March 31, 1953 F. L. LE BUS 2,633,329

SNATCH BLOCK

Filed Feb. 13, 1950 4 Sheets-Sheet 1

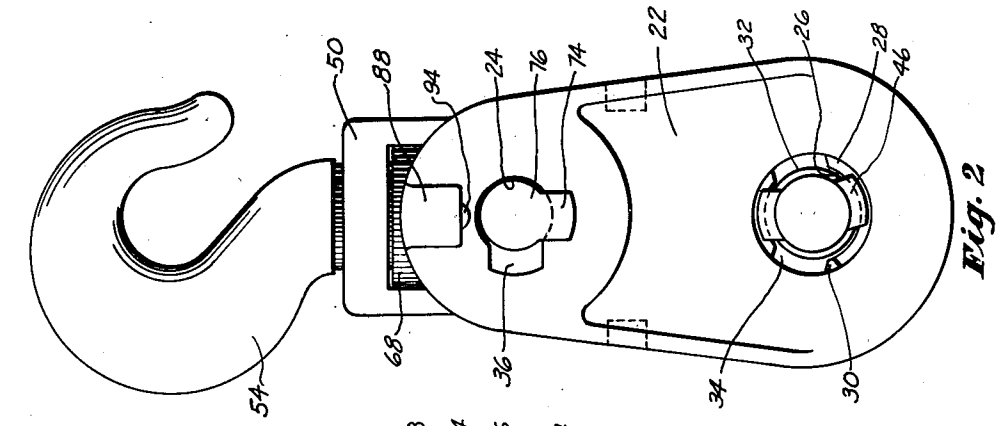


Fig. 2

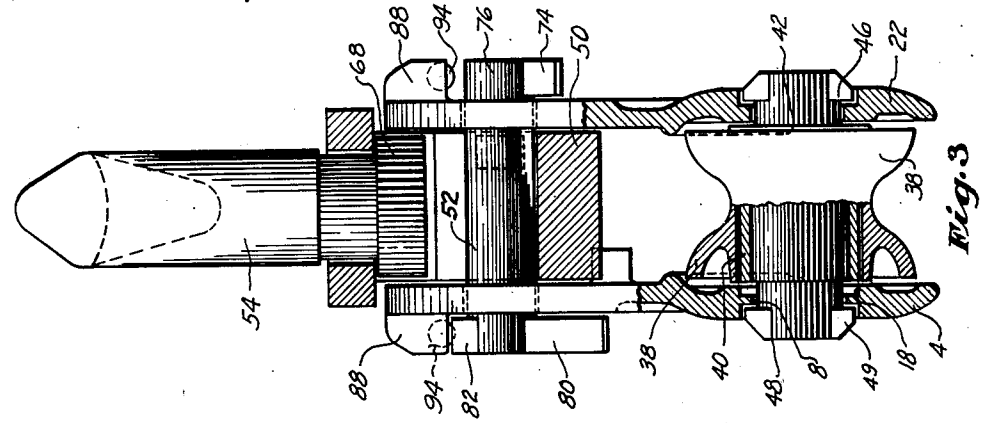


Fig. 3

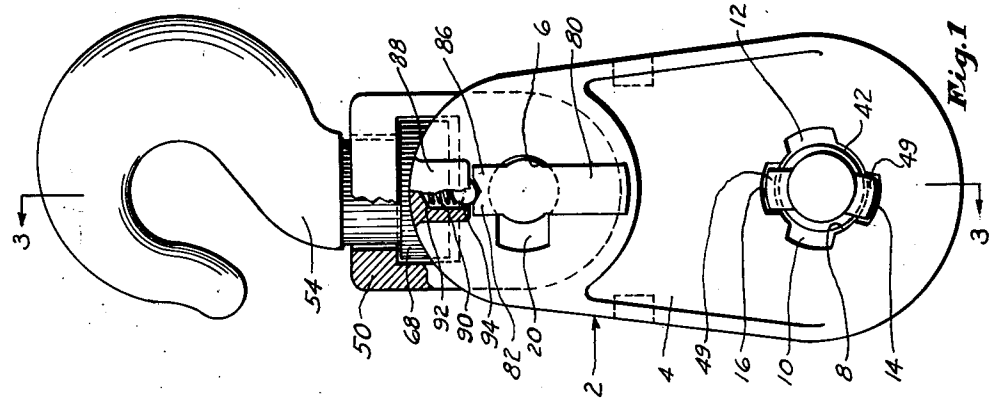


Fig. 1

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March 31, 1953 F. L. LE BUS 2,633,329

SNATCH BLOCK

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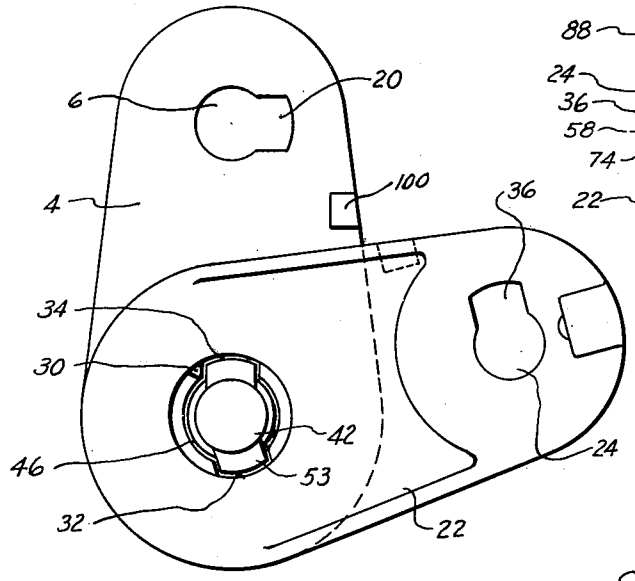


Fig. 4

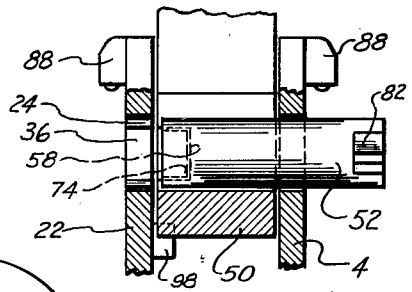


Fig. 6

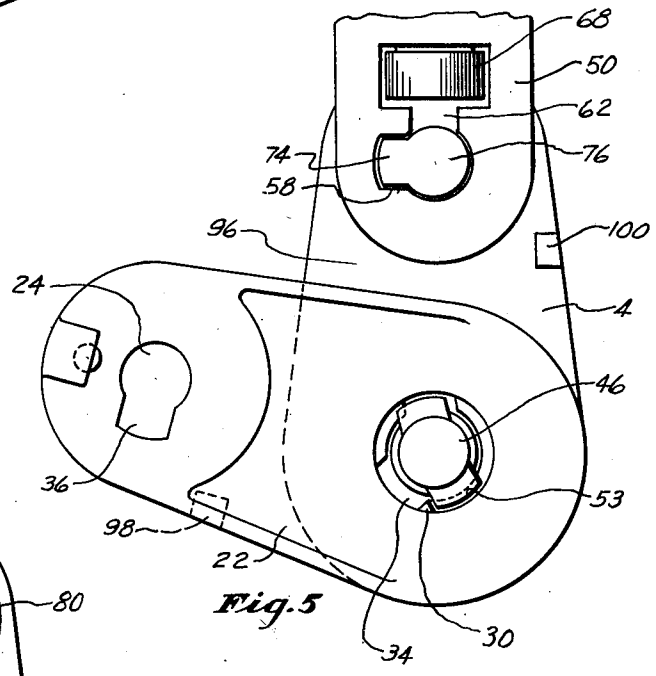


Fig. 5

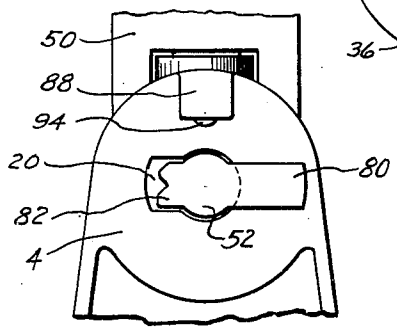


Fig. 7

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SNATCH BLOCK

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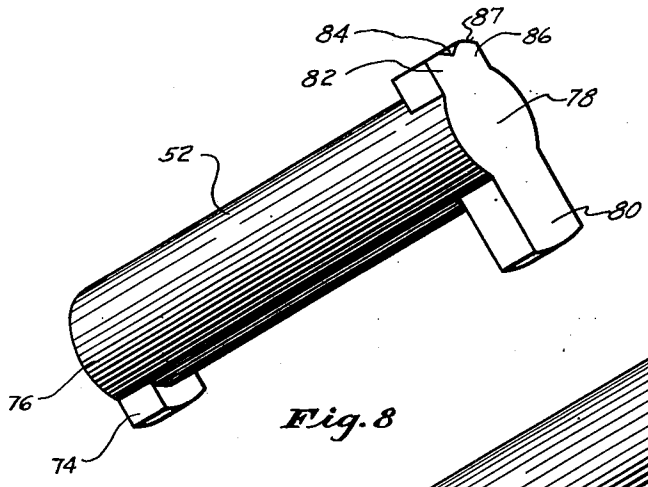


Fig. 8

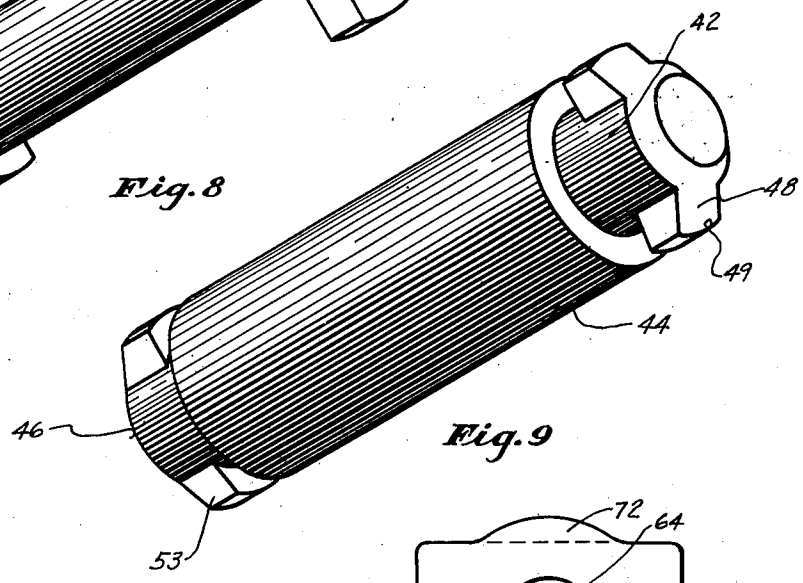


Fig. 9

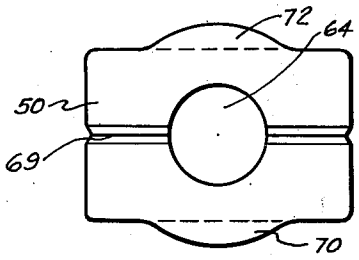


Fig. 10

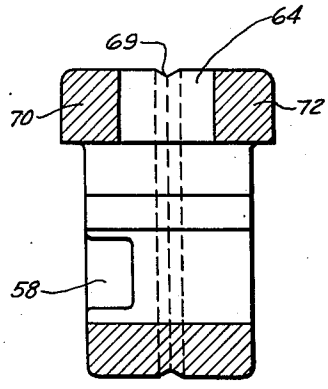


Fig. 12

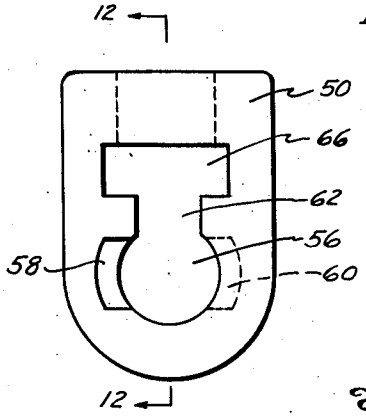


Fig. 11

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SNATCH BLOCK

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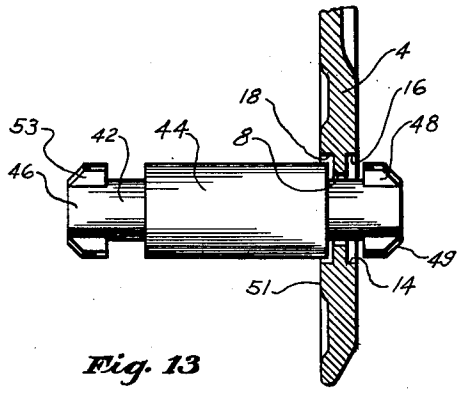


Fig. 13

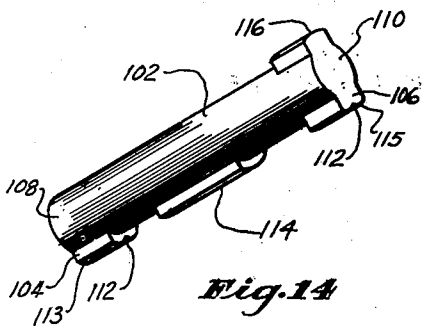


Fig. 14

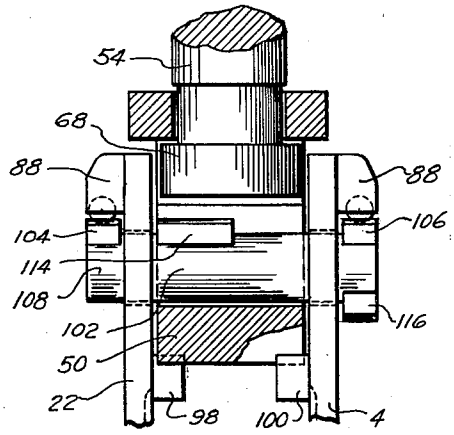


Fig. 15

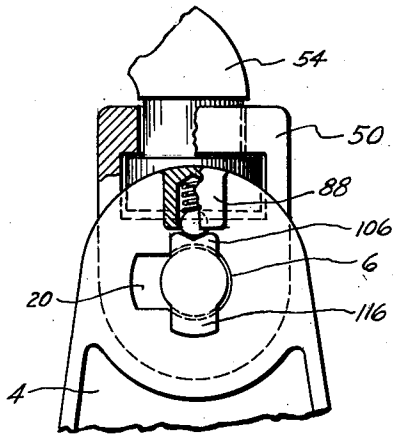


Fig. 16

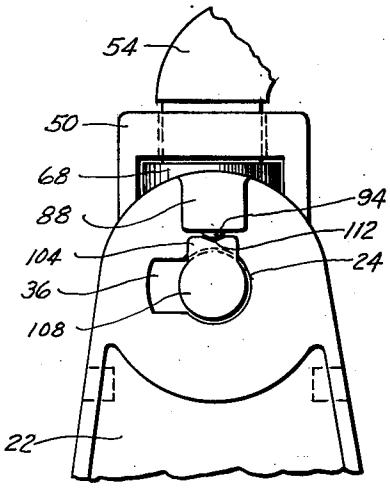


Fig. 17

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Patented Mar. 31, 1953 2,633,329

UNITED STATES PATENT OFFICE

2,633,329

SNATCH BLOCK

Franklin L. Le Bus, Longview, Tex.

Application February 13, 1950, Serial No. 143,961

10 Claims. (Cl. 254—193)

1

This invention relates to improvements in non-threaded locking devices for bolted assemblies and more particularly, but not by way of limitation, to non-threaded locking devices for snatch block assemblies.

At the present time snatch blocks are assembled by the use of threaded bolts and nuts, thereby necessitating the use of wrenches to open the blocks for receiving a cable or rope or to completely disassemble the blocks. It is frequently necessary to open or disassemble a snatch block in an elevated position, such as in an oil well drilling rig for example, where men are working on the ground below. It is obviously hazardous to use or store wrenches in such a position, since the person changing or repairing the block may accidentally drop a wrench, or a wrench may be accidentally dislodged from its place of storage and fall. Snatch blocks are also frequently subjected to severe vibrations, shocks and the like which tend to loosen the nuts and bolts used on conventional blocks, causing the nuts to come off during operation of the block. In addition to the loosening effect, the threads on the bolts are often damaged, creating considerable difficulty in subsequent assembling and disassembling operations.

The present invention contemplates a snatch block assembly utilizing non-threaded bolts having locking heads on the opposite ends thereof and side plates formed to cooperate with the locking heads to hold the block in assembly.

An important object of this invention is to provide a snatch block assembly capable of being opened or completely disassembled without the use of tools.

Another object of this invention is to provide a safe and durable snatch block assembly simple in operation and construction.

Another object of this invention is to provide a snatch block assembly which will not be opened or damaged by vibrations or shocks encountered in normal use.

Another object of this invention is to provide a snatch block which may be opened for receiving a cable or rope in total darkness simply and efficiently by anyone familiar with the operation of the snatch block.

A further object of this invention is to provide a snatch block assembly having no threaded elements.

Other objects and advantages of the invention will be evident from the following detailed description, read in conjunction with the accompanying drawings, which illustrate my invention.

In the drawings:

2

Figure 1 is a side elevational view of the improved snatch block partially in section.

Figure 2 is an elevational view of the opposite side of the snatch block.

Figure 3 is a transverse sectional view taken on lines 3—3 of Figure 1, partially in elevation.

Figure 4 is a side elevational view of the snatch block with the hook and hook swivel removed, illustrating the position of the movable side plate preparatory to assembling or disassembling.

Figure 5 is a side elevation view illustrating the position of the movable side plate when a cable or rope is placed in the block.

Figure 6 is a sectional detail of a portion of the snatch block illustrating the longitudinal movement of the swivel hinge pin.

Figure 7 is an elevational detail of a portion of the snatch block illustrating the rotational movement of the swivel hinge pin.

Figure 8 is a perspective view of the swivel hinge pin.

Figure 9 is a perspective view of the sheave axle pin.

Figure 10 is a top view of the hook swivel.

Figure 11 is a side elevational view of the hook swivel.

Figure 12 is a sectional view taken on line 12—12 of Figure 11.

Figure 13 is an elevational detail of the sheave axle pin and a portion of the stationary side plate.

Figure 14 is a perspective view of a modified swivel hinge pin.

Figure 15 is a transverse sectional view partially in elevation of the upper portion of a snatch block utilizing the modified swivel hinge pin.

Figure 16 is a side elevation view, partially in section, of the upper portion of a snatch block utilizing the modified swivel hinge pin.

Figure 17 is a partial side elevational view of the opposite side of a snatch block utilizing the modified swivel hinge pin.

Referring to the drawings in detail, reference character 2 designates a snatch block generally, having a conventional shaped stationary side plate 4 provided with upper and lower apertures 6 and 8, respectively. Communicating with the lower aperture 8 are two slots 10 and 12 disposed in the plate 4 at an oblique angle. Also communicating with aperture 8 are two grooves 14 and 16 in the outer surface of side plate 4 disposed at the same oblique angle, but offset essentially ninety degrees from slots 10 and 12 for purposes as will hereinafter be set forth. In the inner face of side plate 4 is a circular recess 18

(Figure 3) concentric with aperture 8. Communicating with the upper aperture 6 is a slot 20 for purposes as will hereinafter be set forth.

Disposed on the opposite side of the snatch block 2 is a suitable shaped movable side plate 22 provided with upper and lower apertures 24 and 26 respectively. A circular recess 28, having a shoulder portion or lug 30 disposed therein (Figure 2), is provided in the outer face of side plate 22 and concentric with the lower aperture 26. Also communicating with aperture 26 are two slots 32 and 34 disposed in plate 22 in a similar manner and directly opposite the slots 10 and 12 in the side plate 4. Communicating with the upper aperture 24 is a slot 36.

Rotatably mounted in the lower portion of the snatch block 2 and between side plates 4 and 22 is a conventional sheave 38 and sheave bushing 40 on a sheave axle pin 42. The sheave axle pin 42 (Figure 9) is provided with an enlarged body portion 44, adapted to receive the sheave bushing 40. Provided on the opposite ends of the sheave axle pin 42 are locking heads 46 and 48 consisting of upper and lower flanges 49 disposed at an oblique angle conforming to the angular disposition of the slots 10 and 12 in the side plate 4 for a purpose as will be hereinafter set forth.

Disposed in the upper portion of the snatch block 2 between the side plates 4 and 22 is a hook swivel 50 rotatably mounted on a swivel hinge pin 52 and connecting with a suitable hook 54. The hook swivel 50 (Figures 10, 11 and 12) is provided with a transverse bore 56 in the lower portion thereof communicating with grooves 58 and 60 provided in the opposite sides of the swivel. The upper portion of the swivel 50 is provided with a vertical bore 64 communicating with a chamber 66, communicating with bore 56 through a slot 62; and chamber 66 is adapted to receive the cylindrically shaped lower end 68 of hook 54. The swivel 50 is made in two pieces and welded together at 69 as illustrated in Figures 10 and 12. The segmental lower ends 68 of hook 54 are obviously placed in chamber 66 before the swivel is welded. Opposed flanges 70 and 72 (Figure 12) are provided on the upper end of the swivel 50 for added strength.

The swivel hinge pin 52 (Figure 8) is provided with a radially extending stud 74 at one end 76 thereof. The opposite end 78 thereof is provided with a handle 80 extending radially in the same direction as stud 74. A diametrically opposed locking stud 82 is also provided on end 78. Provided in the outer end of stud 82 is a V-shaped groove 84, providing a protruding portion 86 on the right side thereof, rounded off at 87 as shown in Figure 8.

A pair of locking lugs 88 are disposed on the outer faces of side plates 4 and 22 above and in spaced relation to the upper apertures 6 and 24. Provided in the lower end of each lug 88 is a vertical bore 90 containing a spring 92 and a ball 94, wherein the balls 94 are retained in their respective bores 90 by flaring the walls of the bore inwardly at the lower end thereof.

The modified swivel hinge pin 102 (Figures 14–17) is provided with locking lugs 104 and 106 on the ends 108 and 110 respectively thereof and extending radially in the same direction. Each of the locking lugs 104 and 106 is provided with a groove 112 in the outer end thereof and has the remaining protruding portions 113 and 115 rounded off. The hinge pin 102 is also provided with a turning lug or shoulder 114 in line with locking lugs 104 and 106 and in axial spaced relation thereto. A handle 116 is provided on end 110 and is disposed diametrically opposite to locking lug 106.

Operation

In assembling the snatch block 2, the locking head 48 on the sheave pin 42 is inserted from the inner face 51 (Figures 9, 13) of side plate 4 through aperture 8 and slots 10 and 12. The circular recess 18 is adapted to receive the end of the enlarged body portion 44 of the sheave pin 42, thereby allowing the locking head 48 to clear the outer face of side plate 4 as illustrated in Figure 13. The pin is then rotated until the lugs 49 of locking head 48 are directly opposite grooves 14 and 16 (Figure 1), whereupon the locking head lugs are placed in the grooves to hold the sheave axle pin 42 in a fixed position. The sheave 38 and sheave bushing 40 are assembled on sheave axle pin 42. The movable side plate 22 is then placed in the position illustrated in Figure 4 wherein slots 32 and 34 are in alignment with the lugs 53 of locking head 46. The locking head 46 is then inserted from the inner side of plate 22 through the aperture 26 and slots 32 and 34, whereupon plate 22 is rotated in a counterclockwise direction (referring to Figure 4) until the lug 30 in circular recess 28 contacts the lower lug 53 of locking head 46 as illustrated in Figure 5. With the side plate 22 in the position shown in Figure 5, one end 76 of hook swivel hinge pin 52 (Figures 2 and 8) is inserted from the outer face of side plate 4 through aperture 6 and slot 20. The hinge pin 52 is then rotated until lug 74 is extending vertically upward from the pin 52, thereby allowing the hook swivel 50 to be placed on the hinge pin by use of bore 56 and the vertically disposed slot 62. The hinge pin 52 is inserted in swivel 50 sufficiently to allow the lug 74 to clear the swivel when the hinge pin is rotated and before the cooperation of movable plate 22. The pin is then rotated until lug 74 is opposite the groove 58 in swivel 50, whereupon lug 74 is moved into seating relation in groove 58 as illustrated in Figure 6. The side plate 22 may then be turned in a clockwise direction (referring to Figure 5) to the position illustrated in Figure 2. In this position the slot 36 communicating with aperture 24 in plate 22 is disposed directly opposite lug 74, as disposed in Figure 5, thereby allowing hinge pin 52 to be moved through side plate 22 until the inner face of opposite handle member 80, and locking lug 82 contacts the outer face of side plate 4 (Figure 3). The hinge pin 52 may then be rotated in a clockwise direction (Figure 1) until the ball 94 being retained in the ears 88 on side plate 4 seats in groove 84 between locking lugs 82 and 86. In this position the opposite end lug 74 has been rotated out of alignment with the slot 36 to the position shown in Figure 2, for holding the side plate 22 in locking position, and the assembly is complete.

It is frequently necessary to open the snatch block for rethreading a cable or rope. In order to open the snatch block 2 illustrated in the preferred embodiment, the hook swivel hinge pin 52 is turned in a clockwise direction (Figure 2) to bring the lug 74 to the position shown in Figure 5 wherein the lug 74 is directly opposite the slot 36 in side plate 22, and the groove 58 in swivel 50. The lug 74 is then moved through slot 36 into groove 58 as shown in Figure 6, thereby allowing the side plate 22 to be rotate in a counterclockwise direction (referring to Figure 5), thereby opening

the block. A rope or cable may then be placed through the opening 96 onto the sheave 38.

The side plate 22 is limited in its counterclockwise movement to prevent accidental falling off, by the stud 30 contacting the lower lug 53 of the locking head 46 on the sheave pin 42. The side plate 22 is prevented from being inadvertently turned in a clockwise direction at the beginning of the opening operation by a lug 98 (Figure 6) on the inner face thereof which contacts the lower portion of swivel 50. To close the snatch block, the side plate 22 is turned in a clockwise direction from the position shown in Figure 5 to the position in Figure 2, whereupon the hinge pin 52 and lug 74 are then moved through aperature 24 and the slot 36 in the side plate 22. The plate 22 is then locked by the lug 74 due to turning the hinge pin 52 in a clockwise direction (Figure 7) from the position shown in Figure 7 to the position shown in Figure 1. The force of the spring 92 acting on the ball 94 will retain the ball in the groove 84, and thereby maintain the snatch block in a locked position during all vibrations or shocks encountered during normal operation.

In order to disassemble the snatch block 2 completely, the block is first opened as explained above to the position shown in Figure 5, and the hook swivel 50 is removed by withdrawing the swivel hinge pin 52 with its lug 74 through the bore 56 and slot 62 in swivel 50. The side plate 22 may then be turned in a clockwise direction (Figure 5) to the position shown in Figure 4, to bring the lugs 53 in alignment with slots 32 and 34 to slide the pin and permit removal of the plate from the sheave axle pin 42. The sheave 38, sheave bushing 40 and sheave axle pin 42 may then be removed to complete the disassembling operation thereof.

The provision of the locking lug or ears 88 on the outer face of the side plate 22, along with a groove 60 in the hook swivel 50, permits the hook swivel hinge pin 52 to be utilized in reverse position and yet render the snatch block operable in substantially the same manner as described above. A lug 100 is provided on the inner face of the side plate 4 in the same relative position as the lug 98 in the side plate 22, to prevent the side plate 4 from being turned in the wrong direction during an opening of the block when the hinge pin 52 is reversed.

In assembling the modified structure, the hinge pin 102 is inserted in the snatch block 2 with its locking lug 104 inserted from the outer face of the side plate 4 through the aperture 6 and the slot 20. The pin is then rotated until the lugs 104, 106 and 114 are extending vertically upward to facilitate the assembly of the hook swivel 50. The swivel 50 is assembled on the pin 102 by aligning the lugs 104 and 114 with the slot 62, and the lug end 108 with the bore 56. With the end 108 of the pin 102 disposed within the bore 56, the side plate 22 may be moved from the position shown in Figure 5 of the preferred embodiment, to a vertical position with the aperture 24 directly opposite the end 108 of the pin 102. The hook 54 and the hook swivel 50 are then rotated approximately 90 degrees in a counterclockwise direction (referring to Figure 17), and since lugs 104 and 114 will remain in slot 62 of swivel 50, the hinge pin 102 is also turned. This will position the locking lug 104 in alignment with the slot 36 so that the hinge pin 102 may be passed through side plate 22 until the inner face of locking lug 104 will clear the outer face of plate 22. The hook 54 is then turned in an opposite or clockwise direction (referring to Figure 17) to bring the hook back to a vertical position, thereby positioning the lug 104 out of alignment with slot 36, for locking the snatch block. It will be noted that the block is held in the locked position by the balls 94 disposed in the grooves 112 of the locking lugs 104 and 106.

In opening a snatch block 2 utilizing the modified swivel hinge pin 102, the hook 54, and hence swivel 50 and pin 102 are turned counterclockwise ninety degrees (referring to Figure 17). The locking stud 104 is then directly opposite slot 36 in side plate 22, therefore the locking stud 104 may be moved through slot 36 into slot 62 in the swivel 50 for allowing the side plate 22 to be turned counterclockwise to the position shown in Figure 5. A cable or rope may then be inserted through the opening 96 onto the sheave 38. The snatch block may then be closed and locked as described above for the assembly operation.

To completely disassemble a snatch block 2 utilizing the modified swivel hinge pin 102, the block is first opened to the position shown in Figure 5, as described above. The hook swivel 50 is removed longitudinally from the hinge pin 102, since lugs 104 and 114 are disposed within slot 62 in swivel 50. The hinge pin 102 is then rotated until lugs 104 and 114 are directly opposite slot 20 in the side plate 4, whereupon the pin may be removed. The remaining steps for disassembly are identical to those described above for snatch block utilizing swivel hinge pin 52 of the preferred embodiment.

The modified swivel hinge pin 102, as well as the preferred swivel hinge pin 52, may be reversed without affecting the operation of the snatch block. When the swivel hinge pin 102 is reversed, the side plate 4 will be the movable plate instead of the side plate 22, and the hook 54 will be turned in the opposite direction to that described above for the opening and closing steps.

It is to be noted that the lugs of the locking heads 46 and 48 on the sheave axle pin 42 are disposed at an oblique angle, thereby rendering the removal of the side plates 4 and 22 from the pin 42 possible only in one position.

Although only the construction and operation of non-threaded locking bolts as utilized with a snatch block have been described herein, I do not wish the present invention to be so limited. Non-threaded locking bolts of the kind described and disclosed could easily be used in several different types of bolted assemblies such as crown blocks having a plurality of sheaves, or gear box covers, for example.

From the foregoing, it will be apparent that the present invention contemplates a bolted assembly such as a snatch block or the like, wherein two side plates are held in assembly by a non-threaded axle pin which may be easily rotated to facilitate assembly or disassembly of the side plates thereon.

Furthermore, one of the side plates is readily removable with respect to the other in order to permit threading of a pulley or sheave normally mounted on the axle pin and the movement of with a non-threaded hinge pin having locking one side plate relative to the other is provided lugs which, upon partial rotation will cooperate with slotted portions in the side plates to permit longitudinal movement of the hinge pin out of contact with the movable side plate so that it may be opened with respect to the stationary plate.

Furthermore, the rotational movement of the movable side plate is limited in one direction to prevent any possibility of disassembly from the axle pin. A hook-carrying swivel is mounted on the hinge pin if desired.

Changes may be made in the combination and arrangement of parts as heretofore set forth in the specification and shown in the drawings, it being understood that any modification in the precise embodiment of the invention may be made within the scope of the following claims without departing from the spirit of the invention.

I claim:

1. A snatch block comprising a pair of plates, an axle pin mounted between the plates, a sheave journaled on the axle pin, multiple locking lugs provided at opposite ends of the axle pin, a plurality of obliquely disposed slots provided in the side plates and cooperating in a position of alignment with the locking lugs to provide for assembly of the side plates onto the pin, said locking lugs in a position of non-alignment with the slots for maintaining the side plates in assembly.

2. A snatch block comprising a pair of plates, an axle pin mounted between the plates, a sheave journaled on the axle pin, locking heads provided at opposite ends of the axle pin, a plurality of obliquely disposed slots provided in the side plates and cooperating in a position of alignment with the locking lugs to provide for assembly of the side plates, said locking lugs in a position of non-alignment with the slots maintaining the side plates in assembly, a swivel hinge pin journaled between the plates in spaced relation to the axle pin, locking flanges provided at opposite ends of the hinge pin operative in one position to maintain the plates in fixed relation to each other, a slotted portion provided in one of said plates and operative in a position of alignment with a locking head at one end of the hinge pin to permit longitudinal movement of the hinge pin out of contact with the side plate whereby said side plate may be rotated relative to the other of said side plates.

3. In a snatch block comprising a movable side plate and a stationary side plate, a sheave axle pin mounted between the plates, a sheave journaled on the axle pin, locking lugs provided at opposite ends of the axle pin, a plurality of obliquely disposed slots in the side plates cooperating with the locking lugs for maintaining the side plates in assembly, a swivel hinge pin disposed between the plates in vertical spaced relation to the axle pin, locking heads provided on the opposite ends of the hinge pin and operative in one position to maintain the side plates in closed assembly, said hinge pin locking heads operative in another position to permit movement of the movable plate on said axle pin, a swivel disposed on the hinge pin, and a hook rotatably secured to the swivel.

4. In a snatch block comprising a pair of plates, an axle pin mounted between the plates, a pulley journaled on the axle pin, a hinge pin mounted between the plates and having radially extending locking lugs on the opposite ends thereof, means provided in the outer face of one of said side plates operatively associated with one of the locking lugs in one position of the hinge pin for maintaining the side plates in locked assembly, a radially extending lug provided on the hinge pin in spaced relation to the locking lugs, a swivel carried by said hinge pin cooperating with said radial lug to provide rotation of the hinge pin with the swivel for disposing the locking lug in a position to provide longitudinal movement of the hinge pin whereby the locking lugs are released from one of said side plates.

5. In a bolted pulley assembly comprising a stationary side plate and a movable side plate, an axle bolt mounted between the plates, a pulley rotatably disposed on the bolt, locking lugs on opposite ends of the bolt, means in the plates to facilitate insertion of the locking lugs through the plates during assembly thereof, and means provided in the plates cooperating with the locking lugs upon rotation of the axle pin for locking the plates in assembly, a hinge pin mounted between the plates, locking flanges on the hinge pin for maintaining the side plates in closed position, and means in the side plates providing for longitudinal movement of the hinge pin to move the locking lugs out of engagement with the movable side plate whereby said movable side plate may be rotated relative to the stationary side plate.

6. In a snatch block comprising a stationary side plate and a movable side plate, a sheave pin mounted between the plates, a sheave rotatably supported on the pin, locking lugs provided at opposite ends of the pin, a plurality of obliquely disposed slots provided in the plates to facilitate insertion of the locking lugs therethrough to provide assembly of the plates onto the pin, a grooved portion in the outer face of the movable plate and cooperating with the locking lugs at one end of the pin for locking the plates in assembly, a hinge pin mounted between the plates, locking lugs on the hinge pin for maintaining the side plates in locking position, and a key-shaped aperture in the side plates providing for longitudinal movement of the hinge pin in one position of the locking lugs whereby the movable side plate may be rotated relative to the stationary plate, and a swivel and hook assembly secured on the hinge pin.

7. A snatch block comprising a movable side plate and a stationary side plate, an axial pin mounted between the side plates, a sheave journaled on the axle pin, locking heads on opposite ends of the axle pin, slots provided in the movable side plate to provide insertion of the locking heads on one end of the axle pin therethrough in one position of the movable side plate, a swivel journaled between the side plates in spaced relation to the axle pin adapted to be disconnected from the movable side plate to permit rotation of the movable side plate on the axle pin, stop means on the movable side plate adapted to contact the swivel to preclude rotation of the movable side plate in one direction, and stop means on the movable side plate cooperating with the locking heads on one end of the axle pin to limit rotation of the movable side plate in the opposite direction and preclude movement of the movable side plate to said one position when the block is opened.

8. A snatch block comprising a movable side plate and a stationary side plate, an axle pin mounted between the side plates, a pair of obliquely disposed locking heads on one end of the axle pin, a second pair of obliquely disposed locking heads on the opposite end of the axle pin in aligned relationship with the first mentioned locking heads, obliquely disposed slots in each side plate in aligned relationship to permit insertion of said locking heads therethrough, a pair of grooves in the stationary side plate to receive one pair of the locking heads to provide rotation of the axle pin in the movable side plate upon rotation of the stationary side plate, stop

means on the movable side plate to limit independent rotation of the movable side plate on the axle pin in one direction, means normally precluding rotation of the movable side plate in an opposite direction, and means normally precluding rotation of the stationary side plate in said one direction.

9. In a bolted assembly comprising a stationary side plate and a movable side plate, an axle bolt mounted between the side plates, a hinge pin mounted between the plates and in spaced relation to the axle bolt, a pair of locking lugs on the opposite ends of the hinge pin and operative in one position of rotation of the hinge pin for maintaining the side plates in a locked position, said locking lugs operative in a second position of rotation to facilitate longitudinal movement of the hinge pin through the movable side plate whereby said movable plate may be rotated relative to the stationary plate, and a member journaled on the hinge pin having a recess therein to receive the locking lugs on one end of the hinge pin and limit said longitudinal movement of the hinge pin.

10. In a bolted assembly comprising a stationary side plate and a movable side plate, an axle bolt mounted between the side plates, a hinge pin mounted between the side plates in spaced relation to the axle pin, a pair of locking lugs on the opposite ends of the hinge pin and operative in one position of rotation of the hinge pin for maintaining the side plates in a locked position, said locking lugs operative in a second position of rotation to facilitate longitudinal movement of the hinge pin out of contact with the movable side plate whereby said movable plate may be rotated relative to the stationary plate, a swivel disposed on the hinge pin, said swivel being provided with a recess in one end thereof to receive the locking lug on one end of the hinge pin upon said longitudinal movement thereof in such a manner to retain the swivel on the hinge pin during rotation of the movable side plate, and a hook rotatably secured in the swivel.

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