

March 16, 1926.

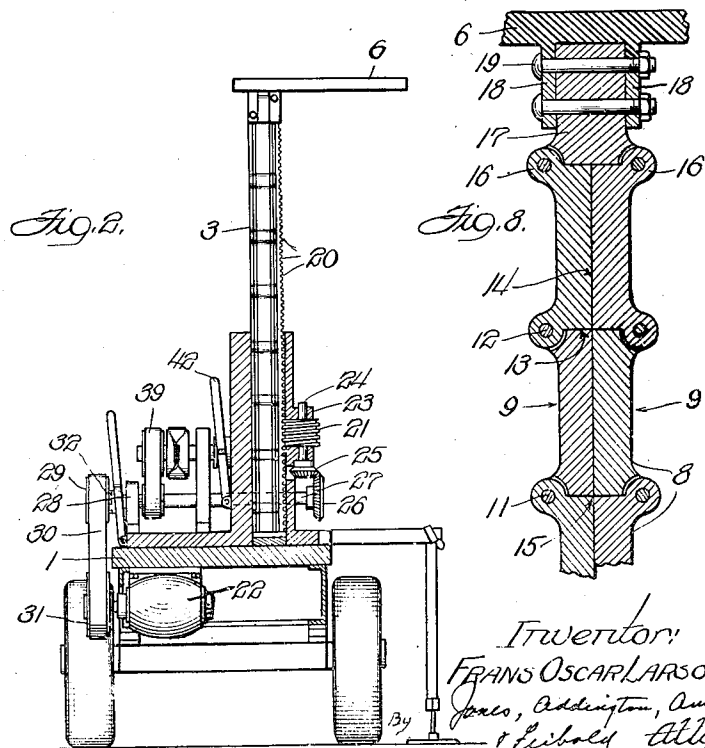
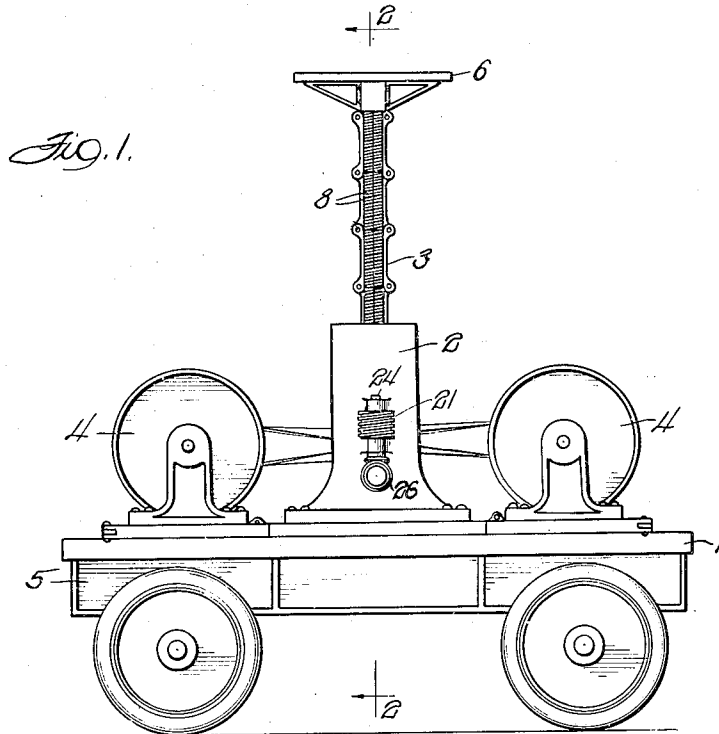
1,577,040

F. O. LARSON

PORTABLE HOIST

Filed Dec. 10, 1923

2 Sheets-Sheet 1



March 16, 1926.

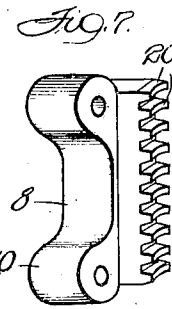
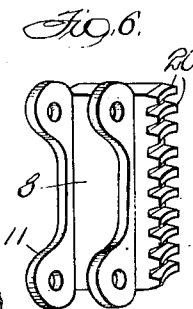
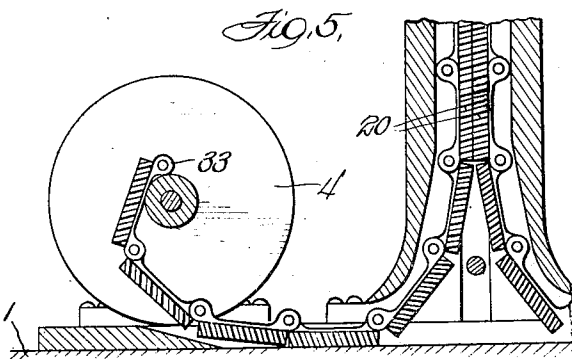
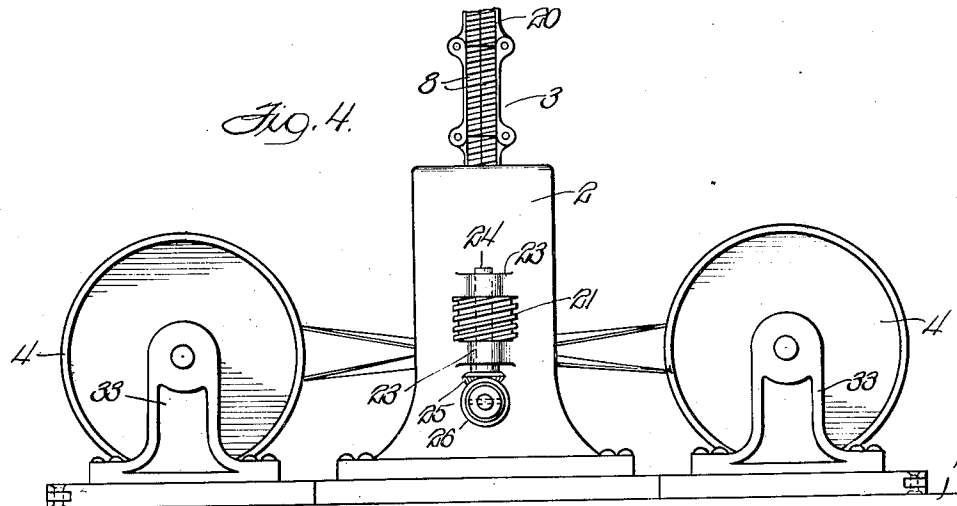
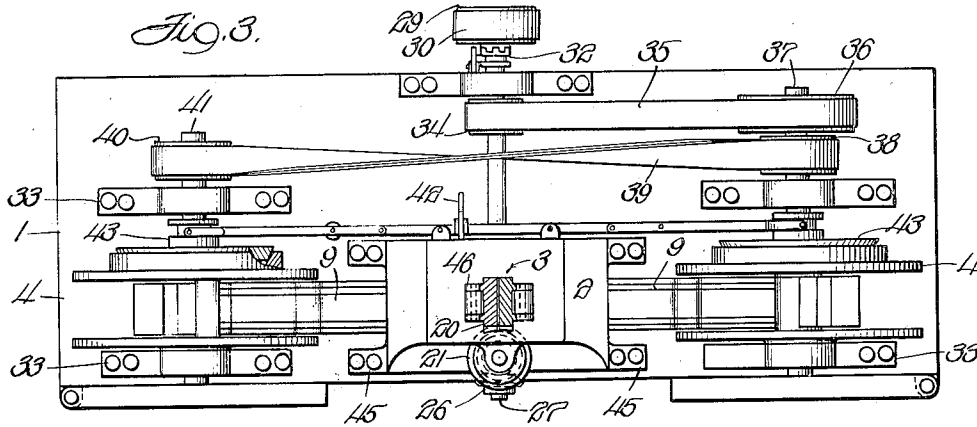
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PORTABLE HOIST

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

FRANS OSCAR LARSON, OF CHICAGO, ILLINOIS.

PORTABLE HOIST.

Application filed December 10, 1923. Serial No. 679,531.

To all whom it may concern:

Be it known that I, FRANS OSCAR LARSON, a subject of the King of Sweden, residing at Chicago, in the county of Cook and State of Illinois, United States of America, have invented new and useful Improvements in Portable Hoists, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to hoists.

More particularly my invention is directed to portable hoists for elevating to predetermined heights objects of considerable weight, or for elevating a working platform, which may be used in various connections, as for example on wrecking wagons or the like.

Devices of this type are usually employed where it is desirable to project platforms upon which objects are placed for elevation to higher levels, or where platforms are elevated in order that objects suspended overhead may be rapidly repaired. To illustrate, surface transportation companies of large cities usually maintain what is known as wrecking wagons which include platforms on extensible frames, the latter being employed for projecting the platforms to a position which is most convenient for the linemen to erect or repair the trolley wires of the company. As a further example, in building construction or in the elevation of heavy objects to different levels, hoists of the crane type have commonly been employed, but their use requires considerable effort and expense in not only obtaining them on the job at times, but also in mounting them, due to a lack of suitable supporting or bracing space about the place where they are to be used.

The chief difficulty hereinbefore encountered in this work is that no one particular construction could be used universally for all these different purposes. It was common practice to build each hoist of a certain design which usually limited its employment for one reason or another to one or more uses.

Consequently the cost and maintenance of a hoist have heretofore been expensive.

One of the objects of my invention is to provide a hoist capable of unlimited use, by the employment of a structure which is

simple, inexpensive to construct and has a high degree of strength and durability.

I accomplish this result by the novel form of construction employed in the present invention, being chiefly in the design of the lifting element or column, upon which the platform or the objects to be lifted are attached or supported for elevation to a different level.

The lifting column comprises essentially a pair of opposed parallel members which become flexible in one direction only when separated from each other for winding upon drums, or the like. This peculiar action of these parallel members results from forming them of links which are so arranged as to have pivotal movement in this one direction only, and consequently, when these members are placed in back-to-back relation, that is so that this one direction only of each member is opposed to the other with respect to the center line of the column, both members cooperate to form a rigid unit. Thus the column may be raised to any desired height within a practical range.

As a further feature of novelty, a drive is provided to raise the column through the use of teeth on the links for forming a continuous rack to be engaged by a worm drive. In cooperation with this drive, means is provided to operate the drums in unison therewith, but a separate control may be used to take up any slack occurring in the opposed parallel members, the latter having the appearance of chain-like members formed of these links.

One specific use for which my invention may be especially adapted is in the raising of telegraph poles when the latter are set up in the holes dug to receive the same. The top of the poles are connected to the apex of the column when in its lowermost position. Raising of the column thereupon raises the pole to its vertical position. If the pole is not in alignment, when so raised, the hoist may be moved to bring the pole directly over the hole, the pole being lowered in the latter by lowering the column of the hoist the necessary distance. I find by the use of the hoist disclosed herein that telegraph poles may be quickly, easily and cheaply set up.

In order to apprise those skilled in the art how to construct and practice my in-

vention, I shall now describe an embodiment thereof in connection with the accompanying drawings which form a part hereof.

In the drawings:

5 Figure 1 is a side elevation of a hoist embodying my invention, illustrating the lifting column partly extended;

Fig. 2 is a view taken on line 2—2 of Fig. 1;

10 Fig. 3 is a top plan view of the hoist;

Fig. 4 is an enlarged detail view, illustrating the mechanism which forms the essential part of my invention, and which, if so desired, may be removed from the chassis mounting illustrated in Fig. 1 and placed upon a truck or like mounting;

Fig. 5 is a vertical sectional view through one of the winding drums and the lower portion of the column;

20 Figs. 6 and 7 are detail views of adjacent link members forming said column, illustrating the worm teeth at one side thereof which mesh with a power driven worm for operating the column; and,

25 Fig. 8 is an enlarged vertical section through the upper portion of the column.

The embodiment in which I choose to illustrate my invention comprises mainly a base 1, a vertical guide post 2, a column 3 and a pair of drums 4 upon which the column is adapted to be wound when withdrawn from its extended position. These parts may be mounted upon any form of support, whether it be a chassis 5 as shown in the drawings, or a stationary base fixed to its mounting.

35 The important feature of the invention, as I shall presently describe, resides in an extensible column capable of being wound upon drums, when lowered. Usually a working platform 6 is supported by the column and is so constructed that it will sustain a considerable load, which might in certain cases be objects to be brought to a different level, while in other cases it might comprise a crew of workmen desiring to obtain access to an aerially suspended trolley wire construction.

40 Column 3 is formed of a plurality of links 8 capable of being swung about their pivotal point in one direction only. The links 8 as shown in the drawings, particularly Fig. 8, are arranged to form two flexible chain-like member 9, each of which is adapted to be wound about one of the drums 4. As shown in Figs. 6 and 7, the adjacent links of each of the chain-like members 9 are constructed so that the connecting portion 10 of one link lies between the connecting portion 11 of the other link. The link illustrated in Fig. 7 having the connecting portion 10 is adapted to connect at either end of the link illustrated in Fig. 6 by permitting the apertured ends of portion 10 to lie between the opposite apertured wings

forming the connecting portion 11 of this link shown in Fig. 6. The apertures in the portion 10 and the apertures in the wing portions 11 are brought into alignment to receive pivot pins 12 as shown in Fig. 8. 70 The forward part of each form of link, that is the portions in front of the parts 10 and 11, are formed rectangular and preferably with horizontal faces 13, which meet the vertical faces 14 to form right angular corners 15. Consequently, the links of each chain-like member are permitted to pivot in one direction only, namely away from the center line of the column 3, but are prevented from so doing by the action of the other member, whereby said members cooperate to form in effect a single rigid column. Thus by providing two of such mutually cooperating members, in back-to-back relation, such as I propose to use in forming the column 3, it is impossible to permit the column to flex in either direction away from the center line thereof. That is by placing these members together or back to back, each serves as a preventive against the pivotal movement of the links of the other in the direction of their movement, which is otherwise possible when these members are separated from each other.

The two upper links designated 16 are 95 pivotally connected to a block 17 to which the platform 6 or some similar member is attached. The exact method of attaching the platform 6 to the block 17 is not essential to the present invention, but I have illustrated, however, depending flanges 18 laterally embracing the block 17, with bolts 19 passing through the flanges and block to lock the same securely together.

Worm teeth 20 may be provided in one of the lateral sides of the links 8 to be engaged by a worm 21 driven by a motor 22 suitably mounted on the under side of platform 1.

A pair of integrally formed bearing brackets 23 is provided on one side of the post 2 for carrying a driving shaft 24 to which the worm 21 is rigidly fixed. A bevel gear 25 is secured to the lower end of shaft 24, for meshing with a second bevel gear 26 disposed at right angles thereto and mounted at one end of a transverse or horizontal driving shaft 27. Shaft 27 preferably extends to the opposite side of the machine and is supported at this end in a journal bracket 28 mounted upon base 1. At this end of shaft 27 a pulley 29 is suitably mounted and is adapted to be driven by a belt 30 extending downwardly and entraining over a second pulley 31 at the end of a motor shaft of motor 22. 125

Between the pulley 29 and the journal bracket 28 a clutch 32 may be provided for disengaging the drive between the pulley 29 and the horizontal driving shaft 27. However, the particular location of clutch 32 is 130

immaterial, and therefore, may be provided at any other desirable place.

A pair of brackets 33 suitably secured to the base 1 is provided at each end of the machine for supporting, in rotatable relation, the drums 4. I do not desire to stress the particular manner in which these drums are to be mounted, but I have found that it is preferable to have them in alignment with column 3. As shown in Fig. 5, the lowermost link of each of the chain-like members 9 is adapted to be secured to the drum at 33, so that when the drums 4 are rotated these chain-like members may be wound upon the same.

A pulley 34 is fixed upon the horizontal shaft 27. About the pulley 34 a belt 35 is trained for driving a pulley 36 fixed to one end of a shaft 37 upon which the right hand drum 4 is mounted. A second pulley 38 is fixed to said shaft 37 for transmitting the drive, by means of a belt 39, to a pulley 40 fixed to the same end of a shaft 41 upon which the left hand drum 4 is mounted. Thus a common drive is provided, which may be controlled by means of a lever 42 connecting with a pair of clutches 43, each of which is mounted upon one side of one of the drums 4. This control permits the rate at which the column is raised or lowered to be regulated at will by the operator. Thus any slack occurring as the chain-like members 9 are wound upon or unwound from the drums, may be taken up by regulating the rotation of the drums 4 independently of the drive raising and lowering the column, said drive comprising the worm 21 which engages the worm teeth 20 formed in the sides of the links 8.

The vertical guide post 2 may be of any desirable construction. As is shown in Fig. 3, feet 45 are provided at the corners of the base 2 for securing the same to the base 1. As is shown in the top plan view in this figure, the column 3 passes through a cross-shaped guideway 46 formed in this post. I have found that post 2 will embrace the column 3 sufficiently by this arrangement to permit the column to be extended any desirable distance for elevating the platform 6 to different levels.

Within a practical range there is no limit to the height to which platform 6 may be extended. This entirely depends upon the size of the machine as a whole and upon the strength of the links 8 forming the column 3.

As shown in Fig. 2, the platform 6 may extend outwardly from one side of the machine so that the objects carried upon the platform may be conveniently unloaded. This permits the hoist to be moved alongside of the receiving platform and the platform 6 to be brought adjacent thereto. A supporting structure such as has been shown in Fig. 2 in dotted lines, may be extended from

this side of the hoist to brace the same as the result of the platform protruding from said side and tending to cause the machine to tip in this direction.

I wish to emphasize that the construction just described, as well as the manner of mounting the drums 4, the column 3 and the motor 22 may be varied without departing from the scope of this invention.

It is believed that the structural principle underlying this invention, its fundamental theory, and the merits and advantages which it possesses will be clear to those skilled in this art without further detailed description or elaboration of other equivalent specific forms in which the invention may find expression.

Hence without limiting the invention to any or all of the particular embodiments thereof herein selected for purposes of illustration and description, I claim—

1. In a hoist of the class described, in combination, a supporting base, drums upon said base, an extensible column comprising a pair of chain-like members each flexible in one direction only and adapted to be wound upon said drums, a drive for said drums, and control means for regulating the speed of said drums independently of said drive for controlling the slack in said chain-like members.

2. In a hoist of the class described, in combination, a supporting base, drums upon said base, an extensible column comprising a pair of chain-like members each flexible in one direction only and adapted to be wound upon said drums, the direction of each chain-like member being opposite to that of the other member, a drive for said drums, and control means for regulating the speed of said drums independently of said drive for controlling the slack in said chain-like members.

3. In a hoist of the class described, in combination, a supporting base, drums upon said base, an extensible column comprising a pair of chain-like members adapted to be wound upon said drums but rigidly interlocking into a unit when brought in parallel relation to each other, driving means for operating said drums, and control means for regulating the speed of said drums.

4. In a hoist of the class described, in combination, a supporting base, drums upon said base, an extensible column comprising a plurality of links forming chain-like members arranged in parallel relation, and a gear in common driving engagement with the opposite links of said chain-like members whereby to raise and lower the same in unison with each other.

5. In a hoist of the class described, in combination, a supporting base, drums upon said base, an extensible column comprising a plurality of links forming chain-like mem-

bers arranged in parallel relation, teeth formed on the same side of said links, and a single gear engaging said teeth for driving said chain-like members.

5 6. In combination with a base for carrying a hoisting mechanism, a post on said base, an extensible column comprising a pair of chain-like members interlocking to form a rigid upright when brought in parallel
10 relation to each other, said post being provided with a central opening of substantially the same cross section as that of said extensible column, said extensible column adapted to move through said opening and
15 to be guided by said post, teeth on said chain-like members, and a driving gear supported at one side of said post for engagement with said teeth.

20 7. In combination with a base for carrying a hoisting mechanism, a post on said base, an extensible column comprising a pair of chain-like members interlocking to form a rigid upright when brought in parallel relation to each other, bearings at the side
25 of said post and an opening in said post between said bearings, a gear supported by a

shaft carried in said bearings, the periphery of said gear extending through said opening for meshing engagement with said chain-like members, a gear at one end of said shaft, a counter-shaft having a gear thereon for driving engagement with said first gear, and means for driving said countershaft.

8. In combination with a base for carrying a hoisting mechanism, a post on said base, an extensible column guided on said post, said extensible column comprising a pair of chain-like members interlocking to form a rigid upright when brought parallel
40 to each other, drums upon which said chain-like members are adapted to be wound, cross shafts for said drums, means for driving said cross shafts, and frictional clutch members serving as take-up mechanisms associated
45 with each drum whereby to vary the drive of either shaft for controlling the rotation of said drums.

In witness whereof, I have hereunto subscribed my name.

FRANS OSCAR LARSON.