April 11, 1950 H. F. PARKER 2,503,682

HOIST

Filed Nov. 26, 1946 2 Sheets-Sheet 1

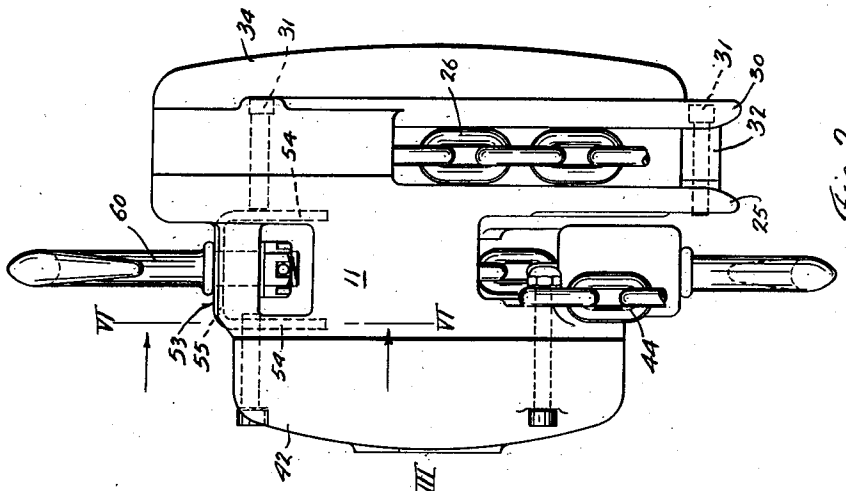


Fig. 2.

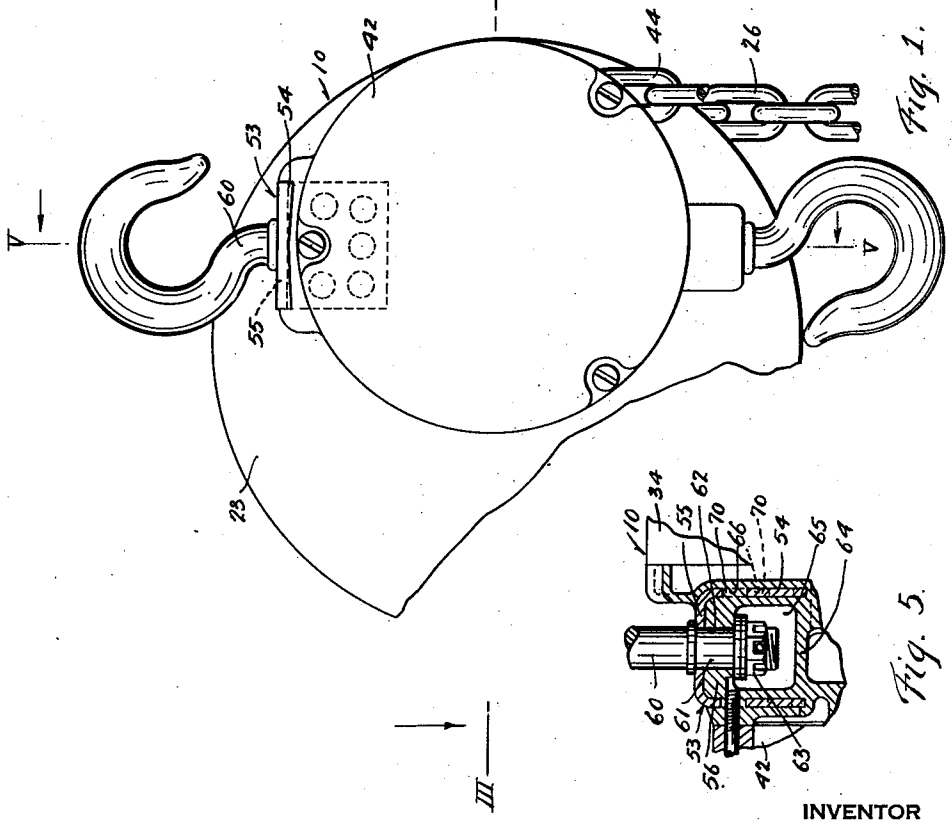


Fig. 1.

Fig. 5.

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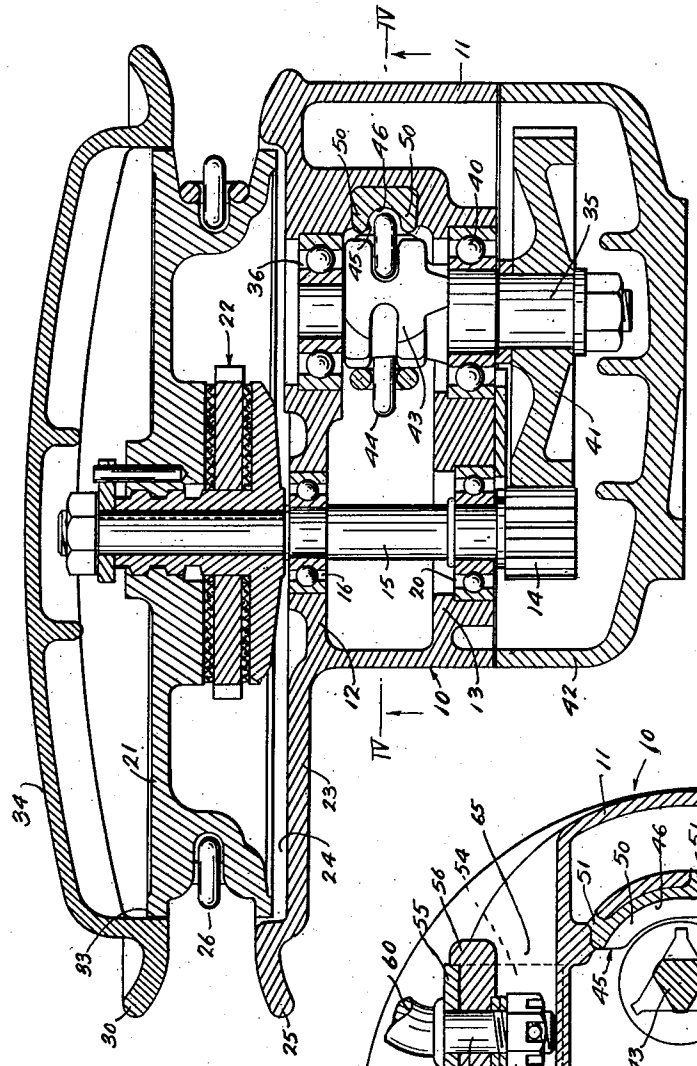


Fig. 5

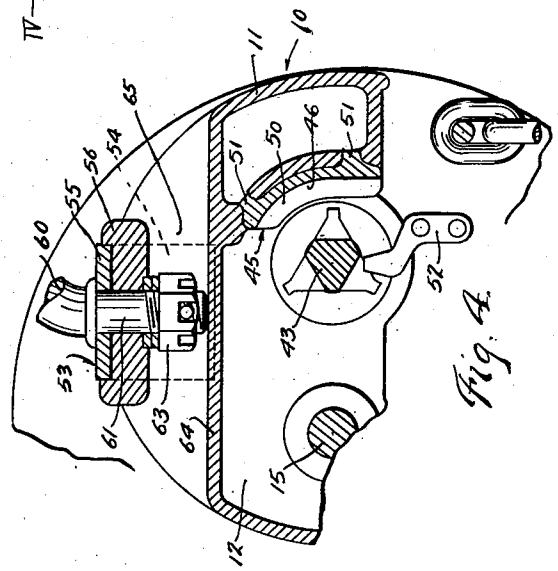


Fig. 4.

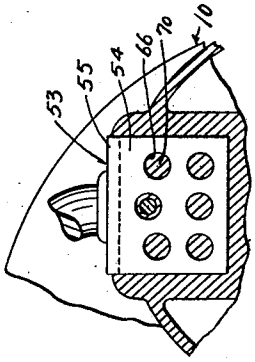


Fig. 6.

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HOIST

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3 Claims. (Cl. 254—167)

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My invention relates in general to hoists, and more particularly to hoists having light weight cast metal frames.

It is now found desirable to make hoist frames or casings of die cast metal, and preferably of those metals which are extremely light weight. Such metals, however, are usually of relatively low shock resistance as compared to some of the heavier metals, and the amount of sound metal which can be placed in regions of greatest stress in die cast hoist frames is limited owing to characteristics of the die casting process. For example, it is well known that while relatively thin sections of sound metal can be obtained in die casting processes, when it is attempted to cast relatively thick sections the metal in the outer regions solidifies first, and then as the metal in the center of the casting cools it contracts. This contraction process forms voids throughout the center section of the metal thereby forming an imperfect casting of reduced overall strength. Furthermore, such lighter metals do not usually possess the wearing qualities necessary for continuous use and long life in mechanisms of the character described.

It has therefore been a principal object of my invention to provide a hoist frame of the lighter metals reinforced at points of greatest stress by parts made from metal of greater shock and wear resistance embedded in the cast metal of the hoist frame.

Another object has been to provide the reinforcing parts referred to hereinabove with means for anchoring them within the casting without the use of any bonding material.

Another object is to provide a wear-resistant insert molded within the casting of the hoist frame for reinforcing the area where the greatest wear is imposed by operation of the load chain.

These and other objects which will be apparent to those skilled in the art have been accomplished by the device shown in the accompanying drawings, of which:

Fig. 1 is a front elevation of a hoist embodying my invention;

Fig. 2 is a side elevation of the complete hoist;

Fig. 3 is a sectional plan view of the hoist taken on line III–III of Fig. 1;

Fig. 4 is a vertical sectional view taken on line IV–IV of Fig. 3;

Fig. 5 is a fragmentary sectional view taken on line V–V of Fig. 1; and

Fig. 6 is a fragmentary sectional view taken on line VI—VI of Fig. 2.

While I have shown and described a hand hoist, it is obvious that my invention is applicable to other types of hoists, such as those which are operated by an electric motor or the like.

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Referring to the drawings, the hoist comprises a frame or housing 10 having an outer wall 11 and end walls 12 and 13. The hoist shown is of the type having a single gear reduction and therefore provided with a pinion 14 mounted upon or made integral with a hand wheel shaft 15. This shaft is mounted in suitable antifriction bearings 16 and 20 supported, respectively, by the end walls 12 and 13. The hand wheel 21 of the device is mounted upon the outer end of the hand wheel shaft 15 and is connected thereto through the medium of the usual type Weston brake 22. The end wall 12 is extended in a wall extension 23, circular in form and having its periphery eccentrically arranged with respect to the outer wall 11 of the frame. This wall extension together with the inner wall 12 is so formed as to provide a recess 24 for the reception of one of the flanges of the hand wheel. The outer periphery of the wall extension is flared outwardly as shown in Fig. 3, whereby to provide an inner guide 25 for the hand chain 26. Arranged in spaced relation with the inner guide 25 is an outer guide 30 which is secured to the inner guide by suitable bolts 31 and spacers 32. The outer chain guide is recessed at 33 for the reception of the outer flange of the hand wheel, and this recess is closed by means of a cover portion 34 formed integrally with the outer chain guide 30.

A load wheel shaft 35 is rotatably supported by antifriction bearings 36 and 40 carried by the end walls 12 and 13, respectively. This shaft carries a load gear 41 which meshes with the gear pinion 14. These gears are enclosed by means of a cover member 42 which is secured to the frame 10 by suitable means.

The load wheel 43 of the hoist is mounted between the bearings 36 and 40 and is preferably made integrally with the load wheel shaft 35. This wheel is provided with the usual teeth and notches for the reception of the load chain 44. The chain guide 45 of my invention is preferably made of some suitable ferrous metal and is positioned at the point where the greatest wear is produced by the load chain. This guide is in the nature of an insert as shown in Figs. 3 and 4, and the metal of the frame is molded about it. The insert is provided with the usual chain groove 46 bounded by walls 50. These walls are flared outwardly as shown whereby when being molded within the casting during the process of molding, the insert will be securely anchored within the

casting. Tabs 51 are provided on the insert for anchorage in proper position in the mold during the die-casting process. The customary stripper 52 is provided and is suitably secured to the frame beneath the load wheel.

As is well known, one of the points of greatest stress in a hoist is in the region of the point of attachment of the hoist hook; and whenever the frame is made of die cast metal, it is usually impracticable to provide enough shock resistance in such metal within the available space to give sufficient strength to stand such stresses. In other words, since the die casting process inherently involves contraction and formation of voids in the centers of thick sections of die cast metal, it is not possible to employ only die-cast metal in the regions of such stresses and to obtain the necessary strength and shock resistance thereat. Therefore, in carrying out my invention, I provide a strap 53 made from a highly shock resistant material, such as, for example, a special steel having high ductility characteristics in combination with a die-cast frame. The strap comprises downwardly projecting legs 54 joined by a horizontal portion 55. The horizontal portion extends across the top of a yoke portion 56 provided on the frame, and to which the hoist hook 60 or other suspension member is attached. The hook is provided with a pivotal portion 61 which extends down through an aperture 62 formed in the horizontal portion of the strap and through the yoke 56. This portion of the hook is retained in pivotal relation with the yoke by means of a nut 63 secured to the lower end thereof. The yoke is spaced from the top wall 64 of the casing thereby providing a channel 65 for passage of the nut when the device is being assembled.

As shown in Fig. 6, the side members 54 of the strap 53 are formed with apertures 66 which extend through the metal thereof and into which the metal of the casing flows when being molded about the strap. Such metal thus provides integral studs 70 which serve to anchor the strap within the casting and to thereby securely bond the parts together, whereby the strap with its greater shock resistance will reinforce the cast metal of the frame at the stress points, thus providing adequate strength in the hoist for the loads to be placed upon it. The steel strap 53, having a relatively high modulus of elasticity and being placed across the top of the yoke 56, stretches less under shocks than does the die cast material of the casing, which is of relatively low modulus of elasticity and, therefore, the strap absorbs the majority of the shock loads. By this arrangement, the hoist casing may be generally constructed of any of the die casting metals, whereby the advantages of such process are acquired while at the same time the cast metal is reinforced so as to obviate danger of breakage at the high stress points.

What is claimed is:

1. A hoist comprising a frame of relatively low wear-resistance material, a load lift wheel rotatably carried by said frame, a load chain engaging said wheel, and a separate chain guide of relatively high wear-resistance material integrally molded within said frame for bearing engagement and cooperation with said load chain said guide having its opposite inwardly extending anchoring faces flaring away from each other, and integral aligning tabs projecting from said guide and embedded within the metal of said frame.

2. A hoist comprising a cast metal frame and a hoist suspension member secured to said frame, said frame comprising two integral opposed side wall portions and an integral yoke portion extending between and connecting said side wall portions, an inverted U-shaped reinforcing metal strap having its downwardly extending leg portions embedded within the cast metal of said wall portions and being formed with apertures receiving the cast metal of said wall portions, the horizontal portion of said strap overlying said yoke portion, said hoist suspension member being connected to said yoke portion and said horizontal strap portion for supporting said hoist.

3. A hoist comprising a frame and a hoist suspension member secured to said frame, said frame comprising two opposed cast metal side wall portions and a cast metal beam abutment extending between and connecting said side wall portions, said frame being formed between said wall portions and below said abutment with a transverse opening, an inverted U-shaped reinforcing metal strap partly surrounding the opening and having its downwardly extending leg portions embedded within the cast metal of said wall portions and being formed wtih apertures receiving the cast metal of said wall portions, the horizontal portion of said strap overlying said beam abutment portion, said beam abutment and said horizontal strap portion being each formed with a registering aperture for the pivotal reception of the suspension member, and fastening means disposed within the transverse opening of the casing and secured to the lower end of the suspension hook for connecting the latter to the frame.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,281,503	Brunell	Oct. 15, 1918
1,348,034	Moore	July 27, 1920
1,385,600	Willett	July 26, 1921
1,740,168	Fisher	Dec. 17, 1929
1,787,526	Honstain	Jan. 6, 1931
1,865,299	Berry	June 28, 1932
1,993,744	Morison	Mar. 12, 1935
2,274,280	Stinson	Feb. 24, 1942