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SKIP HOIST

Filed March 2, 1925

3 Sheets-Sheet 2

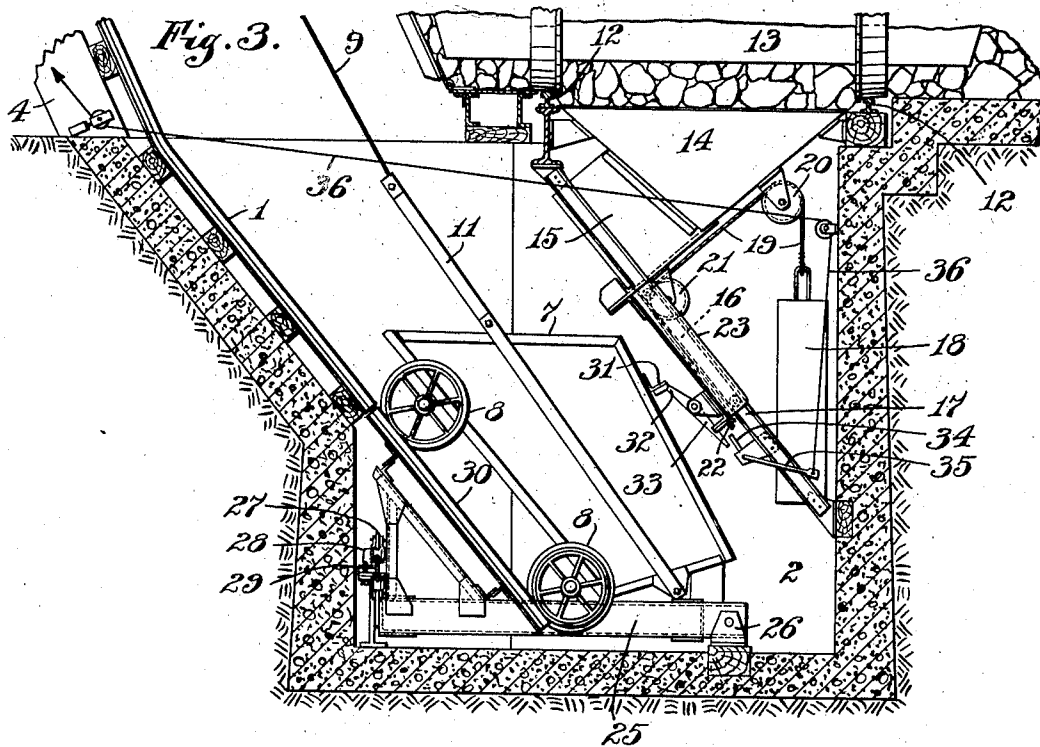
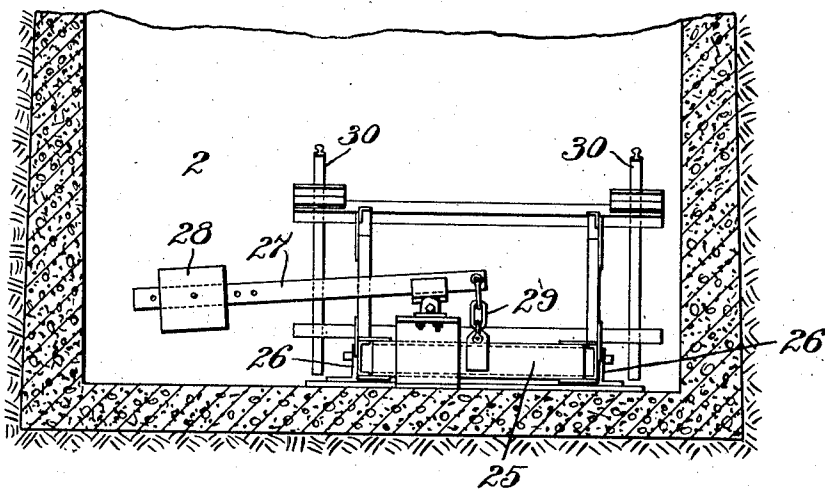


Fig. 4.



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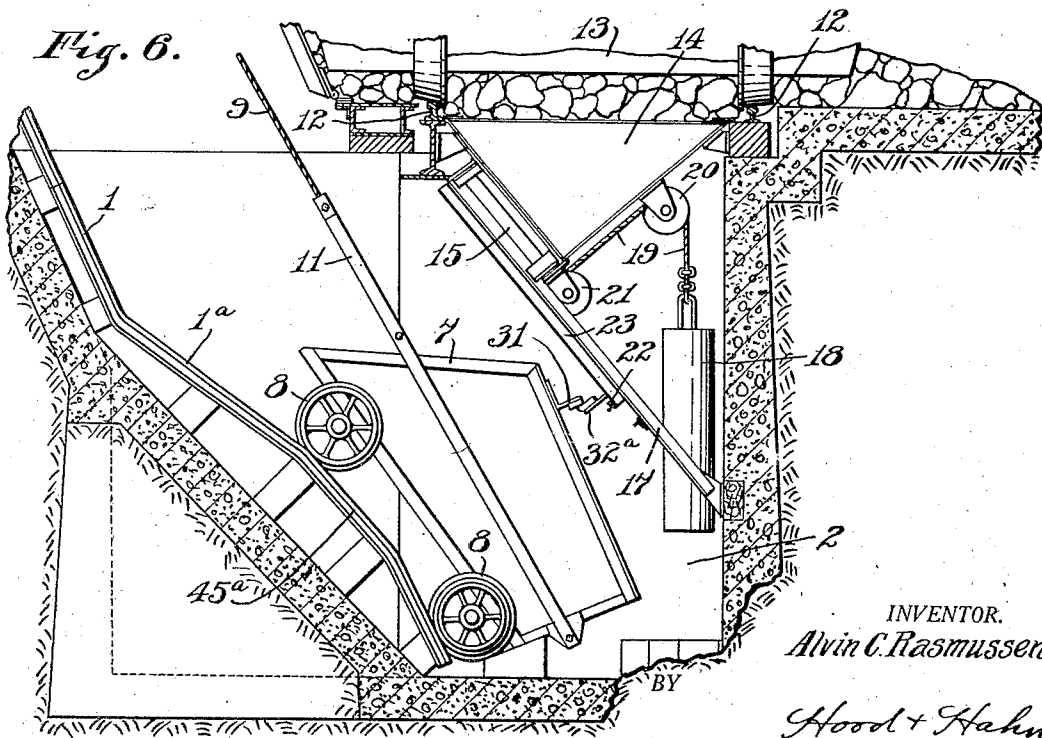
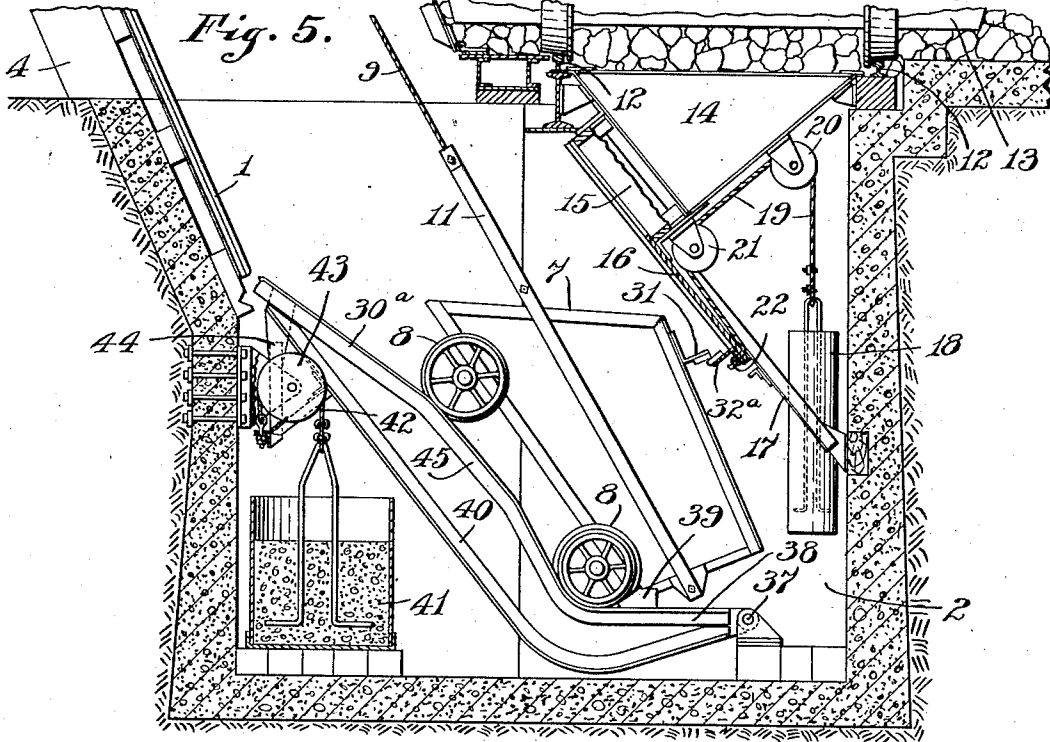
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UNITED STATES PATENT OFFICE.

ALVIN C. RASMUSSEN, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO INSLEY MANUFACTURING COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

SKIP HOIST.

Application filed March 2, 1925. Serial No. 12,537.

This invention relates to improvements in skip hoists and particularly that type for elevating material from the point at which it is dumped or unloaded to the point at which it is handled.

The invention is particularly applicable to skip hoists adapted for raising material dumped from material cars and the like into a storage bin from which it may be loaded to distributing wagons, etc.

One of the objects of the invention is to provide means for automatically closing the gate of the bucket loading hopper when the bucket receives a predetermined load.

Another object of the invention is to provide means for automatically closing the gate of the bucket loading hopper independently of the load delivered to the bucket.

For the purpose of disclosing the invention, certain embodiments thereof have been illustrated in the accompanying drawings, in which—

Fig. 1 is a side elevation of a skip hoist apparatus embodying the invention;

Fig. 2 is a plan view of the loading pit and hopper;

Fig. 3 is an enlarged sectional view of the loading pit showing a side elevation of the bucket and loading mechanism;

Fig. 4 is a sectional view of the loading pit showing a front elevation of the bucket platform illustrated in Fig. 3;

Fig. 5 is a sectional view showing an enlarged side elevation of a modified form of the bucket loading mechanism;

Fig. 6 is a similar view of still another modified form of the bucket loading mechanism; and

Fig. 7 is an elevation of a modification.

In the embodiment illustrated in Figs. 1 to 4 a suitable inclined trackway 1 extends from the loading pit 2 to a receiving hopper 3 and this trackway is mounted on a framework 4 which extends beyond the trackway. At the dumping point the ends 5 assume a horizontal position, while on each side of the frame is provided a pair of supplemental tracks 6. The supplemental tracks are spaced wide enough apart to permit the

forward end of the loading bucket to pass therethrough and ride on the ends 5. The hoisting bucket 7 consists of an open topped bucket mounted on four wheels 8 adapted to travel on the trackway 1 and the rear wheels are provided with extended flanges which, when the bucket reaches its dumping position travel on the widened tracks 6 so that the rear end of the bucket will continue to travel upwardly while the forward end moves horizontally whereby the bucket will assume dumping position. The bucket is raised and lowered by a suitable cable 9 passing over a sheave at the top of the frame 4 and operated from a hoisting engine 10. This cable is attached to the forward end of a bridle 11, which bridle passes on either side of the bucket and is pivotally connected to the bottom of the bucket.

The bucket receives its load while in the loading pit 2, which pit is beneath the tracks 12 for a bottom dumping car 13. This pit has arranged therein an open topped hopper 14 the sides of which converge toward a delivery opening 15 controlled by a sliding gate 16 mounted on inclined guideways 17. The gate is normally urged towards closed position by a counterweight 18 suspended at one end of a cable 19. This cable passes over a sheave 20 on the bottom of the hopper 14 and forwardly and over a second sheave 21 and thence rearwardly and dead ended on the rear end 22 of the slide members 23 of the gate whereby the weight 18 will exert a constant tendency to move the gate toward its closing position.

Immediately beneath the hopper there is provided a platform frame 25 hingedly mounted at its rear end on posts 26 and maintained in its normal elevated position by a counterweighted arm 27, the counterweight 28 of which may be adjusted along the same for varying load conditions. The forward end of this arm is connected by suitable linkage 29 with the free or forward end of the platform frame 25. The platform frame carries inclined tracks 30 which are separate from, but form a continuation of the trackway 1. These tracks are toward

the forward or free end of the platform frame and this platform is adapted to receive the bucket 7 when it is in its lowered position.

5 The bucket on its upper side is provided with a finger 31 adapted, as the bucket is lowered, to engage the stop end 32 of a lever arm 33 mounted on the guides of the gate for the purpose of opening the gate as the bucket is lowered and this stop is so
10 positioned that by the time the bucket reaches its lowermost position the gate will be open to its fullest extent. Due to the fact that the bucket is lowered unloaded
15 and therefore light, the platform 25 will be maintained in its raised position so that the finger 31 may engage the stop 32. The opening of the gate 16 of the hopper 14 by the lowering of the bucket permits the material to run from the hopper into the bucket
20 and when the load in the bucket reaches a predetermined weight, sufficient to overcome the counterweight 28, the forward end of the platform frame 25 will drop, tilting the bucket downwardly and thereby disengaging the finger 31 from the stop 32 per-
25 mitting the counterweight 18 to close the gate 16, after which the bucket may be elevated to its delivery point.

30 For the purpose of closing the hopper gate 16 independently of the automatic action, a tripping arm 34 is provided which is adapted to engage the rear end of the lever 33 and upon operation of the controlling
35 arm 35 by the pull cable 36, raise the stop 32 out of engagement with the finger 31. The tracks 30 and platform 25 form in effect a cradle for the bucket 7, which cradle is hingedly supported at one end to permit
40 the opposite end to tilt, permitting the finger 31 during this tilting action to disengage from the stop 32.

45 In the structure illustrated in Fig. 5 a slightly different construction of the bucket supporting table is disclosed. In this construction the tracks 30^a are hinged at their rear ends as at 37, a part of the same being substantially horizontal as at 38 and provided
50 on this horizontal portion with chock members 39 to hold the bucket 7 at rest beneath the hopper. These tracks are braced by suitable braces 40 and the forward end of this cradle is maintained in its elevated
55 position by a counterweight 41 having a cable 42 passing over a sheave 43 and dead ended on the lower end of a downwardly extending arm 44 on the free end of the cradle, whereby the tendency of the weight
60 41 will be to urge the cradle and with it the empty car upwardly. The tracks 30^a have a hump 45 intermediate of their ends and so positioned that when the car is at rest in its lowermost position the rear wheels of the car will have passed off the hump

65 and the front wheels are just on the hump. This arrangement is such that in event it is desired to close the hopper gate 16 before the predetermined load is delivered to the bucket, by hoisting the bucket the front end
70 of the car will immediately drop down as it moves off the hump, permitting the finger 31 to disengage from the stop 32^a and allowing the gate to be moved to its closed position. However, the normal operation of
75 the device is similar to that illustrated in Fig. 3, the weight 41 being adjusted for a predetermined load and when the bucket 7 becomes loaded to this point the front end of the cradle will drop down permitting the finger 31 and stop 32^a to disengage.
80

In the structure illustrated in Fig. 6 the cradle feature for supporting the bucket is dispensed with and reliance is placed en-
85 tirely upon the raising of the bucket for permitting the hopper gate 16 to close. In this structure the trackway 1 is extended into a portion 1^a, which portion is provided with a hump 45^a similar to the hump 45
90 illustrated in Fig. 5. As soon as the bucket 7 starts on its ascending movement the front wheels of the bucket will drop off the hump 45^a, immediately disengaging the stop 31 from the stop 32^a and the weight 18 will close the gate 16.
95

In order to insure closing of the gate 16 in case, for any reason, counter-weight 18 should fail to close it, I pivot, at each upper
100 corner of the gate structure, a trip arm 50 the lower end of which is normally held outwardly by a spring 51, the upper end of the trip arm being formed to engage with a roller 52 mounted on cross bar 53
105 arranged across the upper side of the hopper spout 15. The cross bar 31 is formed to co-operate with the lower ends of trip levers 50 so as to pass said levers freely in the downward motion and so as to engage said
110 levers on the upward motion of the skip whenever said levers are in any intermediate position, and thus drive the gate 16 upwardly to closed position until the upper ends of the trip levers engage their respective rollers 52, whereupon the lower ends of
115 said levers are retracted from the path of movement of the cross bar 31 so that the skip may proceed upwardly.

In case the counter-weights have fully closed the gate 16, the upper ends of the trip levers 50 will have been driven into en-
120 gagement with their rollers 52 so that their lower ends will be retracted from the path of movement of the cross bar 31.

I claim as my invention:

1. In a skip hoist the combination with a delivery hopper having a delivery opening and a sliding gate controlling said opening, of means urging said gate toward closed
125 position, a hoisting bucket traversing said

- opening and when in loading position in a position to receive the contents of said hopper through said opening, and means on said bucket for engaging said gate and moving the same to open position as the bucket moves to loading position, said bucket having a movement transversely of the traversing movement to disengage said means from the gate and permit the gate to be closed.
2. In a skip hoist the combination with a delivery hopper having a delivery opening and a sliding gate for controlling said opening, of means for urging said gate toward closed position, a hoisting bucket traversing said opening and when in loading position in position to receive the contents of said hopper through said opening, means on said bucket for engaging said gate as the bucket moves to loading position for opening the gate and maintaining the same open and means for imparting a movement to the bucket transversely of its traversing movement and prior to the completion of the traversing movement of the bucket past the delivery opening to disengage said means from said gate and permit the gate to close.
3. In a skip hoist the combination with a delivery hopper having a delivery opening and a sliding gate for controlling said opening, of means for urging said gate toward its closed position, a hoisting bucket having a movement traversing the delivery opening of the hopper and substantially parallel with the movement of the gate, means on said bucket for engaging said gate to cause the same to be opened as the bucket moves to loading position, and means for imparting to said bucket prior to the completion of its traversing movement past the delivery opening, a diverging movement from said gate to disengage said means and permit the gate to be closed prior to the completion of the traversing movement of the bucket past the delivery opening.
4. In a skip hoist the combination with a delivery hopper having a delivery opening, of a gate for controlling said opening, means for urging said gate toward closed position, a loading bucket having means thereon for engaging said gate to move the same to open position when the bucket is moved to loading position and a support for said bucket in loading position movable under predetermined load conditions to move said engaging means on the bucket to disengaging position to permit the gate to close.
5. In a skip hoist with a delivery hopper having a delivery opening, of a sliding gate for controlling said opening, means for urging said gate toward its closed position, a hoisting bucket having means for engaging the gate for moving and holding the same to open position and a movable platform for receiving and supporting the bucket when unloaded with the gate engaging means in operative relation to the gate and movable when the bucket is loaded to a predetermined point to move said engaging means on the bucket to disengaging position to permit the gate to close.
6. In a skip hoist the combination with a delivery hopper having a delivery opening, of a sliding gate controlling said opening, means urging said gate toward closed position, a bucket having a hoisting movement traversing said opening, means on said bucket for engaging said gate as the bucket is moved to loading position for opening the gate, a movable platform for supporting the bucket in loading position and movable under predetermined load conditions to move the bucket transversely to its traversing movement to disengage said gate-engaging means and permit the gate to close.
7. In a skip hoist the combination with a delivery hopper having a delivery opening, of a sliding gate for controlling said opening, means urging said gate toward closed position, a hoisting bucket, means on said hoisting bucket for engaging the gate to move the same to open position as the bucket is moved to lowered position, a cradle for said bucket for supporting the same in loading position having one end pivotally mounted and the other end movable, the free end of said cradle being movable under predetermined load conditions on the bucket to tilt the bucket to disengage said gate engaging means and permit the gate to close.
8. In a skip hoist the combination with a delivery hopper having a delivery opening, of a sliding gate for controlling said opening, means for urging said gate toward closed position, a hoisting bucket having a movement traversing said delivery opening, means on said bucket for engaging said gate and a guideway for said bucket imparting a movement transversely to its traversing movement to cause said engaging means to engage the gate and move the same open as the bucket is moved to loading position and to cause the same to disengage the gate as the bucket is hoisted to permit said gate to move to closed position before the bucket completes its traversing movement past the delivery opening.
9. In a skip hoist the combination with a delivery hopper having a delivery opening, of a sliding gate for controlling said opening, means urging said gate to its closed position, a hoisting bucket having means for engaging said gate and having a traversing movement past said delivery opening, a track on which said bucket travels and an inclined portion in said track at the loading end thereof for moving the bucket transversely

of its traversing position as it is moved to loading position for causing said engaging means to engage the gate and move the same to open position and for permitting said bucket to move in the opposite transverse direction as it traverses said opening in hoisting direction to permit said engaging means to disengage said gate and permit the gate to close prior to the completion of the traversing movement of the bucket past the delivery opening of the hopper.

In witness whereof, I ALVIN C. RASMUSSEN, have hereunto set my hand at Indianapolis, Indiana, this 24th day of February, A. D. one thousand nine hundred and twenty-five.

ALVIN C. RASMUSSEN.