Aug. 25, 1925. 1,551,426

R. PAVELLA

HOIST

Filed Jan. 15, 1923 2 Sheets-Sheet 1

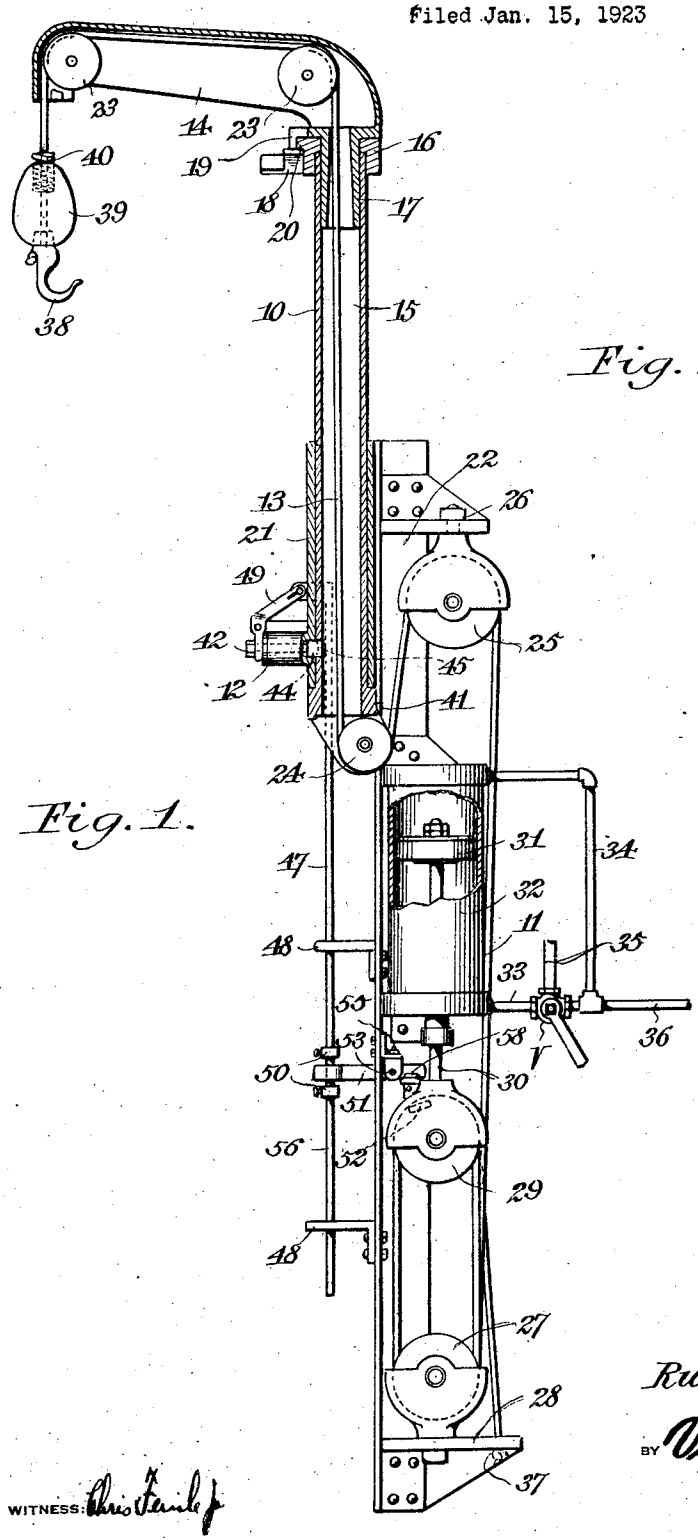


Fig. 1.

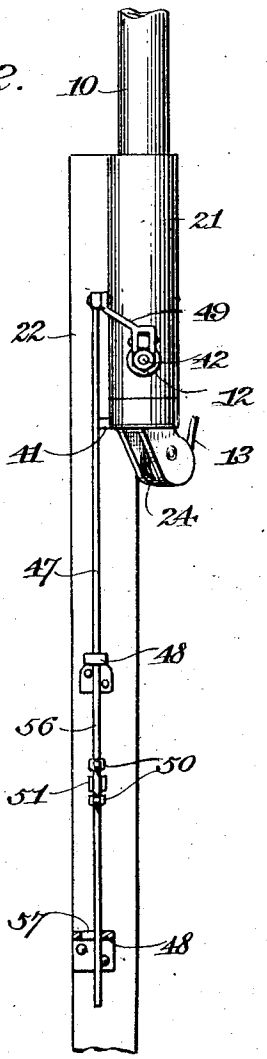


Fig. 2.

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Fig. 3.

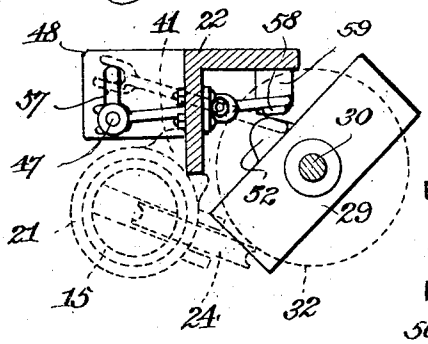


Fig. 4.

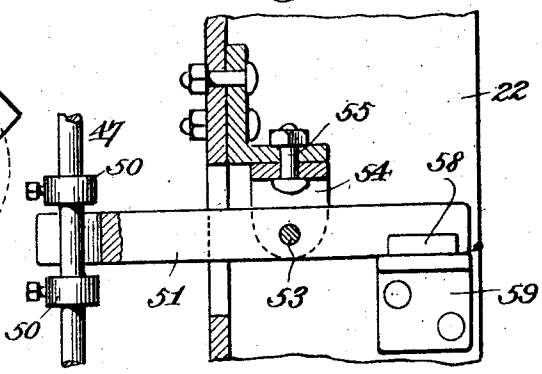


Fig. 5.

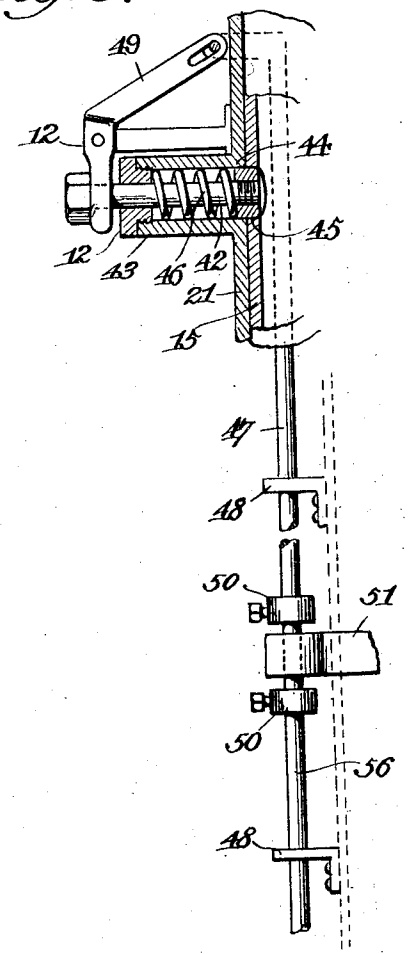


Fig. 6.

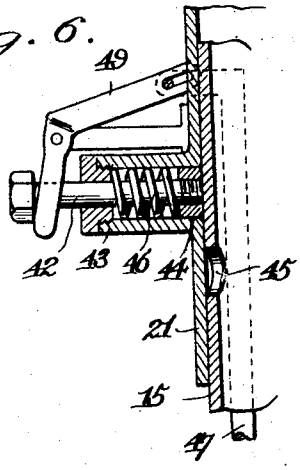
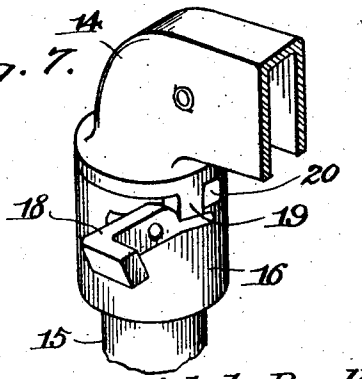


Fig. 7.



WITNESS

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UNITED STATES PATENT OFFICE.

RUDOLPH PAVELLA, OF BROOKLYN, NEW YORK.

HOIST.

Application filed January 15, 1923. Serial No. 612,606.

To all whom it may concern:

Be it known that I, RUDOLPH PAVELLA, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Hoists, of which the following is a specification.

This invention relates to hoists.

Some of the objects of the present invention are: to employ a crane, means for raising and lowering the crane including a flexible cable or the like, and means for holding the crane in a raised position and for releasing said crane to be lowered; to employ means automatically operable to hold the said crane in a raised position; to employ a flexible cable or the like as a part of a hoist for raising and lowering a load which also serves in the raising and the lowering of the crane which is a part of the hoist; and with these and other objects in view the invention resides in the particular provision, relative disposition, and the functions of the parts hereinafter fully described and illustrated in the accompanying drawing, in which:

Figure 1 is a sectional elevation of the hoist of the present invention.

Figure 2 is a fragmentary side elevation.

Figure 3 is a sectional plan view.

Figure 4 is a detail sectional view on the line 4—4, Figure 1.

Figures 5 and 6 are detail views of features of the means for holding the crane in a raised position and for releasing the crane to be lowered.

Figure 7 is a perspective view of one of the detail features.

Referring now more particularly to the several views of the drawings, it will be apparent that, the hoist of the present invention, generally, comprises a crane 10, means 11 for raising and lowering the crane, and means 12 for holding the crane 10 in a raised position and for releasing the crane to be lowered. A flexible cable 13 or the like is employed to which a load to be raised and lowered with the hoist is directly connected and which also serves in raising and in lowering the crane 10.

The crane 10 comprises preferably two main sections, a section 14 and a section 15. The section 14 is hollow and the section 15 is tubular. A casting 16 is attached to the upper end of the section 15. The casting 16 has a central opening therein which receives the reduced part 17 of the section 14. It should now be manifest that the section 14 can turn on the section 15. In order to prevent the section 14 from turning on the section 15 there is provided a latch 18 which is pivotally connected to the casting 16, and this latch 18 coacts with a lug 19 on a portion of the section 14. The latch 18 is weighted and is normally in a position in which it confronts the lug 19. A second lug 20 on the casting 16 confronts the lug 19 to prevent turning of the section 14 in one direction; the latch 18 preventing turning in the opposite direction. The section 15 of the crane is disposed in a hollow cylindrical part 21 which is fixedly attached to a support 22 in the nature of an angle iron erected in the desired location so that the crane 10 may be raised up through and lowered down through an opening in a sidewalk over a basement as an instance of one of the uses of the hoist.

The means 11 comprises the cable 13, pulleys 23 carried by the section 14 of the crane, a pulley 24 carried by the section 15 at the lower end thereof, a sheave 25 carried by a bracket 26 attached to the support 22, a sheave 27 carried by a bracket 28 attached to the support 22, a sheave 29 at one end of a piston rod 30 whose piston 31 is arranged for movement in a cylinder 32 to which a fluid is admitted and from which the fluid is exhausted by pipes 33 and 34 which communicate with the interior of the cylinder 32, and a three-way control valve in communication with the pipes 33 and 34, and a supply pipe 35 and an exhaust pipe 36. The cable 13 is passed over the pulleys 23, under the pulley 24, over the sheave 25, under the sheave 27, over the sheave 29, then under the sheave 27 and over the sheave 29 a second time, and then having the extremity attached as at 37. The free end of the cable has a hook 38 and a weight 39 which carries a spring 40 which will at times engage a portion of the section 14 of the crane. A stop lug 41 at the lower end of the section 15 is confronted by the support 22 and prevents the crane from turning relatively to the part 21. It will be noted that the sheave 25 is disposed above the upper limit of movement of the pulley 24. The cylinder 32 is attached to the support 22 between the sheave 25 and the sheave 27. The arrangement of

the parts is such that the piston 31 may be dropped to the bottom of the cylinder 32 which brings the sheave 29 in proximity to the sheave 27 and at this time the crane 10 is in its lowered position and the hook 38 is in proximity to the basement floor. By admitting a fluid such as water or steam to the cylinder 32 in the operation of the valve V and through pipe 33, the piston 31 will move upwardly, and as a consequence the hook 38 at the end of the cable will move upwardly until the spring 40 encounters a portion of the crane section 14 whereupon the crane will move upwardly until the bolt of the means 12 springs into engagement with a portion of the crane section 15 whereupon the crane will be held against further movement in any direction.

When the sheave 29 is completely raised, the piston 31 to which the sheave is connected by the piston rod 30 is at the limit of its upward travel. In this position the load hook 38 is also at the limit of its upward travel, the single cable passing from the hook 38 over and under the several sheaves, and being drawn taut when in its position between said hook and the fixed anchorage 37 so that no further upward movement of the sheaves 29 is possible. The sheaves 27 and 29 are multiple sheaves and when sheave 29 is at the limit of its upward travel, the cable wound around these two groups of sheaves is that part of the cable which is payed out as the sheave 29 is lowered, and the part of the cable that has been payed out passes from the sheave 28 over the sheave 25, under the sheave 24, over sheaves 23 and continues down with the lifting hook 38 to the level of sheave 27, when the sheaves 27 and 29 will be together and the piston 31 will be at the limit of its downward movement of travel. When the crane is being raised or lowered the lifting hook 38 will be tight against the end of the crane arm 14, and the cable will lengthen or shorten between the sheaves 24 and 25 as sheaves 27 and 29 are brought upward or away from each other at the upward or downward travel of the piston 31.

The means 12 comprises a bolt 42 arranged in a casting 43 attached to the part 21 having a hole 44 therein which with a hole 45 in the crane section 15 is brought into registry; the bolt being actuated by a spring 46 and being movable into the hole 45 automatically when the hole 45 registers with the hole 44; and a rod 47 supported by members 48 and connected at one end to a pivoted forked lever 49 engageable with the bolt 42 behind its head, and the rod having nuts 50 between which one end of a member 51 having compound movement is disposed; the opposite end of said member being movable into and out of the path of movement of a lug 52 carried by the case of the sheave 29. The member 51 has compound movement inasmuch as it is pivoted as at 53 to a member 54 swivelled as at 55 in connection with a portion of the support 22. The portion 56 of the rod 47 below the top member 48 is flexible, and the lower extremity of the portion 56 is disposed in a slot 57 in the lowermost member 48; the portion 56 being of a normal tendency to hold member 51 in such a position that its free end will be out of the path of movement of the lug 52. When it is desired to have the free end of the member 51 in the path of movement of the lug 52 the member is moved by hand to bring the free end behind a stop 58 carried by member 59 attached to the support 22. It will now be manifest that when the free end of the member 51 is disposed in the path of movement of the lug 52 that, the latter, as the piston moves through a certain distance, will move the free end of the member 51 upwardly and its opposite end between the nuts 50 downwardly and likewise the rod 47 will be moved downwardly causing the lever 49 to move and as a result the bolt 42 will be withdrawn from the hole 45. The crane 10 is then free to move downwardly under its own weight and the weight carried by the cable. It is, of course, understood that the movement of the bar 51 into the path of movement 52 is accomplished by manually lifting the bar and placing it opposite of the lug 58 as previously mentioned, the same will then be in the path of movement of the member 52. The compound movement which is lateral and vertical of the bar 51, springs the lower part of the bar 47 out of vertical position and holds it in such position until the upward travel of the sheave 29 causes the parts 51 and 52 to engage each other to lift the bar to a position above the lug 58. Lowering of the sheave 29 will now cause the tension in the bar 47 to move the bar 51 back to normal position on the inside of the lug 58. During the process of hoisting, the bar 47 is in its normal vertical position and up and down movement of the sheave 29 will not withdraw the bolt 42, as parts 51 and 52 are out of the same path of vertical movement. The valve V of course is operated to allow the exhaust of the fluid beneath the piston; the said fluid passing through the pipe 33 through the valve to the exhaust pipe 36. The pipe 34 is employed to allow any fluid which might pass the piston 31 to be exhausted from the cylinder 32 to the exhaust pipe 36.

From the foregoing it will be manifest that; the crane 10 may be raised and lowered; the crane is raised by fluid pressure; the crane is automatically locked against movement in a raised position; the crane is prevented from turning while it travels up and down; the cable may be moved independently of the crane; and the crane is

brought down with means and under conditions controllable by one man in an easy manner.

What is claimed is:

1. In a hoist, a crane capable of being raised and lowered, and means automatically operable to hold the crane in an elevated position against movement, said means including a member having compound pivotal movement and being under the influence of a flexible part.

2. In a hoist, a crane capable of being raised and lowered, and means automatically operable to hold the crane in an elevated position against movement, said means including a movable rod having a flexible part, and a member mounted for compound pivotal movement under the influence of said flexible part and in engagement with portions thereof for effecting the movement of the rod when the member is moved.

3. In a hoist, a crane capable of being raised and lowered, and means for holding the crane in an elevated position against movement, said means comprising a spring actuated bolt which is engageable with a portion of said crane, a member having compound movement, and a motion transmitting connection between said spring actuated bolt and said member.

4. A hoist comprising a crane, means for raising and lowering said crane comprising a sleeve in which a part of said crane moves, pulleys carried by said crane, pulleys carried by relatively fixed parts, a fluid cylinder, a piston movable in said fluid cylinder, a pulley connected to said piston, a single cable which passes over all of said pulleys, which has one end attached and which has a portion engageable with a portion of said crane, a valve in communication with said fluid cylinder for controlling the flow of fluid to and from said fluid cylinder, and means for holding the crane in an elevated position.

5. A hoist comprising a fixedly mounted sleeve, a crane having a part thereof movable in said sleeve, a pulley on the lower end of the part of said crane which moves in said sleeve, a pulley carried by a relatively fixed part and disposed above the upper limit of movement of the pulley carried by the lower end of the part of the crane which moves in said sleeve, a cable which passes over said pulleys and having one end thereof attached and the opposite end thereof extending through said crane and a portion which engages a portion of said crane, and means for exerting a pull on said cable.

6. A hoist comprising a fixedly mounted sleeve, a crane having a part thereof movable in said sleeve, a pulley on the lower end of the part of the crane which moves in said sleeve, means for limiting the movement of the crane in opposite directions, a pulley carried by a relatively fixed part and disposed above the upper limit of movement of the pulley carried by the lower end of the part of the crane which moves in said sleeve, a cable which passes over said pulleys and having one end thereof attached and the opposite end extending through said crane and a portion which engages a portion of said crane, and means for exerting a pull on said cable.

7. A hoist comprising a crane, a flexible cable having a portion which engages a portion of said crane, means for paying out and taking up said flexible cable in the raising and lowering of said crane, means for holding said crane in a raised position, including a flexible part, said first means having a movable part, and said second means having a part movable into and out of the path of movement of said movable part in effecting the lowering of said crane, said last part having a compound pivotal movement for co-action with said flexible part.

8. A hoist comprising a crane capable of being raised and lowered, a weighted flexible cable having a portion which engages a portion of said crane in the raising thereof, means for paying out and for taking up said cable in the lowering and raising of said crane, means for holding said crane in a raised position and for releasing said crane to be lowered, said first means having a movable part, said second means including a part having a compound pivotal movement capable of being moved into and out of the path of movement of said movable part to operate the said means for holding the crane in a raised position and for the release of said crane to a lowered position.

9. A hoist comprising a crane capable of being raised and lowered, a weighted flexible cable having a portion which engages a portion of said crane in the raising thereof, means for taking up and for paying out said cable in the raising and lowering of said crane, a spring actuated bolt movable into and out of engagement with a portion of said crane and serving to hold said crane in a raised position when in engagement with the portion of said crane, a motion transmission connection including a rod connected to said spring actuated bolt, a member having compound pivotal movement, the said rod having a flexible part which normally holds said member in a certain position, said first means having a movable part, the said member being movable into the path of movement of said movable part, and means for holding the member out of the path of movement of said movable part.

10. A hoist comprising a crane, means for raising said crane, means for holding said crane in an elevated position while said hoist is operated, means for operating said hoist, means for releasing said crane from

said elevated position, and means for lowering said crane, all of said means co-operating through the simultaneous movement of a single continuous cable.

11. In a hoist, the combination of a crane, a single cable, means for raising and lowering said hoist by said cable while said crane is in a stationary position, means for holding said crane in a raised position, and means for releasing said crane from said raised position, said last two means being controlled by said first means.

In testimony whereof I hereby affix my signature.

RUDOLPH PAVELLA.