Aug. 4, 1942. L. H. ROBERTS 2,291,649

WIRE LINE HITCH ASSEMBLY

Filed June 11, 1940 3 Sheets-Sheet 1

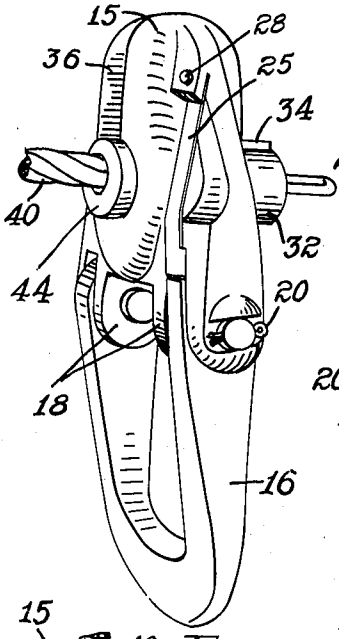


Fig. 1.

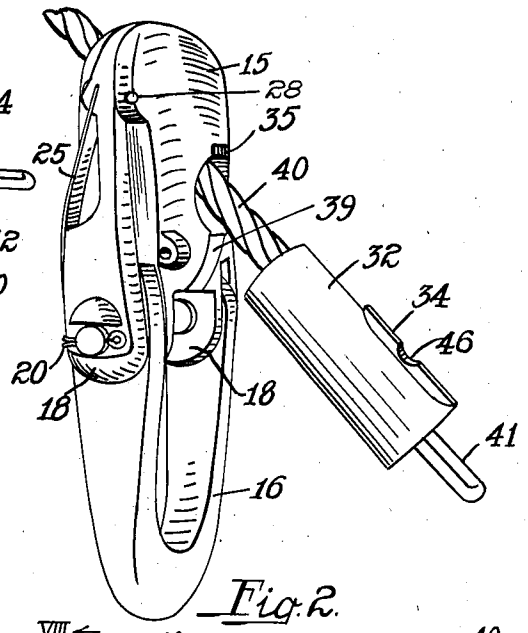


Fig. 2.

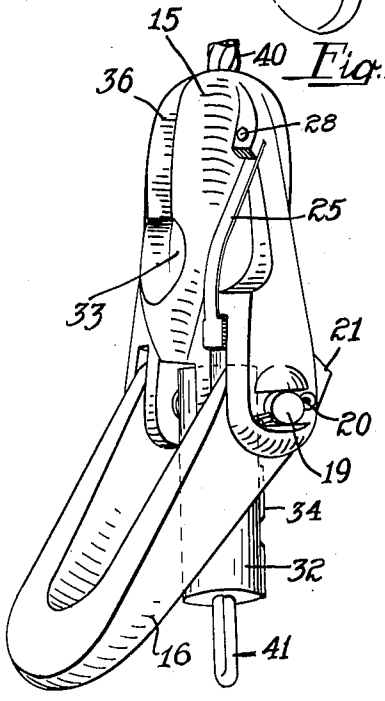


Fig. 3.

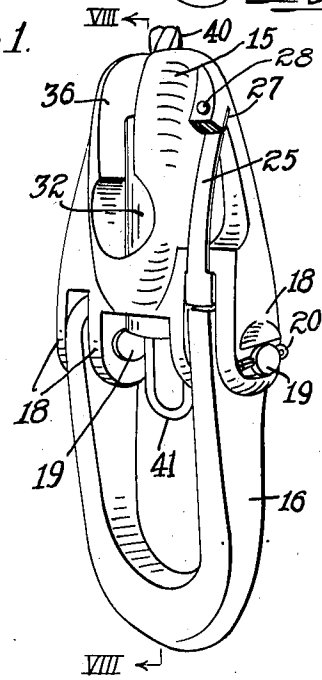


Fig. 4.

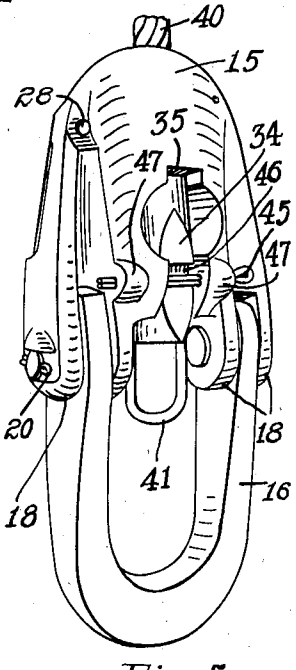


Fig. 5.

INVENTOR

Leslie H. Roberts

By Green & McCallister

His Attorneys

Aug. 4, 1942. L. H. ROBERTS 2,291,649

WIRE LINE HITCH ASSEMBLY

Filed June 11, 1940 3 Sheets-Sheet 2

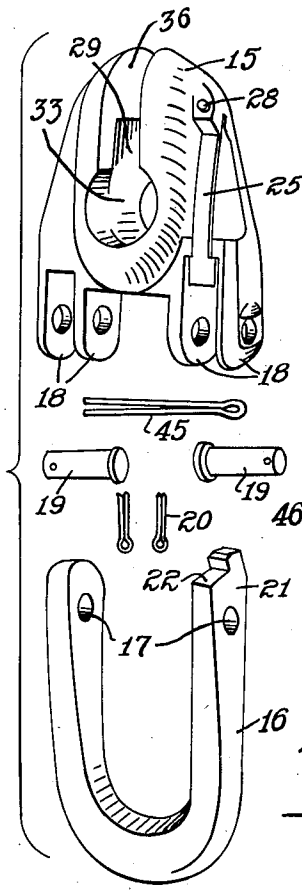


Fig. 6.

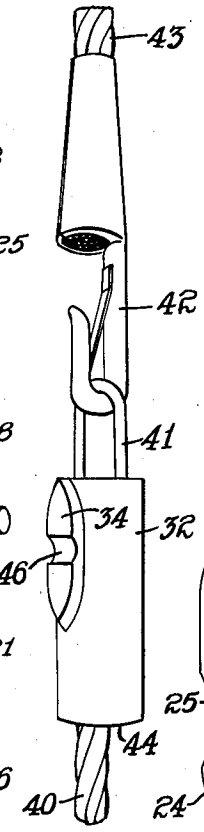


Fig. 9.

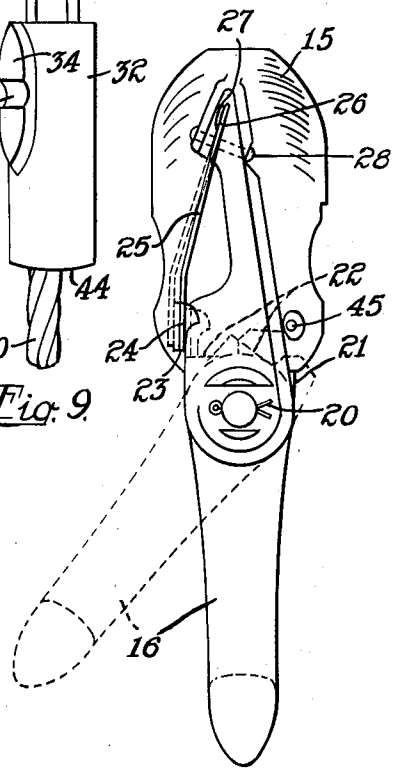


Fig. 7.

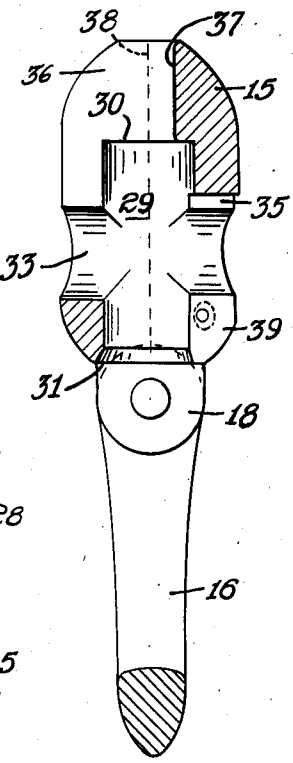


Fig. 8.

INVENTOR

Leslie H. Roberts

By Green & McCallister

His Attorneys

Aug. 4, 1942. L. H. ROBERTS 2,291,649

WIRE LINE HITCH ASSEMBLY

Filed June 11, 1940 3 Sheets-Sheet 3

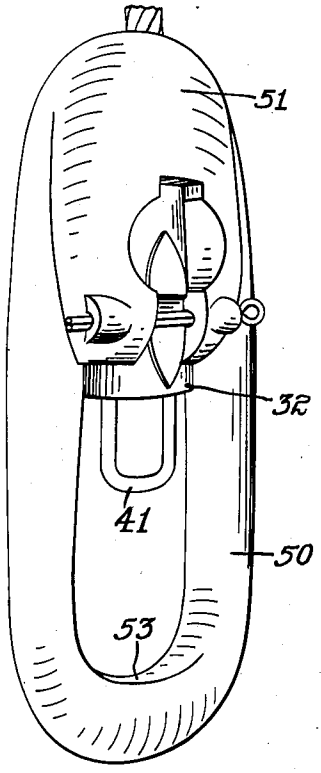


Fig. 12.

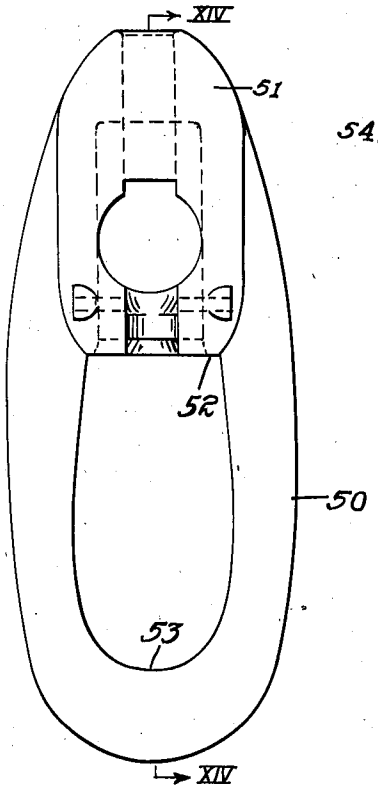


Fig. 13.

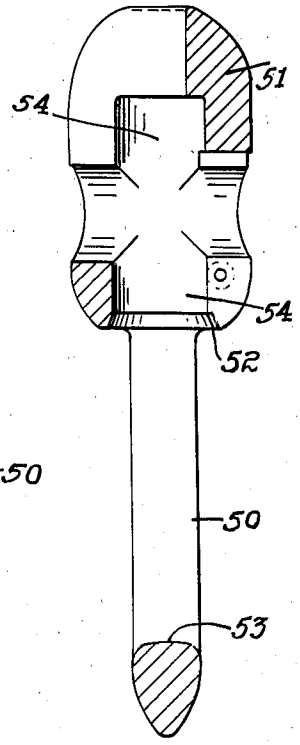


Fig. 14.

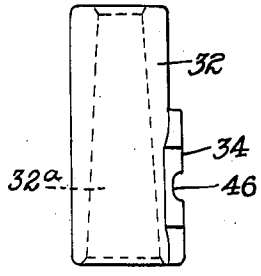


Fig. 10.

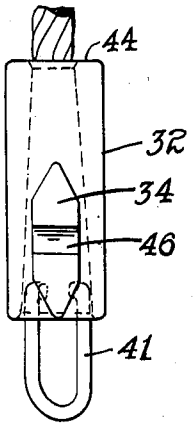


Fig. 11.

INVENTOR

Leslie H. Roberts

By Green & McCallister

His Attornies

Patented Aug. 4, 1942

2,291,649

UNITED STATES PATENT OFFICE

2,291,649

WIRE LINE HITCH ASSEMBLY

Leslie H. Roberts, Galva, Kans., assignor to Spang and Company, a corporation of Pennsylvania

Application June 11, 1940, Serial No. 339,878

9 Claims. (Cl. 24—123)

This invention relates to wire line hitches such as used in the drilling and servicing of oil and gas wells.

When a derrick is built or a mast erected, for the purpose of handling well drilling tools or installing or removing well tubing or pump rods, it is customary to run through the pulley or crown block located at the top of the derrick or mast, a length of wire line cable, both ends of which reach to the ground. This line is known as the derrick line and its purpose is to provide means for drawing through the pulley or crown block the lines used in performing the work on the well.

Prior to my invention, when a hoisting cable was to be used, it was tied to the end of the derrick line and pulled over the pulley or crown block until the end of the hoisting cable reached the ground level. When this was accomplished the derrick line was laid aside and the hoisting cable was used in performing the necessary hoisting operation.

After completion of the hoisting operation, the derrick line was again attached to the end of the hoisting cable and as the hoisting cable was reeled onto its drum, the derrick line was pulled back over the crown block or pulley so that both ends were again at ground level, to be available when required.

Heretofore, the end of the hoisting cable has been attached to the eye or becket of the pulling hook or other hoisting apparatus by means of a wrap hitch and a number of wire line clamps. Obviously the shortness of the bend occasioned in making this wrap hitch and the use of wire line clamps left the end of the hoisting cable in a more or less permanently deformed condition, and, inasmuch as the wire used in the make-up of hoisting cables has a relatively low elastic limit, the stresses set up in making these bends and in clamping the cable strands together caused breakages in individual wires in this portion of the hoisting cable considerably in advance of failure of the hoisting cable as a whole, with the result that it was necessary to frequently cut off that portion of the hoisting cable included in these wrap hitches.

The crown block or pulley at the top of either a mast or derrick is mounted between support members and surrounded by guideways. These permit passage of relatively straight hoisting cable without difficulty but when the end of the cable was bent out of shape, it was quite difficult to draw the cable through the guideways and between the support members without leading it out of the groove of the pulley or crown block, permitting it to drop beside the pulley or crown block where it frequently became fouled and securely wedged. When this happened it usually required at least two men to free it and replace it in the pulley or crown block groove. To do this the men had to climb the derrick or mast which consumed considerable time and involved a considerable degree of danger, especially when the rig elements were covered with snow or ice or when it was raining or when a severe wind was blowing.

Attaching and detaching the end of the hoisting cable to the elevating apparatus consumed considerable time and in addition, damaged the hoisting cable, involving the cost of repair necessary to perform the work as well as the loss due to idleness of equiment.

An object of this invention is to produce an assembly of wire line hitch elements by the use of which the above dangers and waste of time and material are obviated in getting ready to pull the pumping rods or tubing from a well.

Another object is to produce an improved wire line hitch.

A further object is to produce a wire line hitch assembly, by the use of which "stringing up" or servicing of oil and gas wells can be materially simplified and cheapened.

Another object is to produce an improved connector member for use in a wire line hitch assembly.

A still further object is to produce a connector member for a wire line hitch assembly having a pivotally mounted bail at one end which is automatically locked in extended position and which may be released by a simple manual operation.

A still further object is to produce an extremely rugged and readily manipulated wire line hitch assembly for use in the "stringing up" and servicing of oil and gas wells with portable well pulling units.

These and other objects which will be apparent to those skilled in this particular art, I attain by means of the wire line hitch assembly described in the specification and illustrated in the drawings accompanying and forming part of this application.

In the drawings, throughout which similar elements are denoted by like characters:

Figures 1, 2, 3, 4 and 5 are perspective views of a wire line assembly embodying this invention; Figures 1, 2 and 3 disclose the positions of certain of the parts entering into the make-up of the assembly during the act of assembling such

parts, while Figures 3 and 4 show such parts in assembled position.

Figure 6 is an exploded view of the wire line hitch connector member which forms part of the assembly. In this view, all of the elements entering into the make-up of the connector member are shown in perspective.

Figure 7 is a side view of the connector member of the assembly with the bail thereof shown in two positions; in dotted lines swung to an off position and in full lines in normal position.

Figure 8 is a longitudinal sectional view of the connector member and is taken on line VIII—VIII of Fig. 4;

Figure 9 is a view in perspective of a derrick line hook permanently secured at one end of the derrick line and hooked into the staple, eye or becket of a hitch block, referred to in the well drilling art as a swivel. The hitch block is permanently secured to one end of the hoisting cable.

Figure 10 is a view in side elevation of the hitch block per se;

Figure 11 is a view in front elevation of a hitch block attached to a cable and equipped with its staple, eye or becket;

Figure 12 is a view in perspective of a modified form of wire line hitch assembly;

Figure 13 is a front view in elevation of a connector member disclosed in Figure 12; and

Figure 14 is a sectional view taken on line XIV—XIV of Figure 13.

The connector member

The connector member of the wire line hitch assembly of the form disclosed in Figs. 1 to 8 inclusive comprises a body portion **15**, a bail **16** having its opposite ends, which are transversely pierced as at **17**, confined for swinging movement between opposed pairs of bosses **18—18**. These bosses project from the inner end of body portion **15** and are pierced as shown in Figure 6 to receive stub shafts **19—19** which are headed at one end for abutment against the inner face of the inner of bosses **18—18** and which are pierced at their opposite ends to receive retaining cotter pins **20**. These stub shafts pass through openings **17—17** in the ends of the bail and form the pivot members about which the bail is adapted to swing.

End **21** of one bail arm **16** is notched as at **22** to provide a squared seat which is contacted by the end **23** of a lock member **24** when the bail is in normal position, that is, in line with the body portion of the connector member as shown in Figures 1, 2, 4 and 5 and by dotted lines in Figure 7.

Lock member **24** is secured to the outer or free end of a spring **25**; the opposite end **26** of the spring body being secured within a slot **27** formed for its reception in the body portion **15**. A pin **28** which passes through an opening adjacent the end **26** of the spring retains the spring in position.

When the spring and lock member are in normal position, with the bail in normal position, the bail is locked against movement. By moving the spring and lock member **24** to the dotted line position shown in Figure 7, the bail is released, and may be swung to an off position, such as shown by dotted lines in Figure 7 and in Figure 3. When the bail is moved from off to normal position, the lock member **24** by means of spring **25** is moved to locking position so that the bail will be automatically locked in normal or distended position. It will remain in this position until it is manually released by bending the spring to the dotted line position of Figure 7.

Body portion **15** of the connector member is provided with an axial or centrally located cylindrical socket **29** which extends from the inner or lower end of the body portion, between the pairs of bosses or ears **18—18**, to a point **30** beyond the center of the body. This socket is open at its lower end and has its wall chamfered as shown at **31** in order to facilitate entrance thereinto of hitch block **32** ("swivel").

Body portion **15**, intermediate its ends and midway between the ends of socket **29**, is provided with a cross channel or passage or bore **33**. The diameter of this bore or cross channel is preferably the same as the diameter of cylindrical socket **29**. Since hitch block **32** is provided with a key-like projection **34**, the upper portion of bore **33** on one side of body portion **15** is provided with a rectangularly formed offset or enlargement **35** for accommodating the key-like projection **34** during passage of the hitch block through the body from one side to the other.

Body portion **15** above the bore or cross channel **33** is provided with a slot **36** having parallel walls and which intercepts socket **29**, the bore or cross channel **33**, and extends to a point **37** beyond center line **38** of body portion **15**.

Body portion **15** on the opposite side from slot **36**, and below bore or cross hole **33**, is provided with a slot **39** also having parallel walls and which also intercepts socket **29** and bore or cross hole **33**.

The width of slots **36** and **39** is such as to permit the sidewise movement therethrough of the cable or wire line **40**, to one end of which hitch block **32** is permanently secured.

Hitch block **32** is provided with a tapered or frusto-conically shaped cavity or hole **32***a*—as shown by dotted lines—which extends therethrough, and, into this tapered hole one end of the sucker rod line, or one end of the tubing line, as the case may be is permanently secured. Several methods of accomplishing this are in general use, but I preferably make use of a zinc, babbit or lead fill in the same manner as is done in securing one end of a drilling cable within the swivel of a wire line rope socket. The staple **41** which forms the eye, or becket of the hitch block is placed in position within the socket of the hitch block as shown in Figure 11 prior to the time the soft metal fill is introduced.

When the well pulling unit is placed in position, the eye or becket **41** of the hitch block attached to the end of either the sucker rod line or the tubing line, is hooked onto hook **42** attached to one end of the derrick line **43**, as shown in Figure 9. The pulling of the derrick line over the crown block or pulley, pulls the pulling line into place. The hitch block and the derrick line hook are of relatively small diameter and of such dimensions as to easily follow the groove in the crown block or pulley without danger of jumping or being led out of the crown block or pulley groove.

Bail **16** of the wire line hitch is disconnected from the body portion **15** and placed through the eye or becket of the tubing block, the tubing rod hook, the wiggle weight hook or other implement as the work requires. Bail **16** is then connected to body portion **15** of the wire line hitch (Figs. 1–5 inclusive).

The construction of the wire line hitch permits the entry of the hitch block into position within its socket **29** while the connector member of the hitch assembly is attached to the pulling tool. When the hitch block has been pulled to the desired location, all that it is necessary to do in order to connect the pulling line to the wire line hitch connector is to pass the hitch block horizontally through the cross through channel or bore **33** as shown in Figure 1, unlatch lock member **24**, swing the bail to an off position at an angle to body portion **15** as shown in Figure 3 and give the hitch block a 90° movement to vertical position, Fig. 3, and then pull it vertically into socket **34** until its end **44** abuts the upper end of socket **29**, Figs. 4 and 5. The bail is then moved to normal position, where it is automatically locked by lock member **24**. The hitch block is then locked in place in its socket by means of cotter key **45**, (see Fig. 5), which passes through notch **46** in key projection **34** of the hitch block. Bosses **47** located at the sides of slot **39** and through aligned holes in which cotter key **45** is passed, constitute, in conjunction with the walls of said slot **39**, a key way for key projection **34**, and prevent rotation of the hitch block within its socket. Because of this construction any degree of twist or back twist may be put in the line when two or more lines are being run.

In the modified form of connector member illustrated in Figures 12, 13 and 14, the bail **50** is formed as a unitary part of the body portion **51**. Aside from this, the wire line hitch connector member of Figures 1–8 inclusive and that of Figures 12, 13 and 14 are the same with the exception that the distance from the inner end **52** of the body portion **51** and the inner curved surface **53** of the bail is such that the hitch block **32** can be swung into position within the bail so as to align the same with its socket **54** in body portion **51**. For this reason, the overall length of the modified form of connector member (Figs. 12, 13 and 14) is somewhat greater than that of the preferred form (Figs. 1–8 inclusive).

When using this modified form, an S link is used for attaching bail **50** to the eye or becket of the instrument or tool to be used.

It will be apparent that when either form of connector member of the wire line hitch assembly of this application is used, the line is maintained straight and the difficulties above set forth in connection with the older method are eliminated, as well as the difficulties and hazards of men climbing the rig in icy, windy or snowy weather. It will also be apparent that the use of the wire line assembly of this application eliminates the use of soft rope for the pulling over operation; saves tear-down time; saves cut-off costs of pulling lines; saves wire line clamps and makes well servicing quicker, cheaper, less arduous and much safer than with the older method.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A cylindrical hitch block permanently attached to one end of a hoisting cable and for use with a detachable hitch; said hitch block having a projection extending outwardly from one side thereof; said hitch comprising a body having a hitch block socket therein, and a slot opening into said socket and within which the projection on said hitch block is adapted to be located for preventing relative rotation between said block and hitch body.

2. In a detachable hitch for connecting hoisting cables and in combination with a cable having a cylindrical hitch block permanently attached to one end thereof, a body having a hitch block receiving socket therein and a passage extending through its side walls and intersecting said socket for permitting passage therethrough of the hitch block and the swinging of said cable into axial alignment with said socket, and means on said hitch block for preventing rotation thereof when seated within said socket.

3. In a detachable hitch for hoisting cables and for use with a cable having a cylindrical hitch block permanently attached to one end thereof and having an outwardly extending side projection, a body having a socket for receiving said hitch block, a passage extending straight through said body at right angles to said socket and which is so shaped as to permit said hitch block with its side projection to be threaded therethrough, and slots on opposite sides of said socket, one located above and the other below said passage; the construction and arrangement being such that when the hitch block is threaded through said passage its cable may be moved through said slots to align the hitch block with said socket with the side projection of the hitch block engaging the walls of one of said slots to prevent rotation of the block within the socket.

4. A detachable hitch for connecting hoisting cables and comprising a body having a socket therein with one end open to receive a hitch block, a channel extending through the body from side to side for passage therethrough of a hitch block in a direction perpendicular to the longitudinal axis of said socket, and slots on opposite sides of said channel which connect with said socket and said channel, and a bail projecting from that end of the body adjacent the open end of said hitch block socket; the construction and arrangement being such that a hitch block permanently attached to a hoisting cable can be passed through said channel, moved to position in front of the open end of said socket and then slid lengthwise into said socket.

5. A detachable hitch for connecting hoisting cables and comprising a body having a socket therein with one end open for reception of a hitch block, a channel extending through the body midway between the ends of said socket for passage therethrough of a hitch block; said body on opposite sides of said channel having slots which connect with said socket and said channel, a bail projecting from and pivotally connected to that end of the body adjacent the open end of said hitch block socket, and a manually releasable spring actuated latch for normally holding said bail in extended position with relation to said body; the construction and arrangement being such that a hitch block permanently attached to a hoisting cable can be passed through said channel, moved to position in front of said socket by releasing and swinging said bail and then seated within said socket.

6. In a detachable hitch for hoisting cables, a body having a socket therein with one end open for reception of a hitch block attached to one end of a cable; said body having a through passage intermediate its ends and which intersects said socket; said body on opposite sides of said socket having slots which connect with said socket and said passage; the slot on one side

of said body being located above said passage while that on the opposite side is located below said passage; the construction and arrangement being such that the hitch block can be positioned for movement into its socket by passing the same entirely through said passage and then moving the cable to which it is attached sidewise through said slots until said block is in line with said socket after which said block can be moved axially within said socket to its seat.

7. In a detachable hitch for hoisting cables, a body having a socket therein with one end open to receive a hitch block attached to one end of a cable and having an outwardly extending side projection; said body having a channel extending therethrough from side to side perpendicular to the longitudinal axis of said socket and which is so shaped as to accommodate the passage of the hitch block with its side projection; said body having slots on opposite sides of said channel through which said cable may be moved sidewise to position, and means for anchoring said hitch block within its socket; the construction and arrangement being such as to permit threading of said hitch block and cable through said channel and moving the same and cable into axial alignment with said socket, with the side projection of said hitch block engaging the walls of one of said slots for preventing rotation of said block within its socket.

8. In a detachable hitch for hoisting cables, a body having a socket therein with one end open for receiving a hitch block attached to one end of a cable and having an outwardly extending side projection; said body having a passage extending therethrough from side to side at right angles to said socket for the passage of the hitch block and cable, and slots on opposite sides of said passage through which said cable may be moved sidewise to position; the construction and arrangement being such as to permit the threading of said hitch block through said passage, and movement of said hitch block and cable into axial alignment with said socket, with the side projection of said hitch block engaging the walls of one of said slots for preventing rotation of said block within its socket.

9. A detachable hitch for connecting hoisting cables and comprising a body having a socket therein with one end open for reception of a hitch block, a channel extending through the body from side to side midway between the ends of said socket, and slots on opposite sides of said channel which connect with said socket and said channel, and a bail projecting from that end of the body farthest removed from the bottom of said hitch block socket; the construction and arrangement being such that as a hitch block permanently attached to a hoisting cable can be passed through said channel, moved to position in front of said socket, and then slid axially into said socket.

LESLIE H. ROBERTS.