H. SANTROCK.

HOISTING APPARATUS FOR SILOS

APPLICATION FILED FEB. 16, 1914.

1,138,322.

Patented May 4, 1915

2 SHEETS—SHEET 1.

Fig. 1.

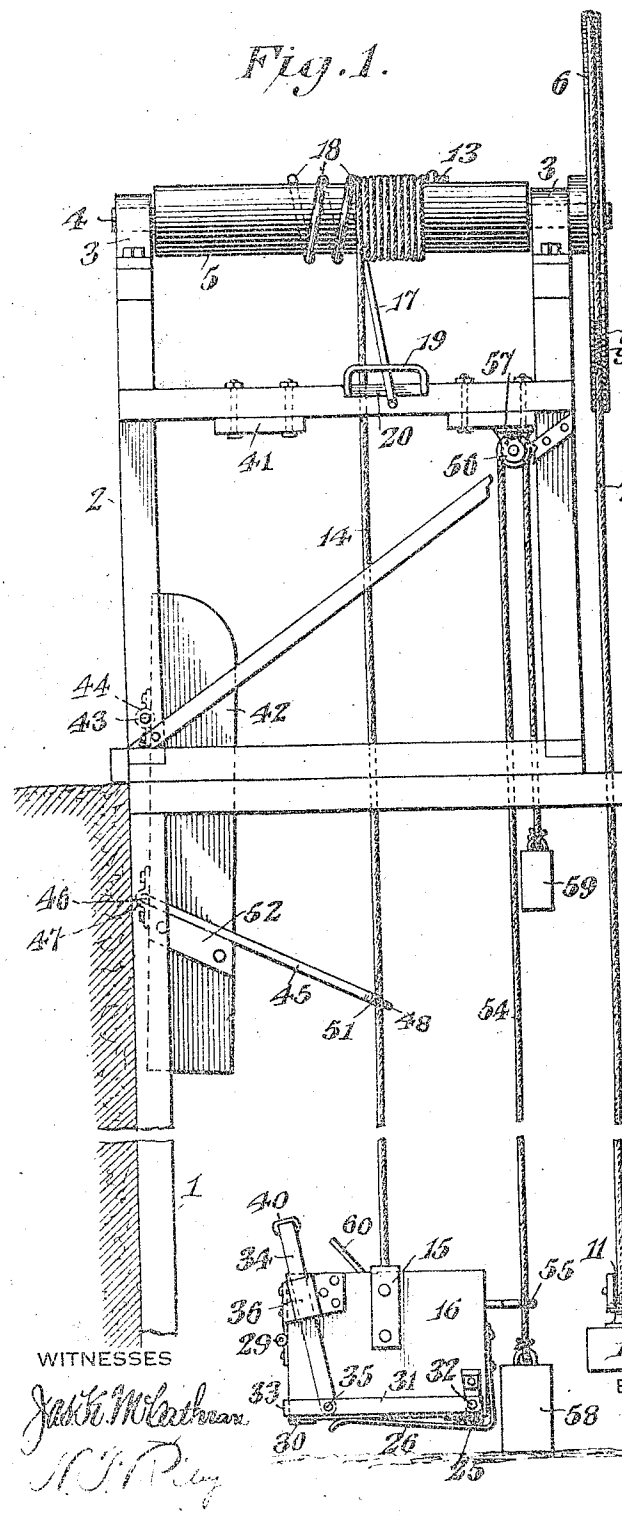
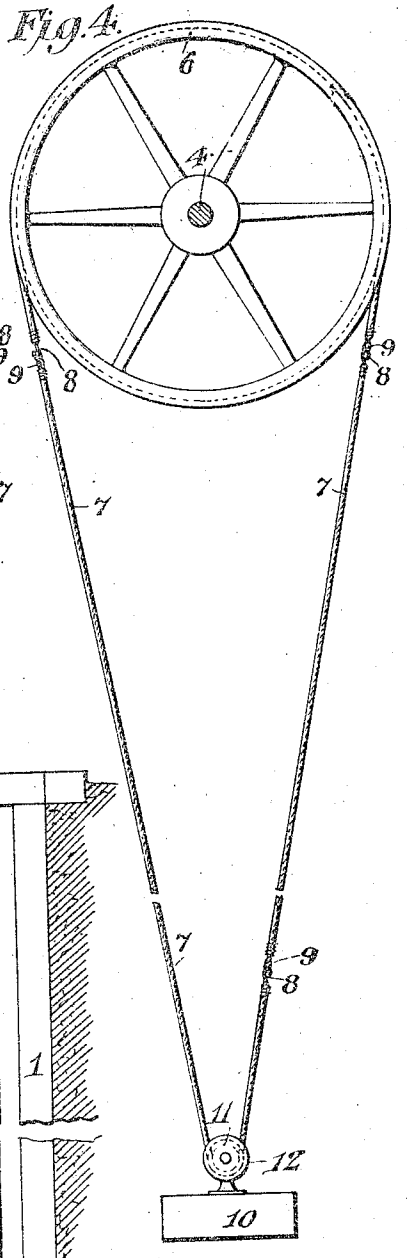


Fig. 4.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

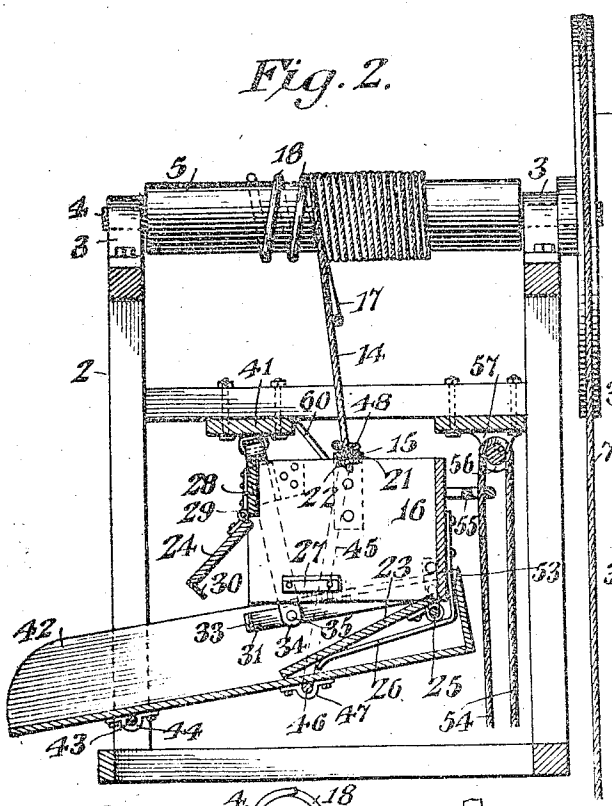


Fig. 5.

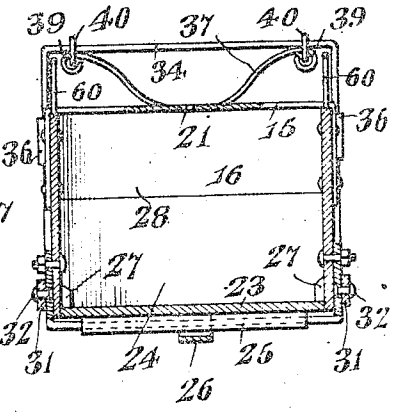
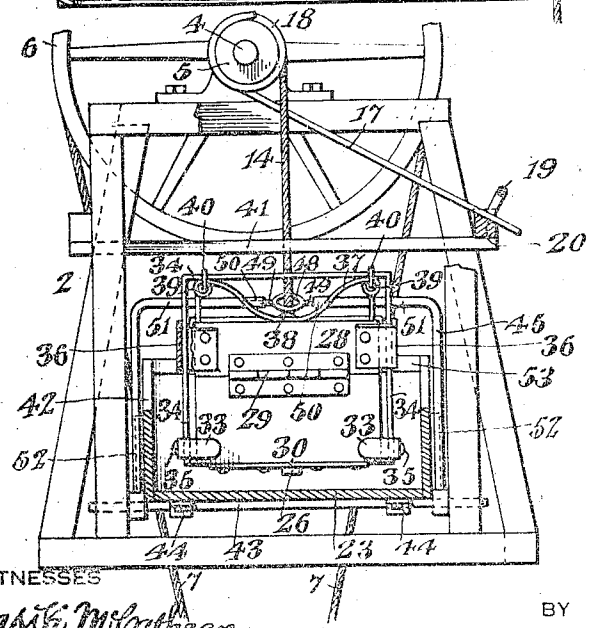


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY SANTROCK, OF KENSINGTON, KANSAS.

HOISTING APPARATUS FOR SILOS.

1,138,322. Specification of Letters Patent. Patented May 4, 1915.

Application filed February 16, 1914. Serial No. 818,996.

To all whom it may concern:

Be it known that I, HENRY SANTROCK, a citizen of the United States, residing at Kensington, in the county of Smith and State of Kansas, have invented a new and useful Hoisting Apparatus for Silos, of which the following is a specification.

The invention relates to improvements in hoisting apparatus for silos.

The object of the present invention is to improve the construction of hoisting apparatus for silos and to provide a simple, efficient, and comparatively inexpensive hoisting apparatus designed particularly for use in pit silos, and adapted to be operated by one person within a pit and unload itself automatically at the proper elevation, and capable of enabling such person to haul up as much silage as may be required without leaving the pit before the desired amount is obtained.

It is also an object of the invention to provide a hoisting device of this character, adapted to be readily transferred from one silo pit to another when desired, so that a single hoisting apparatus may be operated in connection with a number of silos.

With these and other objects in view the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended, it being understood that various changes in form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing: Figure 1 is a side elevation of a hoisting apparatus constructed in accordance with this invention and shown applied to a silo pit, the bucket being lowered and the chute being arranged in a vertical position. Fig. 2 is a vertical sectional view of the upper portion of the hoisting apparatus, the bucket being elevated and the chute being arranged in an inclined position for discharging the contents of the bucket. Fig. 3 is a front elevation, partly in section. Fig. 4 is a detail view of the operating device. Fig. 5 is a transverse sectional view of the bucket.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

In the accompanying drawing, in which is illustrated the preferred embodiment of the invention, the hoisting apparatus is equipped with a portable main or supporting frame 2 designed to be supported over the top of a silo pit 1, by suitable beams or planking, and adapted to be transferred from one silo pit to another. The main or supporting frame may be of any preferred construction and it is provided at the top with front and rear bearings 3 for the reception of a horizontal shaft 4 carrying a hoisting drum 5 and a relatively large pulley 6 fixed to the drum shaft 4 at the rear end thereof and provided with a grooved periphery for the reception of an operating rope or cable 7 preferably composed of sections detachably connected with one another by terminal hooks and eyes 8 and 9 to enable the operating rope to be increased in length as the silage of the silo is consumed. By this construction an endless operating rope of the desired length is obtained without any of it dangling in and lying upon the material in the pit. Each of the sections of the operating rope is designed to be provided at one end with an eye and at the other end with a hook, so that the sections of the operating rope may be varied in number, as desired. The operating rope which forms the endless operating connection is maintained taut by a weight 10 provided with a grooved pulley 11 mounted in a suitable housing 12 secured to and extending upwardly from the said weight. Either side of the depending portion or loop of the operating rope or cable may be pulled upon by the operator for rotating the pulley 6. Also the long tapering loop and the weight are free to swing laterally in either direction to facilitate an easy operation of the hoisting mechanism.

The drum 5 has secured to it one end 13 of a hoisting rope 14, secured at its other end to a bail 15 of a bucket 16 and adapted to be wound around and unwound from the drum to raise and lower the bucket 16. The hoisting rope or cable is caused to wind uniformly around the drum by means of a rope guide 17 consisting of a rod or stem provided at one end with a coil 18, which is arranged on the drum 5. The rod or stem and the coil may be constructed of a single piece of rod metal, and the coil, which slidably connects one end of the rod with the drum, is arranged to be engaged by the hoisting rope or cable which passes down-

wardly between the coil and the rod or stem, which has its outer portion arranged in a guiding loop 19 mounted on the frame at one side thereof. The rope guide 17 slides along the drum as the hoisting rope or cable is wound around or unwound therefrom, and it prevents the rope or cable from becoming twisted or unevenly coiled around the drum.

The guiding loop 19, which is disposed horizontally, may be conveniently formed from a piece of rod metal or other suitable material which is bent at points equidistant of its ends at right angles to provide spaced end portions and a connecting side portion, the end portions being suitably secured to the frame with the side portion arranged in spaced relation with one of the horizontal beams or members of the frame. The beam or member to which the guiding loop 19 is secured is located below the plane of the drum and is beveled at 20 to correspond to the rod or stem which is arranged at an inclination. No claim is made in the present case to the rope guide.

The lower end of the hoisting rope or cable extends through an opening 21 in the bail 15 of the bucket 16, and it is provided with a suitable stop 22, preferably consisting of a metallic plate or piece which engages the lower face of the bail 15. The hoisting bucket 16, which is preferably rectangular, is provided with a hinged bottom 23 and it has a hinged door or gate 24 at the front. The bottom 23, which is connected at its rear edge with the side walls of the bucket by a suitable hinge 25, is adapted to swing downwardly, as illustrated in Fig. 2 of the drawings, to discharge its contents, and it is automatically closed by a spring 26 after the bucket has discharged its contents. The spring 26, which is approximately L-shaped, is secured to the back of the bucket and it extends downwardly to a point below the bottom thereof and forwardly or outwardly, the free end of the spring bearing against the lower face of the hinged bottom 23 and adapted to urge the same upwardly. The bucket is provided with interiorly arranged stops 27 which limit the inward or upward movement of the bottom 23 when the bucket is empty.

The front gate or door 24, which constitutes the lower section of the front wall of the bucket, is connected at its upper edge to a relatively fixed upper section 28 of the front wall by a suitable hinge 29, and it is provided at its lower edge with an inwardly extending flange 30 projecting beneath and constituting a support for the bottom of the bucket when the hinged door or gate is closed. The door or gate opens under the pressure of the contents of the bucket when the latter is elevated, and the catches are tripped to release the door or gate. The hinged door or gate is locked in its closed position in engagement with the bottom of the bucket by means of a pair of pivot catches consisting of bars 31 located at opposite sides of the bucket and pivoted at their rear ends to the bucket by pins 32 or other suitable fastening devices, and provided at their front ends with inwardly extending laterally disposed lugs 33 which engage the front face of the door or section 24 and hold the latter against outward movement when the locking bars 31 are in a horizontal position. The locking bars 31 are automatically swung downwardly out of engagement with the front door or gate by means of an approximately U-shaped trip 34 composed of spaced sides and a connecting top portion, and straddling the front of the bucket. The sides of the U-shaped trip are pivoted at their lower ends to the locking bars 31 by rivets 35 or other suitable pivots, and the sides of the bucket are provided at their upper portions with guides 36 through which the sides of trip 34 slide. The trip 34 extends above the bucket and it is normally maintained in an elevated position by a spring 37 which yieldably retains the locking bars in engagement with the front gate or door of the bucket. The spring 37, which is disposed transversely of the bucket at the front wall thereof, is centrally secured by a suitable fastening device 38 to the upper edges of the relatively fixed section 28 of the said front wall of the bucket, and its side portions diverge upwardly and terminate in eyes 39 formed by coiling or bending the terminals of the spring 37. The eyes 39 are linked into links 40 which are arranged on the top connecting portion of the trip adjacent to the sides thereof. When the bucket is elevated, the transverse connecting portion of the trip is carried into contact with a horizontal transversely disposed bar 41 of the frame, and the spring 37 is depressed, the links 40 sliding outwardly along the top of the trip and the sides of the latter sliding downwardly in the said guides of the bucket. This operates to swing the locking bars 31 downwardly at the engagement with the front gate or door of the bucket, permitting the latter to open and release the bottom for discharging the contents of the bucket into a chute 42.

The chute 42, which is arranged at an inclination to deliver the contents of the bucket to the desired point, is hinged near its front or outer portion within the upper frame by a horizontal pintle rod 43 extending across the bottom of the chute and through eyes 44 thereof, and mounted at its terminals in the adjacent upright posts or beams of the portable frame. The chute is equipped at its rear portion with a bail 45 having a bottom transverse pivot or pivotal portion 46 extending beneath the rear portion of the

chute and through bottom eyes 47 thereof, whereby the bail is hinged to the chute. The bail 45, which may be of any preferred construction, is provided at its rear portion with a pivotal eye 48 through which the hoisting rope passes. The eye 48 is provided at opposite sides with laterally extending pivots 49 which are received in bearing sockets 50 formed in spaced portions 51 of the top of the bail 45. The chute is adapted to swing downwardly from the inclined position shown in Fig. 2 of the drawings to the vertical position illustrated in Fig. 1, when the bucket is lowered, and when the bucket is elevated, the bail thereof engages with the bail of the chute and elevates the latter during the upward movement, returning the chute to its elevated inclined position. The pivotal mounting or journaling of the eye 48 permits the latter to adjust itself to the changing angle or inclination of the bail 45, without binding against the hoisting rope. The chute is provided at opposite sides with inclined cleats 52 forming stops and arranged to be engaged by the bail to support the same in an extended position when the chute is lowered. The rear wall of the chute is beveled at the upper portion at 53 to clear the bucket when the latter enters and leaves the chute.

The bucket is guided in its vertical movement by means of a guiding rope or cable 54 extending through a horizontal guide eye 55 of the bucket and arranged on and depending from an overhead pulley 56, mounted in a suitable bracket 57 secured to the upper portion of the frame 2. The guiding rope 54 is provided at one end with a relatively heavy weight 58 which rests upon the material within the silo, and its other end is provided with a relatively small weight 59 adapted to maintain the guiding rope taut and permitting the relatively heavy weight to descend as the material within the silo is consumed, whereby an extensible automatically adjustable guide for the bucket is provided. The bucket is provided at opposite sides with upwardly projecting inclined arms 60 arranged to engage the transverse bar or member 41 at the inner or rear edge thereof and adapted to steady the bucket during the operation of the trip.

What is claimed is:

1. A hoisting device of the class described including a bucket, hoisting mechanism having a rope or cable connected with the bucket for raising and lowering the latter, operating mechanism for the hoisting mechanism provided with an extensible operating rope having a free pendant loop and composed of sections for varying its length, and flexible guiding means for the bucket automatically adjustable to correspond with the travel of the bucket.

2. A hoisting apparatus of the class described, comprising a supporting frame, a hoisting bucket, hoisting mechanism for raising and lowering the bucket, and an automatically adjustable or extensible guiding means for the bucket, said guiding means being arranged to rest upon the material within a silo.

3. A hoisting apparatus of the class described, comprising a supporting frame, a hoisting bucket, hoisting mechanism for raising and lowering the bucket, and guiding means for the bucket consisting of an overhead pulley and a guiding rope arranged on the pulley and provided at its ends with unequal weights, the heavier weight being adapted to rest upon the material and the lighter weight operating to maintain the guiding rope taut, and permitting the heavier weight to descend and lengthen the effective portion of the guiding rope as the material is consumed, and means carried by the bucket and slidable on the guiding rope.

4. A hoisting apparatus of the class described comprising a frame, hoisting mechanism, a bucket connected with the hoisting mechanism and having a hinged downwardly opening bottom and provided at one of its walls with a gate having means for engaging the bottom to retain the latter in its closed position, means for holding the gate in engagement with the bottom, and means for releasing the said gate.

5. A hoisting apparatus of the class described, comprising a frame, hoisting mechanism, a bucket connected with the hoisting mechanism and having a hinged downwardly opening bottom and provided at one of its walls with a gate having means for engaging the bottom to support the latter in its closed position, a catch for locking the gate, and automatically operable means for tripping the catch.

6. A hoisting apparatus of the class described, comprising a frame, hoisting mechanism, a bucket connected with the hoisting mechanism and having a hinged downwardly opening bottom and provided at one of its walls with a gate having an inwardly projecting flange at the lower edge arranged to extend beneath and support said bottom in its closed position, a catch for locking the gate in engagement with the bottom, and means for tripping the catch to release the gate.

7. A hoisting apparatus of the class described, comprising a frame, hoisting mechanism, a bucket connected with the hoisting mechanism and including a hinged downwardly opening bottom and provided at one of its walls with a gate having means for engaging and supporting the bottom in its closed position, a spring for urging the bottom upwardly, and means for locking the gate in engagement with said bottom.

8. A hoisting apparatus of the class described, comprising a frame, hoisting mechanism, a bucket connected with the hoisting mechanism and provided at one of its walls with a hinged gate, a catch consisting of a bar pivotally mounted on the bucket and provided with a lug arranged to swing into and out of engagement with the gate, a yieldably supported trip connected with the locking bar and maintaining the same in engagement with the gate, and means mounted on the frame and arranged in the path of and adapted to engage with the trip, whereby the latter is operated to release the gate.

9. A hoisting apparatus of the class described, comprising a frame, hoisting mechanism, a bucket connected with the hoisting mechanism and provided at one of its walls with a hinged gate, opposite locking bars pivotally mounted on the bucket and provided with lugs arranged to swing into and out of engagement with the gate, an approximately U-shaped trip straddling the bucket and connected with the pivoted bars, a spring for yieldably supporting the trip, and means located in the path of the trip and adapted to engage with the same to release the gate.

10. A hoisting apparatus of the class described, comprising a frame, hoisting mechanism, a bucket connected with the hoisting mechanism and provided at one of its walls with a hinged gate, opposite catches mounted on the bucket and movable into and out of engagement with the gate, a trip connected with the catches and composed of spaced sides and a connecting portion, the sides being slidably mounted on the bucket, a bowed spring secured to the bucket and provided at its terminals with links slidably receiving the connecting portion of the trip, and means located in the path of and adapted to engage the trip to release the gate.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HENRY SANTROCK.

Witnesses:
J. H. Ball,
E. M. Ball.