Feb. 16, 1943. D. MacISAAC 2,311,555

HOIST FOR MATERIALS

Filed March 17, 1941

FIG. 3.

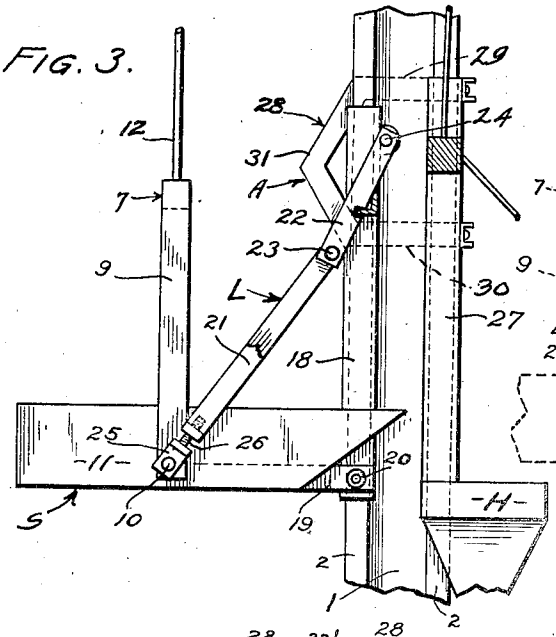


FIG. 4.

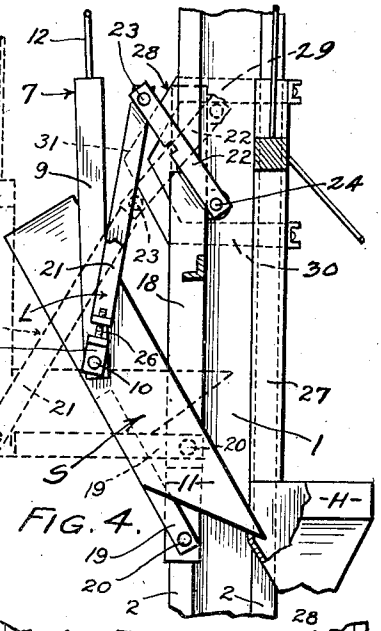


FIG. 2.

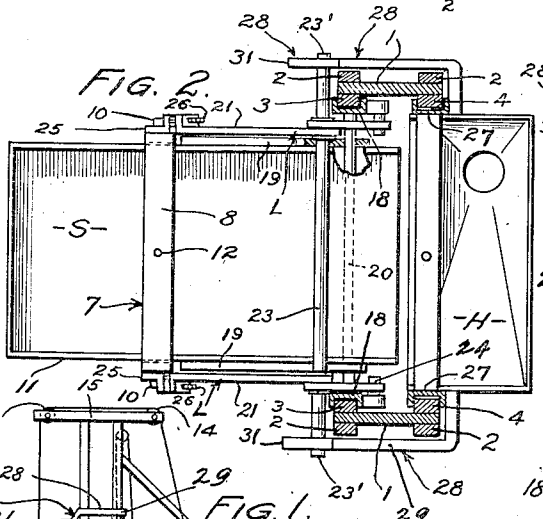


FIG. 5.

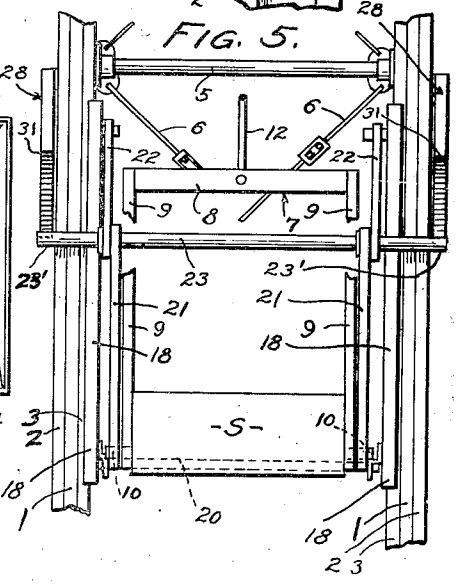
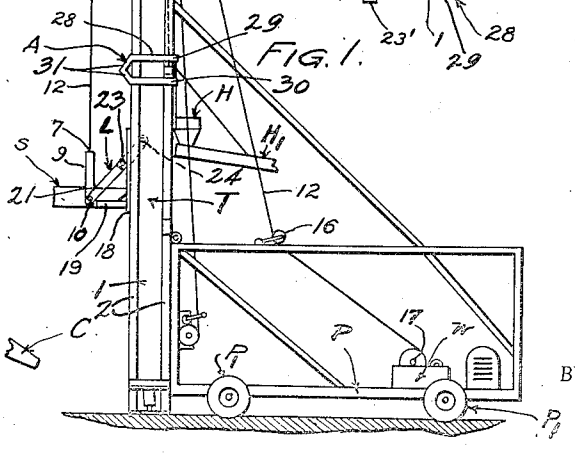


FIG. 1.



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HOIST FOR MATERIALS

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Application March 17, 1941, Serial No. 383,763

8 Claims. (Cl. 214—120)

This invention relates to and has for an object the provision of an improved hoist by means of which building materials such as brick, mortar, concrete or other matter may be rapidly and economically elevated from a point of origin as on the ground to a substantial height and discharged for use.

An object is to provide certain improvements in such devices over other hoists heretofore known and used and particularly over hoists of my invention as disclosed in Letters Patent of the United States granted to me on the 27th day of August, 1940, No. 2,212,711.

Another object is to provide a hoist including a tower, a skip mounted for vertical movement thereon and adapted to receive and discharge quantities of material and means automatically operable at predetermined elevations of the skip for tilting the skip and discharging the materials at designated points and into suitable chutes or receptacles.

A still further object is to provide "a dilly" movable over guides attached to the tower and means connecting the skip and the guide shoes of the dilly for locking the skip in material carrying position and operable at designated positions for unlocking and overbalancing the skip so as to discharge the elevated materials therefrom.

An object, also, is to provide a hopper vertically movable on and adapted to be fixedly held at designated positions on the tower for receiving the materials from the skip, and means associated with and the position of which is determined by the position of the hopper, for tripping the skip when the same has attained a predetermined elevation. Other objects may appear as the description progresses.

I have shown a preferred form of device embodying my improvements in the accompanying drawing, subject to modification, within the scope of the appended claims, without departing from the spirit of my invention.

In said drawing:

Fig. 1 is an elevation, on a small scale, of an assembled hoist embodying my improvements;

Fig. 2 is an enlarged plan of the same with the guides in section;

Fig. 3 is an enlarged fragmentary side elevation of the skip and tower with the skip in carrying position;

Fig. 4 is a similar view of the same with the skip in dumping position; and

Fig. 5 is a fragmentary front elevation of the skip and tower.

Briefly, as shown in Fig. 1, my hoist includes a portable platform P having wheels P_1, P_1, by means of which the apparatus may be moved from one to another location, a power driven winze W mounted on said platform, a tower T attached to or mounted at the forward of the platform, a skip S movable vertically on the tower for receiving material from a delivery chute C connected with a source of supply as a concrete mixer (not shown) when the skip is disposed at the lower extreme of its movement, a hopper H movable on the tower to selected elevations for receiving the material from the skip and having a chute H_1 adapted to lead to a point of disposition, a tripping unit A adjustable on the tower and a locking mechanism L associated with the skip, all as hereinafter described.

The tower T is formed of two columns of like form and height either constructed of wood or metal and in a common transverse plane with webs 1 having vertical reinforcing cleats or ribs 2 on their outer surfaces and vertical guides 3 and 4 on their inner sides, guides 3, 3 and 4, 4, respectively, being transversely opposite and the cleats 2 being arranged preferably at the edge portions of the webs 1.

The two columns of the tower are transversely connected at suitable distances apart by means of bars 5 and are diagonally braced as by means of adjustable rods 6, as shown in Fig. 5.

Skip S has an overhanging yoke 7 with a cross bar 8 and legs 9, 9 which are pivoted at points 10, 10, on the sides 11 of the skip. The skip is supported by means of a cable 12 which operates over pulleys 13 and 14 carried by the top member 15 of the tower and disposed at the front and back thereof and is thence extended downwardly over a block 16 where it is wound upon the drum 17 of winze W, thereby providing means for raising and lowering the skip at the will of an operator.

The skip S is guided in its movement on the tower guides 3, 3 by means of a dilly having elongated shoes 18 of channeled cross section and the lower ends of said shoes are connected with the skip body by means of bars 19 which are pivoted at 20 substantially in the plane of the yoke axis 10 to the shoes and have their outer portions rigidly secured to the sides of the skip. Thus, as shown in Fig. 4, when the skip is tilted for dumping its contents into hopper H it swings on the tilting axes 20. The upper ends of shoes 18 are also connected with the skip by means of toggle joints including links 21 and 22 at opposite sides of the skip which are

hinged together at 23 at points vertically spaced from axes 20, links 21 being hinged at the points 10 to the sides of the skip and links 22 being hinged at points 24 to the upper extremities of the shoes 18, as shown in Fig. 3. Links 21 are preferably formed of two parts including short sections 25 directly connected with the sides of the skip and adjusting bolts 26 connecting the portions 21 and 25 thereof for the purpose of adjusting the links of the toggle accurately for assuming positions beyond dead center as shown in Fig. 3 for the purpose of locking the skip in loaded position and for breaking the toggle joint, as shown in Fig. 4 when unloading the skip.

Hopper H also has a pair of shoes 27 movable over guides 4, 4 and suitably connected with the hopper. At the top of shoes 27 I provide a pair of tripping cams 28, 28 having horizontal portions 29 and 30 rigidly attached at their rear ends to the shoes 27 and intermediate and forwardly extended cam portions 31 approximately divided equally into ascending and descending sections for engagement with the extremities 23' of a rod forming the hinge 23 of the toggle links 21 and 22. The cam faces 31 extend outwardly and forwardly from the front edges of the tower columns so that when the skip attains a predetermined elevation, the trunnions 23' will engage the cam faces and thereby break the toggle joints so that the ensuing upward movement of the skip will cause the skip to be overbalanced by its load and swing on its hinges 20 into the position shown in Fig. 4. The position of the inclined rear end of the skip at the moment of unloading will be positioned over the mouth of the hopper H and will thus discharge its contents into the hopper. Thereupon, the operator will reverse the winze W and the skip will first pivot at its nose on the edge of hopper H and then on axes 20 and will assume the position shown in Fig. 3, after which it will fall by gravity under the control of the operator into loading position beneath the delivery loading chute C for a succeeding operation.

The tripping means A being adjustable with the hopper insures the accurate positioning of the hopper and tripping mechanism for successively dumping loads of material into the hopper at variable elevations. Thus, the apparatus, regardless of the height of the tower, is readily adjustable for loading, elevating and unloading substantially uniform quantities of material from any level of origin to any level of discharge, within reasonable limitations and requires only the attention of the operator of the winze as far as the operation of the apparatus is concerned. The operation is automatic and the lift of the skip corresponds to the prepositioned hopper.

Briefly then, it will be observed that the operation of the device is as follows:

Hopper H having been positioned at a desired elevation for discharging a material for use, the tripping device A being vertically adjustable on the tower, preferably with the hopper but not necessarily so, will be positioned so that when a load of material has been discharged from the loading chute C into the skip at the will of the operator and under his control, the skip will rise vertically on the tower, guided by its shoes 18 and guides 3 to a position where the cam faces 31 of the tripping device will engage the extended trunnions 23' at the moment the trunnions engage the lower extremity of the ascending faces of the cams, thus, the toggle links are actuated for moving the toggle joint over dead center position and then upwardly while the skip is tilted rearwardly for discharging the contents thereof into the hopper H from a position between the columns of the tower. Immediately following the unloading operation, the skip is lowered by the operator and is at all times under his control, into position for reloading, and on the initial downward movement of the skip, the toggle connections are restored to their normally locked positions, thereby supporting the skip with the bottom thereof horizontally disposed and in position for a new load of material when it reaches its lowest extremity of movement adjacent chute C.

As the skip begins its downward movement, its nose, as shown in Fig. 4, overlies and engages the forward edge of the hopper. The skip, not being at such time otherwise supported swings on its axes 20 inasmuch as the nose of the skip rests upon the edge of the hopper, and gravity is effective for repositioning the skip into a horizontal plane, as shown in Fig. 3. Thus, the pivoted movement of the skip initially on the edge of the hopper acting as a fulcrum and on axes 20, serves to restore the skip to reloading position. As the skip is swung to horizontal position the nose of the skip is moved clear of the hopper so as to permit an ensuing downward movement in readiness to receive a new load of material and the toggles will be automatically relocked for retaining the skip in reloading position. The foregoing operations are accomplished before the counter momentum of the dilly, effective through axes 20 and 10 becomes operative to stop the pivoted movement of the skip from dumping position to full load receiving position.

It is quite apparent that a tower may be of any desired height and constructed as a unit or formed of attached sections so that it may be readily transported from one location to another, and if the height of the tower is such that it cannot be supported entirely from the platform P, additional guys or braces (not shown) may be employed for supporting it.

What I claim is:

1. A hoist comprising: a tower having vertical guides thereon, a skip having shoes movable over certain of said guides, means tiltably connecting said skip with said shoes for bodily tilting the skip in an unloading operation, means for pivotally connecting said skip with said shoes at points vertically spaced from the tilting axis of the skip, means for locking the skip in load carrying position and operable to release and permit the tilting of the skip in an unloading operation, and means for elevating and lowering said skip.

2. A hoist comprising: a tower having vertical guides thereon, a skip having shoes movable over certain of said guides, means hingedly connecting said skip with corresponding extremities of said shoes for bodily tilting the skip in an unloading operation, means for additionally connecting said skip with the corresponding other extremities of said shoes, means for locking the skip in load carrying position and operable to release and permit the tilting of the skip in an unloading operation, means for elevating and lowering said skip, and a tripping mechanism carried by said tower and adapted to be operative upon the attainment of the skip to a predetermined elevation so as to release the skip for unloading the material carried thereby.

3. A hoist comprising: a tower having vertical guides thereon, a skip having elongated shoes

movable over certain of said guides, means hingedly connecting said skip with the lower extremities of said shoes for bodily tilting the skip in an unloading operation, means for additionally connecting said skip with the upper extremities of said shoes, means for locking the skip in load carrying position and operable to release and permit the tilting of the skip in an unloading operation, means for elevating and lowering said skip, a hopper adjustable vertically on said tower, and a tripping device associated with said hopper and engageable with said locking means so as to release and effect the unloading of the material carried by said skip at predetermined elevations.

4. A hoist comprising: a tower having vertical guides thereon, a skip having shoes movable over certain of said guides, means for hingedly connecting said skip with said shoes at vertically spaced points for bodily tilting the skip in an unloading operation, means for locking the skip in load carrying position and operable to release and permit the tilting of the skip in an unloading operation, and means for elevating and lowering said skip, a hopper adjustable vertically on said tower having shoes movable vertically over certain of said guides, and a tripping device movable with said hopper and having portions engageable with said locking means and adapted to release and effect the unloading of material carried by said skip at predetermined elevations.

5. A hoist comprising: a tower having vertical guides thereon, a skip having shoes movable over certain of said guides, means hingedly connecting said skip with said shoes at vertically spaced points for bodily tilting the skip in an unloading operation, means for locking the skip in load carrying position and operable to release and permit the tilting of the skip in an unloading operation, means for elevating and lowering said skip, certain of said connections between said skip and said shoes including toggle connected members which are respectively connected with the skip at points near the center of gravity thereof, so that when the skip is loaded and is moved upwardly said toggle connections will lock the skip in load carrying position, and tripping means engageable by said toggle means at the axis of the hinge of the toggle members at predetermined elevations for unlocking said toggle connections and swinging said skip into unloading position.

6. A hoist comprising: a tower having vertical guides thereon, a skip having shoes movable over certain of said guides, means hingedly connecting the unloading end of said skip with said shoes for bodily tilting the skip in an unloading operation, means for additionally connecting an intermediate portion of said skip with said shoes, for locking the skip in load carrying position and operable to release and permit the tilting of the skip in an unloading operation, means for elevating and lowering said skip, the last mentioned connection between said skip and said shoes including toggle connected members which are respectively connected with the skip at points near the center of gravity thereof and with said shoes at points vertically spaced from the connections of said first mentioned means, so that when the skip is loaded and is moved upwardly said toggle connections will lock the skip in load carrying position, and tripping means engageable by said toggle means at predetermined elevations for unlocking said toggle connections and swinging said skip into unloading position, said tripping means including a member adjustable vertically on said tower for varying the unloading position of the skip on the tower, and having oppositely inclined surfaces engageable at the axis hinge pintles of said toggle members.

7. A hoist comprising: a tower having vertical guides thereon, a skip having elongated shoes movable over certain of said guides, means hingedly connecting said skip with the upper portions of said shoes for bodily tilting the skip in an unloading operation, means for additionally connecting said skip with the lower portions of said shoes for locking the skip in load carrying position and operable to release and permit the tilting of the skip in an unloading operation, means for elevating and lowering said skip, the last mentioned connection between said skip and said shoes including toggle connected members which are respectively connected with the skip at points near the center of gravity thereof and with said shoes at points vertically spaced from the connections of said first mentioned means, so that when the skip is loaded and is moved upwardly said toggle connections will lock the skip in load carrying position, and tripping means engageable by said toggle means at predetermined elevations for unlocking said toggle connections and swinging said skip into unloading position, said tripping means including an oppositely inclined member adjustable vertically on said tower for varying the unloading position of the skip on the tower, and a hopper commonly adjustable on said tower with said tripping means for receiving the contents of the skip at each unloading operation.

8. A hoist comprising: a tower having vertical guides, a skip vertically movable on said tower, a tripping device vertically adjustable on said guides to predetermined elevations, said tripping device including a member formed with a cam on a portion thereof, shoes slidable on said guides, said skip being pivotally connected at a margin thereof with corresponding extremities of said shoes, a toggle device including links pivotally connected at a median point with said skip and with said shoes at points substantially spaced vertically from the skip, and means carried by said links at a point intermediate their hinged connections with the skip and shoes and engageable with said tripping device, whereby said toggle connections may be actuated for tilting the skip at predetermined elevation for dumping the contents thereof.

DONALD MACISAAC.