

H. SAWYER.  
HOISTING MECHANISM FOR CRANES.  
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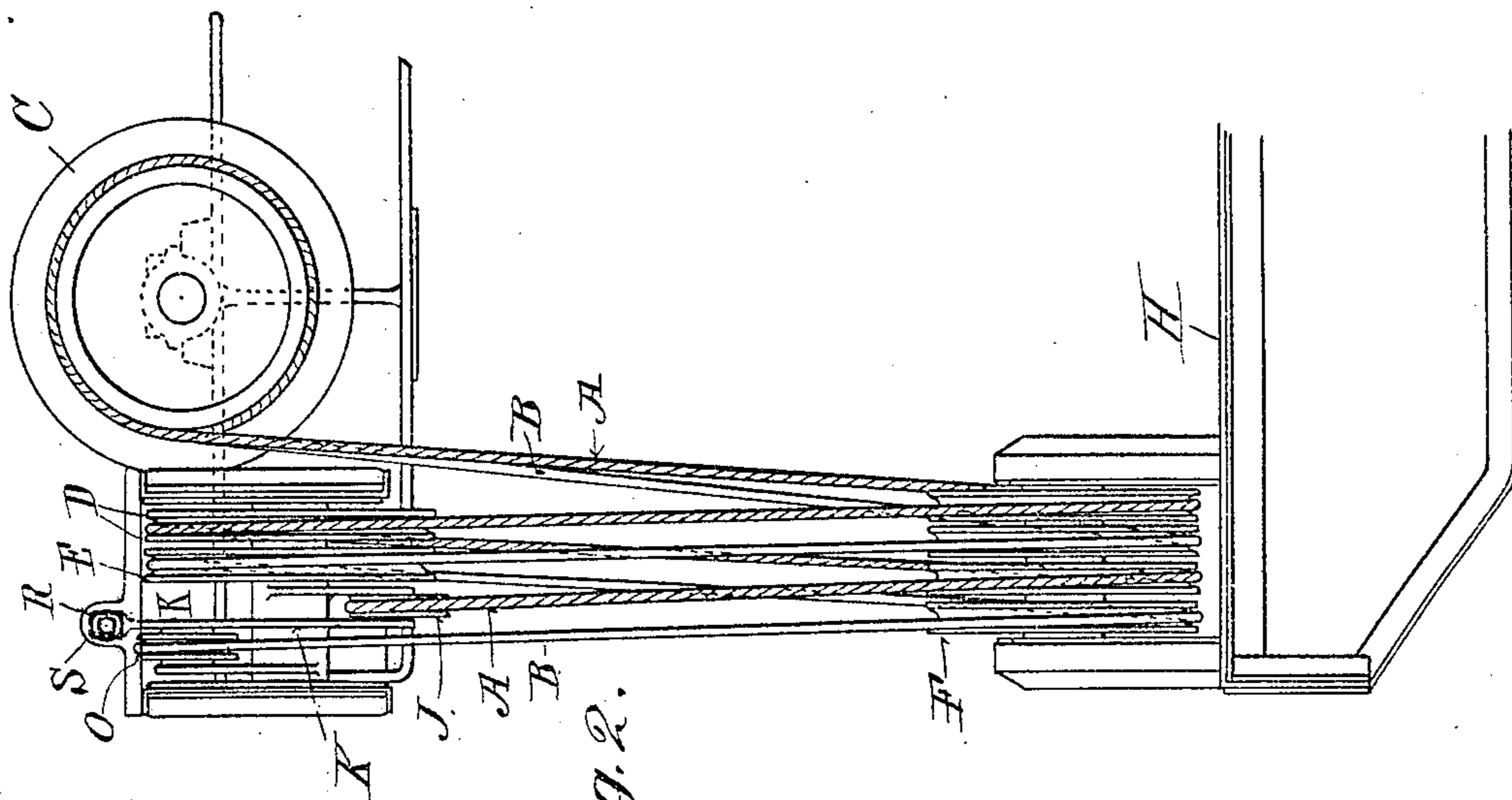


Fig. 2.

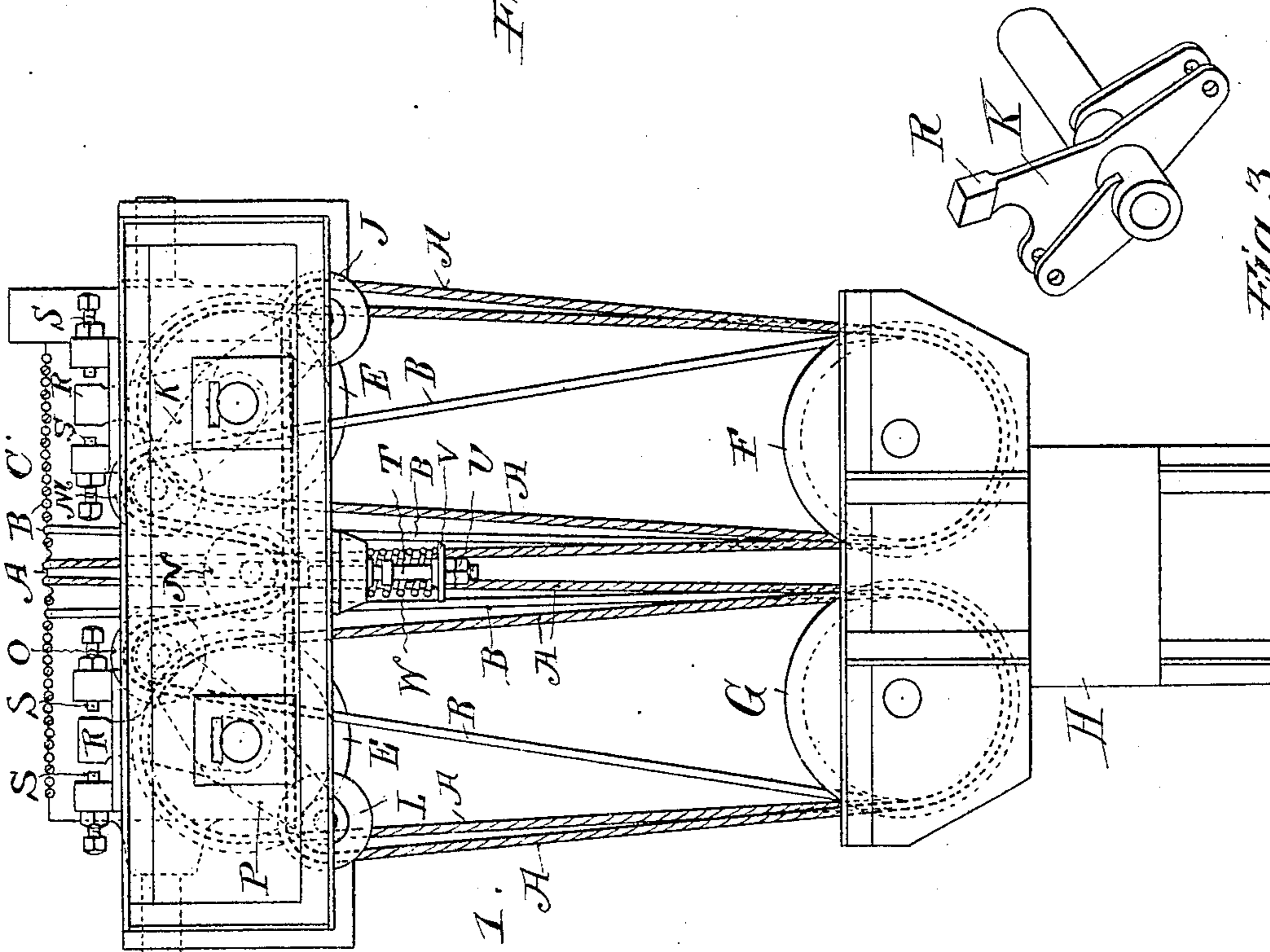


Fig. 1.

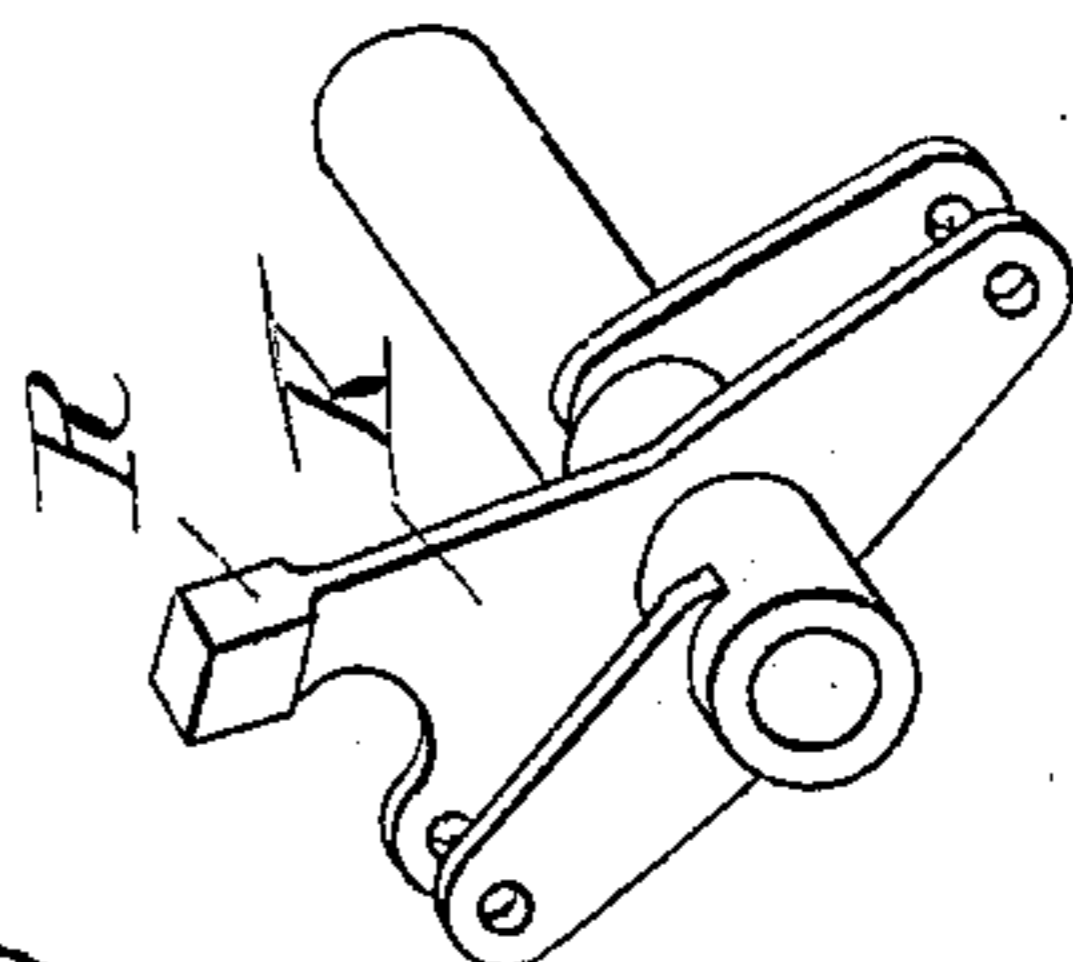


Fig. 3.

Witnesses:  
*[Signature]*  
J. Klein.

Inventor  
Harry Sawyer  
By his Attorney  
Samuel E. Darby

# UNITED STATES PATENT OFFICE.

HARRY SAWYER, OF MUSKEGON, MICHIGAN.

## HOISTING MECHANISM FOR CRANES.

943,956.

Specification of Letters Patent.

Patented Dec. 21, 1909.

Application filed June 8, 1909. Serial No. 500,876.

*To all whom it may concern:*

Be it known that I, HARRY SAWYER, a citizen of the United States, residing at Muskegon, county of Muskegon, and State of Michigan, have made a certain new and useful Invention in Hoisting Mechanism for Cranes, of which the following is a specification.

This invention relates to hoisting mechanism for cranes and other purposes, and particularly in the matter of reaving the hoisting and safety ropes and cables employed.

The object of the invention is to provide an arrangement of hoisting cables for apparatus of this nature, and auxiliary or safety cables associated therewith, and in such relation as to enable the load to be carried by either one or the other of said cables, or by both.

A further object of the invention is to provide an arrangement of hoisting cable, and auxiliary safety cable designed to take the load in case the hoisting cable should part or give way.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing, and finally pointed out in the appended claims.

Referring to the accompanying drawing, and to the various views and reference signs appearing thereon, Figure 1, is a view in side elevation of a hoisting mechanism showing the arrangement of main and auxiliary or safety cables embodying the principles of my invention. Fig. 2 is an end elevation of the same. Fig. 3 is a detached detailed view in perspective of a rocking arm employed in connection with my invention.

The same part is designated by the same reference sign wherever it occurs throughout the several views.

In the practical operation of hoisting cranes and similar apparatus, it is desirable to supplement the main hoisting cable with an auxiliary cable designed to act as a safety device in case the main cable should break, and it may be sometimes desirable to so arrange the main and auxiliary or safety cables as to enable the load to be transferred from the one to the other, or to be distributed be-

tween them. It is also desirable to provide for the stretching of the hoisting cables, and to equalize between the main and safety cables in case of stretching of the one or the other. It is among the special purposes of my present invention to provide a construction and arrangement of cables which accomplishes this and other advantages.

In carrying out my invention I employ the main cable A, and the auxiliary cable B, the former being shown shaded to indicate the strands of which it is made and the latter being shown without such shading so as to readily distinguish them in the drawings. These cables are wound upon the hoisting drum C, which may be of any suitable or convenient construction and arrangement according to the purposes and objects of the apparatus in connection with which the hoisting mechanism is employed. In practice I prefer to wind the two cables in alternate relation upon the drum as most clearly indicated in Fig. 1.

In the framework carrying the hoisting drum, or in any other suitable or convenient relation are pulleys D and E.

Reference signs F, G, designate pulleys carried in a frame H, designed to receive the load to be hoisted. The main hoisting cable A extends over the drum C, down to and around one of the pulleys F, thence up over the pulleys D, thence down again around another one of the pulleys F, thence up around a small pulley J, carried in the end of a lever K, thence horizontally to and around a small pulley L, carried in the end of another lever P, thence down and around one of the pulleys G, thence up over another pulley D, thence down and around another pulley G, and thence back to the drum. The auxiliary or safety cable extends from the drum C, down and around one of the pulleys F, thence up and around pulley E, thence again down and around a pulley F, and thence up and around a small pulley M, carried in the upper end of lever K, thence downwardly and around a small pulley indicated at N, yieldingly mounted as hereinafter more fully described, thence upwardly and around a small pulley O, carried in the upper end of the lever P, thence down and around a pulley G, up and around another pulley E, thence again down and around a pulley G, and thence back to the hoisting drum C. The levers K, and P, are mounted to freely rock upon the shafts or axles car-

rying the pulleys D, and E, or mounted to rock in any other suitable or convenient manner as may be desired. The relative inclinations of the levers K, and P, may be  
 5 adjusted in any suitable or convenient manner, and in either direction. As illustrative of one form of arrangement for accomplishing this result, but to which my invention, as defined in the claims is not to be limited  
 10 or restricted, I have shown the levers K, P, provided with projections R, coöperating with adjustable limit stops S, by means of which the relative angularity of said levers, and the amount of movement thereof, may  
 15 be adjusted and limited as desired. The small pulley N, is carried upon a bolt T, having a collar V, against which operates a spring W, whereby said pulley may move against the action of said spring. Through  
 20 suitable nuts U, the tension of the spring W, may be adjusted.

By the arrangement and construction above described, it is obvious that the entire hoisting strains or load may be readily  
 25 transferred from one to the other of the cables by merely rocking the levers K, P, in one direction or the other, or divided uniformly between the cables by allowing the levers a limited amount of free movement.  
 30 It will be observed that said levers are so relatively positioned in angular relation as to bring their upper ends toward each other, and to separate their lower ends. Therefore, since one of the cables operates over the  
 35 pulleys J, L, in the lower ends of said levers while the other cable operates over pulleys M, O, carried in the upper ends of said levers, it is merely necessary in order to transfer the load from one to the other of  
 40 the cables, or to distribute the load between them, to relatively adjust the relative angularity between said levers, this adjustment being effected by the adjusting limit screws S. Thus by turning up on the outer screws  
 45 S, the upper ends of the levers K, P, are caused to approach each other thereby paying out auxiliary cable B, or lengthening the bights of said cable. The same adjustment of the levers K, P, causes the lower  
 50 ends thereof to be separated farther apart, thereby taking up or shortening the bight of the main cable. In this manner all or a portion of the load may be imposed on the main cable. Similarly, by turning up on the  
 55 inner limit or adjusting screws S, the reverse of the above described operation will take place, thereby imposing the entire or a part of the load upon the auxiliary cable.

In case for any reason the entire load is  
 60 suddenly transferred upon the auxiliary cable, such load will first be taken by the spring W, thereby relieving the cable of the application thereto of a sudden jerking strain. Again, in case the load is carried  
 65 by the main cable, and said cable should

stretch, and it may not be desired to impose any material part of the load on the auxiliary or safety cable, but merely to permit the auxiliary cable to have just sufficient tension to move easily and freely, the stretching of the main cable would naturally impose an increasing strain on the auxiliary cable. To prevent this, the yielding mounted pulley N, permits the auxiliary cable to yield without taking an undue portion of the load by reason of the stretching of the main cable.

While I have shown and described my invention as applied to a hoisting crane, I do not desire to be limited or restricted in  
 80 respect to the particular kind or class of hoisting mechanism in connection with which my invention is used.

It is obvious that any desired power mechanism for operating the hoisting drum may  
 85 be employed, and it is equally obvious that the load may be connected to any desired construction or arrangement of hoisting frame to be engaged by the hoisting cables. My invention therefore, as defined in the  
 90 claims, is not to be limited or restricted in respect to these features.

Having now set forth the object and nature of my invention, and a construction embodying the principles thereof, and having  
 95 described the purpose, function and mode of operation thereof, what I claim as new and useful and of my own invention and desire to secure by Letters Patent is:

1. In a hoisting mechanism, a main and  
 100 auxiliary or safety hoisting cable, and means for transferring at will the load from the one to the other of said cables, and for automatically distributing the load between  
 105 them.

2. In a hoisting mechanism, a main and an auxiliary safety cable, one of said cables being arranged to take a hoisting load, and the other to normally run idle, in combination with means for transferring the load  
 110 from the one to the other of said cables, and to automatically distribute the load between them.

3. In a hoisting mechanism, a main and an auxiliary safety cable, one of said cables  
 115 being arranged to take the hoisting load, and the other to remain idle, in combination with a yielding connection for the idle cable whereby said cable is relieved of any increase in load by reason of the stretching of  
 120 the load carrying cable.

4. In a hoisting mechanism, a main and an auxiliary safety cable, pulleys over which  
 125 said cables respectively operate, levers carrying said pulleys at the respective ends thereof, and means for adjustably rocking said levers.

5. In a hoisting mechanism, a main and an auxiliary hoisting cable, pulleys over  
 130 which said cables respectively operate, angu-

larly arranged levers carrying said pulleys at the respective ends thereof, and means for adjusting the angular relations of said levers with reference to each other.

5 6. In a hoisting mechanism, a main and an auxiliary hoisting cable, relatively movable pulleys over which said cables respectively operate, means for relatively moving said pulleys, and a yielding connection for  
10 one of said cables.

7. In a hoisting mechanism, a main and an auxiliary safety cable, pulleys over which said cables respectively operate, angu-

larly arranged levers carrying said pulleys, arms connected to said levers, and adjusting 15 screws for engaging said arms to rock said levers.

In testimony whereof I have hereunto set my hand in the presence of the subscribing witnesses, on this 4th day of June A. D., 20 1909.

HARRY SAWYER.

Witnesses:

J. L. HAGA,  
T. C. AKIN,  
P. J. KNIPERS.