April 18, 1944. C. N. WOLD 2,346,956

HOISTING AND CONVEYING APPARATUS

Filed July 5, 1943 3 Sheets-Sheet 1

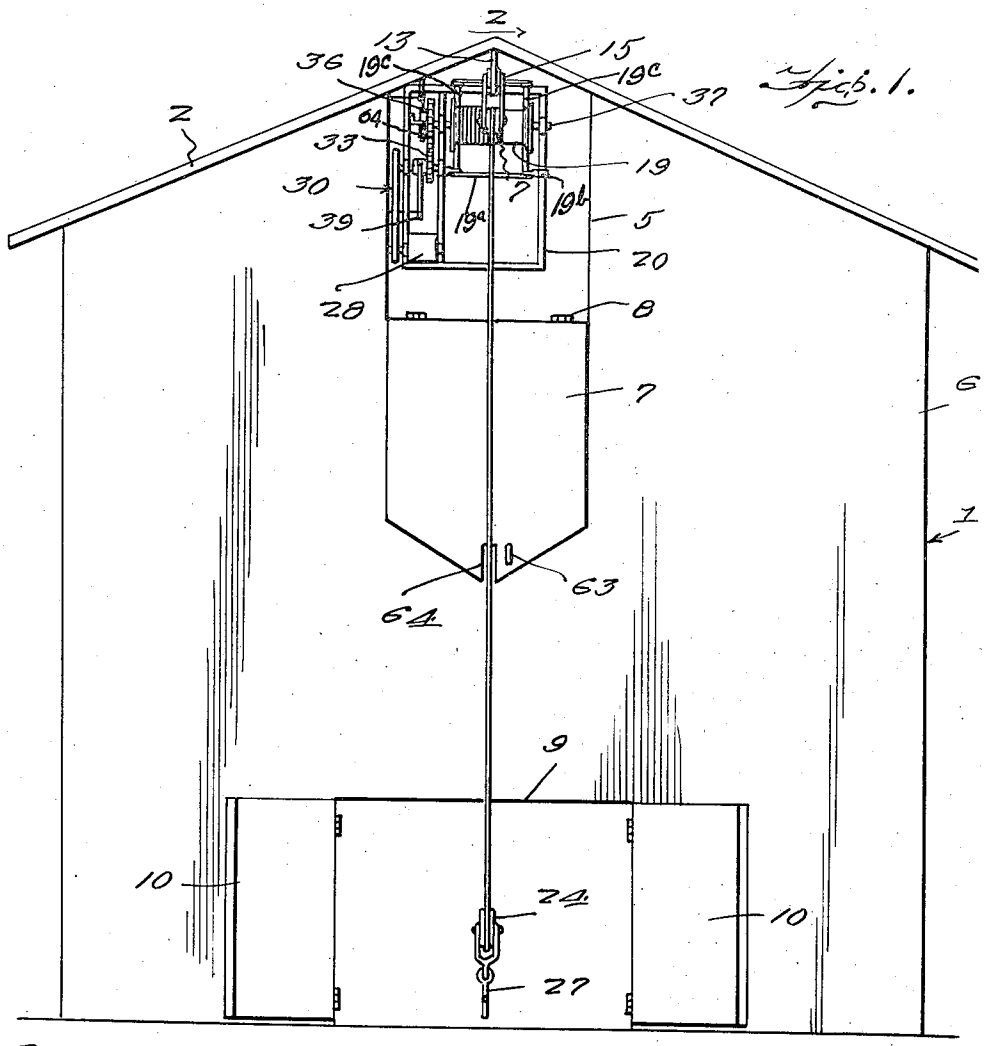


Fig. 1.

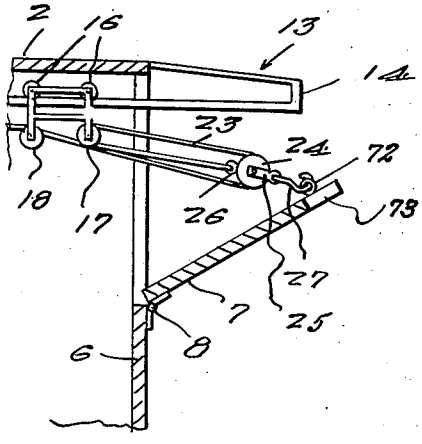


Fig. 5.

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HOISTING AND CONVEYING APPARATUS

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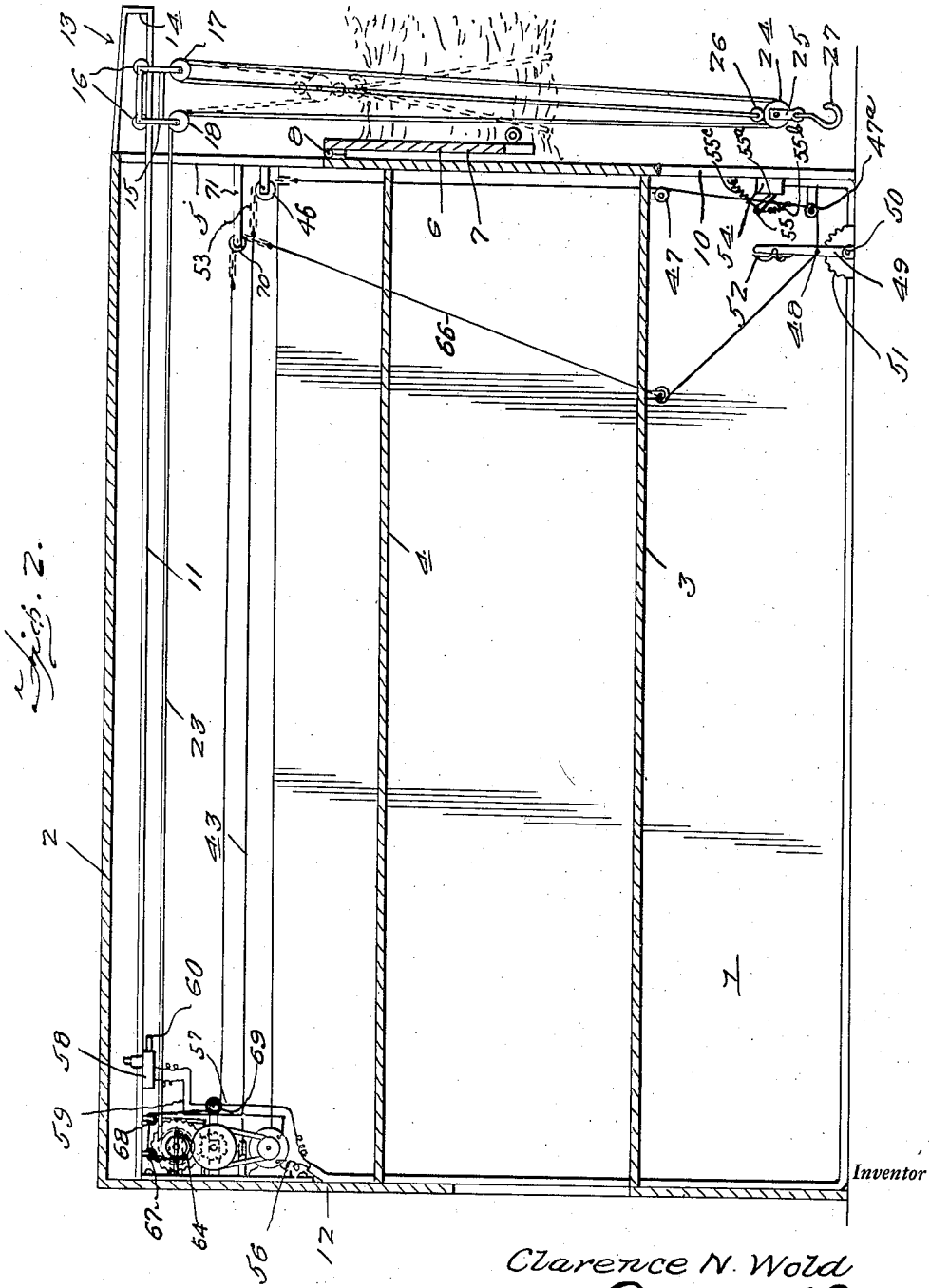


Fig. 2.

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Filed July 5, 1943 3 Sheets-Sheet 3

Fig. 3.

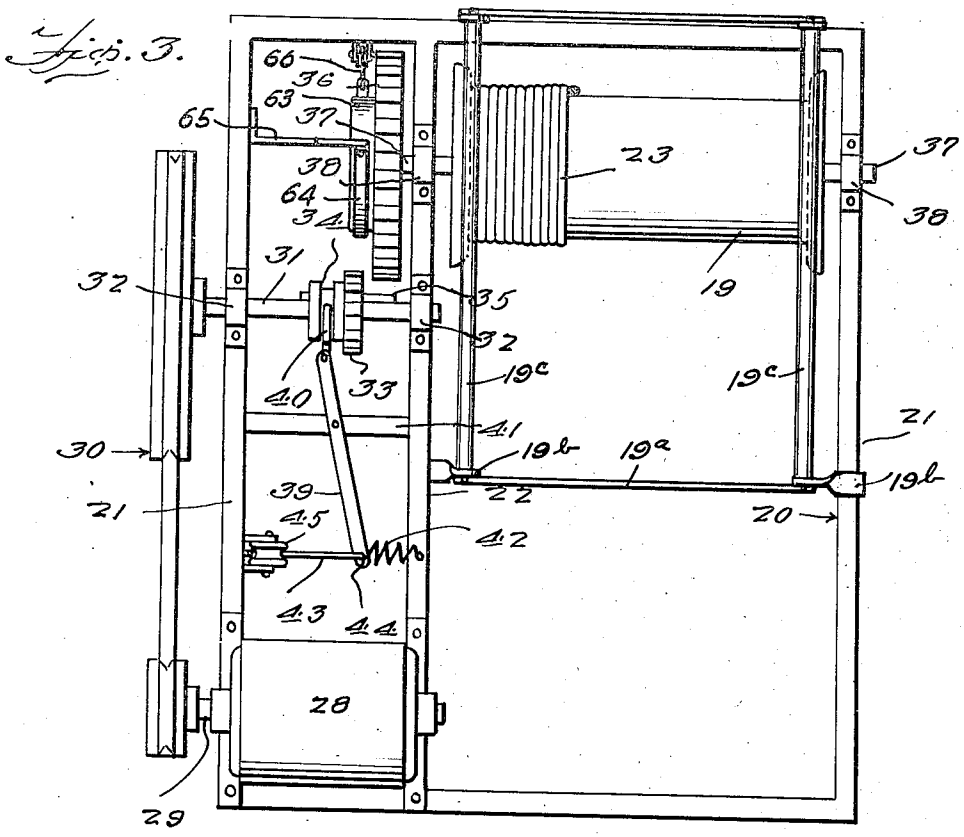
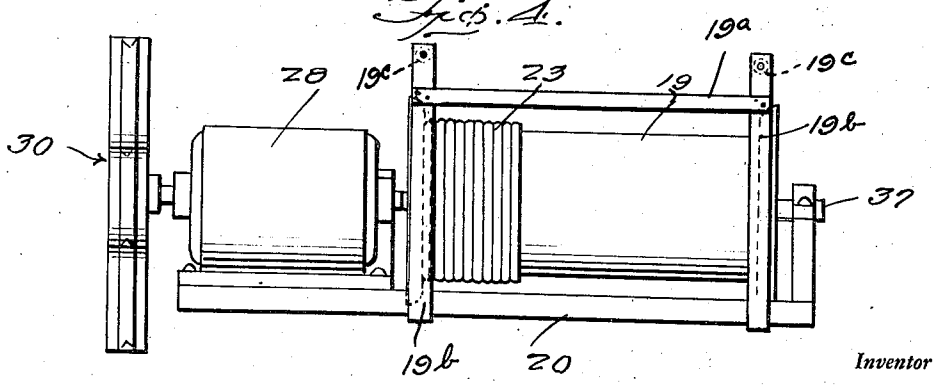


Fig. 4.



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UNITED STATES PATENT OFFICE

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HOISTING AND CONVEYING APPARATUS

Clarence N. Wold, Roseau, Minn.

Application July 5, 1943, Serial No. 493,584

1 Claim. (Cl. 212—87)

My invention relates to improvements in hoisting and conveying apparatus for use more particularly, although not necessarily, in barns for loading hay into lofts in the barns.

The primary object of my invention is to provide apparatus for the purpose above set forth which may be easily and quickly installed in the upper portion of a barn adjacent the roof to hoist hay from the ground or from wagons outside the barn and convey the hay into the barn for placement as desired, and which economizes in the use of cable and pulleys, involves parts of simple construction, is safe, and comparatively inexpensive to manufacture and install.

Other and subordinate objects are also comprehended by my invention, all of which, together with the precise nature of my improvements will be readily understood when the succeeding description and claims are read with reference to the drawings accompanying and forming part of this specification.

In said drawings:

Figure 1 is a view in elevation illustrating my invention in its preferred embodiment installed in a barn,

Figure 2 is a view in vertical section taken on the line 2—2 of Figure 1,

Figure 3 is a view in front elevation of the cable winding reel, the drive therefor, and the supporting frame for said reel and drive,

Figure 4 is a view in bottom plan of said reel, drive, and frame, and

Figure 5 is a detailed view in longitudinal section illustrating an optional use of the invention.

Referring to the drawings by numerals, my improved hoisting and conveying apparatus has been shown therein, by way of exemplification only, as installed in a type of barn 1 provided with a gable-type roof 2, lower and upper lofts 3, 4, respectively, an upper, central hay-loading doorway 5 in the front wall 6 of the barn adapted to be closed by a door 7 hinged, as at 8, to open outwardly and downwardly, and a lower entrance doorway 9 adapted to be closed by swinging doors 10.

A basic element of my improved hoisting and conveying apparatus is a rod-like, overhead track 11 in the upper portion of the barn 1, in the peak of the roof 2, close to said peak and which extends in the longitudinal center of the barn horizontally from the rear end wall out of the doorway 5 for a suitable distance and terminates outside said doorway 5 in an upturned front end loop 13 forming a vertical front stop 14 for a purpose presently seen. The terminal of the loop 13 and the other end of the track 11 are fixed to the barn structure in any suitable manner, not shown.

A trolley-type carriage 15 of skeleton form straddles the track 11 and is suspended from said track by means of a pair of front and rear grooved wheels 16 running on said track and suitably mounted in the carriage. The carriage 15 is provided, below the track 11, with a pair of front and rear pulleys 17, 18, respectively.

In the rear upper portion of the barn 1 is a cable-winding reel 19 horizontally disposed, and a power drive, presently described, for said reel, both supported by a rectangular frame 20 including upright side bars 21 and an intermediate upright bar 22, said frame being suitably fixed to the rear wall 12 of the barn 1 in elevated position such that the reel 19 is supported directly below the track 11.

A hoisting cable 23 is suitably fixed at one end to the reel 19 and extends forwardly over the pulley 18 of the carriage 15 and from said pulley around the usual sheave 24 of a sheave block 25, said cable being trained from the sheave block 25 upwardly and rearwardly over the front pulley 17 of the carriage 15 and having its upper end connected, as at 26, to said sheave block in the usual manner. The sheave block 24 carries the usual grappling hook 27. An upright safety guide frame 19a for the cable 23 is mounted on one of the side bars 21, and the bar 22 of the frame 20, in front of the reel 19, and by means of brackets 19b, the frame 19a including upright guide rollers 19c.

The power drive comprises a motor 28, the armature shaft 29 of which is connected by a belt and pulley drive 30 to a driven shaft 31 journaled in bearings 32 fixed on one side bar 21 of the frame 20 and on the intermediate bar 22 respectively. A clutch gear 33, having a grooved collar 34, is splined on the driven shaft 31, as at 35, for shifting into and out of mesh with a relatively larger gear 36 fast on one end trunnion 39 of the reel 19, said reel having a pair of such end trunnions by means of which, and bearings 38, said reel is mounted on one side bar 21 and the intermediate bar 22 of the frame 20.

A gear shifting lever 39 provided with a forked end 40 straddling the grooved collar 34 is pivoted intermediate its ends, as at 35, on a fixed bar 41 of the frame 20 for swinging in one direction to mesh the gear 33 with the gear 36. A coil spring 42 suitably connected to the lever 39 and to the intermediate bar 22 urges the lever 39 in the

other direction whereby the gear 33 is normally held out of mesh relative to the gear 36.

A pull cable 43 is provided for swinging the gear shifting lever 39 in the proper direction to cause the gear 33 to mesh with the gear 36. The cable 43 is connected at one end thereof, as at 44, to the lever 39, then trained around a guide pulley 45 on the frame 20, extended forwardly to the front of the barn 1, and then downwardly inside the barn around a series of upper, lower and intermediate pulleys 46, 47 and 47a, with its other end connected, as at 48, to an upright cable operating hand lever 49 arranged at the ground or floor level adjacent to the doorway 10 for convenient reach through said doorway. The cable operating lever 49 is pivoted, as at 50, for movement into set positions established by the usual toothed segment 51 and hand grip operated detent 52 on said lever. Where the cable 43 runs over the pulley 46, a length of chain 53 may be interposed in said cable to better resist wear.

As will be seen, the hand lever 49 and pull cable 43 provide means for operatively connecting the motor drive to the reel 19 for winding up the hoisting cable 23, and for disengaging said drive so that the reel 19 may idle and unwind said cable 23.

Adjacent the doorway 10 is a switch box 54 suitably mounted on the front wall 6 and which may be of any conventional type for plug-in connection thereto of power lines, not shown, from a remote source of electrical supply, not shown. The switch designated 55 is connected on one side to one side of the motor 28 by a line 56. The other side of the switch 55 is connected by a line 57 to one side of a motor cut-out switch 58 of the spring loaded plunger type and connected on its other side by a short line 59, to the other side of said motor. The plunger 60 of the cut-out switch 58 is arranged in the path of rearward movement of the carriage 15 and said switch 58 is designed to be set at different locations along the track 11 so that said carriage may disable the motor 28 as it travels rearwardly to different locations in the barn 1, whereby hay, or the like, suspended from the sheave block 24 may be unloaded in the lofts, for instance, as occasion may require. For setting the motor cut-out switch 58 in different locations, a suitable clamp, such as represented at 61, may be provided on said switch for engagement with the track 11. The lever 55a of the switch 55 is connected to the pull cable 43 by a coil spring 55b and to the front wall 5 by another coil spring 55c, the arrangement being such that under pull on said cable 43 to operatively connect the motor drive to the reel 19, the switch 55 will be pulled closed, and when the cable 43 is slackened to permit the spring 42 and lever 39 to disengage the clutch gear 33, the switch lever 55a will be pulled open by the spring 55c.

As will be seen, the hoisting cable 23 and sheave block 24, together with the carriage 15, constitute a block and tackle which, when the reel 19 is disengaged from the motor drive, may be pulled out of the barn 1 through the doorway 5, as by a line, not shown, suitably attached to the carriage 15, after which the sheave block 24 may be lowered so that the hook 27 may be attached, as represented by dotted lines in Figure 2, to a bale of hay 62, or the like. The motor drive may then be connected to the reel 19 by operation of the hand lever 49, and the motor energized simultaneously, in the manner described, to cause reel 19 to reel up the hoisting cable 23 and hoist the load to the carriage 15, the carriage being held in the loop 13 by said line during this hoisting operation. As the load is elevated to the carriage 15, said carriage may be released, in a manner which will be clear, whereupon the carriage and load will be pulled into the barn through the doorway 5 until the carriage strikes the plunger 60 and thereby cuts out the motor 28. The motor drive may then be disconnected, or disabled, to permit the load to descend, under the influence of gravity, for deposit where required.

As will also be apparent, the motor 28 may be deenergized by operation of the switch 55 before the carriage 15 engages the plunger 60 of the motor cut-out switch 58 if it is desired to halt said carriage before it engages said plunger 60. To hold the reel stationary when the carriage 15 is thus halted, and also whenever desired, a brake mechanism is provided for the reel 19 comprising a brake drum 63 fast on the gear 36, and a brake band 64 having one end fast on a bracket 65 suitably secured to the frame 20 and its other end suitably connected to a pull cable 66 for tightening of the band around said drum by pull exerted on said cable. The pull cable 66 is extended upwardly from said band 64 over a pair of pulleys 67, 68 suitably mounted above the drum 63, then downwardly and forwardly around another suitably mounted pulley 69 and forwardly from pulley 69 to a pulley 70 mounted on a bracket 71 on the front wall 5. From the pulley 70 said pull cable 66 is extended downwardly and around a suitable pulley 71 to the hand lever 49 the arrangement being such that when said lever 49 is operated in the proper direction and degree to permit the clutch gear 33 to be disengaged by the spring 42, and the switch 55 to be opened by the spring 55c, further operation of said lever in the same direction will exert pull on the pull cable 66 to brake the reel 19 and hold the same stationary. Obviously, by easing up on the lever 51 the reel 19 may be permitted to idle when such operation is desired.

After loading of the loft is accomplished, or at any other time, the sheave block grappling hook 27 may be coupled to an eye-bolt 72 on the door 7 and the apparatus used to pull said door shut, as indicated in Figure 5.

The stop 14 limits forward travel of the carriage 15 out of the barn 1, the advantage of which will be obvious. A notch 73 is provided in the door 7 to straddle the loop 14 when said door is closed.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly the invention, as described, is susceptible of modification without departing from the inventive concept and right is herein reserved to such modifications as fall within the scope of the appended claim.

What I claim is:

In a barn having end walls, and an upper doorway in one end wall, an overhead track extending from the other end wall horizontally out of the top of said doorway and terminating outside said doorway in an upturned loop, a carriage mounted on said track to travel from said loop through said doorway into said barn and provided with pulleys thereon, a reel mounted on said other end wall in elevated position, a block and tackle for elevating a load to said carriage when the latter is in said loop comprising a cable having one end fixed to said reel for winding of the cable on said reel and unwinding therefrom under op-

eration of the reel in opposite directions, respectively, said cable being trained over said pulleys to form a block elevating and lowering loop when said cable is unwound, a motor drive for operative connection to said reel to operate the same in a cable winding direction and including a clutch adapted to be disengaged to permit the reel to idle in a cable unwinding direction, said drive being mounted in elevated position on said other end wall, a remote manual control for said drive, and a carriage operated control for said motor comprising a motor cut-out switch on said track operative by travel of the carriage into said barn, and settable along said track into different positions.

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