(No Model.) 2 Sheets—Sheet 1.

T. S. MILLER.

DUMPING DEVICE.

No. 525,084. Patented Aug. 28, 1894.

Fig. 1,

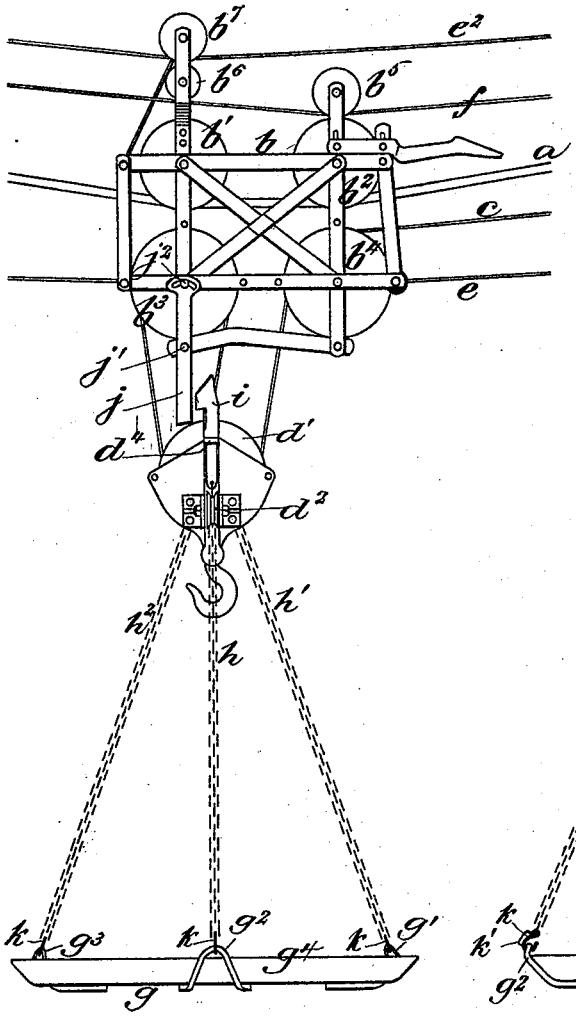

Fig. 2,

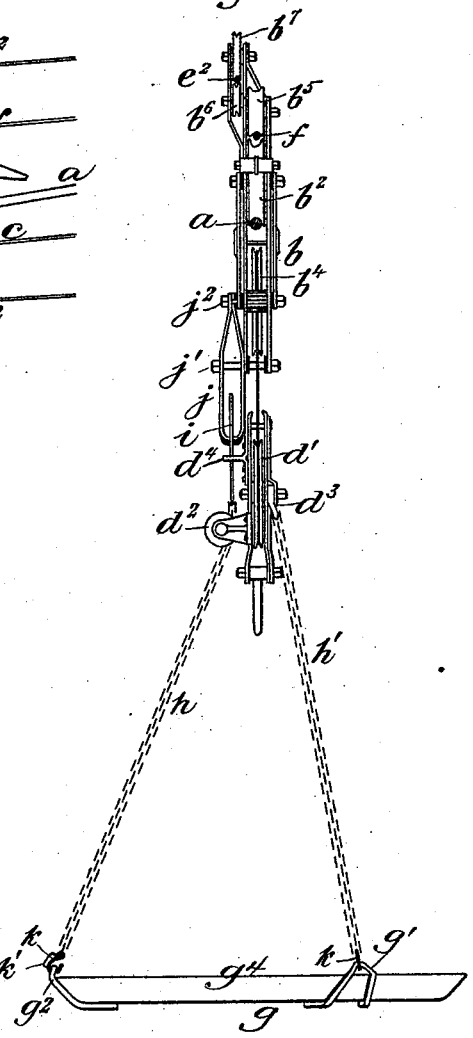

Fig. 6,

Fig. 7,

WITNESSES:

Fred. J. Kempson.

J. E. Greer.

INVENTOR

Thomas Spencer Miller

BY

Gifford & Law,

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3,

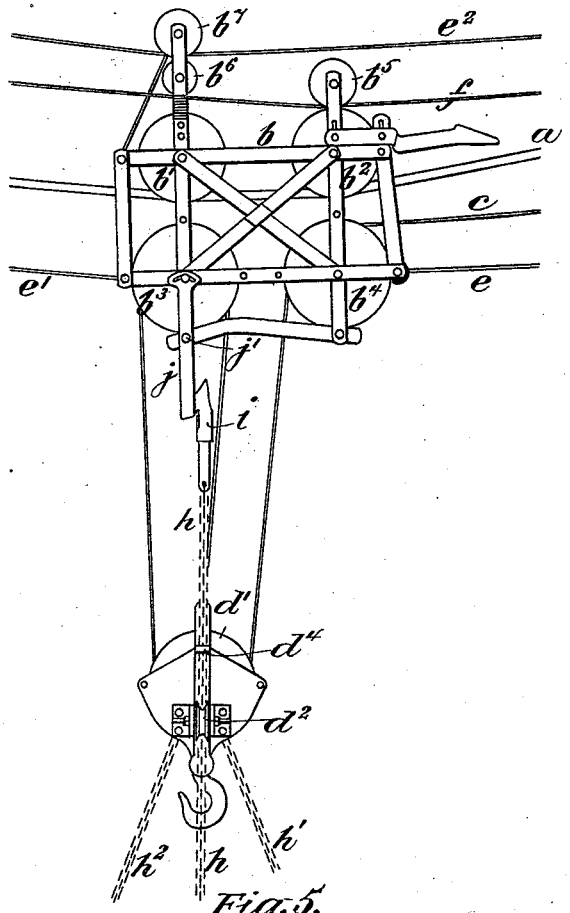


Fig. 4,

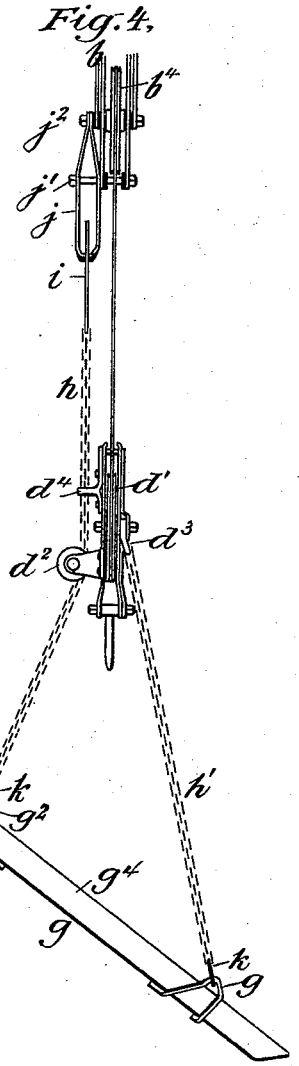


Fig. 5.

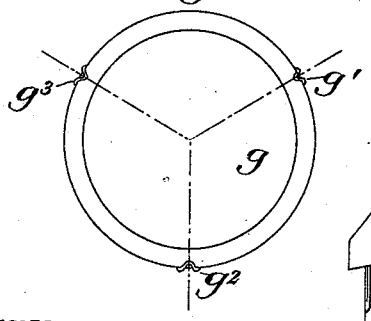
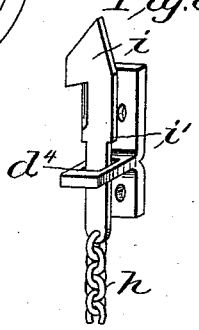


Fig. 8.



WITNESSES:

Fred't. Hemper.

J. E. Greer.

INVENTOR

Thomas Spencer Miller

BY

Gifford & Law

ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

DUMPING DEVICE.

SPECIFICATION forming part of Letters Patent No. 525,084, dated August 28, 1894.

Application filed January 5, 1894. Serial No. 495,769. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, of South Orange, in the State of New Jersey, have invented a new and useful Improvement in Dumping Devices, of which the following is a specification.

In the use of hoisting and conveying apparatus of the class described in my Patents No. 458,183, dated August 25, 1891, and No. 496,203, dated April 25, 1893, the custom heretofore has been to require that the load should be lowered within reach of an attendant before being dumped so that the attendant could disengage the support at one side of the skip or bucket. This custom has been attended with many disadvantages. The suddenness of the dump has so quickly relieved the supports from the weight as to produce confusion and entanglement between the ropes. Where, to obviate this, the load was lowered to the ground, it has involved a serious loss of time.

The object of my present invention is to enable the load to be dumped, if desired, in midair and at the same time, so gradually as to avoid the difficulty above referred to.

Another advantage may be availed of under my present construction which is, that after the bucket or tray is dumped it may be returned to its normal position so that as it travels back to the starting point to be reloaded, it is more under control and less in the way.

In constructing an apparatus to accomplish the above object, I have embodied a principle and mode of operation which I believe to be broadly new (viz: the utilization of the weight of the load to produce an engagement of mechanism acting inversely to the movement of the load) which may be applied to other purposes besides the dumping of the load. I will describe this principle in the best form that I have embodied it up to the present time, and as applied to the dumping of the load; but I do not wish to be limited either to that form nor to its application for that purpose.

Figure 1 is a side view of sufficient to illustrate my invention. Fig. 2 is an end view of the same. Fig. 3 is a side view of the same with the parts in dumping position. Fig. 4 is an end view of a portion of the same with the parts in dumping position. Fig. 5 is a plan view of the tray or bucket. Figs. 6 and 7 are details. Fig. 8 is a detail of the lug d^4, the hook and chain.

a is the cable support or trackway in a hoisting and conveying apparatus of the class above referred to.

b is a carriage containing the wheels, b' and b^2, running on the cable, and the suspended sheaves b^3 and b^4 and the supported sheaves b^5, b^6 and b^7.

c is a fall rope passing over the sheaves b^3 and b^4 and around the sheave d' of the fall-block d.

e and e' are inward and outward haul ropes fastened to the carriage, and which together with the rope e^2 constitute substantially an endless rope. e^2 passes between the sheaves b^6 and b^7.

f is what I term the button rope which regulates the spacing of the fall rope carriers, not shown.

d^2 is a sheave mounted upon the fall block.

g is the tray (I use the word broadly to include any load receptacle) provided with loops g', g^2 and g^3.

h, h' and h^2 are suspenders by which the tray or bucket is supported. Certain of these suspenders, as h' and h^2, always follow the movement of the fall block and may be fixed at their upper ends to the fall block, as shown at d^3. Another suspender, as h, normally also follows the movement of the fall block, but under certain conditions, described hereinafter, depending upon the weight of the load, will move inversely to or upon the fall block and produce a differential movement between the suspenders h' h^2, attached to one part of the tray, and the suspender h, attached to another part of the tray. A mechanism for producing this inverse or differential movement may be the following: The suspender h passes behind the sheave d^2 and is fixed at its upper end to a hook i which acts as a movable suspender holder. When the suspender h is in the position shown in Figs. 1 and 2, for holding the tray or bucket in its normal or level position, it is supported by a lug d^4 fixed on the fall block above the sheave d^2 on top of which lug a shoulder i' of the hook i rests. The hook thus constitutes a member which, normally, is supported by and moves with the fall-block

but which is free to move inversely or differentially with respect to the fall-block as when the relative motion between the two is from the position shown in Fig. 1, to that shown in Fig. 3. I will now describe how the relative motion is produced and how it is made dependent upon the weight of the load.

j is a detent. In the construction shown, it is supported by the carriage and consists of a loop hanging down from the carriage b to which it is connected by a pivot at j' and by an adjustable connection at j^2, so that its lower end may be adjusted slightly in the plane of the carriage. The detent j is so placed with respect to the hook i that the engagement or disengagement between the two will be determined by weight of the load as follows: The center of gravity of the load is not in the vertical line between the supporting wheels b', b^2, but is to one side of that line. The sheaves b^3, b^4 suspend the fall-rope in such position that the resultant weight of the load hangs from the carriage to one side of said vertical line. This tends to throw the weight upon the wheel b' and to relieve the wheel b^2 so as to tip the carriage into the position shown in Fig. 3 and produce engagement between the inversely movable member or hook i and the detent or loop j. This tipping of the carriage will only occur when the tray is loaded, so that we have two conditions, viz: When the tray is loaded, the inversely movable member or hook i will be engaged with the detent; and when the tray is unloaded, it will be disengaged. Therefore, when the tray is loaded, the lowering of the tray by the fall-block and the suspenders h', h^2 fixed thereto, will cause the tray to dump by reason of the inverse or differential movement of the member or hook i and the suspender h secured thereto relatively to the fall block and suspenders h', h^2. But when the tray is unloaded, it may be lowered without inclining as far as the fall rope will permit. Various other ways of supporting the detent j and various other constructions for causing the weight of the load to produce engagement between it and the inversely or differentially moving member i may be adopted, and I do not wish to limit myself to any particular construction. The sag of the cable under its own weight and the weight of the load may assist the engagement of the inversely or differentially moving member with the detent. Thus, when the carriage is about the center of the span, the cable will tend to occupy substantially a horizontal position, as shown in Fig. 1. As the carriage is hauled in toward the near end of the span by the inhaul rope e, it has to travel up an incline, the steepness of which increases as it approaches close to the near support of the cable until finally, it attains the inclination shown in Fig. 3 where the detent j has been moved toward the member i so as to produce engagement between the two; or, as it might be otherwise expressed, the member i has been moved toward the detent j by the tendency of the fall rope to support the tray or bucket perpendicularly to a horizontal plane. If the carriage be hauled from the center of the span toward the far cable support, the cable will also tend to assume an inclined position, but such as to move the detent j and the member i apart rather than together. Suppose the member i and detent j to be engaged. To dump the tray I proceed as follows: The fall rope c is paid out slowly until the tray or bucket has descended to the extent shown in Fig. 4, whereupon it will be found that the member i has been held by its engagement with the detent j so that as the suspenders h^2 and h' have been allowed to descend with the fall block, the suspender h has been prevented from descending, and the suspender h has acted as a stop against the complete descent of one part of the tray or bucket, and the tray or bucket has been thus tipped into the dumping position shown in Fig. 4. It is plain that this tipping of the tray or bucket can be made as gradually or as quickly as may be desired, depending only upon the rapidity with which the fall rope c is paid out. Thus, the load can be dumped so gradually as to prevent any considerable shock or reaction productive of vibration or entanglement of the supporting gear, and this is accomplishable while the load is in mid-air and without the aid of any workmen at the dumping point.

I claim—

1. In a hoisting or conveying apparatus in combination, a fall-block, a tray, supporting mechanism for the tray from the fall-block, a member movable inversely relatively to said fall-block, a detent wherewith said member is engaged by the weight of the load, and supporting mechanism connecting said tray with said member, substantially as described.

2. In a hoisting or conveying apparatus in combination, a tray, a fall-block, supports for different parts of said tray, means whereby one of said supports is fixed to said fall-block, and means whereby another of said supports is movably connected with said fall-block, whereby the inverse movement of one of said suspenders relatively to fall-block as the fall-block descends may dump the tray, substantially as described.

3. In combination, a fall block, a tray, a supporting mechanism connecting said tray with the fall-block, other supporting mechanism connected with said tray and normally sustained on said fall block, a detent, and means of connection between said last named supporting mechanism and said detent when the tray is loaded, substantially as described, said supporting mechanisms being connected with different parts of said tray.

4. In a conveying apparatus, the cable supported at two ends of a span, a carriage traveling thereon, a tray below said carriage, a support extending from one part of said tray up to said carriage, means whereby said sup-

port is engaged with said carriage upon the inclination of said carriage, and means whereby the other part of said tray is supported, substantially as described.

5. In a conveying apparatus in combination, a carriage, a tray, a fall rope, supporting mechanism connecting the same with the tray, whereby said tray is supported from said carriage, and two engaging members one connected with the carriage and the other with one part of the tray, so located relatively to each other that their engagement and disengagement are controlled by the inclination of the carriage, substantially as described.

6. In a conveying apparatus in combination, a carriage, a fall-block, a fall-rope, a tray, a supporting mechanism for said tray fixed to said fall-block, another supporting mechanism, a member on said fall-block whereby the lowermost position of said last-named supporting mechanism is fixed and means for engagement between said last-named supporting mechanism and the carriage, whereby the uppermost position of said last-named supporting mechanism is controlled independently of the position of the first-named supporting mechanism, substantially as described.

THOS. SPENCER MILLER.

Witnesses:
FRED. S. KEMPER,
JAMES T. LAW.