(No Model.) 4 Sheets—Sheet 1.

A. E. BROWN.

HOISTING BUCKET.

No. 368,453. Patented Aug. 16, 1887.

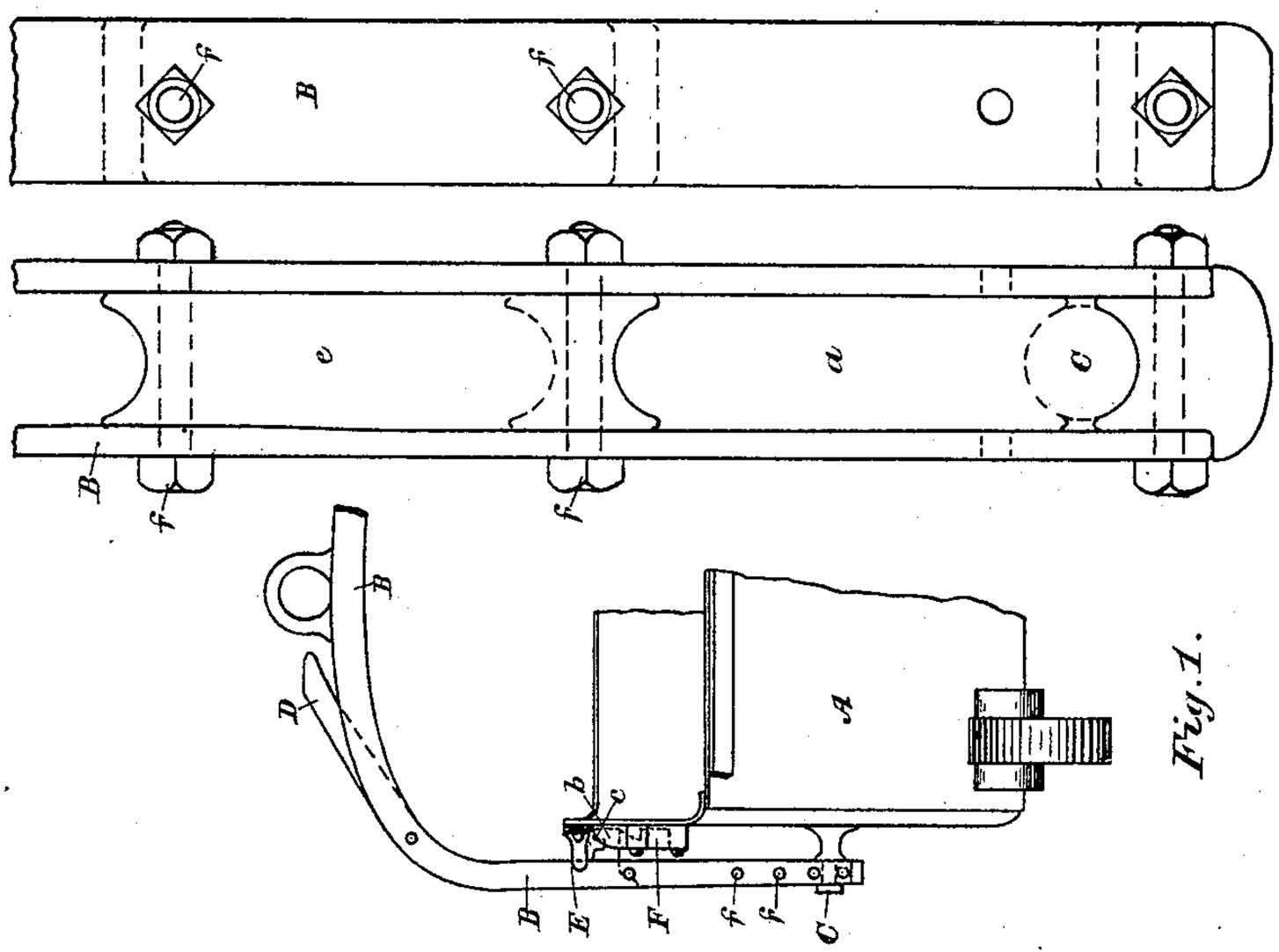


Fig. 11.

Fig. 12.

Fig. 1.

Fig. 4.

Witnesses,
W. J. Graham,
H Hausen

Inventor,
Alex. E. Brown
By Dyer & McGuire Atty's.

(No Model.) 4 Sheets—Sheet 2.

A. E. BROWN.

HOISTING BUCKET.

No. 368,453. Patented Aug. 16, 1887.

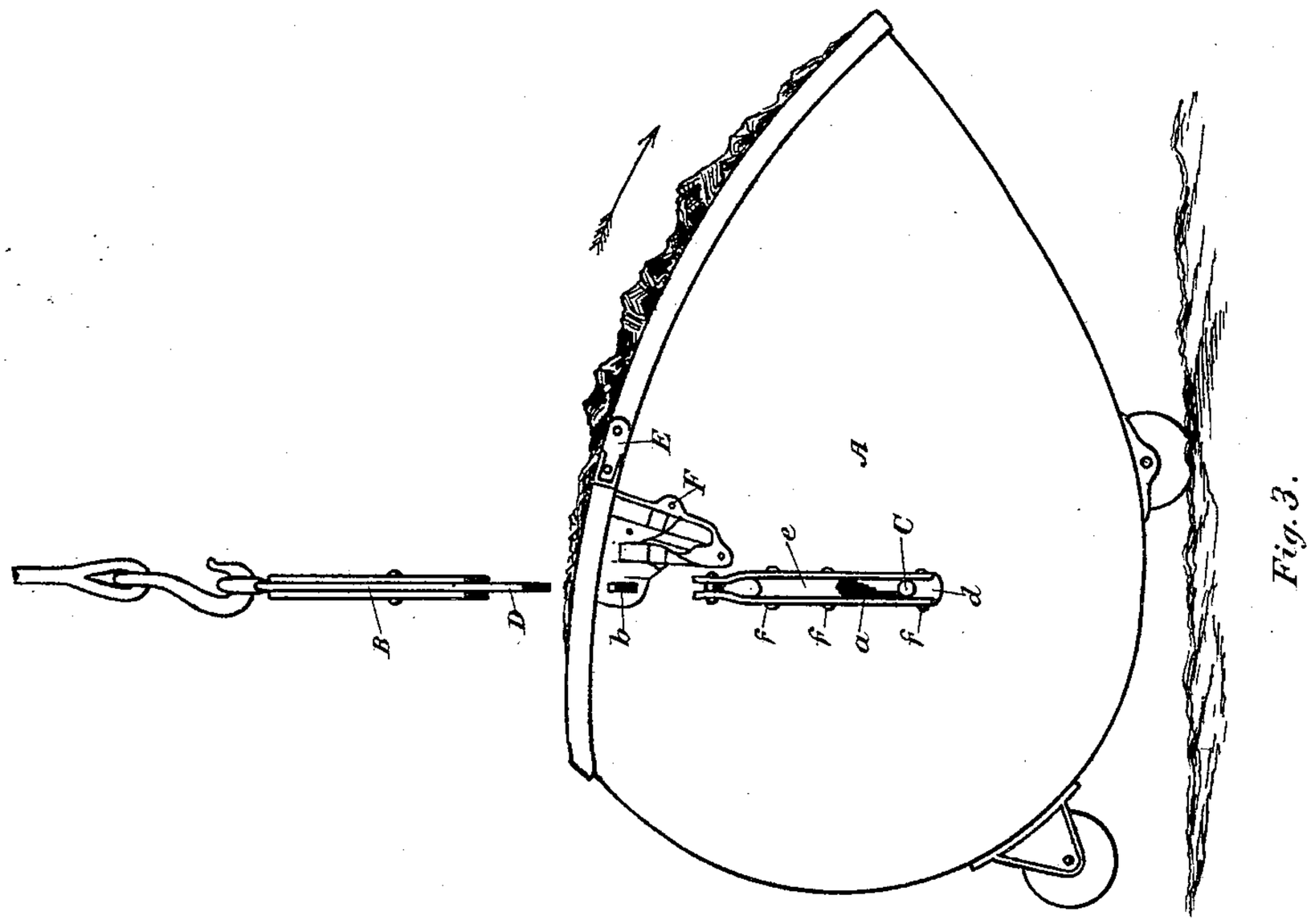


Fig. 3.

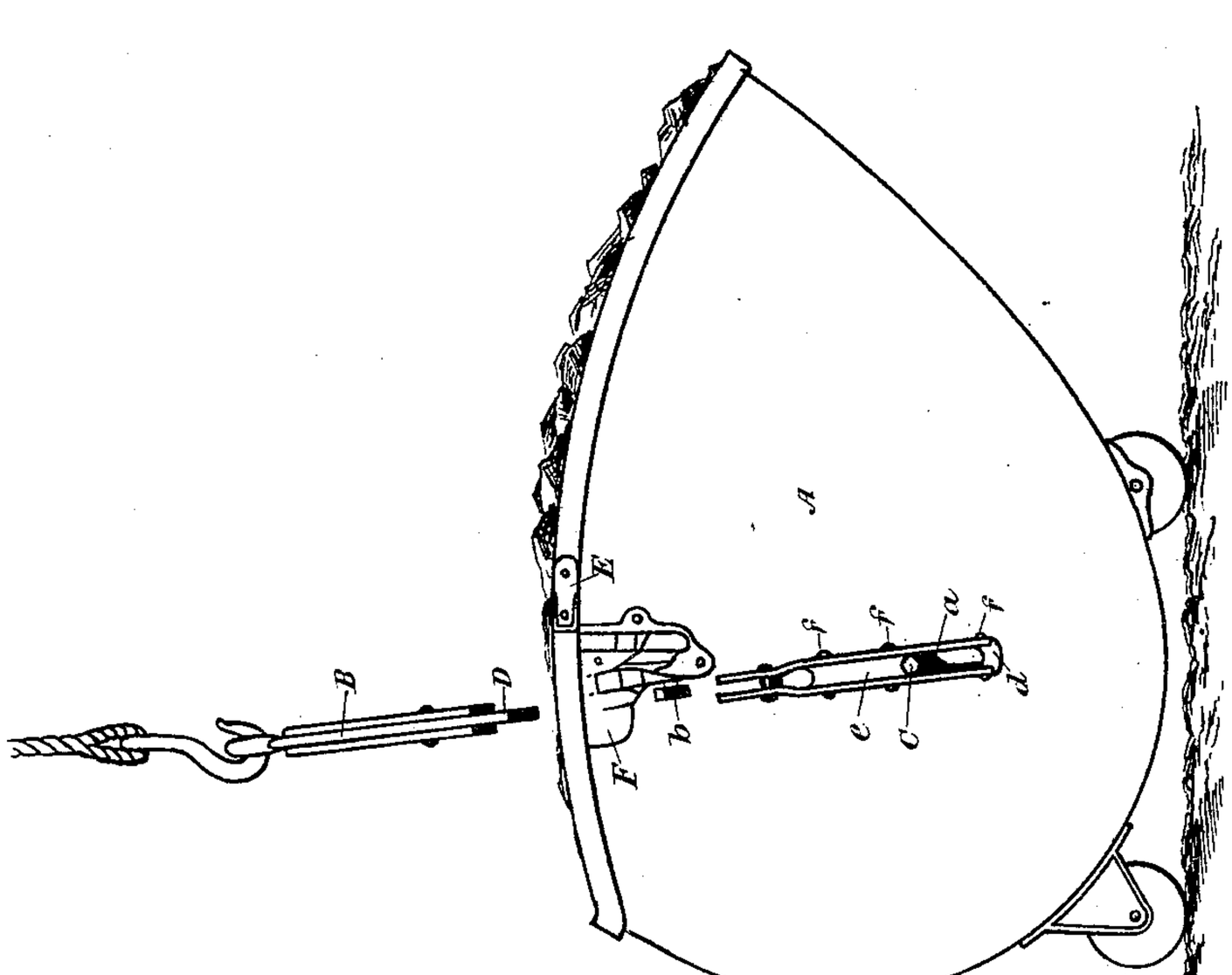


Fig. 2.

Witnesses
W. J. Graham.
F. Hausen

Inventor.
Alex. E. Brown
By F. N. M. Dieterich Atty.

(No Model.) 4 Sheets—Sheet 3.

A. E. BROWN.

HOISTING BUCKET.

No. 368,453. Patented Aug. 16, 1887.

Fig. 5.

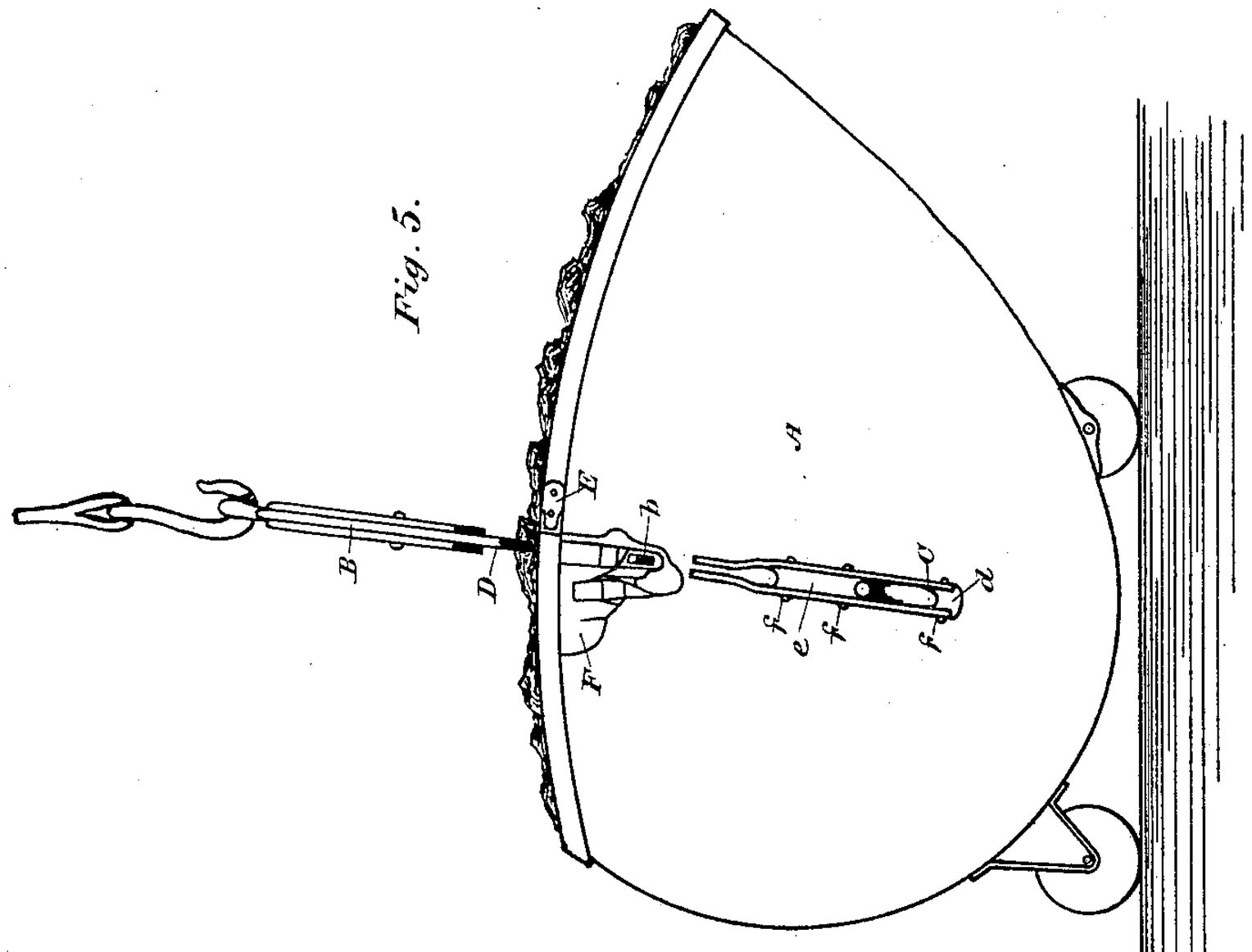
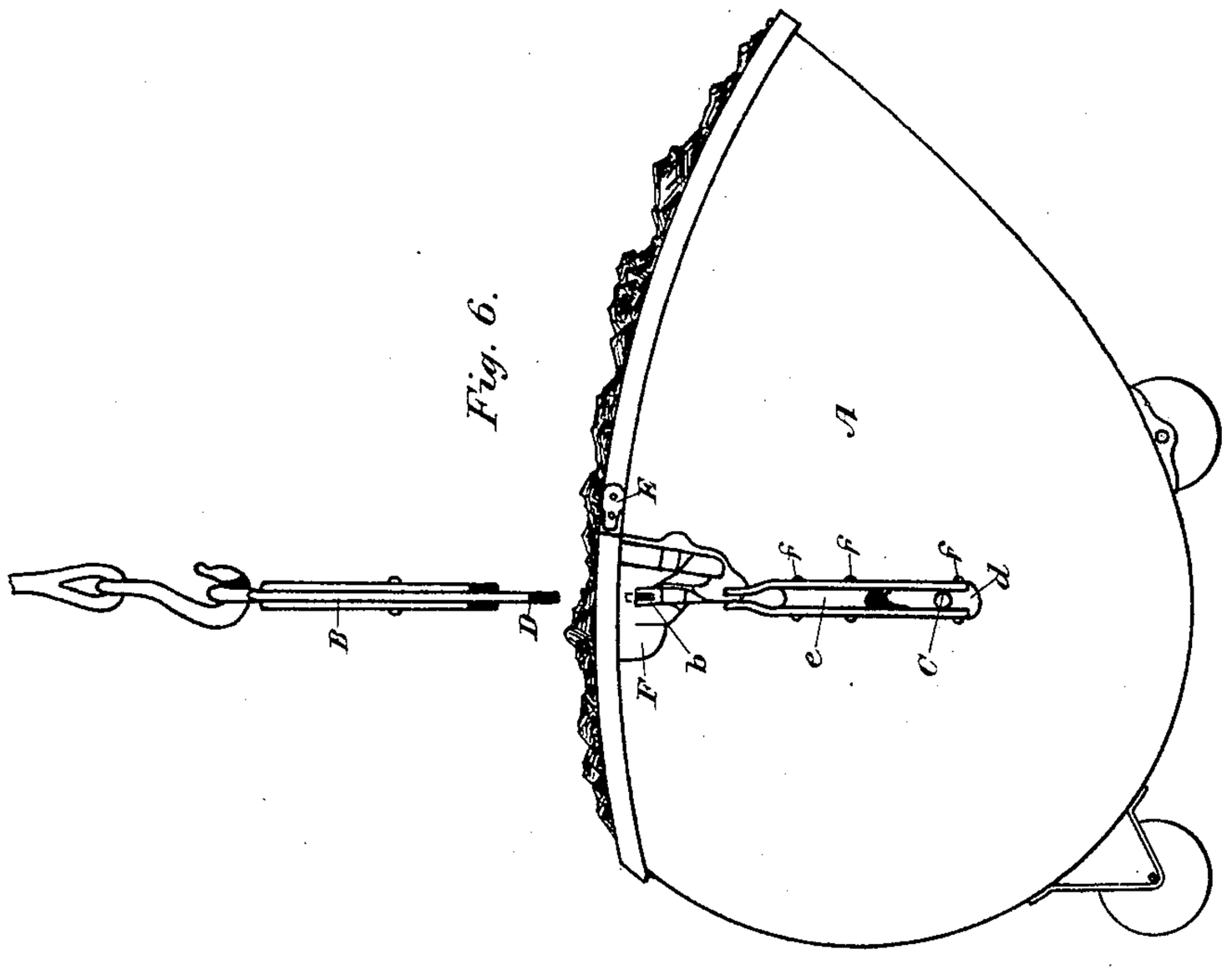


Fig. 6.



Witnesses.

W. J. Graham.

H. Hauser

Inventor

Alex. C. Brown

By J. N. McIntire Atty.

(No Model.) 4 Sheets—Sheet 4.

A. E. BROWN.

HOISTING BUCKET.

No. 368,453. Patented Aug. 16, 1887.

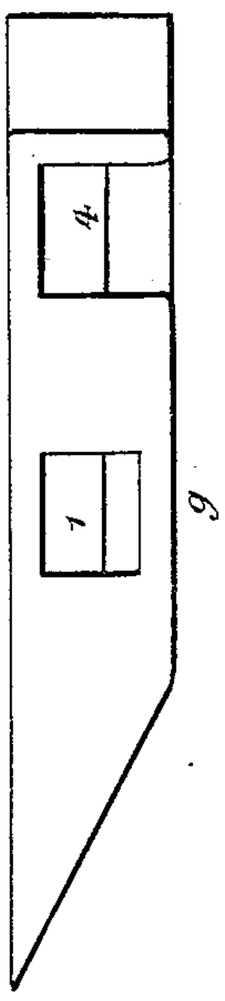


Fig. 9.

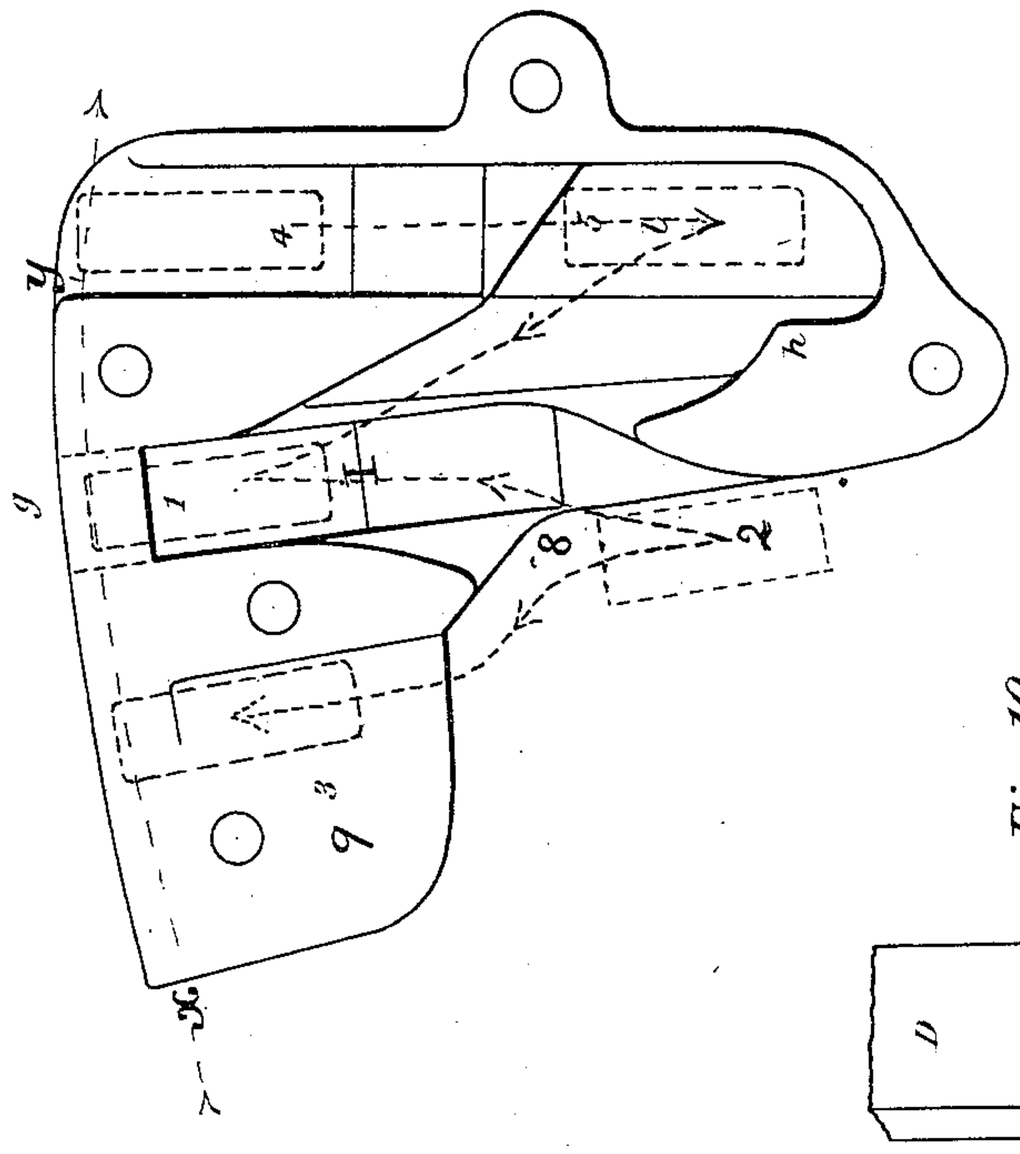


Fig. 8.

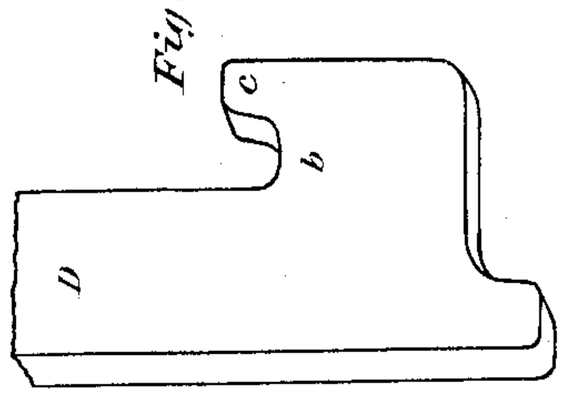


Fig. 10.

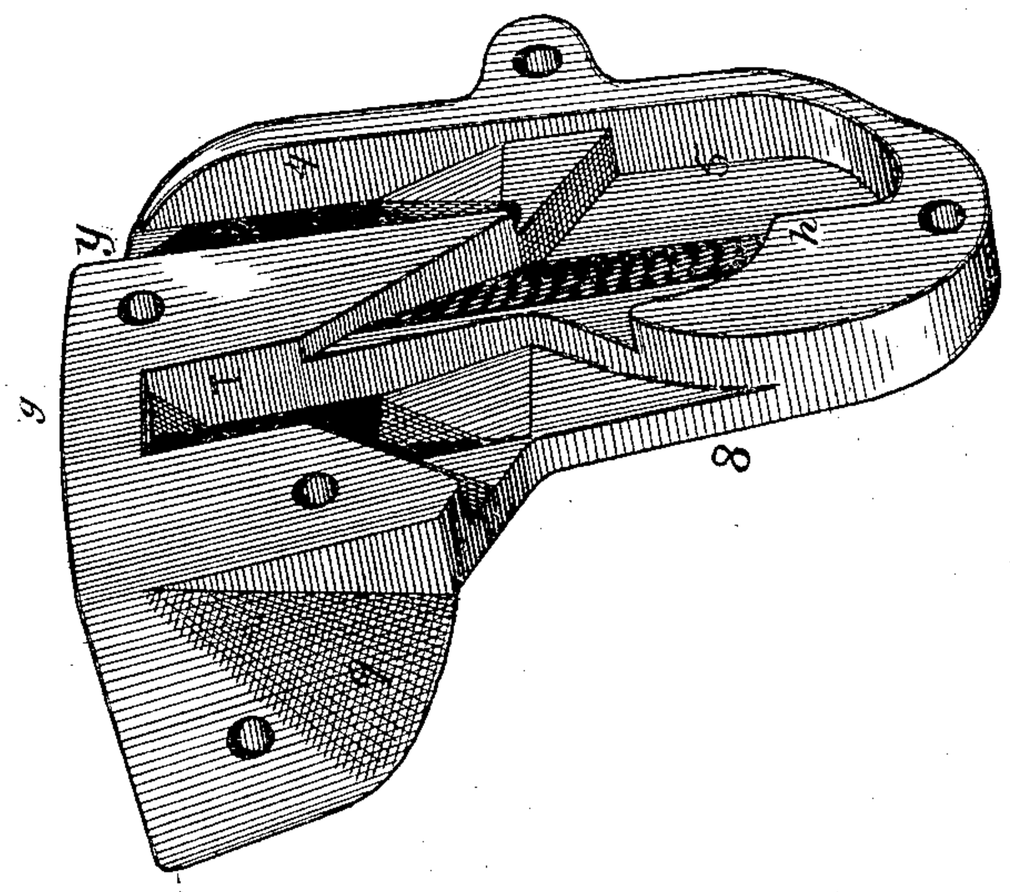


Fig. 7.

Witnesses,
W. J. Graham.
H. Hansen

Inventor.
Alex. E. Brown.
By L. N. McIntire Atty.

UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO.

HOISTING-BUCKET.

SPECIFICATION forming part of Letters Patent No. 368,453, dated August 16, 1887.

Application filed March 5, 1887. Serial No. 229,810. (No model.)

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.

My invention relates to novel means or contrivances for the purpose of rendering the usual buckets of hoisting and conveying machines capable of automatically performing all the necessary movements or operations necessary to the dumping or discharging of their contents only upon the pile or surface onto which the filled bucket may be lowered, and righting themselves or resuming their normal locked position with the catch devices of the bail or handle for reascension and refilling and transportation to be again emptied, and so on in the usual order of the performance of such operations.

It has been suggested previous to my invention to combine with the buckets of hoisting-machines and their bails various sorts of devices or contrivances for accomplishing the automatic dump at the proper time of the bucket, and in another application for Letters Patent by me filed simultaneously with this, and numbered 231,019, is shown and described one of such contrivances; but neither in it nor in any other with which I am familiar has it been practicable or possible to insure, first, the dumping of the bucket only when the latter shall descend onto the pile or surface onto which its contents are to be discharged; second, the subsequent relocking of the bucket in proper position with its bail as soon as the bucket shall have been again lifted, and, third, the prevention of any disengagement of the bucket-locking device either when the latter shall be subsequently lowered onto the surface where it is to be refilled or during its ascent (in a filled condition) and its transposition to the locality or pile at which it is to be again dumped. I have devised means for the accomplishment of these purposes with perfect certainty, and at the same time in a perfectly automatic manner, which means are at the same time exceedingly simple and durable, and in the form in which I have so far carried out my invention require only the use of a pair of locking-catches on the bail or handle, substantially such as now in common use, and the addition near each side of the bucket, near its upper edge, of a single piece, made preferably of cast metal, to coact with the lugs of the said bail-catches.

To enable those skilled in the art to which my improvement relates to make and use my invention, I will now proceed to describe it more particularly, referring by letters of reference to the accompanying drawings, which form a part of this specification, and in which I have shown my invention carried out in that form in which I have so far practiced it with perfect success.

In the drawings, Figure 1 is a partial end view or elevation of a dump-bucket such as is now commonly used in hoisting and conveying machines for handling coal, ores, &c., showing my invention applied thereto. Fig. 2 is a side view with a portion of the bail and catch-lever removed, showing the position of the catch levers or devices of the bail relatively to the locking and releasing cam-plate or device when the bucket may have been lowered onto the pile and the parts are in the position preparatory to the dumping of the contents of the tub. Fig. 3 is a similar partial side view showing the bucket in the position which it assumes in discharging its contents, and illustrating the changed relative positions of the parts consequent to the slight lifting of the bail and seating of the bucket on its trunnions to effect the dumping operation. Fig. 4 is a side view showing the positions of the parts after the bucket has automatically righted itself ready to travel to the locality at which it is to be refilled. Fig. 5 is a similar but partial side view showing the same parts in the relative positions they will appear in when the bucket shall have been lowered onto the supporting-surface for refilling. Fig. 6 is a similar partial side view showing the same parts in the relative positions they will appear in when the bucket shall have been refilled and lifted from the last-described position and is being carried to the place to discharge its load. Fig. 7 is a perspective view, and Figs. 8 and 9 are side and top views, en-

larged scale, of the locking and releasing cam-like devices detached from the bucket. Fig. 10 is a perspective view, enlarged scale, of the locking end of one of the catch-levers. Figs. 11 and 12 are partial views, same scale, of the handle or bail, showing the slotted trunnion-bearing.

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

A is a body portion of a metallic bucket or tub constructed in about the usual form.

B is the bail or handle by which the bucket is supported on its trunnions C, which, however, instead of being arranged in simple holes or cylindrical bearings in the handle B, are located within longitudinal slots *a*, formed in said handles, within which slots the trunnions have a given amount of movement in a manner and for the purposes to be presently explained.

D are levers pivoted at either side in the bail or handle, the upper ends of which levers are adapted to be depressed by hand, as usual, for the purposes of effecting the disengagement of the bucket-locking devices, which latter in the case shown are composed of the lug-like projections *b* on the lower ends of said levers, which lugs *b* are formed, as shown, with upward extensions or lips *c*, in a manner and for the purposes to be presently explained.

In the formation of the slots or oblong openings *a* in the handle I produce said slots by the use of a filling-in block or piece permanently fastened, as seen at *d*, and a shifting filling-in block, *e*, secured in place by means of bolts *f f*, as illustrated, so that whenever it may be desired to dispense with the use of the slot *a* and use the catch-lever shown for the purpose of manipulation by hand only the filling-in block *e* may be shifted by the removal of the two bolts *f f* and by slipping the said block down so that the lower one of the said bolts may be passed through what was the upper one of the holes in said block, (and the lower bolt passes through the lower hole and a supplemental hole in the parts of the handle,) thus bringing the lowermost semicircular end of the block *e* into position to come into contact with the upper half of the periphery of one of the hub-trunnions when the latter is situated on the bearing-surface of the block *d* or cylindrical bearing for said trunnion after the fashion of the arrangement of bail or handle and bucket-trunnion in common use prior to my invention.

E is a simple projection or stop applied to or formed on each side of the bucket, near its upper edge, in such relation to the cam-like locking and releasing devices F as to receive the pull or shock of the bail whenever the bucket rights itself, to prevent any backward movement thereof or any tendency to move back farther than the proper position, which might necessarily shock or strain the locking-lugs of the levers D or any portion of the cam-like device F.

The construction, or rather the shape or conformation, of the cam-like device F is peculiar, and will be best understood by visual inspection of the drawings illustrated.

In view of the foregoing brief description of the separate parts the following explanation, together with the visual inspection of the drawings, will make clear the conformation of this peculiarly-shaped device and its operations and effects, as well as the general operation of my improved contrivance.

Assuming the filled bucket to have just been lowered to merely touch the pile or surface onto which its contents are to be discharged, the relative positions of the bucket and its fixtures with the bail or handle and its locking devices would be such as represented at Fig. 6, in which positions the locking-lugs *b* would be in a position such that it would be confined laterally between the walls of the recess I, with its lip-like extension projecting upwardly and behind the bridge-like portion *g* of the cam-like casting. (Shown on an enlarged scale at Figs. 7 and 8.) Now, while the bucket rests upon the pile of coal or other material, a further slacking of the hoist-rope permits the bail or handle to descend (the trunnions of the bucket working up within the slots before referred to) until the lugs *b* shall have passed down in the recess I and out into the position seen in dotted lines at 2 of Fig. 8, when, by the tendency of the lower ends of the catch-levers D to swing toward the sides of the bucket, these lug-like devices *b* will pass by the surface of the cam device F and rest sidewise against it in about the position just described as being shown at 2, Fig. 8, in dotted lines, and also shown in Fig. 2. Upon lifting the handle or bail up again (in order to bring the trunnions of the bucket to a bearing and slightly lift the bucket from the pile of coal) the lug-like devices *b* will pass along up in contact with the edge portions 8 of the device F in the direction indicated by the arrows at Fig. 8 until, having run out of contact with this edge portion and been forced laterally outward to the proper position by the outwardly-inclined surface at 9, Figs. 7 and 8, the slightly-elevated bucket will turn in the direction indicated by the arrow at Fig. 3 and discharge its contents. Having emptied itself, the bucket will turn backward by gravity and resume its normal position relatively to the pivoted bail or handle, and in so doing the edges of the lug-like devices *b* and their extensions *c* will ride along over the surface of the cam-plate from the point *x* until they pass off at the point *y*, (see Fig. 8,) when they will drop into the upper ends of the recess 4 of the casting, in which position, by contact with the vertical sides of said recess, and, further, by contact with the bucket-stop E, the effectual locking of the bucket with the bail is effected. In this condition of parts the empty bucket is supposed to travel to the source of supply, and being there lowered onto any surface on which the bucket has to rest while being filled. The lowering of the bucket

onto such surface and the subsequent slight lowering of the bail will cause the said lug-like devices *b* of the handle to descend in the vertical recess 4 to the lowermost point thereof and into recess 5. (Shown in Figs. 5 and 8.) As soon as the bucket shall have been refilled, the bail or handle is of course elevated, first, in the hoisting operation, and moves, without lifting the bucket, until the trunnions of the latter shall have become again seated on the filling-in blocks *d* of the handle, and during this upward movement of the handle relatively to the bucket the lug-like projections *b* are forced to travel from the bottom of the recess 5, first slightly upward, and then upward and laterally, in the direction indicated by the arrows of Fig. 8, until they ascend into the proper positions in the recesses I and assume their original and highest positions therein, as seen at 1, Fig. 8, with their hook-like portions engaged beneath the bridge-like parts *g* of the casting F. In this relative position of the parts the full bucket is conveyed and lowered to the locality for discharging, when the operations already described may be repeated.

To prevent the bail or handle when lowered at the time and place for refilling the bucket from falling or oscillating backwardly at its upper end, the lower part of the recess 5 is made purposely to extend somewhat below the vertical wall or shoulder *h*, against which latter the locking-lug of the handle comes and prevents the handle from turning upon its pivoted support on the trunnion of the bucket.

It will be seen from the foregoing description of the parts and from the explanation just made of their operation that by means of the single peculiarly-shaped casting F, one of which is placed at each side of the bucket, in conjunction with the lug-like projections *b* and the usual locking-levers, D, of the bail or handle, I am enabled to provide for use a hoisting and conveying bucket which is entirely automatic in its operations and which can only be discharged of its contents after the bucket shall have been lowered onto the pile or surface onto which the coal or other material is to be dumped, and then slightly lifted therefrom to permit the rotation of the bucket on its trunnions.

It will be understood, of course, that in lieu of the pivoted handles D, with their lug-like projections *b*, which I have adopted and shown in order to employ some locking device now in common use, some other lug-like locking device, differently arranged, may easily be employed in conjunction with the same structure or locking or disengaging casting or device shown at F, and it will be seen that, although it may be expedient to employ shifting filling-in blocks *d*, so as to render the organization changeable from one adapted to operate according to my invention to one in which the locking devices may be operated, as shown, by hand, this feature may be omitted without departing from the principle of my invention, the gist of which rests particularly in the use of a cam-plate or device either formed of a single casting or of separated parts, provided with a series of engaging-depressions and cam-like surfaces for manipulating the locking-lug of the handle-engaging devices, both in and out and laterally, in substantially the manner in which I have hereinbefore explained, in order that upon the seating of the full bucket upon the pile or surface the engaging-lugs may descend and free themselves from the engaging devices of the bucket, so as to permit the latter when elevated by its trunnions to automatically dump, and so that said locking-lugs may then ride or travel over to a supplemental or secondary depression, into which they drop for re-engagement or detention of the bucket in a righted position during its transmission, and so that upon the redescent of the bucket upon any surface at which it is to be refilled the locking-lugs may again descend in the last-mentioned depression and upon the reascending of the bail or handle will be guided into their original depression and engagement with the locking plate or device F.

Of course the peculiar mode of operation resulting from the use of such a device as shown at F, or some equivalent thereof, can be done only by the use of a bail or handle capable of a given amount of movement or fall up and down relatively to the trunnions of the bucket supported by said handle, and hence the arrangement or combination with the trunnions of the bucket of a handle yoked around said trunnions so as to properly support them in an axial manner, and at the same time permit the lowering and re-elevation around about the trunnions, is an important and indispensable feature of my contrivance.

Having now so fully explained the construction and operation of my improved automatically dumping and righting bucket that those skilled in the art can make and use my invention, either in the form herein shown and described or in some other embracing the principle of my invention, and wishing it to be understood that the precise sizes and proportions, as well as the details of construction, are not important so long as substantially the means shown be employed to accomplish the novel ends of my improvement, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a tub or bucket provided with the usual sustaining-trunnions and a suitable bail or handle having a given amount of play up and down relatively to said trunnions, and having also suitable movable locking-lugs, *b*, a cam-like engaging and releasing device, F, operating, substantially as described, by means of a series of suitable depressions and cam-like surfaces to manipulate the said locking-lugs in substantially the manner and for the purposes hereinbefore set forth.

2. The combination, with the bucket or tub

and means for effecting the engagement and disengagement between the handle and said bucket at the proper times, for the purposes described, of a handle or bail formed or provided with slots or yokes and having an up-and-down movement relatively to the trunnions of the bucket supported by said handle, all 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.