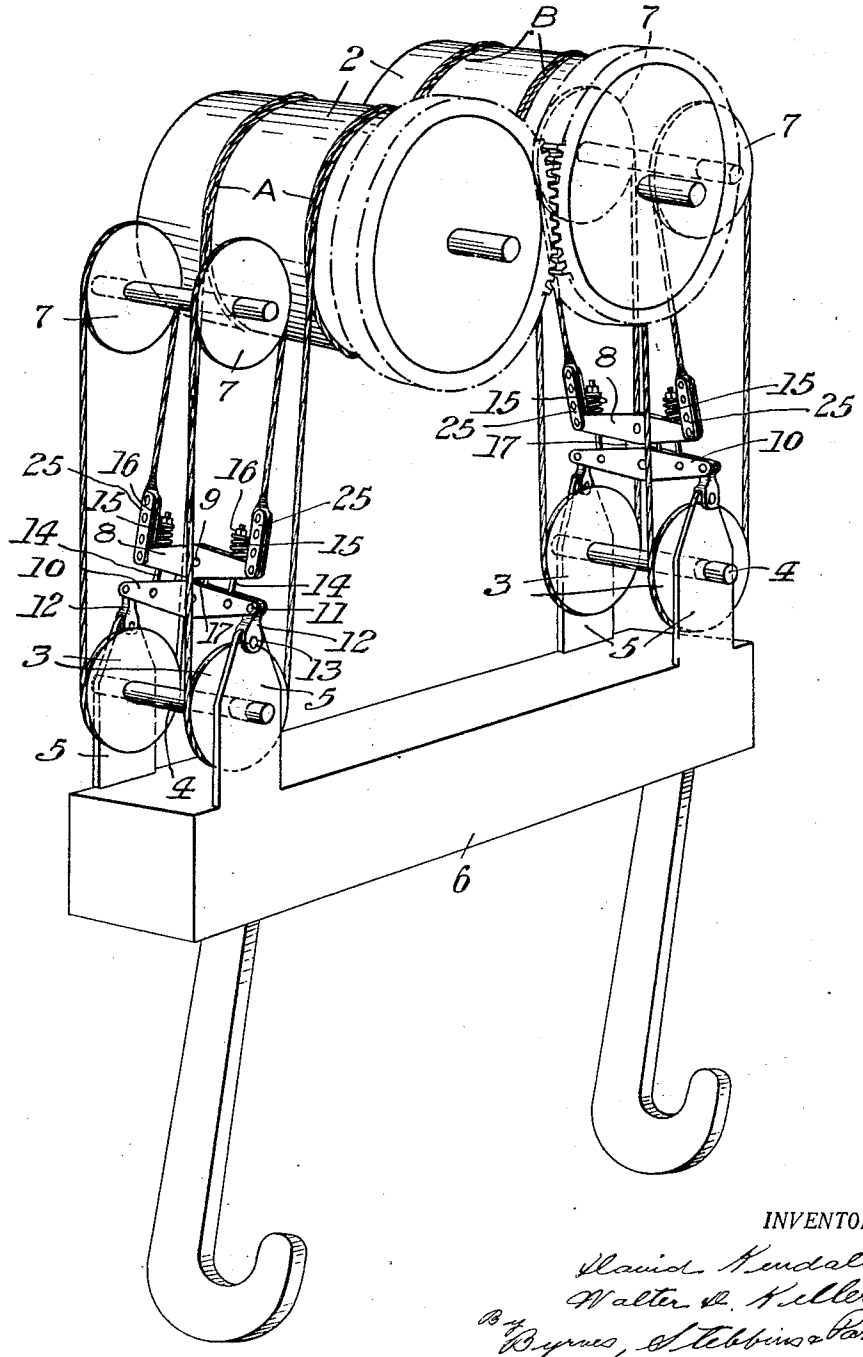
Jan. 19, 1932. D. KENDALL ET AL 1,841,958

HOIST MECHANISM

Filed Aug. 14, 1928 3 Sheets-Sheet 1

Fig. 1.



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HOIST MECHANISM

Filed Aug. 14, 1928 3 Sheets-Sheet 2

Fig. 3.

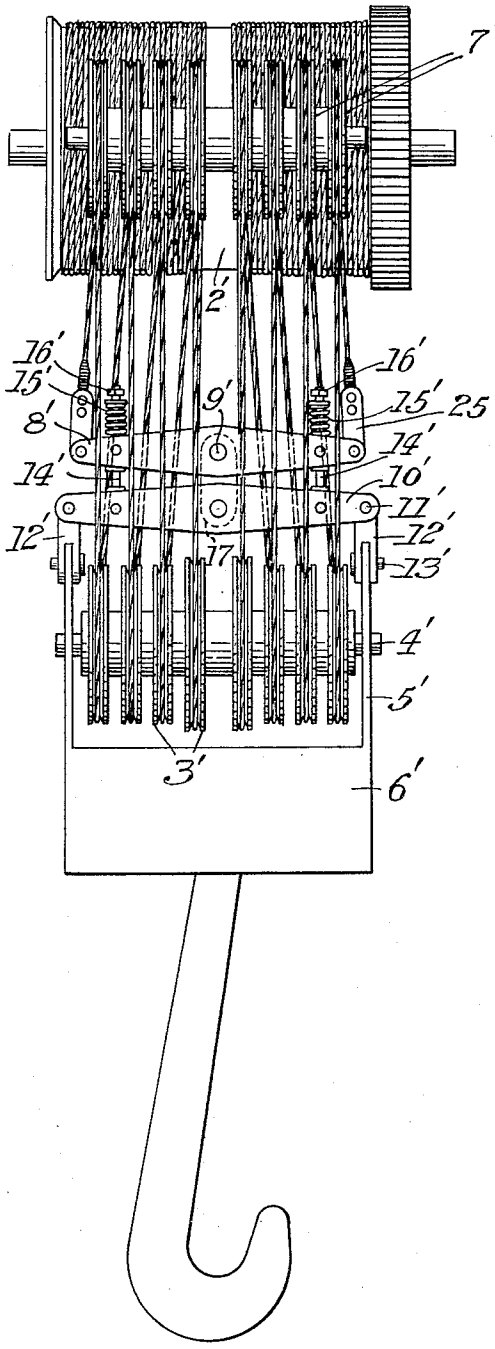
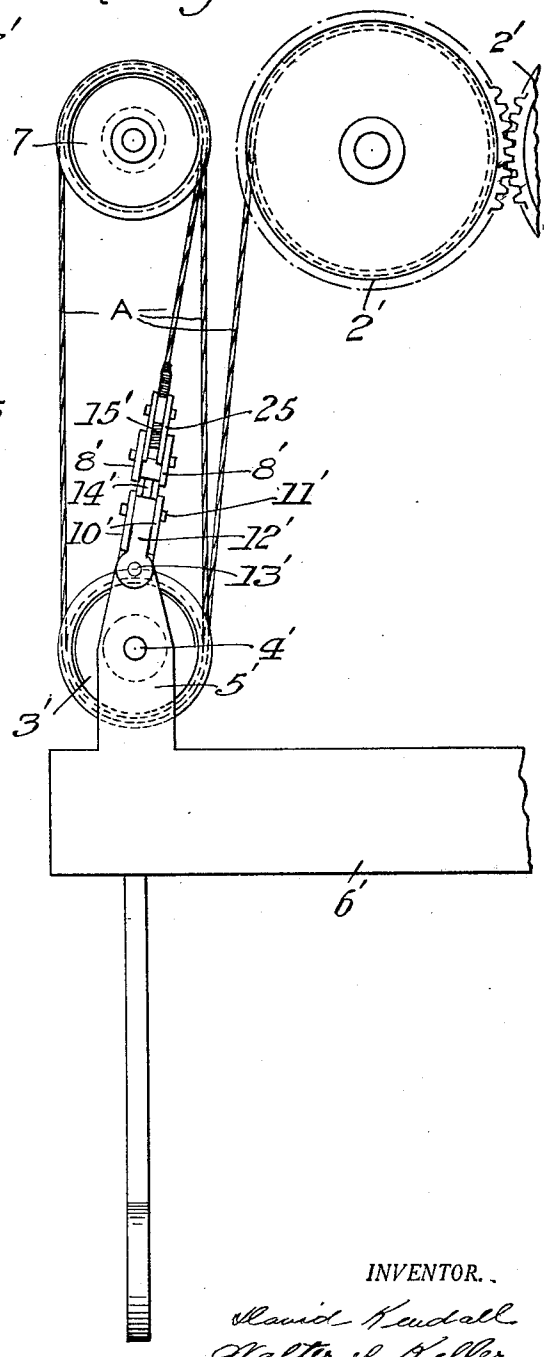


Fig. 2.



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HOIST MECHANISM

Filed Aug. 14, 1928 3 Sheets-Sheet 3

Fig. 4.

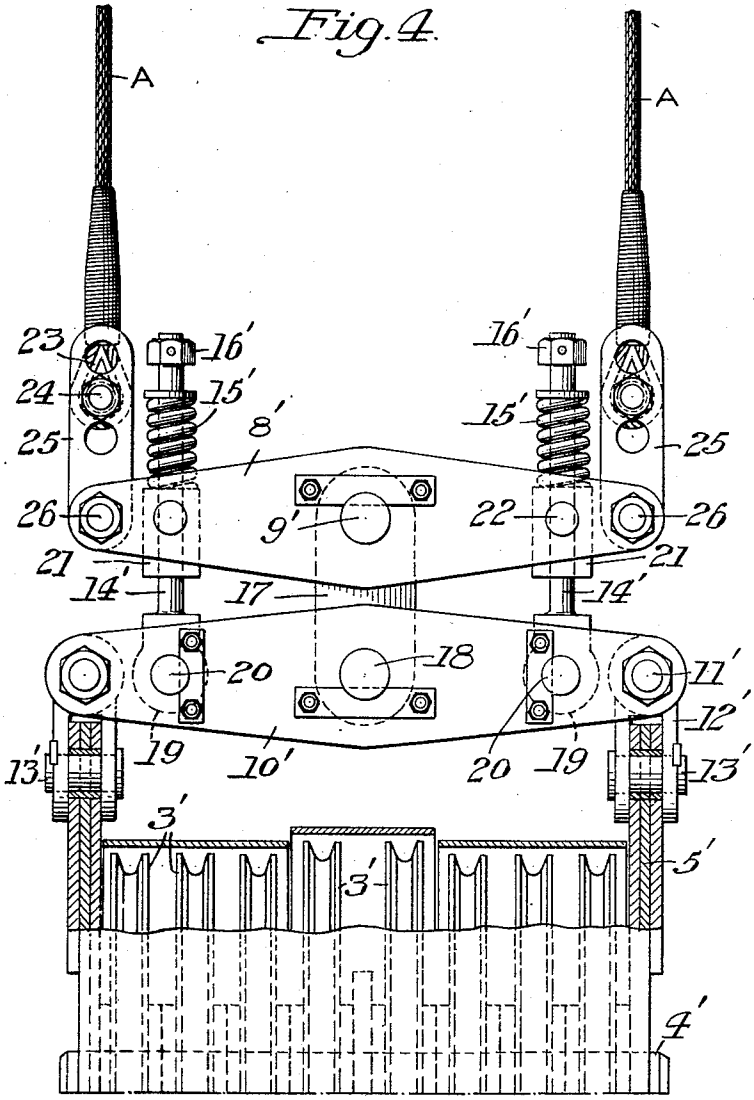
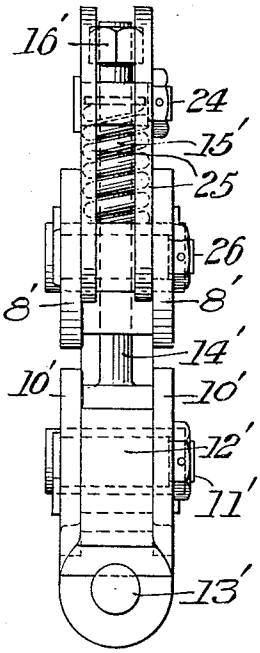


Fig. 5.



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UNITED STATES PATENT OFFICE

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HOIST MECHANISM

Application filed August 14, 1928. Serial No. 299,483.

The present invention relates broadly to the art of material handling, and more particularly to mechanism for hoisting. For example, the invention is of great value in ladle cranes for handling hot metal.

It is customary in many hoisting installations to provide a plurality of hoist cables, each of which is separably secured to a hoist drum at one end and to the lifting hook at its opposite end. It not infrequently happens that one of such cables breaks during a lifting operation, and precipitates the load being lifted. In the event the mechanism is being utilized for the lifting of molten metal, the breaking of one of the cables is apt to result in the dropping of the ladle and the spilling of the molten metal, with great danger of injury to workmen, and damage to equipment. The hazards with other types of equipment and other materials is, in many cases, almost as great.

The present invention relates to an improved form of hoist mechanism embodying a plurality of hoist cables and of such construction that the breaking of one of the cables does not result in dropping of the load or in the throwing of any sudden and violent shock on to the remaining cables.

In the accompanying drawings, there are shown for purposes of illustration only certain preferred embodiments of the present invention, it being understood that the drawings do not define the limits of our invention, as changes in the construction and arrangement of the parts, as well as in the exact location and arrangement of the pulleys and drums, may be made without departing from the spirit of our invention or the scope of our broader claims.

In the drawings:

Figure 1 is a perspective view, largely diagrammatic, illustrating one embodiment of the present invention;

Figure 2 is a side elevational view of a host mechanism similar to that shown in Figure 1;

Figure 3 is an end elevational view of the construction shown in Figure 2;

Figure 4 is an elevational view, on an enlarged scale, of the compensating mechanism; and

Figure 5 is an edge view, on an enlarged scale, of the compensating mechanism of Figure 4.

In accordance with the present invention, there is provided a plurality of lifting drums 2 of any desired construction, herein illustrated as being of the inter-geared type. Secured to one of the drums is a pair of lifting cables A and similarly secured to the other lifting drum is a second pair of cables B. All of these cables pass downwardly from the lifting drums around pulleys 3 carried on axles 4 journaled in supports 5 on a hoist head 6. From the pulleys 3 the cables pass upwardly around pulleys 7 supported in the crane structure, and thence extend downwardly to a compensating mechanism.

The compensating mechanism comprises a lever or connector 8 for each pair of cables connected through a central pivot 9 with a yoke or carrier 10 making pivotal connections 11 with links 12. The links 12, in turn, make a pivotal connection 13 with the supports 5. The axes of the pivots 13 are substantially normal to the axes of the pivots through which the lever 8 is connected to the lever 10, whereby a substantially universal rocking movement of the yoke is permitted.

The yoke 10 carries a pair of spaced bolts 14 extending upwardly through openings in the lever 8. The bolts 14 carry compression springs or shock absorbing means 15, the degree of compression of which may be variably adjusted by nuts 16. By reason of this construction, any unequality in the respective pairs of cables A or B is automatically compensated for by a variable compression of the springs 15 cooperating with the lever 8 to which the ends of the cables are connected. In this manner any slight difference in the length of the respective cables does not relieve any of the cables from carrying its proportionate load.

In the event that one of the cables of either pair breaks, the remaining cable of such pair immediately takes the full load, thereby causing its spring 15 to be compressed to the limit. The load, however, is uniformly transmitted to the hoist head 6 through the yoke 10 and its connections thereto. In the event

of such a break, the springs 15 cushion the shock on the remaining cables, whereby the liability of breakage thereof under the sudden imposition of the additional load is obviated.

The Figures 2, 3, 4 and 5 of the drawings show in detail a commercial embodiment of the invention, the parts in these figures of the drawings corresponding to the parts heretofore described being designated with the same reference characters but having a prime affixed thereto. As shown in these figures, the axles 4′ each carry a plurality of pulleys 3′ around which the cables pass in the desired sequence. There is also provided the required number of pulleys 7′ for cooperation therewith.

As illustrated in detail more particularly in Figures 4 and 5, the levers 8′ comprise spaced links which receive therebetween the upper end of a link 17 carrying the pivot pin 9′. The lower end of the link 17 extends between spaced arms forming the yoke 10′ and has a pivotal connection 18 therewith. The bolts 14′ are provided with eyes 19 at their lower ends cooperating with pivot pins 20, these bolts passing through blocks 21 having trunnions 22 which make pivotal connection with the levers 8′. The springs 15′ lie between the blocks 21 and the nuts 16′. A certain amount of clearance is provided so that the springs 15′ do not act unless a cable breaks. The cables are formed with eyes 23 for the reception of pins 24 in the tension links 25, which links make pivotal connection 26 with the levers 8′.

A construction of the character described possesses the advantages of effecting a uniform distribution of the load between a plurality of independent cables and an article to be lifted, and possesses the further advantages of automatically compensating for any inequalities in or breakage of any of the cables without thereby imposing too severe or sudden a shock on the remaining cables. The compensating mechanism may therefore be considered as a combined compensating and shock absorbing construction.

We claim:

1. Hoist mechanism, comprising a plurality of hoisting cables, a connector joining the cables, a carrier pivoted to the connector, and shock absorbing means effective between the connector and carrier.

2. Hoist mechanism, comprising a plurality of hoisting cables, a connector joining the cables, a carrier flexibly attached to the connector, and resilient means effective between the connector and carrier.

3. Hoist mechanism, comprising a plurality of hoisting cables, a connector joining the cables, a carrier flexibly but permanently attached to the connector, and means effective between the connector and carrier and yieldable upon relative movement thereof.

4. Hoist mechanism, comprising a plurality of hoisting cables, a connector joining the cables, a carrier cooperating with the connector, a plurality of slidable connections between the connector and carrier, and resilient means in each of such connections.

In testimony whereof we have hereunto set our hands.

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