DESCRIPTION OF PREFERRED EMBODIMENT OF INVENTION

In the drawings, we have shown in FIG. 1 a low height tie-down winch constructed in accordance with the principles of the present invention locked in position in a tie-down channel 11 mounted on the deck of a rack car or on the decks of multiple level rack cars, and have shown a tie-down chain 12 trained from a winch block 13, under an idler bar 15 extending across a base 16 for the tie-down.

In most cases, the chain 12 may extend upwardly of the idler bar 15 at an angle of substantially 45° and be attached to an automotive vehicle or other apparatus to be tied down to the deck of a flat car or the decks of a multiple level rack car. Where it may be necessary to position the tie-down remote from the vehicle, the chain 12 will extend horizontally through an idler bar 17 of an idler 19, and then angle upwardly to the vehicle, usually at an angle of substantially 45°. The idler 19 will hereinafter be more clearly described as this specification proceeds.

The channel 11 may be a conventional form of retainer channel on the deck or decks of a flat or multiple level rack car, or other vehicle. Where the car is used as a rack car to tie-down automotive vehicles, a tie-down channel may extend along the car and be spaced inwardly of the sides thereof. The channels are usually spaced in the order of 40 inches apart, although they need not be so spaced, the spacing being dependent upon the type of vehicle tied down. Each channel has a bottom web, opposite upwardly extending side walls, and retainer flanges 20 extending inwardly therefrom and having inwardly opening notches 21 spaced therealong cooperating with locking means on the tie-down winch for locking the tie-down winch in position in the channel.

The base 16 is shown in FIGS. 1 and 5 as having parallel side walls 22 and 23 having retainer flanges 24 and 25 extending laterally therefrom respectfully, spaced beneath the bottoms of the retainer flanges 20 and inclined upwardly from the leading to trailing ends of said flanges to conform to the bottoms of the retainer flanges 20,20 as the chain 12 is attached to a vehicle and tension is taken up on the chain, tilting the base about its rear end as retained to the channel by a locking lug 27 spaced along the base 16 at the opposite end thereof from the flanges 24 and 25. The locking lug 27 depends from the enlarged diameter end portion of a stepped pin 29, slidably guided in side walls 22 and 23 of the base 16, and extending transversely thereof. A compression spring 30 extends along the reduced diameter portion of the pin 29 and is seated at one end on the inside of an upwardly extending portion 31 of a side wall 23, and at its opposite end on a pin 32, which may be a roll pin. Said roll pin extends through the pin 29 adjacent the shoulder formed at the juncture between the small and large diameter portions of said pin. The compression spring 30 thus biases the lug 27 depending from the large diameter end of the pin 29 into engagement with a notch 21 in the retainer flange 20. The locking lug 27 has opposite vertically extending beveled edges 33 extending vertically along the outer end portion thereof enabling the pin to readily engage within a notch as the tie-down is moved along the channel 11.

The large diameter end of the pin 29 and the lug 27 depending from said pin, slidably fit within a keyhole slot 35 formed in the wall 22. A generally U-shaped rib 36 extends along the bottom and side edges of the slot 35 outwardly of the wall 22, to keep the pin 29 and lug 27 from turning when the lug is in position to lockingly engage a selected notch 21. On the inside of the side wall 22 is a recess 37 receiving the lug 27 when in its release position and accommodating the lug to be held in a

release position by inward and pivotal movement of the lug to engage the inside of the side wall **22** to accommodate free positioning of the tie-down along the channel **11**. The recess **37** has an inclined wall **39** inclined inwardly from its bottom portion toward the round portion of the keyhole slot **35**, as shown in FIG. **3**, forming a widened bottom of said recess to accommodate the pin to be turned into engagement with said wall, when it is desired to hold the lug **27** in a released position. A reinforcing embossment **40** extends outwardly of the wall **22** about the circular portion of the keyhole slot and the large diameter end portion of the pin **29**. When the locking lug **27** is in locking engagement with a notch **21** in a flange **20** of the channel **11**, and it is desired to move the winch block along the channel, it is only necessary to drive the pin **29** inwardly until the lug **27** is out of engagement with a notch **21** in the channel **11**. The tension of the chain will then advance the tie-down along the channel to a next adjacent notch **21**, at which time the pin will snap into position. The blow of a hammer on the head end of the pin **29** is usually sufficient to release the lug **27** from its notch to provide slack in a tie-down chain **12**. Where, however, after release of the lug **27** from the notch **21**, it is necessary to have additional slack chain, a pawl **41** may be released from a ratchet **43**, to accommodate the rotation of the tie-down winch **13** by pulling on the chain **12**.

Where it is desired to relocate a tie-down winch along the channel **11**, the lug **27** may be driven or moved inwardly to register with the recessed portion **37** and then may be turned 30° along the inclined wall **39** of said recessed portion.

The winch block **13** is best shown in FIGS. **2**,**3** and **7** and has a grooved drum portion **45**, terminating into an arm **46** extending generally radially therefrom. The arm **46**, as shown in FIG. **7**, is bifurcated to receive a link **47** of the chain **12**, between the furcations thereof. A vertical attachment pin **48** is provided to connect the link **47** to the arm **46** and accommodate the chain to be wound on the grooved drum portion of the winch block.

When it is desired to remove the chain **12** from the winch block, it is merely necessary to release the pawl **41** from the ratchet **43** and rotate the winch block 90° in either direction from a full release position of the chain, and place the chain attachment pin **48** over a notch **21** in the channel **11**. The pin **48** may then be driven through the furcations of the bifurcated arm **46**. The tie-down winch thus need not be removed from its channel to install a new chain, due to breaking of the chain, or where it may be desired to use a chain of different lengths, or having a different arrangement of hooks to be hooked to the vehicle.

The winch block **13** is coaxial with and may be formed integrally with the ratchet **43**, although the ratchet may be welded or otherwise secured to the bottom of the winch block. The lower margin of the winch block **45** is defined by an annular flange **49** extending radially therefrom and also defining the upper limits of the ratchet **43**. The lower limits of the ratchet **43** are defined by an annular flange **50** extending radially therefrom and fitting within an apertured portion **51** in the bottom of the base **16** and having a cylindrical internal wall forming a bearing for said flange. The annular flange **49** fits within an upwardly spaced apertured portion **52** of a horizontal wall portion **53** of the base **16** and spaced above the bottom wall of said base.

The lower flange **50** has an elongated notch **55** formed therein in the form of a segment of a circle and extending equal distances from opposite sides of a center line extending through the axis of rotation of the winch block **13** and the center of the attachment pin **48**. An internal wall **56** of base **16**, spaced above the apertured portion **51** has a retainer lug **57** extending inwardly therefrom of slightly less length than the notch **55** and extending equal distances in opposite directions from a center line extending through the axis of rotation of the winch block **13** and longitudinal center of the base **16**. A spring **59** biases the pawl **41** to extend over the flange **50**. The lug **57** extends over the flange **50** and cooperates with the pawl **41** to retain the winch block to the base **16**. When the pawl **41** is released from the ratchet teeth, the arm **46** may be brought to a neutral position. The chain will then be in a full release position with the center of the attachment pin **48** intersecting the longitudinal center of the base **16**, and the arm **46** in the broken line position shown in FIG. **4**. The slot **55** will then be in registry with the lug **57**.

The location of the teeth of the ratchet **43** relative to the slot **55** is such that when the pawl **41** is in engagement with a ratchet tooth, the arm **46** is out of a neutral position and the lug **57** will lap the top surface of the flange **50** and retain the winch block **13** and ratchet **43** to the base **16**. This is to prevent the winch block **13** from being accidentally removed from the base **16**.

In order to remove the winch block **13** and ratchet **43** from the base **16** it is necessary to turn the arm **46** to bring the chain **12** into its fully released position, with the slot **55** in registry with the lug **57**. The pawl **41** must then be released to clear the flange **50**, which will then allow the winch block and ratchet to be lifted from the base **16** as a unit.

The pawl **41** is disposed between the bottom wall of the base **16** and the upwardly spaced wall **53** and is pivoted intermediate its ends on a fulcrum pin **61** extending vertically through said vertically spaced walls. An end portion **63** of said ratchet extends into an open portion **65** of the base between the walls **22** and **23** thereof and has an upwardly extending gripper portion **66**, facilitating the release of said pawl by the fingers. The pawl **41** also has an arm **67** extending laterally therefrom having a lug **69** extending from said arm and forming a seat for one end of the compression spring **59**. The other end of said compression spring is suitably seated on an abutment wall **71** of the base **16**, between the bottom and the vertically spaced wall **53** of said base.

When it is desired to completely assemble or disassemble the winch when not in a channel **11** on a transporting vehicle, the pawl **41** is released and the winch block **13** and arm **46** are turned to a full release position. The lug **57** will then be aligned with the slot **55**, as previously described. The winch block and ratchet **43** may then be lifted out of the base **16**. The pawl can be removed from the base by driving out the fulcrum pin **61**. The pawl **41** can then be moved laterally to release the spring **59** to fall to the bottom wall of the base. The spring may then be retrieved and the pawl may be removed from the end of the base or through the opening **65**. To replace a locking lug **27**, pin **29** and spring **30**, it is merely necessary to remove the roll pin **32** and then remove the pin **29** from the side of the winch block.

The winch block **13** has a rectangular socket **73** therein opening to the top thereof (FIG. **2**), to accommodate a wrench **75** having a squared end (not shown) to fit thereinto and turn the winch block to take up on the chain **12** under the control of the ratchet **43** and pawl **41**. As shown in FIG. **2**, the winch block **12** is rotated in a clockwise direction away from the base **16** and side of the car, when it is desired to take up on the chain **12**. In the present form of the invention, the chain take-up exceeds 8 inches and the leverage ratio on the chain increases in the later stages of take-up.

As diagrammatically shown in FIG. **8**, where four tie-down winches are used, the arrangement is such that the take-up forces on the wrenches **75** are always away from the tie-down winch and load being secured. This prevents damage to the vehicle and to the fingers or hand, where the wrench might slip. In FIG. **8**, left and right-hand tie-down winches are shown at each end and at opposite sides of the center line of the car. Thus, at one end of the car a left-hand winch is at one side and a right-hand winch is at the opposite side, so the pull on the wrenches **75** will always be in a direction away from the vehicle being tied down. In a similar manner, at the opposite end of the car, a left-hand winch is at the opposite side of the center line of the car. Thus, the pull on the wrenches **75** is always in a direction away from the winches and car and vehicle being tied down on the car and the locking lugs **27** are always on the outside.

In FIG. 1, we have shown the tie-down chain 12 extending under the idler bar 15 and an idler bar 17 of an idler 19, mounted in the channel, independently of the tie-down winch. From the idler bar 17 the chain goes upwardly at substantially a 45° angle and is attached to the vehicle or other device to be tied down.

We have also shown by broken lines, the chain 12 as extending upwardly of the idler bar 15, at an angle of substantially 45°, where it is attached to an automotive vehicle or other device to be tied down to the car. It should here be noted that the idler bar 15 and idler opening in the end of the base is such as to accommodate the chain to extend angularly upwardly of the idler bar at an angle of substantially 45° or to extend horizontally to pass under the idler bar 17. The idler opening in the end of the base serves as a preliminary guide for the chain and guides the chain to rise slightly and wrap properly into the groove of the grooved drum 45. The slope of the bottom of the opening is shown by broken lines in FIG. 3 and is indicated generally by reference character 77.

The idler 19 is shown in FIG. 10 as being in the general form of an inverted U-shaped frame, in which the base of the U forms the idler bar 17. Parallel legs 79 and 80 extend downwardly of the idler bar 17 and terminate in outwardly spaced elongated runners 81 and 82 at their lower ends slidably engageable with the web of the channel 11. The outer sides of the runners 81 and 82 diverge outwardly to flanges 83 and 84 respectively, extending laterally of said runners and engageable under the retainer flanges 20 of the channel 11 as the chain 12 is brought under tension and inclined upwardly to be attached to a vehicle and the like. The leg 79 has a boss 85 extending laterally outwardly therefrom adjacent the upper end thereof and forming a pivotal mounting for a lock arm 86. A washer 87 bears against the outside of the locking member 86 and is retained thereto by peening the end of the boss 85 over said washer as indicated by reference character 88 in FIG. 10. The fit between the flared end 88 of the boss 85 and the washer 87 is such as to accommodate free rotation of the lock arm 86 about the axis of said boss.

The lock arm 86 converges toward its outer end and terminates into oppositely extending locking projections 89 having dove-tail like heads 90, fitting within a notch 21 in a flange 20 of a channel 11, as the lock arm 86 is moved about the axis of the boss 85 in one direction or another to rest on flange 20 of a channel 11.

Thus, when the idler is in use, as shown in FIG. 1, and the chain 12 may extend upwardly of the idler bar 17 at an angle of substantially 45°. The locking member 86 may be swung about the axis of the boss 85 to engage a dove-tail end portion 90 in a notch 21 in the associated flange 20 and to thereby retain the idler from movement along the channel as tension is taken up on the chain 12 and the chain is under tension tying a vehicle to the flat deck of the car.

It is, of course, understood that the lock arm 86 may be positioned along the retainer flange 20 to extend in a forward or rearward direction as shown in FIG. 9, although said lock arm is usually operative to lock the idler 19 in position with the lock arm 86 extending in a rearward direction as shown in FIG. 1. The lock arm 96, however, is so arranged as to be reversible and to enable the idler to lockingly engage notches in the channel when in either a right or left-hand channel, so the lock arm 86 is always accessible from the outside of the idler. It should further be understood that the shoulders formed by the inner end portions of said dove-tailed end portions of said lock arm engage under the retainer flange in the associated channel, and lock the locking projection 90 from coming out of a retainer notch.

We claim as our invention:

1. In a tie-down for freight vehicles and in combination with a channel on the deck of the vehicle having inwardly extending retainer flanges having inwardly opening notches spaced therealong,

a tie-down winch including a base supported for slidable movement along said channel and having flanges extending laterally from opposite sides thereof for engagement beneath said retainer flanges,

locking means carried by said base and mounted for movement relative to said base into locking engagement with a notch in a retainer flange of the channel to hold said base from movement along said channel,

a winch block mounted on said base intermediate the ends thereof for movement about a vertical axis, and freely accessible from the top of said base,

said winch block having a grooved drum portion and spaced bearing means disposed therebeneath rotatably mounting said winch block to extend above the top of said base,

a flexible tie-down,

means fixing the free end of said tie-down to said grooved drum portion of said winch block, to be wound thereon and extend along the top of said base,

pawl and ratchet means for holding said winch block from rotation in an unwinding direction, and accommodating the operation of said winch block to take up on said flexible tie-down, including a ratchet on said winch block between said spaced bearing portions and a pawl pivoted on said base and releasable from said winch block and ratchet to accommodate removal of said winch block from said base,

guide means for said flexible tie-down at one end of said base, slidably engaged by said flexible tie-down and guiding said flexible tie-down to extend from said winch block for attachment to a vehicle and the like.

2. The tie-down of claim 1,

wherein the winch block has an arm extending radially from the grooved drum portion thereof,

wherein the flexible tie-down is a link chain, and

wherein an attachment pin connects said tie-down chain to the end of said arm, and is releasable by turning said arm 90° to the longitudinal axis of said base, into alignment with and over one of the notches in a retainer flange and punching said pin through said arm and notch for ready replacement of the chain.

3. The tie-down of claim 1,

wherein the base has a pair of vertically spaced walls, having aligned apertured portions having internal cylindrical walls,

wherein the spaced bearing portions include a radial flange extending from the lower end of said winch block and mounted in the upper of said internal cylindrical walls,

a second radial flange extending radially of said ratchet and rotatably mounted in the lower of said cylindrical walls, and

wherein a releasable connection is provided between said base and the lower of said flanges accommodating release of said winch block and ratchet by intentionally moving said winch block into a release position by release of said pawl from said winch block and by pulling movement on said winch block relative to said base as said winch block and the tie down connected thereto are in fully released positions.

4. The tie-down of claim 3,

wherein a segment extends inwardly over the lower of said cylindrical walls into engagement with said flange to hold the winch block in position,

wherein said flange has a notch opening to the periphery thereof and registered with said segment, when said winch block is in a fully released position, to accommodate upward lifting movement of said winch block and ratchet from said base, without removing said base from its channel, and

wherein the teeth of said ratchet are in such relation relative to said notch that the pawl must be released and the ratchet purposely moved to register said notch with said segment.

5. The tie-down of claim 3,

wherein the pawl extends over said flange and cooperates to retain said winch block in position in said base, and

wherein spring means bias said pawl into engagement with said ratchet and accommodates release of said pawl relative to said ratchet, upon the taking up of tension on said tie down, and also accommodates movement of said pawl away from said radial flange to permit free vertical lifting movement of said winch block from said base, upon registry of said releasable connection.

6. The tie-down of claim 4,

wherein said pawl is fulcrummed about a vertical pivot pin,

wherein spring means bias said pawl to extend over the top surface of the lowermost of said flanges into engagement with said ratchet teeth, and

wherein manual release means are provided accommodating selective said pawl for movement of said pawl away from the top surface of the lowermost of said flanges and permitting bodily removal of said winch block and ratchet from said base when said winch block is in a fully released position as said notch in said flange is in registry with said segment.

7. The tie-down of claim 1,

wherein the releasable locking means retaining said base to said channel, includes

a pin movably mounted in said base for movement transversely thereof,

spring means biasing said pin outwardly of said base, and

an elongated locking lug depending from said pin and biased by said spring means to engage a notch in a retainer flange of the channel,

means guiding said lug in alignment with a notch in a retainer flange of the channel to accommodate said spring means to lockingly engage said lug with a notch in a retainer flange of the channel,

whereby said lug may be releasable from said retainer flange by a blow on the end of said pin.

8. The tie-down of claim 7,

wherein the base has a wall through which said pin extends,

wherein an apertured portion is provided in said wall to slidably receive said pin and locking lug, and

wherein a retainer recess is provided on the inside of said wall accommodating the turning of said pin and lug into said recess upon inward movement of said pin and lug, to hold said lug in a fully released position and to accommodate free movement of said base along said channel.

9. The tie-down of claim 8,

wherein a rib extends outwardly of said wall about the lower end portion of said apertured portion for said pin and lug, to hold said lug from turning movement about the axis of said pin, upon engagement of said lug with a notch in said channel.

10. The tie-down of claim 10,

wherein the spaced bearing means comprise flanges defining the upper and lower limits of said ratchet,

wherein said base has generally cylindrical interior wall portions forming bearing openings for said flanges,

wherein said pawl extends over the top surface of the lowermost of said flanges, and

wherein the lowermost of said flanges has a segmental notch therein,

wherein the lowermost interior wall portion has a segment extending inwardly therefrom over the top surface of the lowermost of said flanges and registrable with said notch, when the flexible tie-down in a fully released position, to accommodate removal of said winch block and ratchet from said base without removing said base from said channel upon release of said pawl, and registry of said segment with said segmental notch.

11. The tie-down of claim 10,

wherein a compression spring biases said pawl into engagement with said ratchet,

wherein a pin forms a fulcrum for said pawl intermediate the ends thereof,

wherein removal of said spring and pawl may be attained by driving said pin out of engagement with said pawl, and

wherein said base is closed in the region of said spring, to retain said spring from dropping into said channel.

12. The tie-down of claim 11,

wherein an idler for said flexible tie-down is mounted in said channel and is spaced from said base and consists in an arched bar extending over said tie-down and locking means engageable with a notch in said channel to lock said idler in position.

13. In a tie-down for freight vehicles and in combination with a channel on the deck of a vehicle and having retainer flanges extending inwardly therefrom, with locking notches in said flanges, and a tie-down winch retained to said channel having a tie-down chain extending therefrom and adapted to take up tension on said chain,

an idler for said chain spaced along said channel from said tie-down winch,

said idler including an arched bar through which said chain extends,

parallel legs extending downwardly from said bar and having elongated runners a the lower ends thereof engageable with the base of said channel,

flanges extending laterally of said runners for engagement beneath said retainer flanges, to retain said idler to said channel upon the taking up of tension on said chain,

a reversible lock arm pivoted to an outer of said legs, adjacent one of its ends,

a pivot for said lock arm extending laterally of an outer of said legs,

said lock arm having a free end having locking projections extending upwardly and downwardly therefrom, a selected of said projections being engageable with a notch in said channel upon pivotal movement of said lock arm in one direction or another into position along the top of one of said retainer flanges.

14. The tie-down of claim 13,

wherein the locking projections have lugs on the ends thereof having inclined leading ends and shoulders at the termination of said leading ends, to engage the underside of the channel, by the tension on the chain, and

wherein said arms are inclined relative to each other to position one arm perpendicular to a flange of said channel in one position of said lock arm, and to position the opposite arm perpendicular to the flange of said channel, in the opposite position of said lock arm.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,650,222 Dated March 21, 1972

Inventor(s) Keith W. Broling and Richard A. Tatina

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 71, change "the opposite" to --one--;
line 72, after "car", insert --and a right-hand winch is at the opposite side of the center line of the car.--.

Column 8, line 3, change "tie-down in" to --tie-down is in--;
line 34, change "runners a" to --runners at--.

Signed and sealed this 31st day of October 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

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