H. S. GARDNER.

HOISTING APPARATUS.

APPLICATION FILED JAN. 20, 1916.

1,275,241.

Patented Aug. 13, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

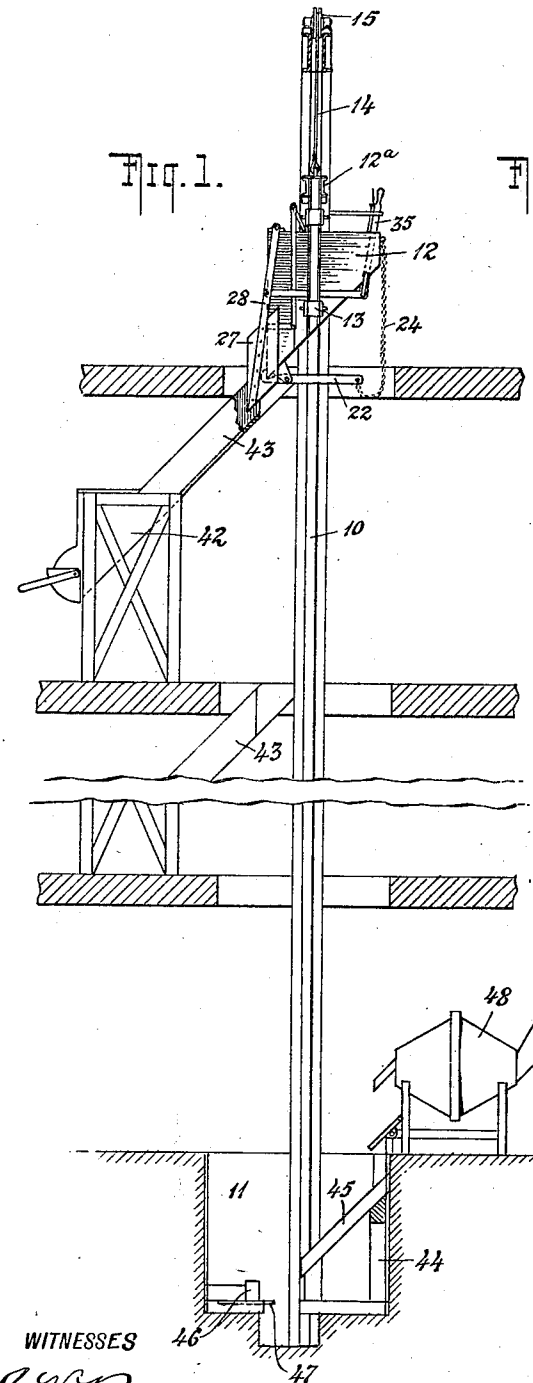
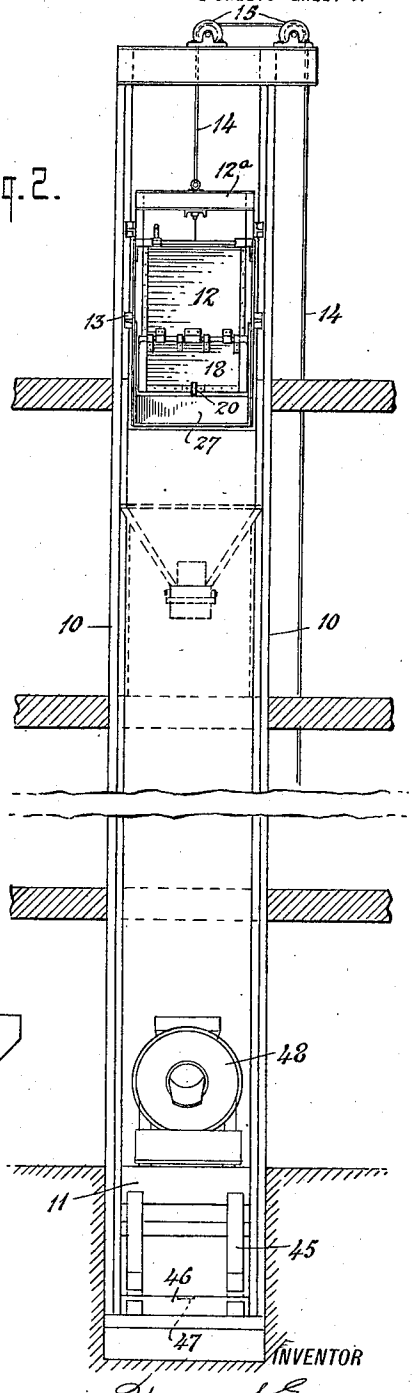


Fig. 2.



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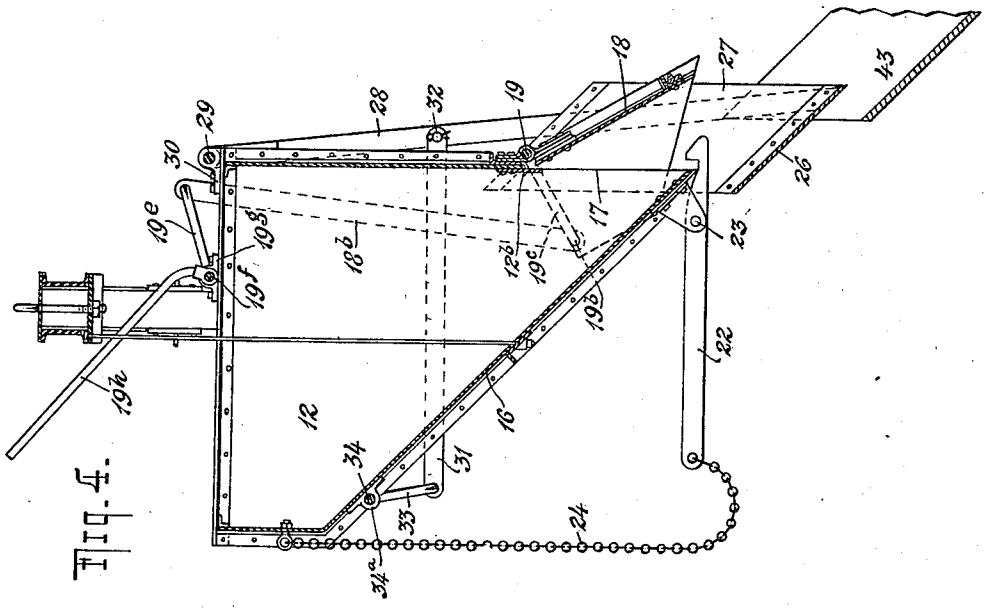


FIG. 4.

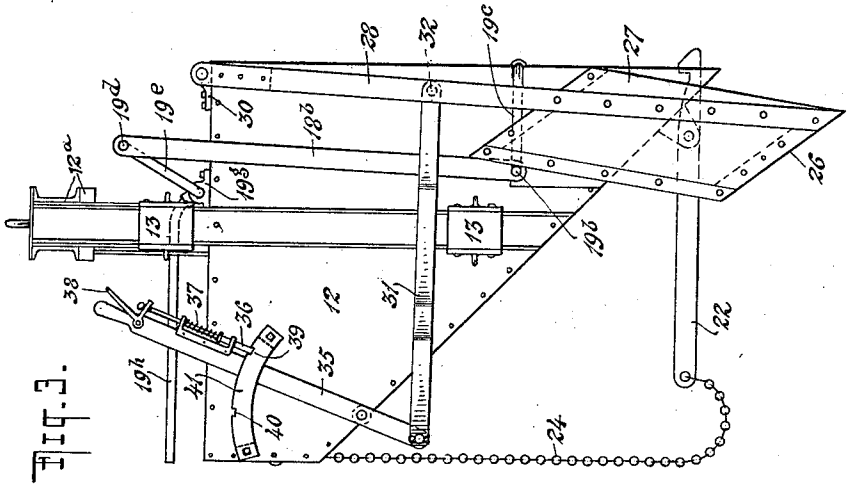


FIG. 3.

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3 SHEETS—SHEET 3.

Fig. 5.

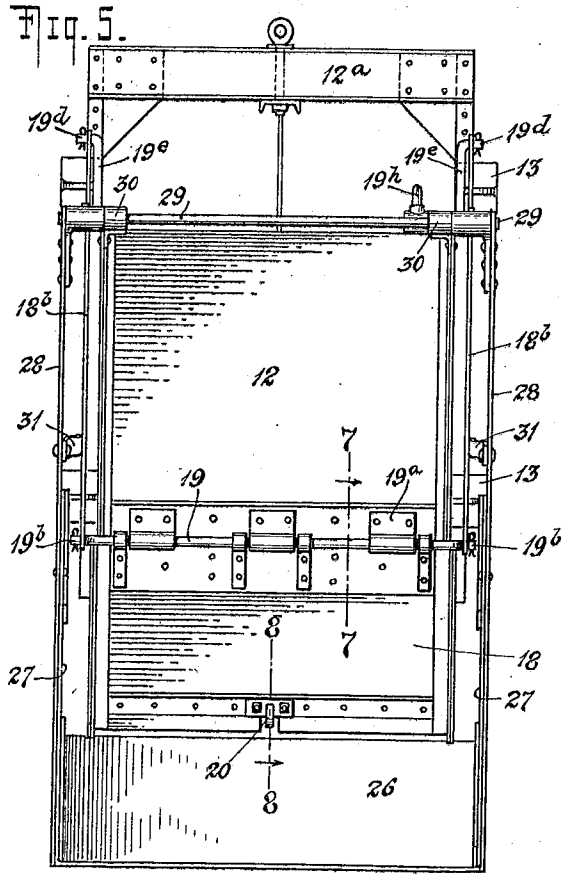


Fig. 7.

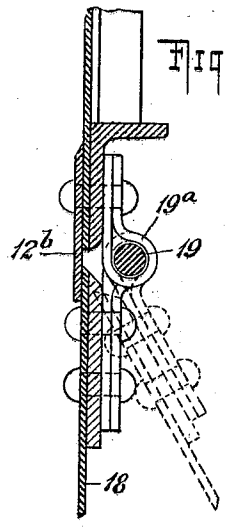


Fig. 6.

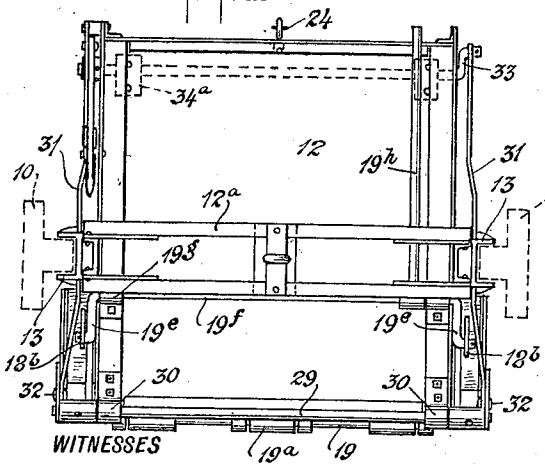
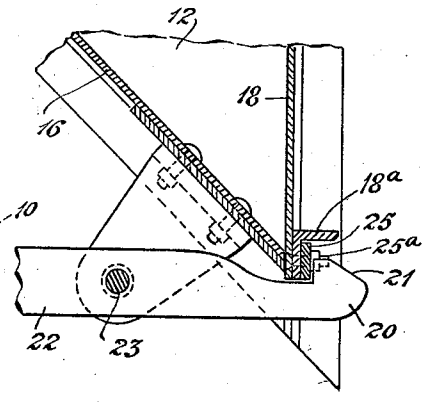


Fig. 8.



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HOISTING APPARATUS.

1,275,241. Specification of Letters Patent. Patented Aug. 13, 1918.

Application filed January 20, 1916. Serial No. 73,111.

To all whom it may concern:

Be it known that I, HOWARD S. GARDNER, a citizen of the United States, and resident of East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a specification.

My invention relates to hoisting apparatus adapted more particularly for use in building operations and construction work and has for its object to provide a simple and efficient apparatus whereby concrete, mortar, sand, cinders, grout and the like may be readily delivered at different floors or at various levels in maximum quantities with a minimum of labor. Other more specific objects of my improvement will appear from the description hereinafter and the features of novelty will be pointed out in the appended claims.

In the accompanying drawings which illustrate an example of my improvement Figure 1 is a sectional elevation of a building in the course of construction showing my apparatus in use; Fig. 2 is a similar view looking at right angles to Fig. 1; Fig. 3 is a detail side elevation on an enlarged scale of the bucket forming part of my apparatus showing the parts in one position; Fig. 4 is a similar view in section showing the parts in the position occupied during the delivery of the material; Fig. 5 is a front elevation of the bucket or receptacle; Fig. 6 is a plan view; and Figs. 7 and 8 are detail sections on an enlarged scale taken respectively on the lines 7—7 and 8—8 of Fig. 5.

As shown in the drawings the apparatus comprises a pair of parallel vertical guideways 10 which are arranged in the building or other structure in any suitable manner and are of any well known type adapted either to be built up in sections to keep pace with the construction or to be installed in the structure after the latter has reached its intended height. The said guideways 10 extend from a point below the lowermost part of the structure, as for instance a pit 11 formed in the cellar floor of a building to the uppermost point at which material is to be delivered and serve as guides for a bucket or receptacle 12 which is provided with grooves or channel members 13 arranged to coöperate with said guideways for maintaining the bucket 12 in its intended vertical or other path. The said bucket 12 may be raised and lowered or otherwise manipulated in any suitable manner, as for instance by means of a cable 14 having its one end connected, for instance, to a frame 12^a in which the bucket is mounted and passing over suitable pulleys 15 to the drum of an engine or motor which supplies the power whereby said bucket 12 is operated. The bucket 12 is preferably provided with a bottom 16 which inclines downwardly from the rear wall toward an exit opening 17 formed in the front wall of said bucket as shown in Fig. 4. This exit opening 17 is normally closed by means of a gate 18 depending, for instance, from a shaft 19 rotatably mounted in suitable bearings 19^a on the bucket 12 and preferably maintained in its closed position by means of a hook or dog 20 having a beveled face 21 and located at one end of a lever 22. The latter is pivotally connected at 23 with the bucket in such a manner that the rearwardly extending portion of said lever will overbalance the forwardly extending portion thereof so that the hook or dog 20, after an actuation of said lever to release the gate 19, will always automatically return to its operative position. The lever 22 may be swung on its pivot 23 in any suitable manner as for instance by means of a chain 24 having its one end secured to the rear end of the lever 23 and its other end suitably attached to the bucket 12. In the preferred arrangement a plate 25 is secured either directly to the gate 18 at its lower edge or to an angle iron 18^a located at said lower edge, said plate 25 being detachably secured, for instance, by bolts 25^a and serving as a wearing surface for the hook 20. As the plate 25 or hook 20 becomes worn through use a new plate 25 may be substituted or a suitable wedge or shim may be introduced between the worn plate 25 and the angle iron 18^a or gate 18 as the case may be to take up wear and to at all times provide for the proper securing of the gate 18 in its fully closed position. In order to protect the shaft 19 and bearings 19^a from becoming clogged with any part of the contents of the bucket 12 as said contents are discharged and at other times, the bucket is provided with a protecting member 12^b which depends downwardly beyond the upper edge of the discharge opening 17 and bridges the space between said upper edge and the upper edge of the gate 18 and pre-

vents any of the said contents from contacting with either the shaft 19 or the bearings 19^a as will be readily apparent. The gate 18 may simply be permitted to open under the influence of the load after being released from the restraining effect of the dog or, as is preferred, the operation of said gate 18 may be controlled by suitable means. As shown in the example this means comprises a link or links 18^b pivotally connected at 19^b with a crank 19^c secured to or forming part of the pivot shaft or the like 19 and having the opposite end connected at 19^d with a crank 19^e secured to or forming part of a shaft 19^f journaled in bearings 19^g located at the top of the bucket 12. The shaft 19^f may be rocked in any suitable manner as by means of a handle or lever 19^h having its end rigidly secured to said shaft 19^f.

In addition to the above the bucket 12 carries a chute 26 preferably having side walls 27, said chute being pivotally connected with the bucket 12 so as to be capable of a swinging pendulum-like movement relatively thereto, by means of rods or arms 28 secured to said side walls 27 and depending from a shaft 29 journaled in bearings 30 located on the upper edges of the side walls of said bucket 12. As shown in Fig. 3 of the illustrated example this chute 26 in its normal inoperative position is entirely inside of the front wall of said bucket so as not to interfere with the vertical movements thereof and is capable of being swung forwardly of said bucket in operative relation to the exit opening 17 when it is desired to discharge the contents of said bucket. In order that said chute 26 may be maintained in its inoperative position and manipulated in the desired manner I have provided links 31 having one end pivotally connected at 32 with the arms 28 and their other ends pivotally connected respectively with a crank 33 secured to or forming part of a shaft 34 and with an operating lever 35 rigidly connected with said shaft 34, the latter being journaled in suitable bearings 34^a carried by the bucket 12. The operating lever 35 extends upwardly in close relation to a side of the bucket 12 and above the top thereof and is preferably provided with a latch 36 maintained in and returned to its normal position by means of a spring 37 and actuated by means of a pivoted finger piece 38. This latch 36 coöperates with recesses 39 and 40 formed for instance in the upper edge of a segment 41 secured to a side wall of the bucket 12 to maintain the lever 35 in its intended position, whereby the chute 26 is locked either in its inoperative or in its operative position. In practice I prefer to provide preferably removable hoppers or bins 42 located at the various levels or on the different floors at which material from the bucket 12 is to be discharged although this is not absolutely necessary and said bucket may simply be caused to discharge its contents for instance to any receiving point. The bins or hoppers 42 if used are preferably provided with auxiliary chutes 43 leading thereto and adapted to coöperate with the chute 26 as will be more fully described hereinafter, it being understood that the auxiliary chutes 43 extend into close proximity to the path of the bucket 12 but without interfering with the vertical movements thereof.

When it its lowermost position ready to be loaded, the bucket rests upon a support 44 located in the pit 11 and provided with inclined members 45 with which the bottom 16 is adapted to come into surface contact, transverse projection 46 being located in said pit in front of said support so as to engage the lower edge of the gate 18 when the bucket 12 is fully lowered. With this arrangement the bucket 12 is firmly supported during loading and the pivots or hinges 19 as well as the dog 20 are relieved from any undue shocks and strains which may accompany the loading process. In order to prevent the dog 20 from being accidentally disengaged from the gate 18 when the bucket is in loading position in the pit 11, I prefer to provide a leaf spring 47 projecting from the transverse projection 46 into the path of the hook or dog 20. This spring 47 thus engages the latter and is placed under tension thereby when the bucket is fully lowered and thus exerts a pressure against said dog or hook 20, tending to maintain it against unintentional dislocation while the bucket is being loaded or remains fully in the pit 11.

When in position in the pit 11 the open top of the bucket 12 is substantially level with for instance the cellar floor and may thus be readily and quickly loaded to capacity or any part thereof for instance with concrete from a concrete mixer 48. After the bucket 12 has been loaded it is raised by the cable 14 to the level at which it is desired to discharge the load or to the particular hopper or bin into which said load is to be delivered. When the bucket has been brought to a standstill a workman first releases the latch 36 from the recess 39 by actuating the finger piece 38 and then swings the lever 35 from the position shown in full lines in Fig. 2 toward the rear until the latch 36 snaps into the recess 40. This actuation of said lever 35 causes a rotation of the shaft 34 so that a push is concurrently exerted on both links 31 which push is communicated to the arms 28 and thus swings the chute 26 from its normal inoperative position shown in Fig. 3 to its operative position indicated in Fig. 4. In this position the chute 26 extends for instance over the free end of one

of the auxiliary chutes 43 in advance of the exit opening 17 so as to bridge the space which normally exists between the end of the said auxiliary chute 43 and the bucket 12. In this position of the parts the latch 36 as before stated is located in the recess 40 so that the lever 35 and its coöperating parts, including the chute 26 are locked in operative position. After the chute 26 has been brought to and locked in the operative position shown in Fig. 4 the operator releases the gate 18 by exerting a pull on the chain 24 to swing the lever 22 on its pivot 23 and to thus move the dog or hook 20 to an inoperative position below the gate 18. If the weight of the load itself does not swing the gate 18 to its open position or it is desired to control the extent of the opening thereof the operator now exerts an upward pressure on the handle 19^h to rock the shaft 19^f in its bearings 19^g and through the crank 19^e and thus produces a downward push on the links 18^b. This downward push will be communicated to the crank 19^e thereby causing a rocking of the pivot shaft 19 and swinging the gate 18 for instance to the open position shown in Fig. 4 which now permits the contents of the bucket 12 to pass into the chutes 26 and 43 to the particular bin or hopper 42 combined therewith. By graduating the actuation of the handle 19^h the extent to which the gate 18 is opened may be accurately gaged so that the speed and volume of the discharge may be efficiently controlled to produce the most effective results with each different material. Owing to the fact that the pivot 19 is located close to the dog 20 a maximum leverage is obtained in the handle 19^h so that said dog is readily disengaged from the gate even though the latter is forced against the said dog by the pressure of the load in the bucket. At the same time with the described arrangement the dog will always automatically return to a normal position so that the gate 18 upon being brought to its closed position will engage the beveled face 21 and depress said dog which, the moment said gate reaches its final closed position, will snap behind the said gate and again lock it in said closed position. After the bucket has been emptied and the gate 18 has been closed the latch 36 is first released from the recess 40 and the lever 35 is swung toward the front of the bucket 12 and thus swings the chute 26 back to its normal inoperative position in which it is again locked through the coöperation of the latch 36 and recess 39. The bucket 12 may now again be lowered into the pit 11 and again loaded. During the discharge of the contents of the bucket 12 the side walls 27 of the chute 26 and the corresponding walls of one of the auxiliary chutes 43 will prevent the load or the said contents from spreading sidewise and will efficiently guide the entire mass toward the particular hopper, bin or other point of deposit. It will be evident that if desired, the pivot 23 may be replaced by a shaft on which more than one lever 22 with its dog 20 is mounted for the purpose of engaging the gate 18 at more than one point to lock it in its closed position.

With my improved construction the vibration of the loaded bucket during its ascent will pack the load down toward the angle formed by the bottom 16 and the gate 18 so that a complete and clean discharge or unloading is automatically had each time the gate is opened and the necessity for scraping the bucket is absolutely avoided.

It will be seen that in my improved construction which is extremely simple the operative parts are all carried by the bucket and that the latter itself is construced so as to have a large capacity and that all the elements may be controlled and operated with a minimum of attendants. During loading the bucket is also efficiently supported and relieved of all strains and shocks tending to injure same or disarrange the parts thereof. The apparatus may be effectively used for distributing concrete, mortar, cinders, grout or any other material and may be successively loaded with different materials without any trouble owing to the fact that each load is fully discharged each time in a clean and efficient manner.

Various changes in the specific form shown and described may be made within the scope of the claims without departing from the spirit of my invention.

I claim:

1. In a hoisting apparatus, a bucket having an exit opening, a movable door for said opening, a chute normally located beneath said bucket, means pivotally connected with said bucket for freely suspending said chute therefrom and means connected with said suspending means whereby said chute is swung pendulum-like from beneath said bucket to an operative position in advance of said exit opening and back again.

2. In a hoisting apparatus, a bucket having an exit opening, a movable door for said opening, a chute, arms having one end pivotally connected with said bucket, and extending downwardly at opposite sides thereof, said arms having their other ends attached to said chute whereby the latter is pivotally suspended on said bucket, a rock shaft, links connected with said rock shaft and with said arms whereby said chute is oscillated pendulum-like to and from an operative position in advance of said exit opening, and a handle operatively connected with said shaft whereby the latter is rocked.

3. In a hoisting apparatus, a bucket having an exit opening, a movable door for said opening, a chute, arms pivotally connected

at one end with said bucket and extending downwardly at opposite sides thereof, said arms having their other ends attached to said chute whereby the latter is pivotally suspended on said bucket, a rock shaft, links connected with said rock shaft and with said arms whereby said chute is oscillated pendulum-like to and from an operative position in advance of said exit opening, a handle operatively connected with said shaft whereby the latter is rocked and means for locking said chute in either of its positions.

4. The combination of upright parallel guides, auxiliary chutes located at different levels adjacent to said guides, a bucket adapted to travel lengthwise of said guides and having an exit opening, a chute normally located beneath said bucket, means pivotally connected with said bucket for freely suspending said chute therefrom, means whereby said chute is swung pendulum-like from beneath said bucket over the end of an auxiliary chute to bridge the space between said exit opening and said auxiliary chute, a movable door for closing said exit opening, and means for controlling the movements of said door.

5. The combination of parallel guides, a bucket adapted to travel lengthwise thereof and provided with an exit opening, a movable door for closing said opening, means for locking said door in its closed position and means at the lower ends of said guides for engaging said locking means whereby the latter is prevented from being unintentionally released while said bucket is in its lowered position.

6. The combination of parallel guides, a bucket adapted to travel lengthwise thereof and provided with an exit opening, a movable door for closing said opening, means for locking said door in its closed position and a spring at the lower ends of said guides adapted to be engaged and placed under tension by said locking means whereby the latter is prevented from being unintentionally released while said bucket is in its lowered position.

7. In a hoisting apparatus, a bucket having an exit opening, a movable door for said opening, a chute normally located beneath said bucket, means pivotally connected with said bucket for freely suspending said chute therefrom, and means whereby said chute is swung pendulum-like from beneath said bucket to an operative position in advance of said exit opening and back again.

8. In a hoisting apparatus, a bucket having an exit opening, a movable door for said opening, a chute normally located beneath said bucket, means pivotally connected with said bucket for freely suspending said chute therefrom, and means whereby said chute is swung on its pivotal connections laterally of said bucket to an operative position in advance of said exit opening and back again.

In testimony whereof I have hereunto set my hand.

HOWARD S. GARDNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."