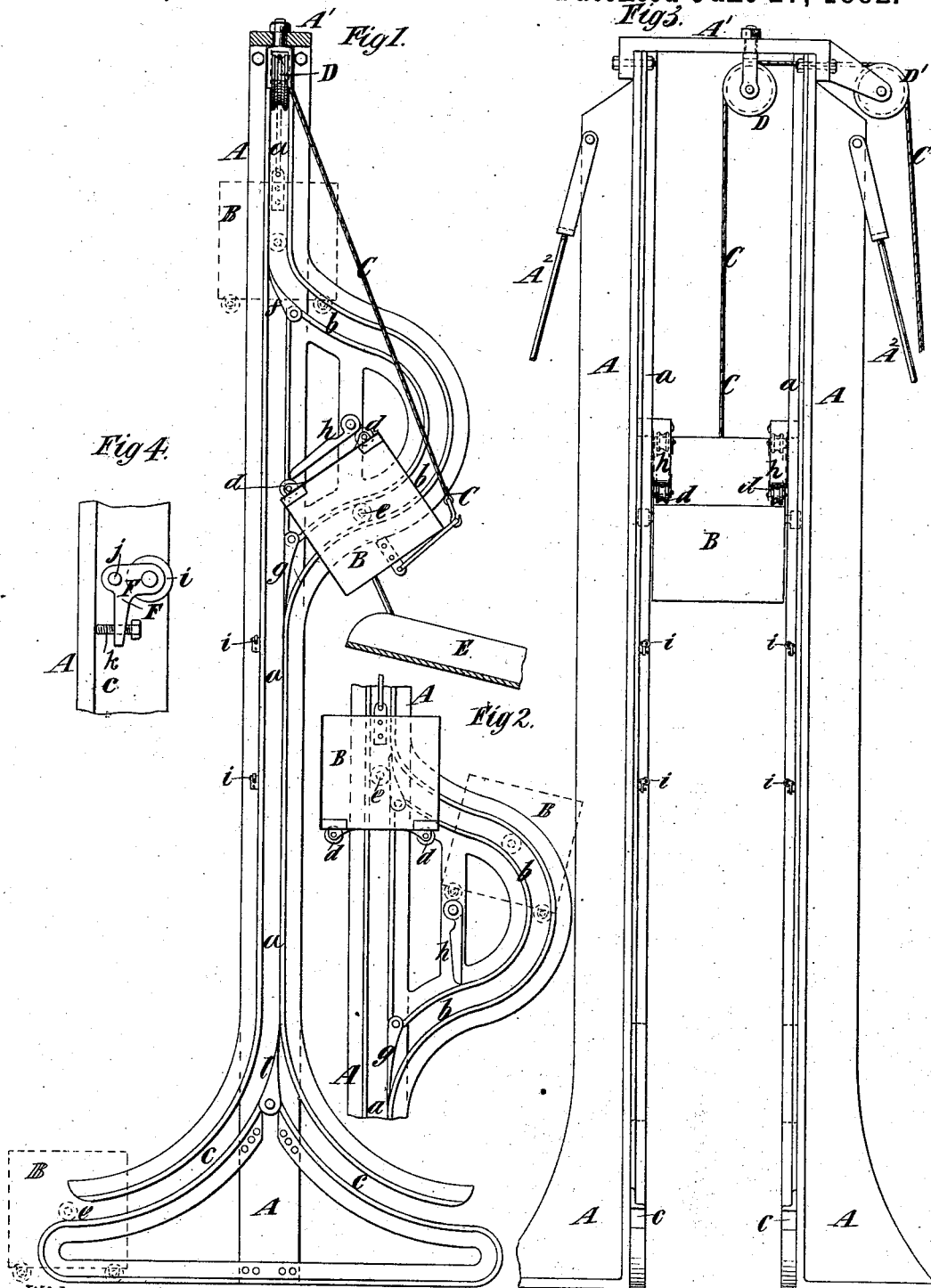


(No Model.)

W. S. ROCKWELL.
HOISTING APPARATUS.

No. 260,324.

Patented June 27, 1882.



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UNITED STATES PATENT OFFICE.

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HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 260,324, dated June 27, 1882.

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To all whom it may concern:

Be it known that I, WALTER S. ROCKWELL, of the city and county of New York, in the State of New York, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a specification.

My invention is applicable to hoisting apparatus for elevating any substances for which buckets are employed; but it especially relates to hoisting apparatus for raising or discharging coal and other substances from vessels. In my apparatus the bucket is raised and lowered by a rope or cable, and its discharge takes place as it commences its descent, its ascent having been made to a height slightly above that at which the discharge is produced; and the principal object of my invention is to provide for automatically tipping or turning over the bucket to empty it, and for again righting or returning the bucket during its descent, and, furthermore, effect these operations in a gradual and easy manner without undesirable shock or jar.

To this end my invention consists in the combination, with a bucket or buckets and uprights provided with main or straight channels or guides adapted to receive trunnions on the buckets, and with curved or arc-shaped branch or turn-out channels or guides on the upper parts of the uprights joining said main channels or guides, and also adapted to receive the trunnions on the buckets, of automatic switches at the upper and lower ends of which compel the trunnions on the buckets to keep in the main channels or guides in ascending, but direct them into the branch or turn-out channels or guides in descending, and stops or abutments, against which the bucket strikes while descending in the branch or turn-out channels or guides, and by which it is automatically overturned, so as to dump or deliver its load into a chute provided for the purpose.

The invention also consists in a novel construction of the aforesaid stops or abutments, which may be termed "tipping-switches," whereby the bucket is prevented from turning back or righting itself until ample opportunity has been afforded for the discharge of its contents, and is caused to move back into the

main channels or guides gradually and without jar or shock.

The invention also consists in the construction of the main channels or guides with branches extending laterally in opposite directions at their lower ends, whereby I enable a bucket to enter the main channels or guides from either side of the apparatus; and in the combination therewith of switches located at the junction of the said branch channels or guides with the main channels or guides, whereby I compel the empty bucket, as it descends, to return to the side of the apparatus from which it was taken.

The invention also consists in details of construction hereinafter described and claimed, including checking-rollers or devices for retarding the descent of the bucket during the time it is being righted after discharging.

In the accompanying drawings, Figure 1 represents a vertical section of my improved apparatus, taken in a plane between the two uprights, showing a bucket in the act of dumping or discharging. Fig. 2 represents a view, similar to Fig. 1, of that part of the upright which is provided with the arc-shaped or curved branch or turn-out channel or groove, showing a bucket ascending. Fig. 3 represents a side elevation of my improved apparatus, and Fig. 4 represents a detail view of a portion of one of the uprights and a checking device on a larger scale.

Similar letters of reference designate corresponding parts in all the figures.

A designates the uprights, which are placed at a sufficient distance apart for the buckets B to pass between them, and which may be constructed of metal. The uprights are united at the upper ends by a head or cross piece, A', and at their lower ends they may be bolted or otherwise secured to the floor or to the deck of a vessel from which material is to be hoisted; or the uprights may be secured to a suitably-constructed base plate or frame, if desired.

The uprights may be additionally secured by guy-ropes or braces A² at their upper ends.

When the apparatus is to be erected for use or taken down the uprights A may be separated and readily handled, and, if desired, they may be composed of sections, so that they may be more readily handled and stowed away.

As here represented, each upright comprises a main or straight channel or guide, *a*, a curved or arc-shaped branch or turn-out channel or guide, *b*, near its upper end, opening or extending into the main or straight channel or guide *a* at both ends, and two branch channels or guides, *c*, extending laterally in opposite directions from the main or straight channel or guide *a*, near the lower end thereof, as best shown in Fig. 1. The channels or guides *a*, *b*, and *c* may be advantageously composed of angle-iron, as here shown.

The bucket *B* is represented as provided with rollers *d* on the bottom, and with trunnions *e*, which consist of studs or rollers on opposite sides, which enter and are adapted to move freely in the channels or guides *abc*. The bucket *B* is operated or raised by a rope or cable, *C*, which extends therefrom upward over sheaves *D D'*, and thence downward to a hoisting-engine or other motor. In this as in many other forms of hoisting apparatus, the hoisting-rope *C* is wound up or pulled to raise the bucket *B*, and is then released and paid out or run back to lower the bucket, and a bell or signal may be provided by which the attendant at the bottom of the uprights may direct the engineer when to hoist, and devices or a trip may be provided at the upper end of the uprights and operated by the bucket in ascending to signal the engineer when to lower.

At the junction of the upper ends of the branch or turn-out channels or guides *b* with the straight channels or guides *a* are switches *f*, which are here represented as pivoted, and which in their normal position fall across and close the straight channels or guides *a*, as shown in Fig. 1; but when the bucket *B* is ascending the trunnions *e* thereon will swing aside or deflect the switches *f*, as shown in dotted lines in Fig. 2; and after the bucket has passed on upward to the position shown in dotted lines in Fig. 1 the switches *f* drop back across and close the channels or guides *a*.

At the junction of the lower ends of the branch channels or turn-outs *b* with the channels or guides *a* are switches *g*, here represented as pivoted. These switches are shown in their normal position in Figs. 1 and 2, and hang down over the end of the channel or guide *b*, so as to compel an ascending bucket to continue in the straight channels or guides *a*, but they allow a bucket to pass freely downward from the branch channels or guides *b* into the straight channels or guides *a*.

Upon each upright *A*, near the center of the arc-shaped branch or turn-out channel *b*, is pivoted a stop or abutment, *h*, the form of which may be seen in Figs. 1 and 2, and which I term a "tipping-switch." The tipping-switch *h* is pivoted at such a distance from the channel or guide *a* that when it hangs down in its normal position (shown in Fig. 2) the bucket *B* can ascend without interference from it; but when the bucket is allowed to descend it enters the turn-out channels or guides *b*, and the rollers *d*,

on opposite sides of the bucket, strike the top of the switch *h*, as shown by dotted lines in Fig. 2. By striking the switch one side of the bucket *B* is stopped or arrested, and as the rope *C* continues to slacken the bucket turns upon its studs or rollers *e* as upon trunnions, and also descends somewhat in the channels or grooves *b* to the position shown in Fig. 1 in full lines. By this turning over the bucket is dumped or discharges its contents into the chute *E*, by which the material is delivered at the desired place. The tipping-switches *h* are of such length below their pivots that they are carried by the rollers *d* on the buckets into the position shown in full lines in Fig. 1, and the bucket is by them held for a considerable time in an inverted position, and ample opportunity is afforded for the discharge of its contents. The tipping-switches also have an additional function, in that they slightly retard the empty bucket in its movement toward the channels or guides *a*, and prevent it from acquiring such a momentum as would cause its studs or rollers *e* to strike forcibly against the sides of the channels or guides *a*. The tipping-switches are arrested in the position shown in Fig. 1 by their ends striking against the outer side of the channel or guide *a*, or they may be provided with pins or projections which strike said channels or guides. As the studs or rollers *e* on the bucket *B* enter the channels or guides *a* the bucket turns, and this produces considerable slack in the rope *C*, and would allow the bucket to drop some distance if it were not retarded.

In order to check or retard the bucket, I attach checking-rollers *i* to the uprights *A*, and as the bucket turns over or rights itself it falls between these rollers, and is thereby checked or retarded, so that its fall is gradual until it again hangs by its hoisting-rope *C*.

It is necessary that the checking-rollers *i* should grasp the bucket with just the desired friction, and to provide for regulating this I pivot the rollers in frames *F*, which are fulcrumed at *j*, as shown clearly in Fig. 4, and I provide adjusting-screws *k*, by which the frames can be adjusted to cause the rollers to project more or less from the uprights *A*. When the bucket ascends it tilts the frames *F* upward on their fulcrums *j*; but when descending the frames are sustained by the screws *k*, and the rollers retard the bucket.

In lieu of the rollers *i*, friction devices or rubbers might be employed, they being adjustable in a similar manner.

If desired, two buckets may be employed in hoisting, and in such case they would be entered into the branch channels or guides *c* alternately.

At the junction of the channels or guides *a* in each upright with the straight channel or guide *I* place a pivoted switch, *l*, adapted to swing over to close either channel or guide *c*, as shown in Fig. 1. If a bucket is entered through the left-hand channel or guide *c*, the switch *l* is swung to the right hand, and as the

bucket descends it returns into the left-hand channel or guide *c*, and is delivered on that side of the apparatus. The rope *C* is then detached from the empty bucket and is attached to the full one on the right-hand side, which is entered through the right-hand channel or guide *c* and swings the switch *l* to the left, and when the bucket has been emptied and descends it returns through the right-hand channels or guides, *c*, to the right-hand side of the apparatus.

The switch *l* might be dispensed with if the hoist were perpendicular; but in case the apparatus is on a vessel the switch *l* is necessary in rough water.

If it is not desired to take buckets from both sides of the apparatus one of the branch channels or guides, *c*, and the switch *l* would be dispensed with, and, indeed, both said channels might be dispensed with and the trunnions *e* on the buckets made to enter directly into the straight channels or guides *a*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a hoisting apparatus, the combination, with a bucket provided with trunnions on opposite sides, and uprights provided with main channels or guides and turn-out channels or guides, of switches for directing the bucket through the main channels or guides in its ascent and through the turn-out channels or guides in its descent, and a stop or stops for tipping the bucket while in said turn-out channels or guides, substantially as herein described.

2. The combination of the uprights *A*, provided

with the main channels or guides *a* and the turn-out channels or guides *b*, of the buckets *B*, provided with trunnions *e*, and the switches *f g*, all arranged substantially as and for the purpose herein described.

3. In a hoisting apparatus, the combination of uprights provided with main channels or guides and turn-out channels, switches at the junction of the turn-out channels or guides with the main channels or guides, a bucket provided with trunnions fitting said channels or guides, and the pivoted tipping-switches for tipping said bucket and for retaining it tipped during its return to the main channels or guides, substantially as herein described.

4. In a hoisting apparatus, the combination of the uprights provided with main and turn-out channels or guides, the bucket working therein, the tipping-switches, and the checking-rollers or devices for retarding the descent of the bucket, substantially as herein described.

5. In a hoisting apparatus, the combination, with the uprights provided with the main channels or guides *a* and laterally-extending branch channels or guides *c*, of the bucket provided with trunnions or rollers *e*, and the switches *l*, for compelling the return of the descending bucket to that side of the apparatus whence it ascended, substantially as described.

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