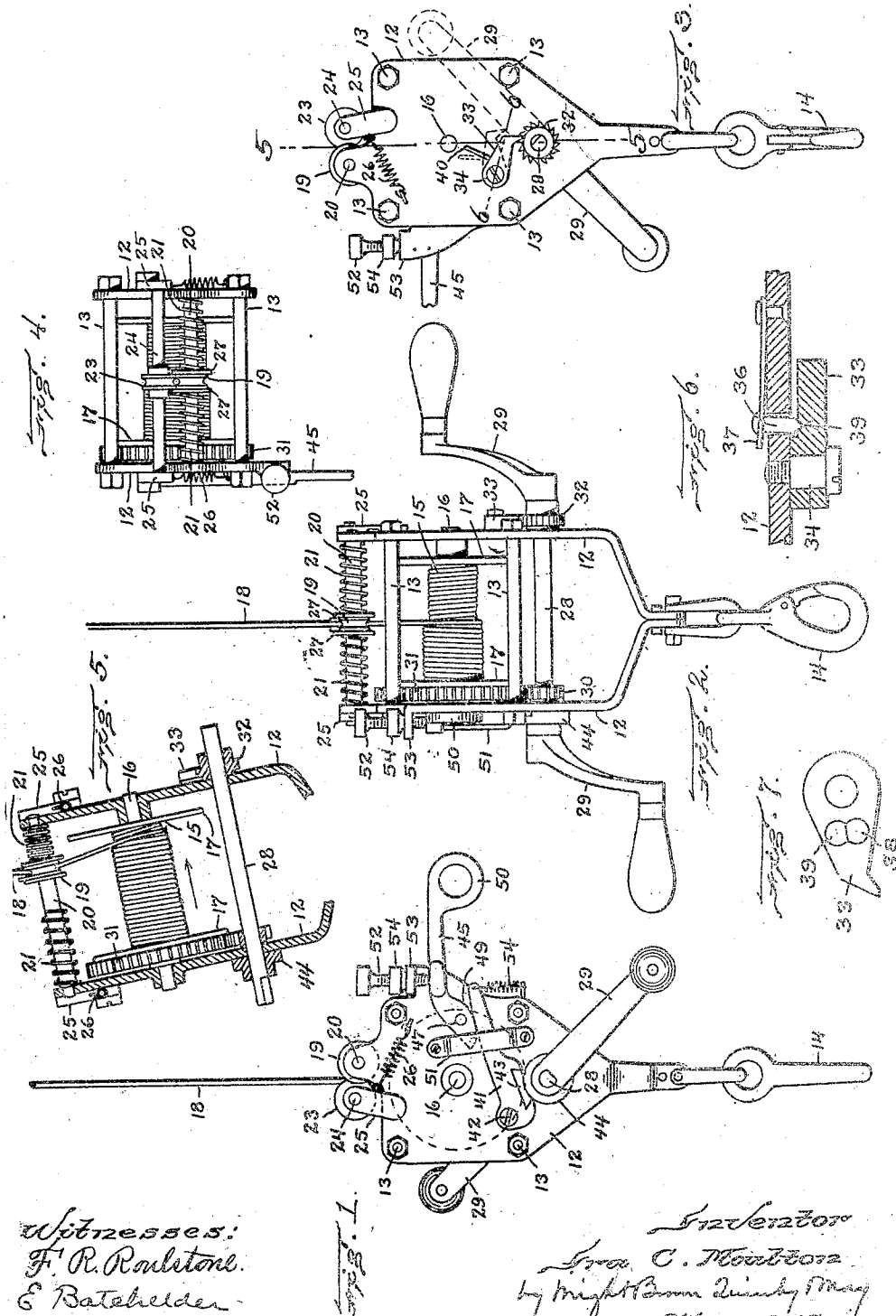


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HOISTING APPLIANCE.
APPLICATION FILED JUNE 15, 1908.

941,722.

Patented Nov. 30, 1909.



Witnesses:
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UNITED STATES PATENT OFFICE.

IRA C. MOULTON, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO SIMPLEX SELF-HOISTING MACHINE COMPANY, OF BOSTON, MASSACHUSETTS,
A CORPORATION OF MASSACHUSETTS.

HOISTING APPLIANCE.

941,722.

Specification of Letters Patent.

Patented Nov. 30, 1909.

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To all whom it may concern:

Be it known that I, IRA C. MOULTON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Hoisting Appliances, of which the following is a specification.

This invention has for its object to provide an appliance whereby an individual may be suspended from an elevated point, and may conveniently and safely raise and lower himself to any extent desired, the appliance being adapted particularly for the use of painters working on the vertical sides of buildings.

The invention is embodied in an appliance comprising a frame having means for engaging a sling or other support for the individual suspended, a drum journaled in bearings on the frame, a suspending rope engaged at one end with the drum, and adapted to be engaged at its upper end with an elevated support, mechanism carried by the frame and adapted to be worked by the individual supported by the frame to rotate the drum, and thus wind or unwind the rope, and means for compensating for inclinations of the drum due to the approach of the suspending portion of the rope to one end or the other of the drum, such inclination having a tendency to cause the separation of the convolutions of the rope, and therefore to prevent the winding of the rope in compact courses or helical coils on the drum.

The invention is also embodied in an appliance characterized as above stated, and provided with improved means for retarding the rotation of the drum when the device is used to lower the supported individual, and improved means for arresting the downward movement of the appliance, and holding it at any predetermined height desired.

The invention consists in the several improvements which I will now proceed to describe and claim.

Of the accompanying drawings forming a part of this specification, Figure 1 represents an end elevation of an appliance embodying my invention. Fig. 2 represents a side elevation of the same. Fig. 3 represents an elevation of the opposite end of the appliance from that shown in Fig. 1. Fig. 4 repre-

sents a top plan view of the appliance. Fig. 5 represents a section on line 5—5 of Fig. 3. Fig. 6 represents a section on line 6—6 of Fig. 3. Fig. 7 represents a side view of the inner side of the locking pawl shown in Fig. 3.

The same characters of reference indicate the same parts in all the drawings.

My improved appliance comprises a supporting frame which may be of any suitable construction, which as here shown comprises two side pieces 12 connected by suitable bolts 13, and connected at their lower ends to form a hanger to which is connected a snap hook 14, or other suitable device to engage the load to be supported by the appliance. In case the appliance is used singly to support the body of a workman, the snap hook 14 may engage a sling, and in case a pair of appliances are used to support a platform or scaffold, each of the hooks 14 may be suitably engaged with the platform.

15 represents a drum, the shaft 16 of which is journaled in bearings in the side portions of the frame, the end portions of the drum being provided with flanges 17 between which are wound convolutions of a supporting rope 18, one end of which is suitably secured to the drum, its other end being adapted to be secured to an over-head support. I use the term rope to indicate any suitable flexible suspending device adapted to be wound upon the drum, said device being of any suitable material, preferably wire strands formed into a wire rope or cord, although, if desired, the part here termed a rope may be composed of metal links constituting a chain. The drum is of sufficient length to permit the rope to be wound in a number of convolutions between the flanges 17, the suspending part of the rope progressing from end to end of the drum while the rope is being wound and unwound.

By reference to Figs. 2 and 5, it will be seen that when the suspending portion of the rope is at the central portion of the drum, or about midway between the flanges thereof, the appliance hangs in a substantially vertical position. As the suspending portion of the rope approaches either end of the drum, the center of gravity changes, and the frame is tilted, as indicated in Fig. 5. The inclination of the drum caused by the tilting of the frame has a tendency to cause the convolu-

tions of the rope to separate from each other as they approach the higher end of the drum. To counteract this tendency and compensate for the inclinations of the drum, so far as the compact winding of the rope on the drum is concerned, I provide means for yieldingly opposing the separation of the convolutions, so that, instead of being separated from each other when the drum is inclined, they remain in close contact with each other until the last convolution comes in contact with the flange 17 at the higher end of the drum, this contact causing the convolutions to progress toward the opposite end of the drum.

The means here shown for yieldingly opposing the separation of the convolutions of the rope as they approach the higher end of the drum comprise, first, a traveler 19 which is engaged with the suspending portion of the rope immediately above the drum; secondly, a guide 20 on which said traveler is movable in a direction parallel with the axis of the drum; and third, springs 21, 21 mounted on the guide at opposite sides of the traveler, and adapted to be compressed by movements of the traveler toward the ends of the drum. The traveler 19 is preferably a loose pulley having a grooved periphery, the side of which engages the suspending portion of the rope, the guide 20 being a cylindrical rod affixed at its ends to the sides of the frame, the rod extending parallel with the axis of the drum. The springs 21 are preferably helical wire springs mounted on the rod 20, the outer ends of the springs bearing against the sides of the frame, while their inner ends are separable from the traveler.

It will be seen that when the convolutions of the rope on the drum are progressing in the direction indicated by the arrow in Fig. 5, the traveler leaves one of the springs and compresses the other, the compressed spring yieldingly opposing the movement of the suspending portion of the rope in the direction indicated, and thus maintaining the convolutions in close contact with each other upon the higher end of the inclined drum. When the rope comes in contact with the flange 17 at the higher end of the drum, the convolutions commence to progress in the opposite direction, and when they have passed the longitudinal center of the drum, the traveler commences to compress the other spring, which, in turn, acts to prevent the separation of the convolutions approaching the corresponding end of the drum. In this way the compact winding of the rope upon the drum is insured, the convolutions being laid in uniform parallel courses upon the drum.

The suspending portion of the rope is held in engagement with the grooved periphery of the traveler 19 by means of a retaining

pulley 23, which is loosely mounted on a secondary guide rod 24 mounted in swinging arms 25 which are pivoted to the frame, and are controlled by springs 26 which act to hold the retaining pulley 23 in engagement with the traveler 19. The traveler is provided with flanges 27 (Fig. 4) which overlap the sides of the retaining pulley 23, and thus cause the retaining pulley to move lengthwise of the drum with the traveler. Provision is thus made for separating the retaining pulley from the traveler whenever this is desirable.

The retaining pulley 23 acts to hold the rope in the groove of the traveler 19 and keeps it there in spite of the fact that the resistance of the springs 21 to endwise movement of the traveler causes the rope to be sometimes deflected as shown in Fig. 5. Without some means to so hold the rope, the latter would be very liable to slip out of engagement with the traveler when the latter is held back by a spring 21 as shown in said Fig. 5. The pulley 23 always shifts along its guide rod 24 as the traveler moves, owing to the overlapping of the flanges of the two pulleys as shown in Fig. 4. A further function of the pulley 23 is to coact with the traveler pulley as a tension on the rope which keeps the cable taut on the drum when not in use. This is caused by the springs 26 acting on the arm 25 to press the pulley 23 against the cable interposed between the pulleys 23 and 19, and thus prevent endwise movement of the wire rope 18 between the pulleys, such as might be caused by an effort of the portion of the rope wound upon the drum to expand when the device is not in use. A wire rope coiled closely on a drum constitutes a helical spring having a constant tendency to expand. This tendency would enlarge the diameter of the convolutions of the coil adjacent to the straight stretch of the rope, and in doing this would tend to move the straight stretch of rope lengthwise between the pulleys. The pressure of the pulleys against the rope, due to the springs 26, is sufficient to prevent this endwise movement of the rope and enlargement of the adjacent convolutions of the coil when the device is not in use.

28 represents an operating shaft journaled in the sides of the frame, and provided at its ends with cranks 29, whereby an individual shaft supported by the appliance may rotate the shaft which is provided with a small gear 30 meshing with a larger gear 31 affixed to the drum or to its shaft.

32 represents a ratchet affixed to the shaft 28, and 33 represents a pawl pivoted at 34 to one of the sides of the frame, and adapted to engage the ratchet 32. Means are provided for locking the pawl 33 either in engagement with the ratchet, as shown by full lines in Fig. 3, or out of engagement with

the ratchet, as shown by dotted lines, said means comprising a pin 36 movable in an orifice in one of the sides 12, and controlled by a spring 37 which presses the pin against the inner side of the pawl 33. The pawl is provided with two adjacent cavities 38 and 39 (Fig. 7), each shaped to fit the end of the pin 36. When the pin is engaged with the cavity 39, it locks the pawl in engagement with the ratchet. When the pin is engaged with the cavity 38, it locks the pawl in a position elevated above the ratchet. The pawl is provided with a handle 40 whereby it may be moved to engage either of its cavities with the pin.

41 represents a brake lever pivoted at 42, and provided with a brake shoe 43 of vulcanized fiber or other suitable material adapted to bear on a disk 44 affixed to the shaft 28. 45 represents an auxiliary brake lever pivoted at 47 to the frame, and provided with a cam face 49 bearing on the outer end portion of the brake lever 41. A pendent cord or handle may be engaged with an eye 50 at the outer end of the lever 45, said handle extending downwardly within reach of the operator, who is enabled by pulling the handle to effectively apply the brake shoe to the disk 44, through the compounding of the levers 45 and 41.

51 represents a confining bar attached to the frame and overlapping portions of the brake levers 41 and 45 to prevent their lateral displacement.

The described appliance may be used as a fire escape, if desired, the compound brake levers enabling a person supported by the appliance to so regulate his descent from an elevated point that the descent may be made with entire safety. The auxiliary brake lever 45 is shown in Fig. 1 as in its uppermost position but it may be forced down and held down in operative engagement with the lever 41 by means of a set screw 52 engaged with a tapped ear 53 on the supporting frame, and bearing on the lever 45. 54 represents a lock nut engaged with the screw 52. The set screw 52 enables a regulated pressure to be constantly applied to the brake shoe 43, when the appliance is used as a fire escape, the screw being adjustable so that the pressure may be adjusted to the load.

I prefer to maintain a light pressure of the brake shoe on the disk 44 by means of a spring 54 to prevent backward rotation of the drum when the pawl 33 is disengaged from the ratchet. When a wire rope is employed, its convolutions have a tendency to act as a spiral spring and rotate the drum

backwardly to a limited extent, thus loosening the convolutions on the drum, when the pawl is disengaged from the ratchet. This tendency is overcome by the constant light pressure maintained on the brake shoe by the spring 54.

I claim:

1. An appliance of the character stated comprising a frame, a drum journaled in bearings therein, a suspending rope engaged with the drum, mechanism carried by the frame for rotating the drum, a traveler engaging the rope above the drum and movable lengthwise of the latter, and a roll mounted to engage the traveler and to move laterally therewith, means being provided for yieldingly holding said roll against the rope to exert tension on the latter and hold it in engagement with the traveler.

2. An appliance of the character stated comprising a frame, a drum journaled in bearings therein, a suspending rope engaged with the drum, mechanism carried by the frame for rotating the drum, a traveler engaging the rope above the drum and movable lengthwise of the latter, means for yieldingly resisting the movement of the traveler toward the end of the drum to prevent the separation of the convolutions of the rope on the end portions of the drum, and a yieldingly mounted roll engaging the traveler and movable laterally therewith to hold the rope in engagement with the traveler and to exert tension on said rope.

3. An appliance of the character stated comprising a frame, a drum journaled in bearings therein, a suspending rope engaged with the drum, mechanism carried by the frame for rotating the drum, a guide above and adjacent to the drum and substantially parallel with its axis, a traveler composed of a grooved idle pulley engaged with the rope and movable on the guide, springs supported by the guide at opposite sides of the traveler and adapted to be compressed by movements of the latter, a roll mounted to move toward and from said traveler and movable laterally therewith, and spring mechanism for holding said roll in contact with the rope to hold said rope in engagement with the traveler and to exert tension on said rope.

In testimony whereof I have affixed my signature, in presence of two witnesses.

IRA C. MOULTON.

Witnesses:

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P. W. PEZZETTI.