

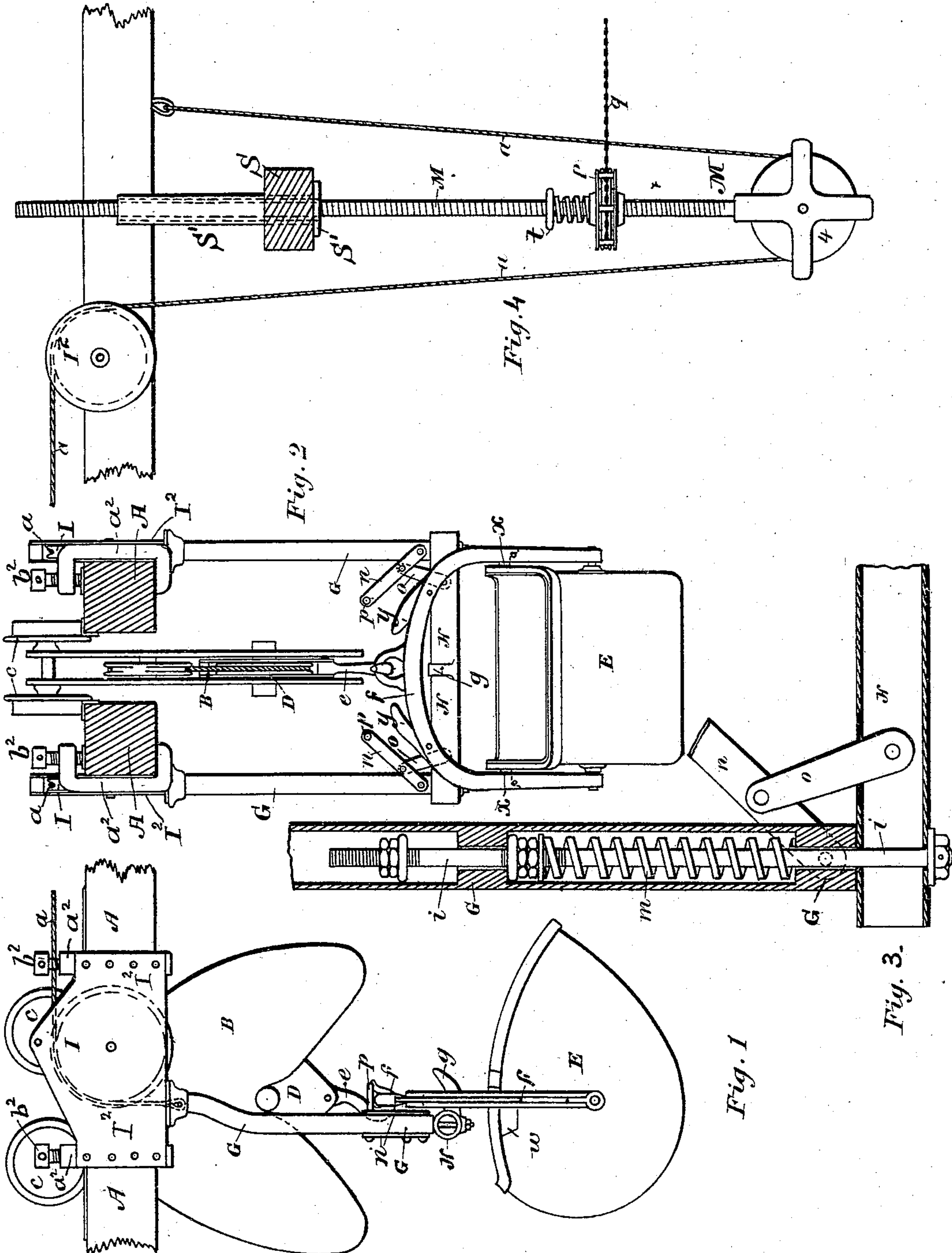
(No Model.)

A. E. BROWN.

HOISTING AND CONVEYING MACHINE.

No. 370,312.

Patented Sept. 20, 1887.



Witnesses,

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HOISTING AND CONVEYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 370,312, dated September 20, 1887.

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To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hoisting and Conveying Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this application.

In the use of automatically-dumping buckets in hoisting and conveying machines for handling coal, ores, and other materials it has long been considered a desideratum to have such buckets capable of discharging their contents at a time and place only which may be predetermined by the operator or superintendent of the conveying apparatus; but heretofore no practically-successful means has been devised, that I know of, by which the superintendent or operator could predetermine and regulate precisely the point or level down to which the loaded bucket might descend before it would certainly automatically discharge its contents.

My present invention has for its object to provide a practical and efficient means for accomplishing this desirable end; and it consists, essentially, in a trip frame or mechanism which is arranged to descend always with the filled bucket, and the limit of descent, which is regulated and controlled through certain media by the attendant, the said tripping frame or mechanism being organized so that, while it will descend with the filled bucket to the predetermined point without affecting the locking mechanism of said bucket, it will, on arrival at the terminus of its descent, act upon the locking mechanism of the bucket in such a manner as to disengage the latter from its bail and permit it to turn upon its trunnions in the usual and well-understood manner for the discharge of its contents, all as will be hereinafter more fully described.

To enable those skilled in the art to which my invention relates to make and use the same, I will now proceed to more fully explain it, referring by letters to the accompanying drawings, which form part of this specification, and in which I have illustrated my invention carried out in that form in which I have so

far practically used it, and which is the best form now known to me.

In the drawings, Figure 1 is an elevation of a portion of a hoisting and conveying machine, showing the application thereto of my novel mechanism or means for operating the latch device of the dump-bucket. Fig. 2 is a view of the same parts seen in Fig. 1, but taken from a point of sight at right angles to that of Fig. 1. Fig. 3 is a similar view to Fig. 2, but on an increased scale and embracing only a few of the devices, and made partly in section to better illustrate certain parts to be presently described. Fig. 4 is a detail view of certain parts, and showing a contrivance or arrangement of devices which I have by preference adopted and successfully employed for regulating or adjusting the point to which the trip mechanism shall be allowed to descend before acting on the latch device of the dump-bucket.

In the several figures the same parts will be found designated by the same letters of reference.

A is part of the apron of an overhanging hoisting and conveying machine, said apron embracing the usual track or tramway, upon which travels the machine or trolley B, the wheels C of which rest on said track, all in a manner well known and not necessary to be explained here.

The usual hoisting-sheave, D, is supported in the ordinary manner by the trolley while the latter is traveling on the track, and from said sheave or block D is suspended (through the medium of the usual hook, *e*) the bail or handle *f* of the dump-bucket E. As all these parts are supposed to be constructed and to operate in the usual manner, no special or further description of them need be herein given.

I represents pulleys that are mounted in metallic frame-pieces *I*², adapted to be secured to the tramway at any desired point by screw-clamps *a*² *b*², as clearly shown, and over which pulleys pass cords or cables *a*, from the ends of which depend the trip-frame mechanism. This tripping-frame mechanism is made thus: There are two depending tubular posts, G, to the upper ends of which are securely fastened the cables *a*, and within said posts are arranged longitudinally-sliding rods *i*, the upper ends of which are sustained by and against the ex-

pansive action of strong spiral springs *m*, (that are arranged within said tubular posts *G*,) and the lower ends of which are securely fastened to and support a horizontal or cross tube or cross-beam, (marked *H*.) At about the middle of this lower tube or cross-beam, *H*, is a projecting hook, *g*, which is designed, under certain circumstances, to support and be acted upon by the bail of the dump-bucket, in a manner and for a purpose to be presently explained.

Pivoted (at their lowermost portions) to the lower ends of the depending tubular posts *G* are vibratory frames *n*, from the uppermost ends of which project laterally (at the same side of the tripping-frame from which projects the hook *g*) tripping pins or lugs *p*, and these vibratory frames *n* are flexibly connected near their lower portions to the upper ends of actuating draw-bars *o*, that in turn are pivoted (at their lower ends) to the base-beam or cross-bar *H*, all as will be best seen by reference to Figs. 2 and 3 of the drawings.

The tripping-frame is arranged and operates in such manner that its normal position is one in which its upper end comes against or about up to a level with the underside of the tramway, (on which travel the wheels of the trolley *B*,) in which position it is held normally by the ropes or cables *a* and a counterbalance-weight attached to the upper or farther ends of said cables. This normal position of the trip-frame is such relatively to the bail or handle *f* of the dump-bucket suspended from the trolley *B* that said bail will always have its upper portion located immediately over and only a short distance above the hook *g* whenever the trolley *B* and its suspended load are in that position in which the bucket is to begin to make its descent, and also such that the projecting tripping-pins *p* will be located immediately over the usual vibratory levers of the bail, that operate when depressed to effect a disengagement from said bail of the locking devices of the bucket.

The cables *a* are connected (at their rearmost ends) to a contrivance, that will be presently described, by which the counterbalanced tripping-frame will have its descent checked at a given or predetermined point; but before explaining the means and manner of regulating the exact point to which the tripping-frame is permitted to descend, I will first describe the mode of operation of the tripping-frame, or the manner in which by means of it I effect the dumping of the bucket at a predetermined point in its descent.

Assuming the bucket to be loaded and all the parts of the contrivance to be in the relative positions illustrated at Figs. 1, 2, and 3, the bucket-sustaining sheave or block *D*, on being released from its permanent supports and allowed to descend in the usual manner, (by slacking up the hoist-rope,) will be lowered, with its load, in the usual way, and soon after having begun its descent the under

surface of the upper portion of the bail or handle *f* will come down onto and will rest upon the projecting hook *g* of the tripping-frame, and from thence on during the descent of the bucket and its attachments said tripping-frame, with all its parts or connections, will be pulled down or carried along by the descending bail *f* of the bucket, (the cables *a* being paid out, of course, over pulley *I*² by the pull on them of the descending tripping-frame,) and thus all the parts will descend together until the tripping-frame shall have arrived at the predetermined point or the locality at which its further descent will be stopped by a cessation of the letting out of the ropes or cables *a*, and as soon as this shall have occurred the gravity of the loaded bucket (then being suspended wholly upon the hook *g*) will for the first time operate to force down the cross-bar or base-tube *H* against the action of the strong coil-springs *m*, and by a further descent of the bar *H* only the vibratory frames *n* will be drawn down at their inner adjacent ends until the tripping-pins *p* will bear with sufficient force on the upper ends of the usual levers, *y*, of the handle-catch devices to force said levers down and effect (in a manner well understood) the unlocking of the bucket from its bail by the releasement of the bucket-lugs *w* (see Fig. 1) from the detaining lower ends, *x*, (see Fig. 2,) of the catch-levers *y*, for the purpose of discharging the bucket's contents. As is usual, after the dumping of the bucket the latter will right itself to the position ready for refilling, and after having discharged its contents will be so much lighter that the springs *m* will lift or assist in lifting the cross-bar *H* to its normal or original position that moment the ascent of the bucket begins, so that the tripping-pins *p* may (by a reverse movement of the frames *n*) resume their original positions and permit the automatic relocking of the bucket to its bail or handle. As the bucket is drawn up again the tripping-frame is also returned to its original position by the action of the counter-weight, before mentioned, upon the cables or ropes *a*.

A reference to Fig. 4 will make clear the contrivance or arrangement of devices which I have so far successfully employed for regulating or adjusting the exact point to which the tripping-frame is allowed to descend before it will become operative to actuate the locking mechanism of the bucket. This contrivance consists simply of a suitable series of wheels or pulleys (not shown) for multiplying the rope movement, over which the cables or ropes *a* are passed before being finally turned partially around pulleys 4, that are mounted, as shown, in or on a sliding frame or rod, *M*, which, with its attachments, constitutes the counterbalancing-weight, and which is lifted to a predetermined extent each time the tripping-frame descends, and vice versa. This rod or frame *M* is formed or provided, as seen at Fig. 4, with an adjustable stop, *P*, that may

have a spring-buffer, *t*, and that is provided with an ordinary chain-wheel, from which passes a chain belt, *q*, running off to some point convenient for manipulation by the attendant of the machine.

5 S is a fixed abutment which supports the screw-rod M through the medium of the internally-threaded tube S', against which the adjustable stop P (or its spring-buffer *t*) is brought by the ascent of the vertically-reciprocatory frame or rod (and its attachments) whenever a sufficient length of each of the ropes *a* shall have been paid out to lift the pulleys 4 to the requisite height to cause the stop P to travel up to the said fixed abutment. By adjusting or setting this stop P to different points on the rod or frame M the extent of motion of the latter may be regulated at pleasure, and in accordance with the limit thus given to the travel of this sliding and counterbalancing device will the extent of descent of the tripping-frame be determined.

Of course some other arrangement or device or contrivance than that shown and described may be employed for regulating the extent of descent of the tripping-frame, the main point or gist of my invention in this particular requiring only that some suitable means be employed to stop and hold the tripping-frame securely at just about the locality to which it is desired to have the bucket descend before discharging its contents.

It will be seen that by the use of substantially such a contrivance as I have shown and described I am enabled, with efficiency and certainty, to cause the dumping of the bucket always at precisely the point in its descent at which it may be desired to have its contents discharged.

40 Many modifications and changes in the mere

details of construction, as well as in the forms and proportions of the parts of the mechanism shown, may be made without departing from the principle of my invention, so long as there be a descending tripping frame or device adapted to be pulled down (against a counter-weight) by the bail of the descending bucket, and constructed so that on the arrival of the bucket at the limit of its descent the increased weight then transferred to the device in contact with which the bucket-handle rests will operate to cause said device to actuate the catch-releasing device of the tripping-frame in substantially the manner hereinbefore set forth.

Wishing it to be understood, therefore, that it is not essential to my invention that the precise forms of the parts or details of construction shown be followed out in practicing the same, what I claim, broadly, as new, and desire to secure by Letters Patent, is—

The combination, with the bucket and its bail, provided with the usual or any suitable bucket-locking device, and means for raising and lowering said bucket in the usual manner, of a movable tripping-frame arranged and operating to descend with the bucket to a predetermined point, as specified, and provided with devices which trip the catches of the bail or handle when, by reason of the said tripping-frame coming to a stop, a larger proportion of the gravity of the loaded bucket is transferred to said tripping-frame, substantially as hereinbefore set forth.

In witness whereof I have hereunto set my hand this 31st day of August, 1886.

ALEXANDER E. BROWN.

In presence of—

E. T. SCOVILL,
CHAS. W. KELLY.