

T. C. WRIGHT.
 AUTOMATIC TRIP FOR HOISTING SKIPS.
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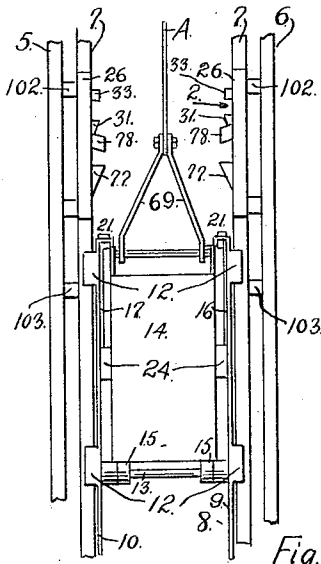


Fig. 1.

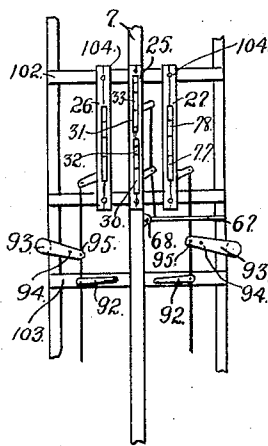


Fig. 2.

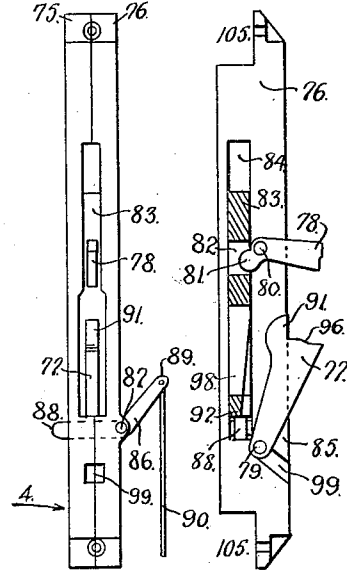


Fig. 3.

Fig. 4.

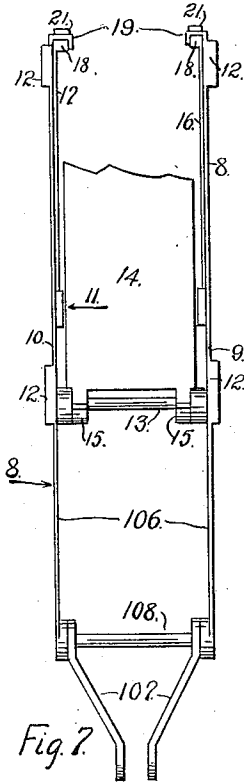


Fig. 7.

Witnesses
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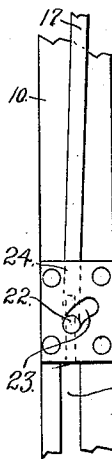


Fig. 11.

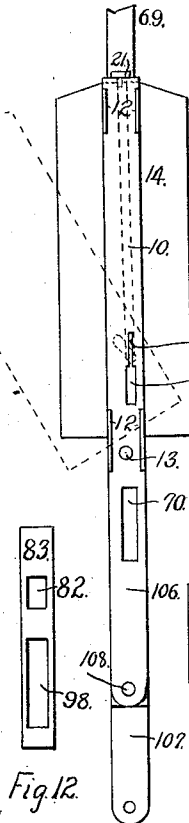


Fig. 12.

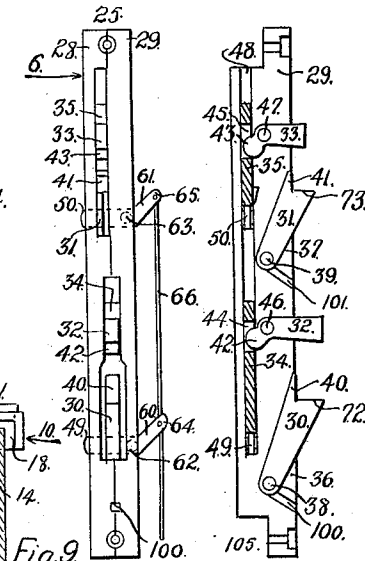


Fig. 5.

Fig. 6.

Fig. 8.

Fig. 9.

Fig. 10.

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AUTOMATIC TRIP FOR HOISTING-SKIPS.

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Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed December 30, 1911. Serial No. 668,610.

To all whom it may concern:

Be it known that I, THOMAS C. WRIGHT, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented new and useful Improvements in Automatic Trips for Hoisting-Skips; and I do declare the following to be a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in automatic trips for hoisting skips used in mining shafts and the like.

The object of my invention is to provide an automatic trip for hoisting skips whereby a mining skip or the like may be hoisted to any desired level and conveniently tilted to a dumping position.

Another object of my invention resides in the provision of an automatic trip for hoisting skips whereby the mining skip or the like may be hoisted from the shaft to any desired level and conveniently tipped in opposite directions.

Another object of my invention resides in the provision of automatic trip for hoisting skips, which acts under the influence of gravity to engage and tilt the skip to a dumping position at any desired level or height.

With these and other objects in view I will proceed to describe my invention with reference to the accompanying drawing forming a part hereof.

In the drawing: Figure 1 is a front elevation of a hoisting frame and skip showing the application of my trip mechanism to the frame. Fig. 2 is a view of one of the side members of the hoisting frame, looking in the direction of the arrow 2, Fig. 1, and illustrating the application of my trip mechanism to the frame. Fig. 3 is an edge view of the housing inclosing a part of the trip mechanism. Fig. 4 is a view illustrating a part of the trip mechanism looking in the direction of the arrow 4, Fig. 3 and having half of the housing removed. Fig. 5 is an edge view of a housing inclosing another part of the trip mechanism. Fig. 6 is a view with half of the housing removed and looking in the direction of the arrow 6, Fig. 5. Fig. 7 is a front elevation of the skip and

skip-carrying frame. Fig. 8 is a view of the skip and skip-carrying frame, looking in the direction of the arrow 8, Fig. 7. Fig. 9 is a detailed view of the upper end of one of the side members of the skip-carrying frame, showing the skip in section. Fig. 10 is a similar view looking in the direction of the arrow 10, Fig. 9. Fig. 11 is a view of the upper portion of one of the side members of the skip-carrying frame, looking in the direction of the arrow 11, Fig. 7. Fig. 12 is a view of a weight employed for actuating the trip mechanism.

The same reference characters indicate the same parts in all the views.

Let the numerals 5 and 6 designate vertically arranged parallel frame members, or studs, of a mining shaft. Each of these frame members or studs 5 and 6 is provided with suitable slides 7. Between these vertical frame members or studs 5 and 6, is arranged a skip-carrying frame designated in its entirety by the reference character 8. The outer surface of the opposite side members 9 and 10 of this skip-carrying frame is provided with channel shaped slides 12, which are adapted to receive runners 7, with which each of the vertical members or studs 5 and 6 of the mining shaft is provided. Intermediate the extremities of the hoisting frame 8, I arrange a cross bar 13 upon which is journaled a skip 14, as shown at 15. On the inner surface of each of the side members 9 and 10, of the skip-carrying frame 8, I respectively arrange slidably mounted members 16 and 17. The upper extremities of which are provided with lugs 18, each of which passes through slots formed in channel shaped extremities 19 of the upper ends of the members 9 and 10 of the skip-carrying frame 8. As more clearly illustrated in Fig. 9 of the drawing, these lugs 18 extend at right angles to the slidable bars 16 and 17 and are adapted to enter slots 20 formed in the upper edge of the skip 14, on the opposite sides of the latter. The lugs 18 are provided with enlarged heads 21, which engage the channel extremities 19 of the side members 9 and 10, of the skip-carrying frame 8 and support the slidable members 16 and 17 in their proper position to be operated by the trip mechanism which will hereinafter be fully explained.

The lower extremity of each of the members 16 and 17 is provided with a laterally

arranged circular projection 22 adapted to be respectively received in a slot 23 formed in a part 24, one of which is secured to each of the side members 9 and 10, of the skip-carrying frame 8. The parts 24 are arranged to straddle the members 16 and 17, a space being left between each of the said parts 24 and the members 9 and 10 to permit free movement of the members 16 and 17 for the purposes which will be hereinafter more fully explained. The lugs 18 normally occupy a position in the slots 20 with which the skip 14 is provided and thus serve to support the skip in a vertical position on the skip-carrying frame 8. Whenever these lugs 18 have been withdrawn from the slots 20 with which the skip 14 is provided, the skip will turn upon its journals by gravity to a dumping position. Now my improved automatic trip is intended to release the skip 14, so that the same may turn upon its journals to a dumping position and at the same time provide a support or stop for the skip-carrying frame, at any desired level or height in the mining shaft or other place.

I will now proceed to describe the construction and arrangement of my automatic trip in relation to the particular kind of skip and skip-carrying frame, which I have described in the foregoing.

By referring to Fig. 1, the position and location of my trip mechanism with respect to the vertical frame members or studs 5 and 6 of the mining shaft, may be readily ascertained, it being understood that this trip mechanism may be arranged upon vertical frame members or studs 5 and 6 at suitable distances apart or in positions corresponding with each level of the mining shaft.

Now referring to Fig. 2, it will be noted that the vertical frame member or stud 6, is provided with a housing 25 inclosing a catching and tripping mechanism. The mechanism is arranged upon the slide 7 parallel therewith and in the direct path of the skip-carrying frame 8. On opposite sides of this housing 25, I arrange housings 26 and 27, inclosing tipping dogs. In connection with the description of this trip mechanism it must be understood that a set corresponding to the mechanisms above referred to is arranged directly opposite the mechanism on the opposite vertical frame member or stud 5. The two sets coöperating with each other for tripping, tipping and supporting the skip.

While I have referred to the housing inclosing the catching and tripping mechanism, the construction and operation of the said mechanism inclosed by the housing may be more clearly understood by describing the same in detail with reference to Figs. 5 and 6.

The housing 25, for the catching and tripping mechanism is formed by joining parts 28 and 29 together. Within this housing I

pivotably mount catching and tripping dogs 30 and 31 and releasing dogs 32 and 33, which are respectively engaged by slidable weights 34 and 35, for maintaining the releasing dogs 32 and 33 in approximate horizontal positions out of engagement with the catching and tripping dogs 30 and 31 and in the path of the skip-carrying frame 8, when on its downward travel. The catching and tripping dogs 30 and 31 are normally extended outwardly into the path of the skip-carrying frame 8, under the influence of gravity, the outward movement of the catching and tripping dogs 30 and 31 being limited by shoulders 36 and 37 formed in, or upon, the members 29, of the aforesaid housing 25. Attention is here called to the fact that the catching and tripping dogs 30 and 31 may be of different shape and in other respects modified and varied to suit the circumstance and condition under which they are used, but as a matter of illustration I have shown them of triangular shape in the accompanying drawing, each of the said catching and tripping dogs 30 and 31 being pivoted at their lower ends, as shown at 38 and 39 respectively, whereby their weight has a tendency to throw the said catching and tripping dogs outwardly into the path of the skip-carrying frame 8.

The releasing dogs 32 and 33, are positioned in such a manner that they may be permitted to swing upwardly without interfering with the catching and tripping dogs 30 and 31, but when they are pushed downwardly they will respectively engage projections 40 and 41, respectively formed upon the upper extremities of the catching and tripping dogs 30 and 31 and carry the said catching and tripping dogs back within the housing 25, leaving the skip-carrying frame 8 free to move downwardly and carry the skip therewith. When these releasing dogs 32 and 33 are pressed downwardly into the housing in the manner above described they carry the weights 34 and 35 upwardly by virtue of cams 42 and 43, with which the releasing dogs 32 and 33 are respectively provided. Consequently whenever the pressure has been released from the releasing dogs 32 and 33, the weights 34 and 35, will slide downwardly in the housing and raise the said releasing dogs 32 and 33 to their normal or horizontal positions.

Attention is here called to the fact that each of the weights 34 and 35 is provided with openings 44 and 45, into which the cams 42 and 43 of the releasing dogs 32 and 33 are respectively received. Attention is here called to the fact that the releasing dogs 32 and 33 are pivoted in the housing as respectively shown at 46 and 47. Attention is also here called to the fact that the pintles, or pivot pins of the catching and tripping dogs 30 and 31 and of the releasing dogs 32

and 33 are formed integral therewith and that the opposite extremities of these pintles or pivot pins are journaled respectively in the opposite sides 28 and 29 of the housing 25. The weights 34 and 35 may be of any desired shape or form, however for the purpose of illustration, I have shown them formed of flat bars and slidably mounted in grooves or guide-ways 48, with which each of the parts 28 and 29, of the housing 25, is provided. The opposite edges of the weights 34 and 35, are respectively received in these grooves or guide-ways 48 with which each of the members 28 and 29 of the housing 25, is provided.

The lower extremities of the weights 34 and 35 are respectively engaged by arms 49 and 50 of bell-crank levers 60 and 61. These bell-crank levers are pivoted in the housing as respectively shown at 62 and 63. The arms 64 and 65 of these bell-crank levers are connected together by means of a rod or other suitable connection 66, for operating purposes. The lower extremity of this rod 66, is connected with a lever 67, pivoted at one extremity to the slide 7, as shown at 68. By pressing downwardly upon this lever 67, the arms 49 and 50, of the bell-crank levers 60 and 61, are raised upwardly and carry the weights 34 and 35 therewith, the weights in turn, turning the releasing dogs 32 and 33 upon their pivots and causing them to move downwardly within the housing and respectively into engagement with the projections 40 and 41 of the catching and tripping dogs 30 and 31, thus causing the catching and tripping dogs 30 and 31, to be drawn into the housing and out of the path of the skip-carrying frame 8. The lever 67 of any particular tripping set may be fastened or secured in the depressed position for maintaining the catching and tripping dogs 30 and 31 and the releasing dogs 32 and 33, within the housing whenever it is desired to dispense with the use of the tripping mechanism of the particular set.

In operation the skip-carrying frame 8 is raised by means of a cable A, connected with a bail 69, of the skip-carrying frame 8, until it comes into contact with the tripping mechanism. Now assuming that the catching and tripping dogs 30 and 31 and the releasing dogs 32 and 33 are in their downwardly extended positions, and that slots 70 with which the opposite side members 9 and 10, of the skip-carrying frame 8 are provided, have been brought to a position to register with the catching dog 30, of each set of tripping mechanism on the opposite sides of the hoisting frame, the said catching dogs 30 will fall outwardly under the influence of gravity and enter the aforesaid slots 70, in the sides 9 and 10 of the skip-carrying frame 8. When the skip-carrying frame 8 has reached this position where the

slots 70, of the frame register with the catching dog 30, of each set of tripping mechanism on the opposite sides of the hoisting frame, slots 71, which are also arranged in the sides 9 and 10 of the skip-carrying frame 8, are in a position to register with and receive the tripping dogs 31, which also fall outwardly by gravity into the slots 71, of the skip-carrying frame 8. When the skip-carrying frame 8 has reached this position and the catching and tripping dogs 30 and 31 have respectively fallen outwardly into the slots 70 and 71, of the skip-carrying frame 8, the cable A, for hoisting the skip-carrying frame, may be slackened, whereby the said frame will move downwardly, the shoulders 73 of the dogs 31, engaging the lower extremities of the members 16 and 17, of the skip-carrying frame 8. The downward movement of the skip-carrying frame 8 and the skip, resulting from the slackening of the cable A, will continue until the shoulders 72, formed upon the catching dogs 30, on the opposite sides of the hoisting frame, engage the upper extremities of the slots 70, formed in the opposite side members of the skip-carrying frame, at which time the skip-carrying frame and the skip will be supported by the dogs 30. Now since the members 16 and 17, of the skip-carrying frame 8, have been held in a stationary position by the tripping dogs 31, during the downward travel of the skip-carrying frame 8 and the skip 14, the said skip 14 has moved away from the lugs 18, formed upon the upper extremities of the members 16 and 17 and these lugs have been released from the slots 20, in the upper edge of the skip 14, whereby the skip 14, is permitted to turn upon its journals or rod 13, to a dumping position under the influence of gravity. For the purpose of permitting the downward movement of the skip-carrying frame 8 and the skip 14, after the tripping dogs 31 have been received in the slots 71, of the skip-carrying frame 8, I provide reduced slots 74, which communicate with the slots 71. As the skip-carrying frame moves downwardly the tripping dogs 31 enter these reduced slots 74 and come into engagement with the laterally extending circular projections 22, with which the lower extremities of each side members 16 and 17 are provided. After the tripping dogs 31 have thus engaged the lower extremities of the members 16 and 17, the further movement of the skip-carrying frame causes the said members 16 and 17 to move laterally, forcing their circular projections into the cam slot 23. After the circular projections 32 have moved into these cam slots 23, the tripping dogs 31, are received in the said reduced slots 74 and entirely fill up the slots, thus preventing the circular extensions 22, of the lower extremities of the members 16 and 17 from

leaving the upper extremities of the slots 23 and moving downwardly to such a position where their lugs 18, would be in a position to again enter the slots 20 of the skip 14.

5 The tipping mechanism at each level may be set in such a manner as to cause the skip 14 to dump in either of two directions. The carrying out of this function may be clearly understood from the following description of the mechanism inclosed in the housings 26 and 27. The mechanisms within these two housings are arranged on opposite sides of the casing 25. The mechanism in each housing is identical with each other and the construction and operation of the mechanism may be readily understood with reference to Figs. 3 and 4. Each of the housings 26 and 27, consists of two parts 75 and 76, secured together in any desired or suitable manner.

10 In each of these housings, I pivotably mount a tipping dog 77, and a cooperating releasing dog 78, the said dogs being respectively pivoted as shown at 79 and 80. The releasing dog 78, is provided with a cam-shaped extension 81, which enters an opening 82 formed in a weight 83, which is slidably mounted in a guide-way 84, with which the housing is provided. The weight 83 normally holds the releasing dog 78 in an outwardly extended position, while the tipping dog 77 normally occupies the outwardly extended position under the influence of gravity. Its outward movement being limited by means of a shoulder or lug 85 with which the housing is provided. Near the lower part of each of the housings 26 and 27, I pivotably mount a bell-crank lever 86 as shown at 87. The arm 88 of which is normally engaged by the lower extremity of the weight 83. To the arm 88 I connect an operating cord or rod 90. When the rod or cord 90 is pulled downward, the arm 88 of the bell-crank lever is caused to move upwardly and carry the weight 83 therewith, which in turn acts upon the cam extension 81, of the releasing dog 78 to move the said dog downwardly into the housing. As the releasing dog 78 moves downwardly into the housing it engages an extension 91 of the tipping dog 77, and acts upon the latter to cause the same to also move into the casing out of the path of the skip-carrying frame 8. In order to maintain the tipping dog 77 and the releasing dog 78, within the casing out of the path of the skip-carrying frame 8, I provide a fastening device 92, see Fig. 2, which is caused to engage the flexible device or rod 90, and hold the latter in the downward drawn position against the influence of the weight 83 and a supplemental weight 93, which is pivoted to the hoisting frame as shown at 94 and connected with the flexible device or rod 90 as shown at 95. Now assuming that the tipping dog 77 and releasing dog 78 are within the casing

27 on the left hand side of the hoisting frame and that the tipping dog 77 and releasing dog 78 extend outwardly from the casing 26 on the right hand side of the hoisting frame, the bottom of the skip 14, will engage a shoulder 96 formed upon the tipping dog 77 and will thus prevent the skip from tipping in the right hand direction, however, since the tipping dog 77 and the releasing dog 78, in the casing 26, on the left hand side of the hoisting frame, have been drawn within the housing 26, there is nothing to engage the skip 14, to prevent the said skip from tilting or dumping in the left hand direction.

From the foregoing description, it will be understood that whenever it is desired to dump the skip 14 toward the right, the mechanism or tipping dog 77 and the releasing dog 78 may be in a similar manner drawn within the casing 27 and the tipping dog 77 and releasing dog 78 on the left hand side of the hoisting frame or in the casing 26, may be left in their outward positions, whereby the tipping dog 77, in the housing 26 will be in position to engage the bottom of the skip 14, to prevent the latter dumping toward the left. The tipping dog 77 and releasing dog 78, in the housing 26 which have been then left in their outward extended positions, will be engaged by the skip 14 in the upward travel of the latter and forced inwardly into the housing, but as soon as the lower edge or bottom of the skip 14 has passed beyond the upper extremity of the tipping dog 77, the said dog will again fall to the outward extended position and in position to engage the bottom of the skip whenever the cable A has been slackened to allow the said skip to again move downward. The upward movement of the skip 14 carries the releasing dog 78 upwardly into the housing, since this dog will be engaged on its under side by the upper edge of the skip. Now as the cable A is slackened, the skip-carrying frame 8 will move downwardly and carry the skip 14 therewith until the bottom of the skip comes into engagement with the tipping dog 77, whereby the skip will tip in the direction opposite to the side which is engaged by the dog 77, the mechanism inclosed in the housing 25 on the opposite sides of the hoisting frame acting to catch and support the skip-carrying frame 8 and to trip or release the skip so that the latter will be permitted to fall to a dumping position.

Attention is here called to the fact that the lower part of the weight 83 is beveled off as shown at 97. The beveled portion being provided with a recess 98, whereby the tipping dog 77 is permitted to move well within the housing out of the path of the skip-carrying cage 8, the recess 98 with which the said weight 83 is provided, receiving the inner edge of the tipping dog 77.

Attention is here called to the fact that

in some instances it may be found desirable to form openings entirely through the various weights employed, while in other instances, it may be found desirable to recess the weights on their surfaces adjacent the different dogs or bevel them off as shown at 97 in connection with the weight 83.

I wish it further understood that I am not limited to any particular shape or construction of the weights but that these weights may be modified and varied, with respect to shape, to suit the particular circumstances and conditions under which they are used.

In order to permit the discharge of dirt and foreign substances which may collect within the housings 26 and 27, I provide in each of these housings a passage 99, which communicates with the interior of the housing at the lower extremities thereof. The housing 25 is also provided with passages 100 and 101 which communicate with the interior of the housing near the lower extremities of the dogs 30 and 31 respectively.

Attention is here called to the fact that each of the vertical frame members or studs 5 and 6 of the hoisting frame is provided with metal cross bars 102 and 103 to which the opposite extremities of the housings 25, 26 and 27 are respectively secured by means of bolts or other fastening devices 104. The opposite extremities of each of the aforesaid housings are mortised as shown at 105, in Figs. 4 and 6, which mortises receive the cross bars 102 and 103. It is also desirable to form mortises in the cross bars 102 and 103 for the reception of the opposite extremities of the aforesaid housings.

The opposite sides 9 and 10 of the skip-carrying frame 8 may be extended below the lower extremity of the skip 14 as shown at 106 and a cage connected therewith by means of a bail 107, journaled upon a cross bar 108. Whenever it is desired to employ a cage, cage catching dogs and releasing dogs similar to the dogs shown in the lower portion of the housing 25 may be employed, and fixed to the studs 5 and 6 of the hoisting frame at the proper distance below the mechanism inclosed in the housing 25. Four sets of the mechanism similar to that of the mechanism in the lower portion of the housing 25, will be found desirable for use in connection with the cage. This mechanism should be permanently secured to the studs 5 and 6 and when the cage is dispensed with the catching dogs and releasing dogs should be drawn into their casings so as to be out of the path of the skip-carrying frame 8. All four sets of this mechanism may be connected up in a manner to be simultaneously operated for drawing them into their casing out of the path of the skip-carrying frame 8.

Attention is here called to the fact that when the cable A is slackened for the pur-

pose of bringing the skip-carrying frame 8 and the skip 14 into contact with the tripping mechanism, the tripping dogs 31 first enter the slots 71 in the opposite sides 9 and 10 of the skip-carrying frame and act to release the lugs 18 of the members 16 and 17, from the slots 20 in the upper edge of the skip 14. The continued downward movement of the skip-carrying frame 8 and the skip 14 results in bringing the bottom of the skip 14 into contact with the shoulders 96 of the tipping dogs 77 and the further movement of the skip-carrying frame 8 and the skip 14 results in turning the skip 14 upon its journals to the dotted line position indicated in Fig. 8, by the time the upper extremities of the slots 70, in the opposite side members of the skip-carrying frame 8 have been engaged by the catching dogs 30, which support the skip-carrying frame and the skip in a stationary position. After the skip 14 has been in this manner tilted to the dotted line position, the said skip will complete its tilting movement under the influence of gravity, to a dumping position.

I have gone into the operation of my invention somewhat at length in connection with the foregoing description, and it is not considered necessary to further follow out its operation.

I have described my invention in its application and use in mining shafts, but it must be understood that the invention may be used in various other places in connection with hoisting apparatus.

I have described and illustrated the specific construction of the various parts of my invention, however, it is understood that all of these different parts may be, to a certain extent, varied and modified according to the particular circumstances and conditions in the application of the invention and still be within the spirit of my invention as determined by the domain of the appended claims.

Having thus described my invention, what I claim is:

1. The combination with a skip and skip-carrying frame, and vertical guides for the latter, of trip mechanism normally projecting into the path of the skip-carrying frame and the skip, said trip mechanism consisting of pivoted catch members, and pivoted releasing members, the pivoted releasing members having movements upwardly independent of the catch members and said releasing members engageable with the catch members on the downward movement of the releasing members, to move the catch members out of interference with the skip-carrying frame and skip, and weights arranged directly in the rear of said releasing members for automatically returning the said releasing members, and catch members into normally operative positions when released

by the skip and skip-carrying frame, said weight having openings therein and the trip members having parts extending into said openings, substantially as described.

- 5 2. The combination with a skip and skip-carrying frame, and vertical guides for the latter, of trip mechanism normally projecting into the path of the skip and skip-carrying frame, said trip mechanism consisting of
10 pivoted catch members and pivoted releasing members, said pivoted catch members adapted to form a stop to the movement of the skip and skip-carrying frame in one direction, the pivoted releasing members having
15 movements upward independent of the catch members, and said releasing members engageable with the catch members on the downward movement of the said releasing members to move the catch members out of
20 interference with the skip and skip-carrying frame, the catch members being automatically returnable under the influence of gravity to their normal operative positions after having been released by the skip-carrying
25 frame, weights arranged directly in the rear of the said releasing members for automatically returning the said releasing members into normal operative positions when released by the skip and skip-carrying frame
30 the said weights having openings therein and the releasing members having parts extending into the said openings for the purpose set forth.

3. The combination with a skip and skip-carrying frame and vertical guides for the latter, of trip mechanism normally projecting into the path of the skip and skip-carrying frame, said trip mechanism consisting of
35 pivoted catching members and pivoted tripping members, and pivoted releasing members, said pivoted tripping members being adapted to release the skip to permit the latter to dump, and said pivoted catch members adapted to form stops to the movement
40 of the skip-carrying frame in one direction during the dumping of the skip, the pivoted releasing members having movement upwardly independent of the catch members and said releasing members engageable with
45 the catch members on the downward movement of the said releasing members to move the catch members out of interference with the skip and skip-carrying frame, the catch members being automatically returnable
50 under the influence of gravity to their normal operative position after having been released by the skip-carrying frame, and means arranged in the rear of said releasing members for automatically returning the
55 said releasing members into their normal operative positions when released by the skip-carrying frame as described.

4. The combination with a skip and skip-carrying frame and vertical guides for the
65 latter, of trip mechanism normally project-

ing into the path of the skip and skip-carrying frame, said trip mechanism consisting of pivoted catch members adapted to form stops to the movement of the skip-carrying frame in one direction, pivoted tripping
70 members for releasing the skip to permit the latter to fall to a dumping position, and pivoted tipping members for causing the skip to tilt to a dumping position, means actuated by the downward movement of the
75 skip-carrying frame and engageable with the catch members, the tripping members and the tipping members to move the latter members out of interference with the skip and skip-carrying frame, the catch members
80 and the tripping members and tilting members being automatically returnable under the influence of gravity to their normal operative position after having been released by the aforesaid means, and weights for
85 automatically returning the aforesaid means to their normal operative positions when released by the skip and skip-carrying frame, substantially as described.

5. The combination with a skip and skip-carrying frame, and vertical guides for the latter, of trip mechanism normally projecting into the path of the skip and skip-carrying frame, said trip mechanism consisting of
90 pivoted catch members, pivoted tripping members arranged at a plane above the catch members, and pivoted tipping members arranged at a plane intermediate the catching
95 members and the tripping members, and releasing members having movements upward independent of the aforesaid instrumentalities, said releasing members engageable with the aforesaid instrumentalities on the downward
100 movement of the said releasing members to move the aforesaid instrumentalities out of interference with the skip and skip-carrying frame, and weights arranged in the rear of said releasing members for automatically
105 returning the latter into normal operative positions when released by the skip and skip-carrying frame, the weights having openings therein, and the releasing members having cam-shaped parts extending into the
110 said openings for the purpose set forth.

6. The combination with a skip and skip-carrying frame, and guides for the latter, of skip dumping mechanism normally projecting into the path of the skip and skip-carrying frame, said dumping mechanism
115 consisting of pivoted members adapted to respectively support the skip-carrying frame, release the skip and tip the skip to a dumping position, and pivoted releasing members having movements upwardly independent of the aforesaid pivoted dumping
120 members, said releasing members engageable with the pivoted dumping members on the downward movement of the said releasing members to move the dumping
125 members out of interference of the skip

and skip-carrying frame, the dumping members being automatically returnable under the influence of gravity to their normal operative positions after having been released by the skip and skip-carrying frame, and weights slidably mounted in the rear of the said releasing members for automatically returning the said releasing members into normal operative positions when released by the skip and skip-carrying frame, the said weights having openings therein and the said releasing members having cam-shaped parts extending into said openings, for the purpose set forth.

7. The combination with a skip and skip-carrying frame and guides for the latter, of skip dumping mechanism normally projecting into the path of the skip and skip-carrying frame, said skip dumping mechanism consisting of pivoted dumping members for respectively tripping and tilting the skip and catching the skip-carrying frame, and pivoted releasing members engageable with the pivoted dumping members on the downward movement of the said releasing members to move the dumping members out of interference with the skip and skip-carrying frame, the pivoted dumping members being automatically returnable under the influence of gravity to their normal operative position after having been released by the skip-carrying frame, and weights arranged directly in the rear of said releasing members and engaged intermediate their extremities by said releasing members for automatically returning the latter into normal operative positions when released by the skip and skip-carrying frame, substantially as described.

8. The combination with a hoisting device and guides for the latter, of trip mechanism normally projecting into the path of the hoisting device, said trip mechanism consisting of pivoted catching members, pivoted tripping members and pivoted releasing members, said pivoted tripping members being adapted to release the hoisting device to permit the latter to dump, and said pivoted catching members adapted to form stops to the movement of the hoisting device in one direction during the dumping of the hoisting device, the pivoted releasing members having upward movement independent of the catching members and the tripping members, said releasing members engageable with the catching members and the tripping members on the downward movement of said releasing members to move the catching members and the tripping members out of interference with the hoisting device, and means for returning the trip mechanism to its normal position.

9. The combination with a hoisting device, of trip mechanism normally projecting into the path of said hoisting device,

said trip mechanism consisting of catching members adapted to form stops to the movement of the hoisting device in one direction, pivoted tripping members for releasing the hoisting device to permit the latter to turn to a dumping position, pivoted tipping members for causing the hoisting device to turn to a dumping position, means actuated by the downward movement of the hoisting device and engageable with the catching members, the tripping members and the tipping members to move all of said members out of interference with the hoisting device, and means for automatically returning the trip mechanism to its normal position.

10. The combination with a hoisting device, of trip mechanism normally projecting into the path of the said hoisting device, said trip mechanism consisting of catching members forming stops to the movement of the hoisting device in one direction, pivoted tripping members for releasing the hoisting device to permit the latter to turn to a dumping position, means actuated by the downward movement of the hoisting device and engageable with the catching members and the tripping members to move all of said members out of interference with the hoisting device, and means for returning the trip mechanism to its normal position.

11. The combination with hoisting means, of trip mechanism normally projecting into the path of the hoisting means, said trip mechanism consisting of catching members forming stops to the movement of the hoisting means in one direction, tipping members for causing the hoisting means to turn to a dumping position, and means actuated by the downward movement of the hoisting means and engageable with the catching members and the tipping members to move all of said members out of interference with the downward travel of the hoisting means.

12. The combination with hoisting means, of trip mechanism projecting into the path of the upward movement of the hoisting means, said trip mechanism comprising catching members forming stops to the movement of the hoisting means in one direction, tripping members for releasing the hoisting means to permit the latter to turn to a dumping position, and means actuated by the downward movement of the hoisting means to move all of said members out of interference with the downward travel of the hoisting means.

13. The combination with hoisting means, of trip mechanism normally projecting into the path of the upward movement of the hoisting means, said trip mechanism consisting of catching members forming stops to the downward movement of the hoisting means, tripping members for releasing the hoisting means to permit the latter to assume the dumping position, and means actu-

ated by the downward movement of the hoisting means to move the said catching members and the said tripping members out of interference with the hoisting means, the said catching members and the said tripping members being returnable under the influence of gravity to their normal operative positions after having been disengaged by the hoisting means.

14. The combination with a skip and skip-carrying frame, of trip mechanism normally projecting into the path of the skip and skip-carrying frame, said trip mechanism consisting of catching members, tripping members and releasing members, the skip being journaled upon the skip-carrying frame, means for securing the skip in a stationary position upon the skip-carrying frame, the tripping members being adapted to release the securing means to permit the skip to assume the dumping position, while said catching members are adapted to form stops to the downward movement of the skip-carrying frame while the skip is assuming the dumping position, the releasing members having movements upwardly independent of the catching members and the tripping members and engageable with said catching members and said tripping members on the downward movement of said releasing members to move said catching members and said tripping members out of the path of the downward movement of the skip and skip-carrying frame, and means for returning all of said members to their normal operative positions.

15. The combination with hoisting means, of trip mechanism normally projecting into the path of the hoisting means, said trip mechanism comprising catching members forming stops to the movement of the hoisting means in one direction, tripping members for releasing the hoisting means to permit the latter to assume the dumping position, releasing members having movements upwardly independent of the catching members and the tripping members and engageable with the catching members and the tripping members on the downward movement of said releasing members to move the catching members and the tripping members out of interference with the hoisting means, the catching members and the tripping members being returnable to their normal positions after having been released by the releasing members, and weights for returning the said

releasing members to their normal positions, said weights having openings therein and the releasing members having parts extending into said openings.

16. The combination with a skip and skip-carrying frame, of trip mechanism normally projecting into the path of the skip and skip-carrying frame, the skip being journaled upon the skip-carrying frame, a fastening device for securing the skip in a stationary position upon the frame, the trip mechanism comprising means for releasing said fastening device to permit the skip to turn upon its journal to a dumping position, and means forming a stop to the movement of the skip and skip-carrying frame during the dumping of the skip.

17. The combination with a hoisting receptacle and a frame upon which the said hoisting receptacle is journaled, of trip mechanism, a fastening device for securing the hoisting device in an operative position upon the frame, the trip mechanism comprising means for releasing said fastening device, means for tipping the hoisting receptacle to the dumping position, and means forming a stop to the backward movement of the hoisting receptacle and frame during the dumping of the hoisting receptacle.

18. The combination with a hoisting receptacle and frame carrying said hoisting receptacle, of trip mechanism, a fastening device for securing the hoisting receptacle in an operative position upon the said frame during the upward movement of the latter, the trip mechanism comprising means for releasing said fastening device, means for tipping the hoisting receptacle to the dumping position, means forming a stop to the backward movement of the hoisting receptacle and frame during the dumping of the hoisting receptacle, and releasing members having movements upwardly independently of the aforesaid instrumentalities and engageable with the latter on the downward movement of the releasing members to move the said instrumentalities out of interference with the hoisting receptacle and frame during the downward movement of the said hoisting receptacle and frame.

In testimony whereof I affix my signature in the presence of two witnesses.

THOMAS C. WRIGHT.

Witnesses:

WILLIAM E. WINDSOR,
OLGA BERLEY.