March 6, 1934. J. M. BENSON 1,950,288

SCAFFOLD HOIST

Filed March 22, 1933 2 Sheets-Sheet 1

Fig. 1.

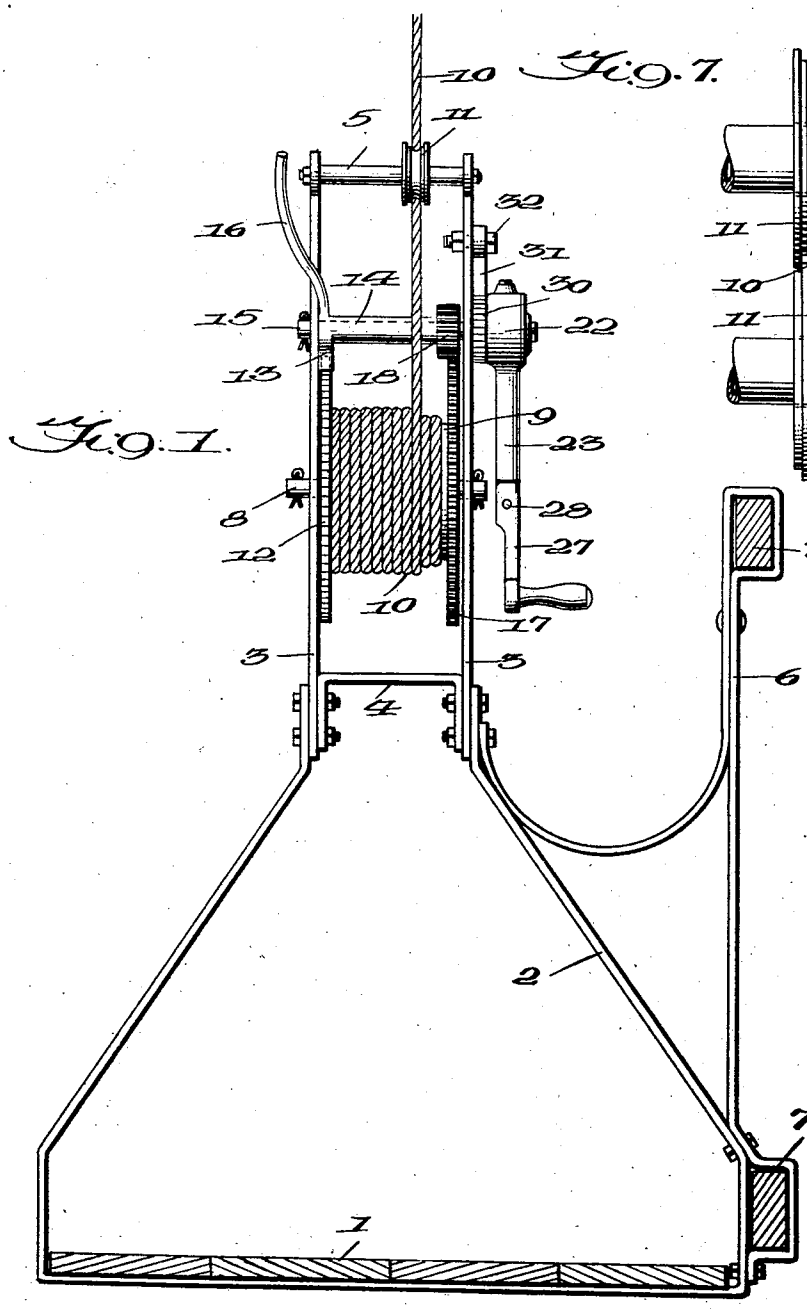
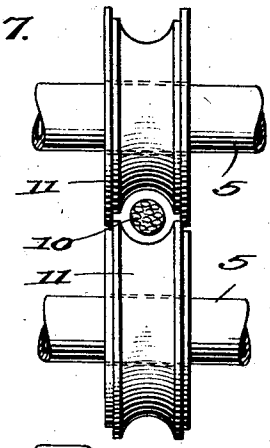


Fig. 7.



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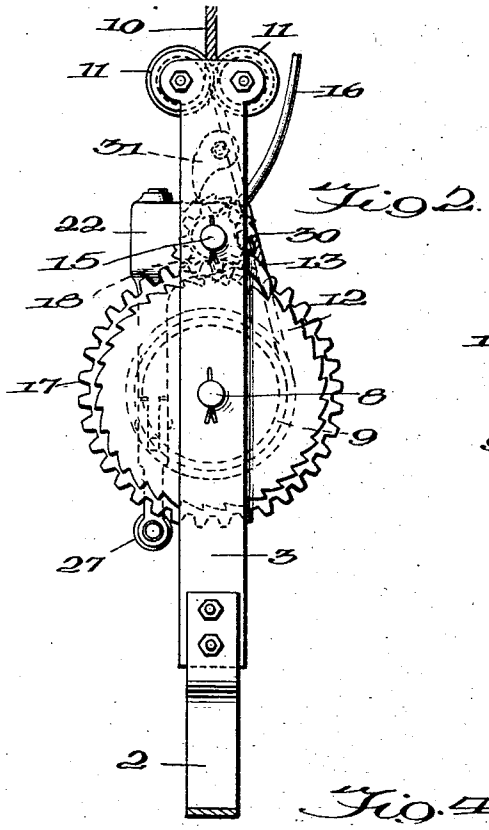


Fig. 2.

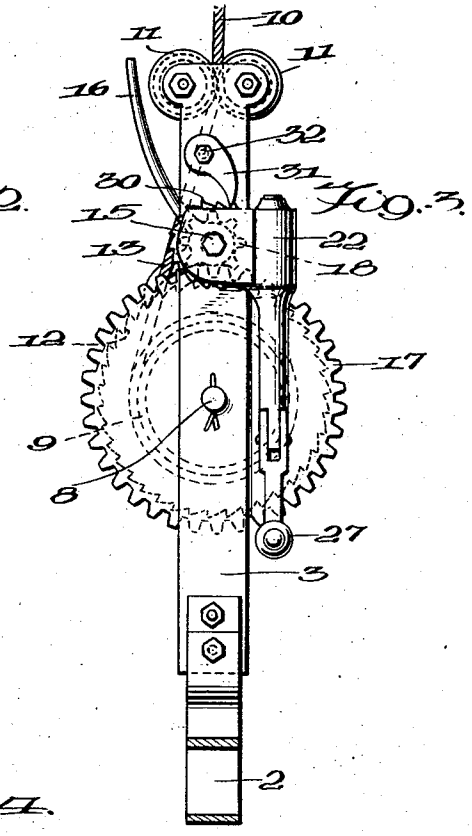


Fig. 3.

Fig. 4.

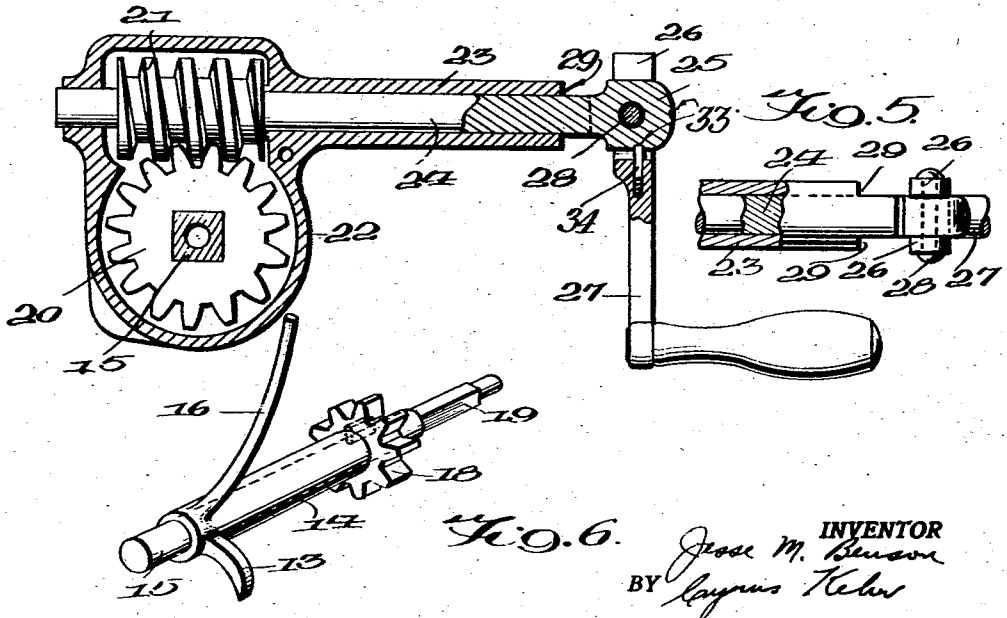


Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE

1,950,288

SCAFFOLD HOIST

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Application March 22, 1933, Serial No. 662,171

21 Claims. (Cl. 254—167)

This invention relates to an improvement in scaffold hoists as used for suspending a scaffold from a building.

The object of this invention is to provide a secure hoist which may be used to raise or lower the scaffold platform but without the danger of so disconnecting the hoist that the platform may drop and thereby injure the workmen. My invention is absolutely safe against the danger of the hoist becoming accidentally disengaged and thereby permitting the platform to fall. Improved means are also provided for operating the hoists, permitting the use of the same operating handle either for raising or lowering the scaffold, but the handle is adapted to be moved to different positions in the raising and lowering operations, so that in one position it operates a worm to lower the hoist, while in the other position, the entire worm structure serves to rotate a spur gear used to wind up the cable on the drum. I have developed a new form of handle structure for performing these operations, so as to permit of the double use of the one operating handle.

In the accompanying drawings,

Fig. 1 is a side elevation of my improved scaffold structure taken from an end of the scaffold;

Fig. 2 is a similar view at right angles thereto;

Fig. 3 is a view similar to Fig. 2 taken from the opposite side of the scaffold;

Fig. 4 is a sectional view partly in side elevation through the handle structure;

Fig. 5 is a detail sectional view therethrough at right angles to Fig. 4;

Fig. 6 is a perspective view of the operating shaft, gear, and pawl; and

Fig. 7 is a detail plan view of the interfitting guide rollers for the cable.

The scaffold comprises the usual platform 1, each end of which is carried by a hanger 2 suspended from the lower ends of side plates 3. A brace 4 extends between the lower ends of said side plates, while the upper ends thereof are secured in spaced relation by spacing rolls 5. The hanger 2 has a guard frame 6, secured thereto carrying a guard rail 7, which extends along the outer side of the platform 1, in order to prevent workmen from falling off of the platform.

A shaft 8 is mounted in the side plates 3, on which shaft is journaled a drum 9 on which is wound one end of a cable 10, the other end of which is adapted to be secured to an upper portion of a building in the usual way. The cable 10 extends between interfitting guide rolls 11, slidably and rotatably mounted on the spacing rolls 5.

One end of the drum 9 has a ratchet wheel 12 fixed thereto. A pawl 13 is arranged in position to engage the teeth of the ratchet wheel 12. The pawl 13 is carried by a sleeve 14 journaled on a shaft 15 and mounted in the side plates 3, and an arm 16 is also connected with the sleeve 14 in order to turn the pawl 13 out of its engaging position when desired.

At the opposite end of the drum 9 from the ratchet wheel 12, is a spur gear 17 fixed to the drum and meshing with a pinion 18 keyed to the shaft 15, so as to be rotated upon turning of said shaft. The shaft 15 has a squared end 19 on which is mounted a worm gear 20, meshing with a worm 21, said worm and worm gear being journaled within a housing 22 having a tubular portion 23, at one side thereof, which portion has a shaft 24 journaled therein. One end of the shaft 24 is attached to the worm 21 while the other end of said shaft extends through the tubular portion 23 of the casing 22, and has an enlarged head 25, receiving a bifurcated end 26 of a handle 27. A pivot 28 connects the head 25 with the arms forming the bifurcated portion 26 of the handle. The outer end of the tubular portion 23 is cut away on diametrically opposite sides, as at 29, to receive the arms 26, when the handle 27 is turned to a position in alignment with the sleeve 23, as shown in Figs. 1 and 3, in which position the handle 27 is interlocked with the sleeve, while it is disconnected therefrom when turned to the position shown in Fig. 4, in which position it may rotate the shaft 24.

Fixed to one side of the casing 22 is a ratchet wheel 30 in position to be engaged by a pawl 31 pivotally mounted on the outside of one of the plates 3, by a bolt 32.

My invention is used in the usual manner of suspending scaffolds from a building, namely, by securing the cables 10, one or more of which would be at each end of the platform 1, to the top of the building or other upper portion thereof. With the handle 27 positioned as shown in Figures 1, 2 and 3, by turning said handle, in a clockwise direction, which will also turn the sleeve 23 and casing 22 and the worm 21 housed therein bodily about the axis of the shaft 15, rotation in a clockwise direction is imparted to the shaft 15 and the pinion 18 resulting in counter-clockwise rotation of the gear 17, and drum 9, serving to wind up the cable on said drum, and thereby raise the platform 1. During this raising action, the pawls 13 and 31 ride over the

teeth of the ratchet wheels 12 and 30, but are in such positions as to prevent movement of the drum 9 in the opposite direction, if the handle 27 should be turned loose accidentally.

When it is desired to lower the scaffold, the handle 27 is shifted to the position shown in Fig. 4, where its bifurcated arms 26 are disengaged from the cut away portion 29 of the sleeve 23. With the handle moved to the position stated the operator should move the arm 16 to disengage the pawl 13 from the teeth of the ratchet wheel 12, and holding said arm 16 with one hand, rotate the handle 27 to the left or counter-clockwise, which turns the worm 21 causing it to impart slow rotation to the worm wheel 20, the shaft 15 and pinion 18 in a counter-clockwise direction, and causing the gear 17 and drum 9 to rotate in a clockwise direction, and thereby unwind the cable 10, which action lowers the platform. Obviously the pawl handle 16 may be held out of engagement by a simple latch or other mechanical means instead of being hand held, if desired.

If desired, the enlarged head 25 of the extension of the shaft 24 may be equipped with recesses 33 for cooperating with the spring-pressed detent 34 carried by the handle 27 in releasably securing said handle in either of its positions of adjustment shown respectively in Figures 1 to 3 and in Figure 4.

The weight of the platform cannot turn the drum, because the worm 21 serves as a lock, and the ratchet wheel 30 and pawl 31 prevents turning of the casing 22 in backward direction and act as a safety, even when the pawl 13 should be disengaged. The use of the handle 27 turning the casing 22 in winding up the cable is desirable, since it expedites the raising operation, but the drum is held against accidental turning in the opposite direction by the pawls 13 and 31. This structure permits the same operating handle to be used either for raising or lowering of the hoist without danger of falling, merely by shifting it to its different positions. If desired, the worm may be used for both raising and lowering operations instead of merely for the raising operation, as mentioned above.

While I have described my improvements in connection with a hoist for a scaffold, nevertheless, it will be understood that my invention may be applied to other types of hoists which are normally operated manually, and it is not intended that the invention is limited merely to use with scaffolds.

I claim:

1. In a hoist, the combination with a winding drum, of means for operating said drum comprising gearing adapted to be rotated and having operative connection with the drum, a casing enclosing the gearing, and means mounting the casing for bodily turning movement about the axis of at least some of the gearing for imparting rotation to the drum.

2. In a hoist, the combination with a winding drum, of means for operating said drum comprising gearing adapted to be rotated and having operative connection with the drum, a casing enclosing the gearing, means mounting the casing for bodily turning movement about the axis of at least one of the gears of said gearing, and manually actuated means connected with the casing for bodily turning the casing to operate the gearing and the drum.

3. In a hoist, the combination with a winding drum, of means for operating said drum comprising gearing having operative connection therewith, a casing enclosing at least part of the gearing, means rotatably mounted in the casing for turning the gearing, and means mounting the casing for bodily turning movement to impart turning movement to at least part of the gearing for operating the winding drum.

4. In a hoist, the combination with a winding drum, of means for operating said drum comprising gearing having operative connection therewith, a casing enclosing at least part of the gearing, means rotatably mounted in the casing for turning the gearing, means mounting the casing for bodily turning movement to impart turning movement to at least part of the gearing for operating the winding drum, and a handle connecting with the casing for bodily turning said casing manually.

5. In a hoist, the combination with a winding drum, of means for operating said drum comprising a shaft operatively connected with the drum, a gear mounted on said shaft, a cooperating gearing element meshing with said gear, a casing supporting said cooperating gearing element, means for rotating said cooperating gearing element, and means mounting said casing for turning movement of the coperating gearing element bodily about the axis of the shaft.

6. In a hoist, the combination with a winding drum, of means for operating said drum comprising a shaft operatively connected therewith, a gear mounted on the shaft, a cooperating gearing element meshing with the gear, a shaft carrying said cooperating gearing element, a casing supporting said shaft and cooperating gearing element, and means mounting the casing for turning movement of the cooperating gearing element bodily about the axis of the first-mentioned shaft.

7. In a hoist, the combination with a winding drum, of means for operating said drum comprising a shaft operatively connected therewith, a gear mounted on the shaft, a cooperating gearing element meshing with the gear, a shaft carrying said cooperating gearing element, a casing supporting said shaft and cooperating gearing element, means mounting the casing for turning movement of the cooperating gearing element bodily about the axis of the first-mentioned shaft, and a handle connected with the second-mentioned shaft for rotating said second-mentioned shaft and cooperating gearing element about the axis thereof, said handle being adjustable to a different position for bodily turning the casing.

8. In a hoist, the combination with a winding drum, of means for operating said drum comprising a shaft operatively connected therewith, a gear mounted on said shaft, a worm meshing with said gear, and means mounting the worm for rotation about its axis and for bodily turning movement about the axis of the shaft for turning the shaft to operate the drum.

9. In a hoist, the combination with a winding drum, of means for operating said drum comprising a shaft operatively connected therewith, a gear mounted on said shaft, a worm meshing with said gear, means including a casing housing and mounting the worm for rotation about its axis and for bodily turning movement about the axis of the shaft for turning the shaft to operate the drum, and a handle connected with the worm for rotating said worm and having means for connection with the casing for bodily turning the casing.

10. In a hoist, the combination with a drum, of means for operating said drum comprising a shaft operatively connected therewith, a gear mounted on said shaft, a worm meshing with the gear, a worm shaft carrying the worm for rotation about its axis, a casing rotatably supporting said worm and worm shaft, and means rotatably supporting said casing and mounting the worm and worm shaft for bodily rotation about the axis of the first-mentioned shaft.

11. In a hoist, the combination with a drum, of means for operating said drum comprising a shaft operatively connected therewith, a gear mounted on said shaft, a worm meshing with the gear, a worm shaft carrying the worm for rotation about its axis, a casing carrying the worm, means mounting the worm and worm shaft for bodily rotation about the axis of the first-mentioned shaft, a handle pivotally connected with the worm shaft for rotating said worm shaft in one position of the handle, and means for connecting the handle with the casing when turned to another position for bodily turning said casing about the axis of the first-mentioned shaft.

12. In a mechanical movement, the combination of a gear, a cooperating gearing element meshing therewith and mounted for rotation about its individual axis, a casing carrying said cooperating gearing element, means mounting said gearing element for bodily turning movement about the axis of the gear, a handle having a connection with the cooperating gearing element for rotating said element about its individual axis, and means for connecting the handle with the casing in one position for bodily turning said casing.

13. In a hoist, the combination of a winding drum, an operating shaft for imparting rotation to said drum, a gear having operative connection with said shaft, a worm meshing with the gear, means mounting the worm for rotation about its individual axis and for bodily turning movement about the axis of the gear for imparting turning movement to the gear by either rotation, and means for permitting bodily turning movement of the worm in one direction only.

14. In a hoist, the combination of a winding drum, an operating shaft for imparting rotation to said drum, a gear having operative connection with said shaft, a worm meshing therewith, a casing mounting the worm for rotation about its individual axis, means mounting the casing for bodily turning movement of the worm and casing about the axis of the gear for turning said gear by either rotation of the worm or said bodily turning movement thereof, and means for permitting bodily turning movement of said worm and casing in one direction only.

15. In a mechanical movement, the combination of a gear, a worm meshing therewith, a casing mounting the worm for rotation about its individual axis, means mounting the casing for bodily turning movement of the worm about the axis of the gear for turning said gear by either rotation of the worm or said bodily turning movement thereof, a worm shaft connected with the worm, a handle connected with the worm shaft for rotating the worm, and means for connecting the handle with the casing for bodily turning the casing when the handle is shifted to one position.

16. In a mechanical movement, the combination of a gearing element, a casing mounting said gearing element for rotation about its individual axis, a shaft for said gearing element, means mounting the casing for bodily turning movement with the gearing element about an axis eccentric to the individual axis, a handle pivotally connected with said shaft to be shifted to one position for rotating the shaft, and interlocking devices carried respectively by the handle and the casing in position to be interlocked upon shifting of the handle to one position for bodily turning the casing by the handle.

17. In a hoist, the combination with a winding drum having a ratchet wheel connected therewith, a shaft geared to the winding drum, a sleeve mounted on the shaft and carrying a pawl cooperating with the ratchet wheel, and an arm connecting with the sleeve for turning the sleeve and pawl.

18. In a hoist, the combination of a winding drum, a ratchet wheel connected therewith at one end of said drum, a gear connected with the drum at the opposite end thereof, a shaft having a pinion meshing with the gear, a sleeve mounted on the shaft and carrying a pawl at one end portion thereof and extending from the pawl approximately to the pinion for holding said pinion against shifting out of engagement with the gear.

19. In a hoist, the combination of a winding drum, a ratchet wheel connected therewith at one end of said drum, a gear connected with the drum at the opposite end thereof, a shaft having a pinion meshing with the gear, a sleeve mounted on the shaft and carrying a pawl at one end portion thereof and extending from the pawl approximately to the pinion for holding said pinion against shifting out of engagement with the gear, and an arm connected with the sleeve for swinging the pawl out of engagement with the ratchet wheel.

20. In a hoist, the combination of a frame, a winding drum mounted therein, a ratchet wheel connected with one end of the drum, a pawl in position to cooperate with said ratchet wheel, means for driving said drum comprising gearing operatively connected therewith, a housing carrying at least part of said gearing, a ratchet wheel fixed to said housing, and a pawl supported by the frame in position to engage said last-mentioned ratchet wheel.

21. In a hoist, the combination of a frame, a drum operatively mounted therein, a ratchet wheel connected with one end of the drum, a pawl in position to engage said ratchet wheel, a gear connected with the other end of the drum, a shaft mounted in the frame and carrying a pinion meshing with the gear, gearing for rotating said shaft, a casing carrying at least part of the gearing and mounted on the shaft for bodily rotation relative to the frame, a ratchet wheel fixed to said casing, and a pawl carried by the frame in position to engage said last-mentioned ratchet wheel.

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