Nov. 27, 1956 H. F. PARKER ET AL 2,772,072

HOIST

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Fig. 2

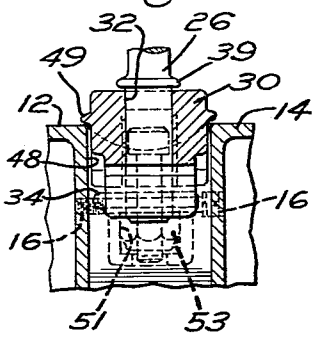

Fig. 1

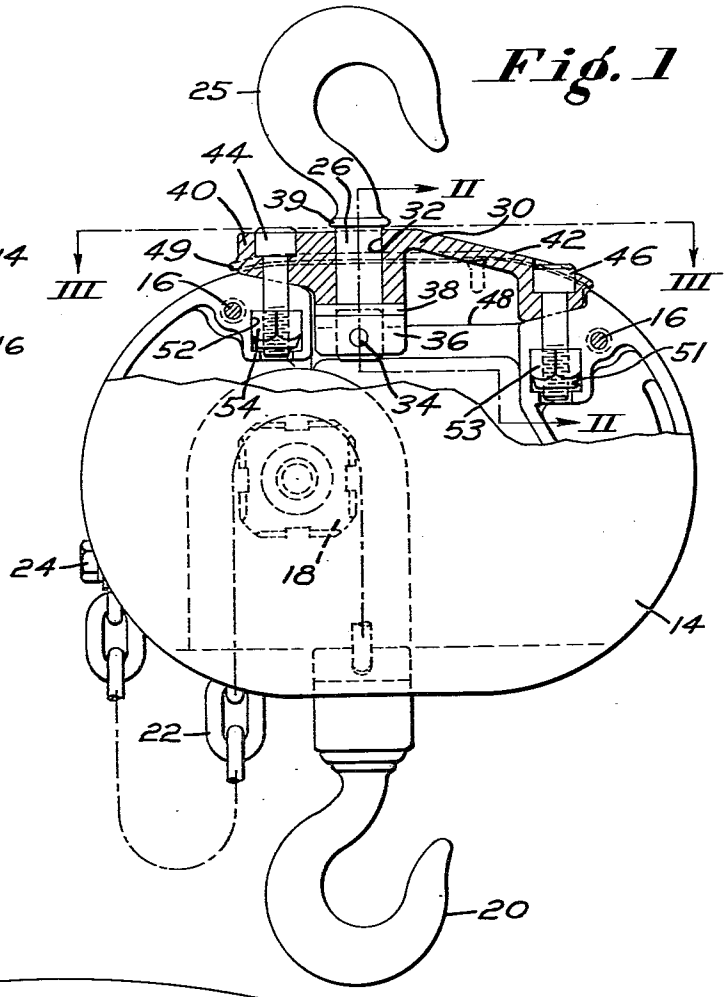

Fig. 3

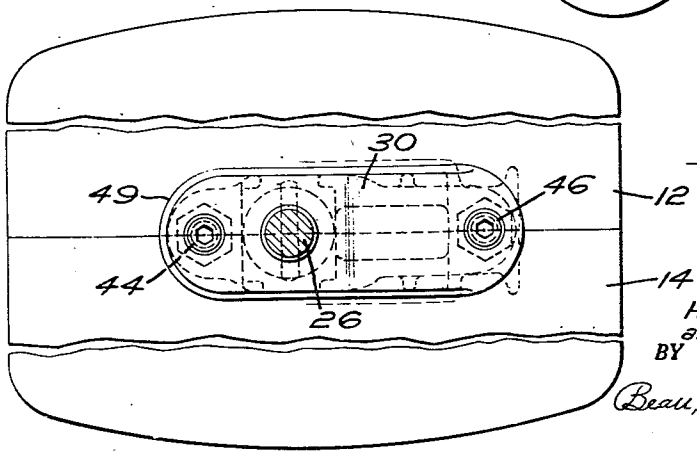

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Fig. 4

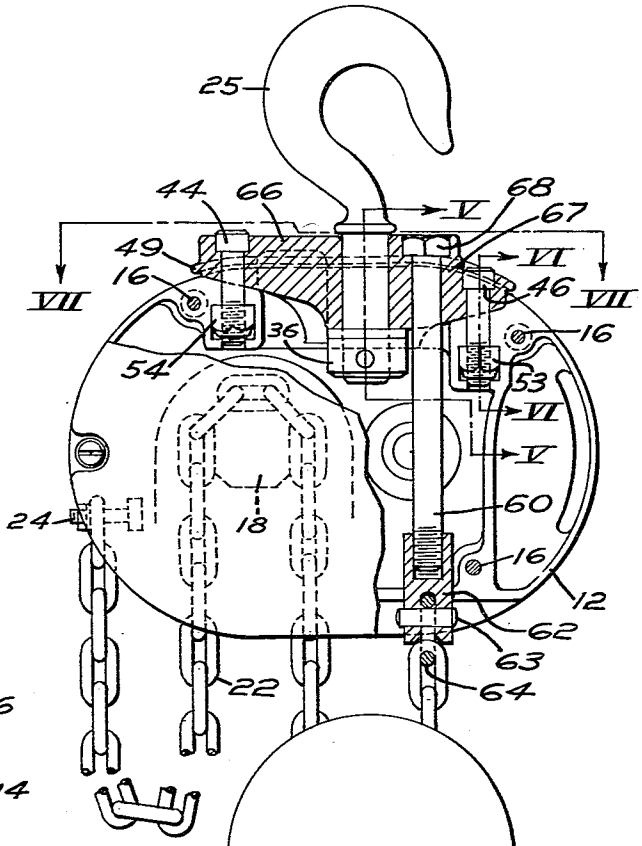

Fig. 5

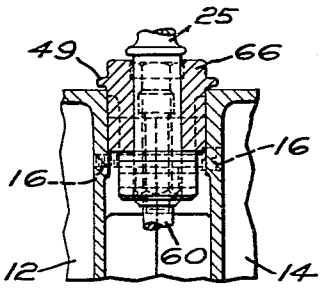

Fig. 6

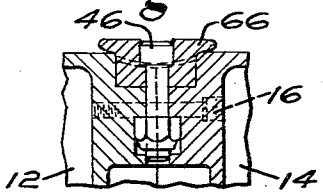

Fig. 7

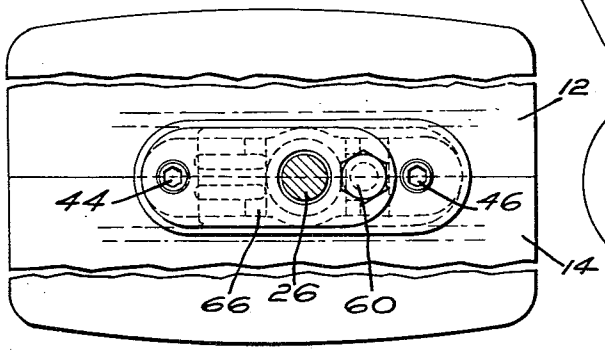

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Fig. 8

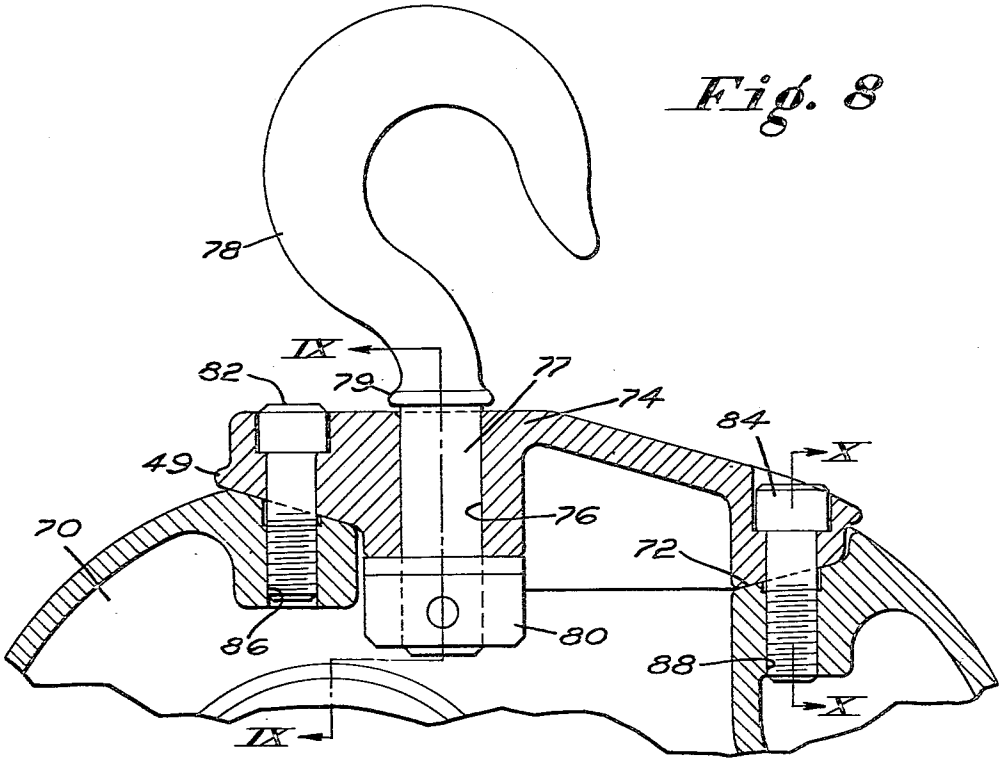


Fig. 9

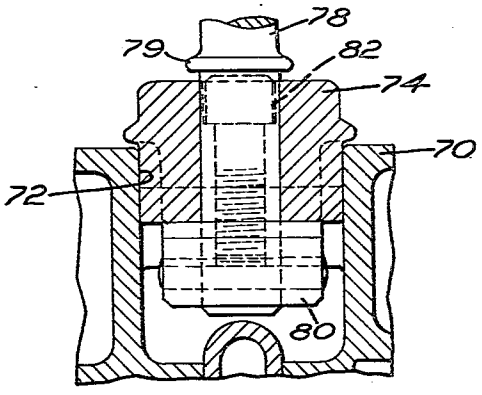
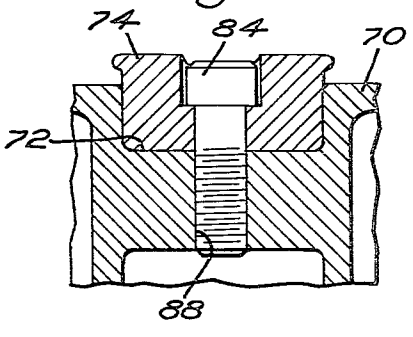


Fig. 10



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HOIST

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Application January 4, 1954, Serial No. 401,846

11 Claims. (Cl. 254—167)

This invention relates to industrial hoists, and more particularly to motorized chain or cable hoists of the type adapted to be suspended by means of hooks from suitable supports, for the purpose of lifting and lowering loads in connection with industrial operations.

It is an object of the present invention to provide an improved hoist frame and suspension hook interconnection arrangement, whereby a hoist of reduced head room requirement is provided.

Another object of the invention is to provide a hoist as aforesaid wherein the suspension hook component thereof is mounted in the hoist frame in improved manner so as to provide increased strength and rigidity in the frame and suspension hook assembly.

Another object of the invention is to provide an improved hoist as aforesaid wherein the suspension hook element of the hoist is engaged to the hoist frame by means of a connection bracket of novel and improved form.

Still another object of the invention is to provide a novel and improved suspension hook mounting bracket device adapted for detachable connection to a "split frame" type hoist in improved manner.

Another object of the invention is to provide a novel and improved suspension hook mounting bracket device adapted for detachable connection to a unitary frame type hoist, in improved manner.

Another object of the invention is to provide, in combination, a novel hoist frame design and a novel suspension hook mounting bracket.

Still another object of the invention is to provide in a hoist as aforesaid, a novel frame design and a series of novel type suspension hook mounting brackets adapted to fit interchangeably into said hoist frame, whereby a single hoist frame is adapted to be converted to a variety of lift strand reeving arrangements.

Other objects and advantages of the invention will appear from the specification hereinafter.

In the drawings:

Fig. 1 is an end elevational view, with portions broken away in section, of a single reeve type chain hoist device of the invention;

Fig. 2 is a fragmentary sectional view, taken along line II—II of Fig. 1;

Fig. 3 is a sectional view, taken along line III—III of Fig. 1;

Fig. 4 is a view corresponding generally to Fig. 1, but of a double reeve type chain hoist embodying a modified form of suspension hook mounting bracket of the invention;

Fig. 5 is a fragmentary section, taken along line V—V of Fig. 4;

Fig. 6 is a fragmentary section, taken along line VI—VI of Fig. 4;

Fig. 7 is a section, taken along line VII—VII of Fig. 4;

Fig. 8 is a fragmentary sectional view through still another form of hoist frame and suspension hook mounting bracket arrangement of the invention;

Fig. 9 is a fragmentary section, taken along line IX—IX of Fig. 8; and

Fig. 10 is a fragmentary section, taken along line X—X of Fig. 8.

In Figs. 1, 2, 3 of the drawing the invention is illustrated as being embodied in an electric motor type chain hoist comprising generally a pair of mating frame parts 12, 14, such as may be conveniently fabricated in the form of die castings of light weight metal, or the like. Assembly bolts such as are indicated at 16 are empolyed to hold the two frame sections in unitary assembled relation, and the motor and drive shaft and gear and brake elements of the hoist mechanism are suitably housed within the two frame sections, as shown in detail for example in our co-pending application Serial No. 239,594 filed July 31, 1951 now Patent No. 2,667,331. Thus, the hoist mechanism will typically include a load lift wheel as indicated at 18 (Fig. 1); a load engaging hook as indicated at 20; and a load lift chain as indicated at 22 which connects to the hook 20 and trains over the load lift wheel. The chain 22 is then tied at its dead end portion to the hoist frame by means of any suitable bolt or screw device as indicated at 24. The suspension hook for hanging the hoist mechanism in operative position is illustrated at 25, and is illustrated to include a shank portion 26 for swivelling connection with the hoist frame, as is typical in the art.

In accord with the present invention a bracket for interconnecting the suspension hook and the frame structure in suitable manner may be provided as illustrated at 30 in Figs. 1–3. As shown therein the bracket device 30 comprises a unitary casting or forging or the like which includes a vertical bore 32 for receiving in rotatable relation therein the shank portion 26 of the suspension hook. The lower protruding end portion of the suspension hook 25 is laterally drilled to receive in press-fitted relation a pin 34, and a collar or nut as indicated at 36 is also laterally apertured and slip-fitted or screwed upon the lower end portion of the hook shank and locked thereto by means of the pin 34, to transmit the load through the hoist frame to the suspension hook when in assembled relation. A washer 38 is preferably installed between the collar 36 and the hoist frame parts to take the wear incidental to swivelling of the hook relative to the bracket 30, or if preferred the hook and bracket member may be arranged to prevent relative swivelling motion, by means of any preferred keying or pin arrangement. Preferably, the shank portion 26 of the suspension hook is provided with an enlarged shoulder as indicated at 39 to cooperate with the collar 36 to hold the hook and bracket parts in proper assembled relation.

The bracket member 30 in end view (Fig. 2) is of generally rectangular sectional form. In side view (Fig. 1) the bracket includes a central hub portion which rotatably embraces the suspension hook shank, and from which diametrically extended cantilever beam portions 40, 42 of tapering vertical thicknesses having their terminal end portions suitably apertured to accommodate vertically disposed mounting bolts 44, 46, respectively. Thus, the bracket member 30 comprises a yoke-like device carrying the suspension hook 25 and adapted to be connected to the housing structure by means of the bolts 44, 46.

The housing structure is recessed as indicated at 48 to accommodate the mounting bracket 30 in substantially submerged or socketed position within the hoist frame; and a peripheral bead as indicated at 49 is preferably formed integrally with the bracket structure so as to form a shoulder fitting over the brink of the recessed por-

tion of the hoist frame. To facilitate assembly and disassembly of the suspension hook and mounting bracket relative to the frame, the frame parts **12, 14** may conveniently be laterally recessed at their mating faces as indicated at **51, 52**, to sufficient depths to accommodate one-half the widths of screwthreaded nut devices as indicated at **53, 54**. Hence, prior to sub-assembly of the two frame parts **12, 14** by means of the bolts **16**, the nuts **53, 54** may first be inserted between the frame parts so that upon assembly of the frame parts the nuts are thereby held in position to receive the bolts **44, 46**. Thus, mounting of the suspension hook and bracket upon the hoist structure may easily comprise the last step of the hoist assembly process, the bracket **30** being then simply set into the complementary recessed portion of the frame structure and the bolts **44, 46** thrust downwardly through the bracket and into screwthreaded engagement with the nuts **53, 54**.

Tightening of the bolts **44, 46** by means of any suitable tool applied to the upper ends thereof from externally of the mechanism will then draw the suspension bracket **30** snugly downwardly into seated relation in the recessed portion of the frame structure, thereby locking the suspension hook and bracket in improved manner relative to the hoist frame. It is a feature of the invention that this mode of mounting of the suspension hook bracket to the frame not only provides a more secure and stronger and more rigid overall structure, but reduces the overall vertical dimension of the hoist and suspension hook assembly, whereby a hoist of the invention requires less operational head room.

It is another feature of the invention that the above described hoist frame and suspension hook mounting arrangement facilitates adaptability of a single hoist frame structure to a variety of load strand reeving types. For example, as illustrated by Figs. 4, 7, the mating hoist frame parts **12, 14** may be suitably apertured to optionally accommodate a load chain carrying a bolt **60** (Figs. 4, 7) which engages in screwthreaded relation at its lower end with a square sectioned shackle block **62** carrying a pin **63** for engagement with the end link **64** of the load lift chain when trained under and then upwardly from a conventional type lower sheave block **65** which in turn carries the load hook **20**. In this application of the invention, the suspension hook mounting bracket is formed as illustrated at **66** to be generally in the form of the bracket as illustrated at **30** in Figs. 1, 2, except that the bracket **66** includes an intermediately vertically reinforced portion **67** which is vertically apertured to accommodate the bolt **60** in sliding relation therethrough. The upper end of the bolt **60** is headed as indicated at **68** and the top surface of the bracket **66** is socketed to accommodate the bolt head and to hold it against turning when lowered thereinto, and thus it will be appreciated that when the bracket is mounted in submerged and snug fitting relation in the hoist frame structure by means of the bolts **44, 46**, the bolt **60** may first be lifted to clear its head from the bracket socket and then tightened in the device **62** and dropped back into the socket so as to anchor the load lift chain in the position shown in Fig. 4. Thus, the load lift chain is supported by the bolt **60** upon the bracket **66** which in turn transmits this load directly to the suspension hook **25** in improved manner, whereby in this instance the suspension hook bracket serves the purpose of relieving the hoist frame of one half of the load supported by the hook **25**.

It will also be appreciated that the hoist frame as illustrated in Figs. 4–7 may be employed with either of the brackets as illustrated in Fig. 1 or in Fig. 4, so as to adapt the single hoist frame to either single or double reeved type hoist arrangements, simply by interchanging the brackets **30, 66** according to the hoist type desired. Thus, it will be understood that a dealer in hoist devices of this type will be required to stock only a minimum supply of hoist frames along with an assortment of

brackets of the types illustrated at **30** in Fig. 1 and at **66** in Fig. 4, and an appropriate number of sheave blocks **65** and chain anchor bolts as illustrated at **60** in Fig. 4. He will thus be equipped to supply any customer with either single or double reeved type hoists as the customer requires, simply by mounting the proper type suspension bracket into the hoist frame, and adding the load chain bolt and lower sheave block devices where needed. This greatly reduces the inventory of hoists required to be carried by the dealer in order to be prepared to meet his customer's requirements.

It is to be particularly noted that the suspension hook bracket for the double reeve type application also differs from the bracket adapted to the single reeve type application as shown in Fig. 1 by virtue of the lateral disposition of the suspension hook aperture therein relative to the vertical center line of the hoist frame. Thus, for example, as shown in Fig. 4, the bracket **66** which is adapted for the double reeve application is designed to dispose the suspension hook **25** midway of the vertical load center lines of the two strands of chain training upwardly from the lower load sheave block **65**, while in the case of the single reeve application as illustrated in Fig. 1 the bracket **30** is designed so as to dispose the suspension hook in line with the single load chain strand training upwardly from the load hook **20**.

Figs. 8, 9, 10 illustrate application of the invention to a unitary frame type hoist wherein the hoist frame is illustrated at **70** to comprise a single casting shaped to accommodate the necessary motor and drive shaft and gear and load lift wheel parts and the like. However, the frame structure **70** is recessed transversely of its upper portion as indicated at **72** to accommodate in snugly seated relation therein the suspension hook bracket as designated generally at **74**. The hub portion of the bracket **74** is vertically bored as indicated at **76** to accommodate in freely rotatable relation therein the shank portion **77** of the suspension hook **78**, the suspension hook being formed with a bearing shoulder **79** and a holding collar or nut **80** at its lower end, as explained in connection with the arrangement of Figs. 1–7. The diametrically extending end portions of the bracket **74** are suitably apertured to accommodate in sliding relation therethrough mounting studs **82, 84**, the hoist frame structure **70** being suitably drilled and tapped as indicated at **86, 88** to receive the threaded end portions of the studs **82, 84**, respectively.

As shown in Figs. 9 and 10, the bracket **74** is of generally rectangular sectional form and shaped and dimensioned so as to fit snugly downwardly into the recessed portion **72** of the hoist frame when drawn thereinto by means of the mounting studs **82, 84**. Thus, as previously stated, the suspension hook mounting arrangement provides a more secure and stronger and more rigid mounting interconnection between the suspension hook and the frame, while reducing the overall vertical dimension of the hoist and suspension hook assembly. Whereas, the drawing at Figs. 8, 9, 10 illustrate the hook mounting bracket **74** as being only of the single reeved hoist type as in the case of Figs. 1–3, it will be understood that the bracket **74** is readily interchangeable with another bracket of generally similar design but formed to accommodate a double reeved hoist arrangement, as explained hereinabove in connection with the device illustrated by Figs. 4 to 7.

It is of course to be appreciated that various changes may be made in the details of the constructions as shown and described hereinabove without departing from the invention. For example, the suspension bracket members **30, 66, 74** may be provided with non-swivelling suspension hook or lug devices in lieu of the suspension hook devices as shown in the drawing, so that the hoist mechanisms may be permanently attached to stationary supports or moving trolleys or the like. Thus, for example, the hook devices as shown may be replaced by externally threaded studs for connection to mounting brackets ex-

tending from overhead trolleys or the like, as may be required. Therefore, although only a few forms of the invention have been illustrated and described in detail, it will be understood that various changes may be made therein without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A hoist construction including a hoist frame and a supension hook for hanging said hoist in operative position, said hoist frame being recessed in its upper surface portion, and a suspension hook bracket device detachably mounted in substantially submerged relation in the recessed portion of said frame, said bracket device having a central hub portion apertured to accommodate therein the shank portion of said suspension hook and opposed beam portions extending substantially diametrically therefrom for attachment to said hoist frame.

2. A hoist construction including a multi-part hoist frame comprising frame parts having mating surface portions and a suspension device for hanging said hoist in operative position, said hoist frame parts being conjunctively recessed in their upper surface portions, and a bracket device detachably mounted in substantially submerged socketed relation in the recessed portions of said frame parts, said bracket device being connected to said suspension device.

3. A hoist construction including a two piece hoist frame comprising two frame parts and a suspension hook for hanging said hoist in operative position, said hoist frame parts each being recessed in its upper surface portion, and a suspension hook bracket device substantially submerged in the recessed portions of said frame parts, said bracket device having its ends bolted to said frame parts and accommodating therein between its ends the shank portion of said suspension hook.

4. A hoist construction including a hoist frame and a suspension device for hanging said hoist in operative position, said hoist frame being recessed in its upper surface portion, and an elongated bracket detachably mounted in substantially submerged relation in the recessed portion of said frame, said bracket being connected intermediate its ends to said suspension device and being connected adjacent its ends to said hoist frame.

5. A hoist construction including a two-part hoist frame comprising frame parts having mating surface portions and a suspension member for hanging said hoist in operative position, said hoist frame parts being conjunctively recessed in their upper surface portions, a suspension member bracket device resting in substantially submerged relation in the recessed portions of said frame parts, at least one of said frame parts being separately recessed below its upper surface recess portion, a threaded nut positioned within said separate recess, and a bolt extending from said bracket into said nut for holding said bracket relative to said frame, said bracket device being connected to said suspension member.

6. A hoist combination including a hoist frame, a suspension device for hanging said hoist in operative position, said hoist frame being recessed in its upper surface portion, and a bracket device detachably mounted in substantially submerged relation in the recessed portion of said frame, said bracket device having a central hub portion connected to said suspension device and beam portions extending outwardly therefrom, means detachably connecting said beam portions to said hoist frame, said recessed frame portion being adapted to selectively accommodate generally similar bracket devices having suspension devices connected thereto at different positions thereon for different center of load arrangements.

7. A hoist construction including a multi-part hoist frame comprising at least two frame parts having mating surface portions, a suspension member for hanging said hoist in operative position, said hoist frame mating parts being conjunctively recessed in their upper surface portions, and a suspension member bracket device detachably mounted in substantially submerged relation in the recessed portions of said frame parts, said bracket device having a central hub portion apertured to receive therethrough one end of said suspension member and having cantilever beam portions extending outwardly therefrom and connected to said frame parts.

8. A hoist construction including a two piece hoist frame comprising two frame parts having mating surface portions, a suspension hook for hanging said hoist in operative position, said hoist frame parts being recessed in their mating surface portions, a suspension hook bracket elongated along the juncture between said mating surface portions and connected intermediate its ends to said hook, said bracket being substantially submerged in the recessed portions of said frame parts, and means detachably securing the ends of said bracket to said frame parts for holding said bracket within said frame.

9. A hoist construction including a hoist frame, a suspension hook for hanging said hoist in operative position, said hoist frame being recessed, a suspension hook bracket device mounted in substantially submerged relation in the recessed portion of said frame, said bracket device having a hub portion apertured to accommodate therein the shank portion of said suspension hook and beam portions extending outwardly therefrom, and means detachably connecting said beam portions to said frame for holding said bracket in said frame.

10. A hoist construction as set forth in claim 9, wherein said bracket device is provided with a peripheral bead extending therearound to form a shoulder fitting over the brink of the recessed portion of said hoist frame.

11. A hoist construction including a multi-part hoist frame comprising frame parts having mating surface portions and a suspension member for hanging said hoist in operative position, said hoist frame parts being conjunctively recessed in their upper surface portions, a suspension member bracket device resting in substantially submerged relation in said recessed portions of said frame parts, said bracket device comprising a central hub portion connected to said suspension member and beam portions extending outwardly therefrom for connection to said frame parts, said frame parts being further conjunctively recessed in portions thereof below their upper surface recessed portions and in alinement with the terminal end portions of said bracket member beam portions, threaded nut devices positioned within said further recessed portions, and bolt devices extending from said bracket device beam portions into engagement with said nut devices for holding said bracket device relative to said frame.

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