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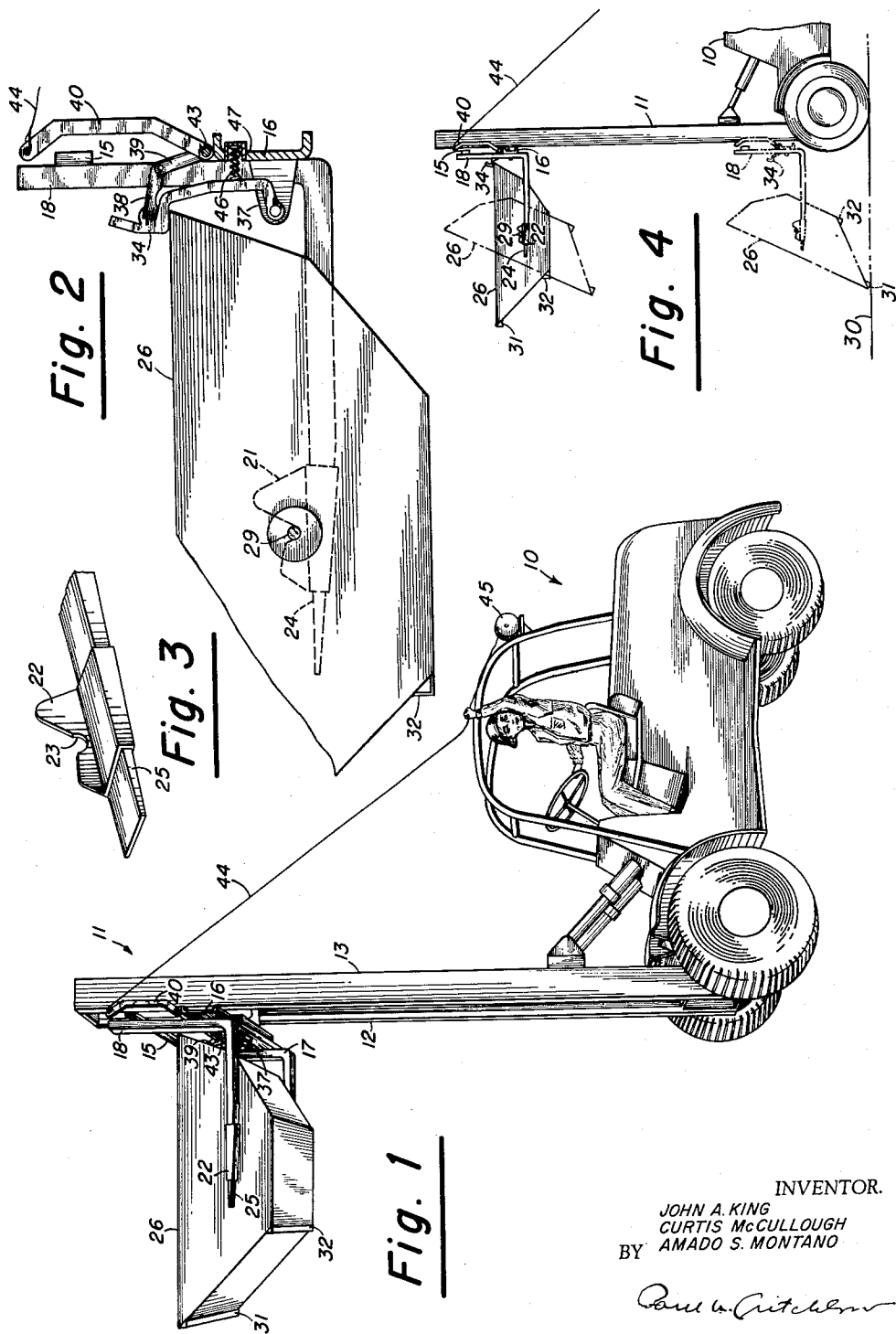
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3,013,684

MATERIAL HOISTING AND DUMPING APPARATUS

Filed April 14, 1959

2 Sheets-Sheet 1



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Fig. 5

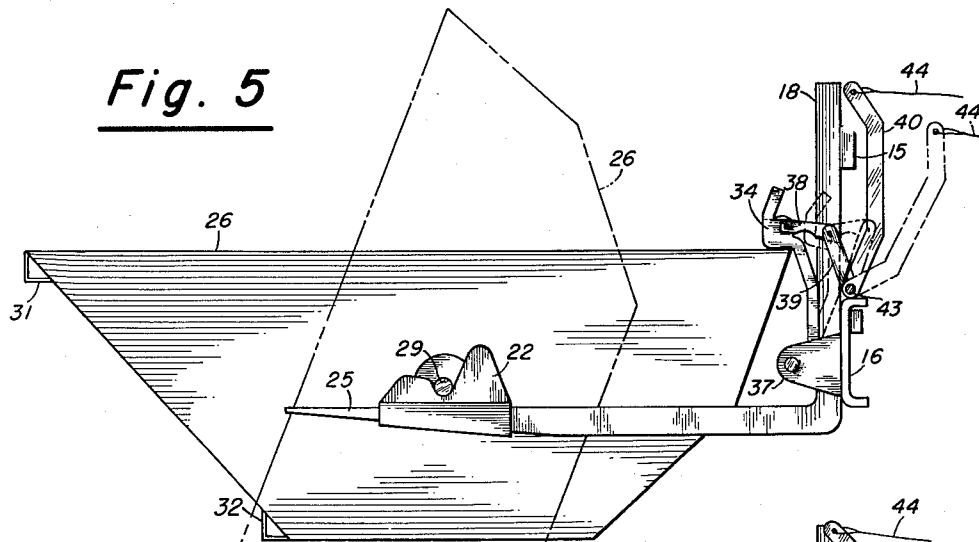


Fig. 6

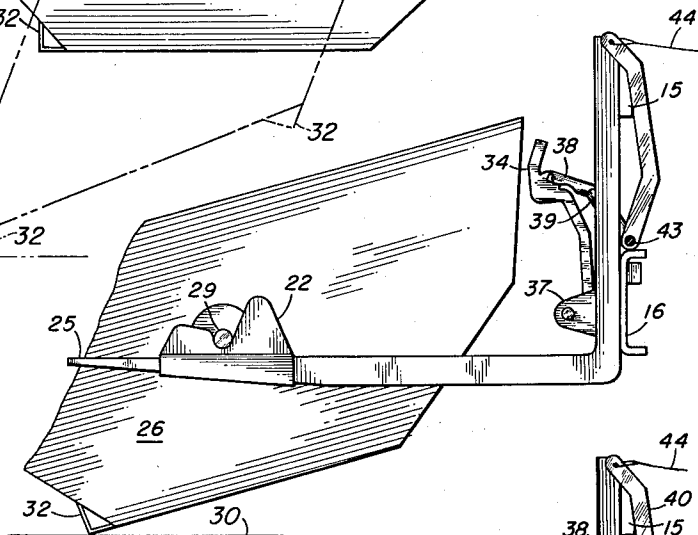
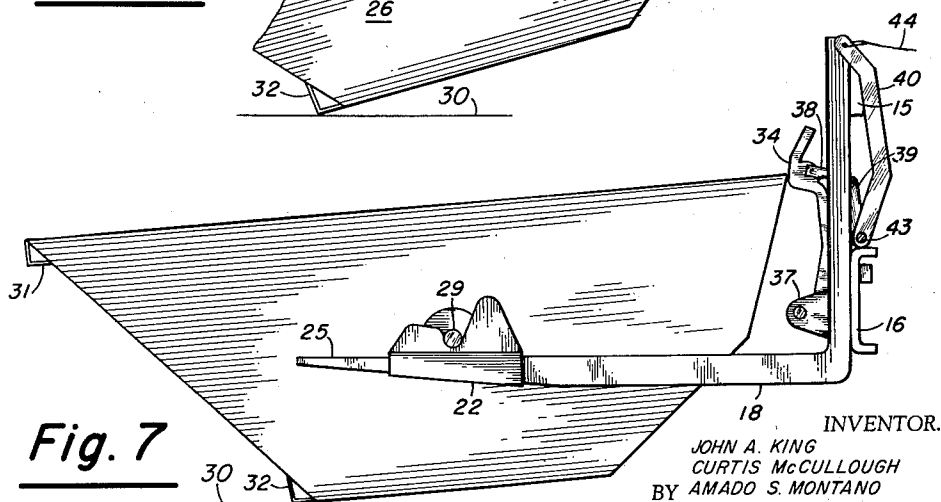


Fig. 7



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3,013,684 MATERIAL HOISTING AND DUMPING APPARATUS

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The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates generally to the transporting of material from one point to another and more particularly to a mechanism for supporting, transporting and dumping material at a designated location.

In the handling of materials it has been customary to employ hoisting trucks, such as fork-lift trucks, to load, transport, dump and then refill. Such trucks, in general, have proven very beneficial, although they are subject to several criticisms particularly when the material being handled is of the loose or pulverulent variety. For example, in the conventional vehicles, the dumping is done by hand, either by scooping out the material or by tilting the container to cause the material to slide out. Aside from the physical effort and time involved in this hand-operation, such a procedure requires extra men which, of course, means added expense. Also, it sometimes is desirable to transfer the contents from the container into large trucks for consolidating the transporting of material and this has proven very hazardous because it required a couple of men to balance themselves upon the sideboard of the truck to unload the container. The present invention eliminates this hazardous method and at the same time effects a considerable saving of man hours.

The primary object of this invention is to provide a vehicle of this character with improved means for the dumping of material automatically.

Another object is to combine with the raising and lowering mechanism of the truck an improved dumping or tilting means whereby the emptying of the contents from the skip box is readily and easily effected.

Another object is to provide a dumping attachment constructed so that it can be manipulated by the operator of the vehicle without his dismounting.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective elevation of a fork truck embodying the present invention;

FIG. 2 is a side elevation of the releasing latch showing a portion of a skip box with the added pivot;

FIG. 3 is a fragmentary end portion of the lift fork showing the lift support attachments;

FIG. 4 is a side view to illustrate the use of the improved method for emptying a skip box;

FIG. 5 is a side elevation indicating the operational movement of the latching mechanism; and

FIGS. 6 and 7 indicate the repositioning of the skip box to its horizontal position.

The proposed device contemplates the use of a conventional fork lift truck 10 which in itself constitutes no part of the present invention and is considered to be self-evident in the drawings.

The features of the invention are more directly concerned with a particular skip-box 26 and the manner in which it is supported and operated. Thus, a detail description therefore is deemed unnecessary. Mounted on

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the front of truck 10, is a conventional elevating structure indicated generally by the numeral 11 and comprising a pair of guide members 12 and 13 having means for slidably supporting a pair of structural members 15 and 16 that can be moved up and down relatively to the guide members. Structural members 15 and 16 support a pair of right angle supporting forks 17 and 18 which are provided with wedge shaped end portions 24 and 25 adapted to enter lift attachments 21 and 22 having truncated pyramidal openings. Vertical movement of structural members 15 and 16 together with supporting forks 17 and 18 is effected by means of power actuated means controlled by the operator, not shown. Sockets 23 are provided in each lift attachment 21 and 22 located on end portions 24 and 25 thereof for supporting pivots 29 located on each side of skip box 26 at a point to the right (FIG. 2) of the center of mass of said box 26 whereby the box will tip to a dumping position as shown by the broken line in FIG. 5 when a latching arm 34 is disengaged therewith. L-shaped angle bars 31 and 32 are suitably attached to the upper and lower leading edges of the box 26 as indicated on the drawings, these bars acting as box protecting bumpers.

Latching arm 34, which normally engages skip box 26, is mounted in the center of structural member 16 and is adapted to maintain box 26 in the horizontal loading position as shown in FIG. 2 until released for dumping. The latch is pivotally mounted on a bracket 37 which is secured to lower structural member 16. A pair of coupling links 38 and 39 provide an operating coupling between latching arm 34 and a control arm 40, which, as shown in FIG. 1, is mounted on an extended shaft 43 running parallel to and above structural member 16, thus enabling freedom for moving the control arm. To operate the latch, control arm 40 is connected by a line 44 to an automatic reel 45 located on the truck 10 convenient to the driver. A compression spring 46 which is mounted in a recessed area 47 of structural member 16, FIG. 2, forces arm 34 back to its latching position when the control arm 40 is released.

In operation, when the skip box 26 contains a quantity of divided material, such as scrap metal or sand, truck 10 is manipulated to position the forks 17 and 18 to effect the engagement of pivots 29 within sockets 23 of lift attachments 21 and 22. The operator then manipulates an elevating control, not shown, so as to raise supporting forks 17 and 18 lifting the skip box 26 off of the ground a sufficient height for transporting.

When it is desired to discharge the material, the operator positions the skip box 26 above the desired location and pulls line 44 which operates control arm 40 and the latching arm 34 to release skip box 26 and permit the box 26 to swing forward on its pivots 29, as indicated in FIGS. 4 and 5. Because of the off center location of the pivots 29, the skip box 26 automatically tilts forward enough to to dump the contents.

Box 26 then remains in this tilted position until it is lowered sufficiently to touch the ground (indicated by numeral 30). As indicated in the sequence of FIGS. 5, 6 and 7, the box touches first on the upper angle bar 31, then on the lower angle bar 32, and, eventually, is returned to its latched horizontal position as the supporting forks are lowered on to the ground. As the skip box pivots toward the horizontal position as shown in FIGS. 6 and 7, it forces latching arm 34 back, so that by the time the box has reached a position of resting on the ground 30, the latching arm has been moved to the right to clear the box 26. At this point spring 47 then forces the latching arm to the left (FIG. 5) to engage with the skip box 26 and is then ready for the reloading. It may be desirable to return the skip box 26 to the original location after it has been dumped. If so, the oper-

ator would wait until he reached the point of loading to reposition the box to the horizontal position and, while the skip box is resting on the ground, the operator pulls line 44 releasing the skip box 26 and at the same time lowers supporting forks 17 and 18. This disengages pivots 29 from lift attachments 21 and 22 of the supporting forks. In this way the operator of the truck may dump the skip box 26 manually from the driver's seat without requiring an additional operator to release the latch 34 when the truck reaches the point of dumping as well as repositioning the skip box for reloading.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. Hoisting and dumping apparatus comprising the combination of an open-top material container having aligned pivot pins projecting laterally outwardly from each of its sides at points near the horizontal center line of the bucket, said points also being spaced slightly away from its center of gravity, and means for supportably carrying and dumping said container; said means including a frame, laterally spaced forks carried by said frame and formed with tapered end portions, a tapered container-supporting sleeve slidably wedged onto the end portion of each fork, and a resiliently releasable latch carried by said frame for engaging a portion of said container, said sleeve members each being formed each with an upwardly-opening notch-forming portion for receiving said pins whereby said container is swingably supported on said pin by said forks, and said releasable means normally restraining said swinging movement and being resiliently releasable for permitting the container to be dumped and for permitting return of said container to an upright latched position.

2. The apparatus of claim 1 wherein said frame is vertically reciprocable for permitting said container to be lowered to the ground whereby said container can

be swung back into a horizontal position, and said releasable means are disposed for engaging said container upon return to said horizontal position.

3. The apparatus of claim 2 wherein said fork truck mounts control means for remotely controlling the release of said releasable means.

4. Hoisting and dumping apparatus comprising the combination of an open-top material container having aligned pivot pins projecting laterally outwardly from each of its sides at points near the horizontal center line of the bucket, said points also being spaced slightly away from its center of gravity, and means for supportably carrying and dumping said container, the container further having a rearwardly-slanted planular front wall provided at its upper and lower corners with bumper members; said carrying and dumping means including a frame, laterally spaced forks carried by said frame and formed with tapered end portions, a tapered container-supporting sleeve slidably wedged on the end portion of each fork, and a resiliently releasable latch carried wholly by said frame for engaging a portion of said container, said sleeve members each being formed with an upwardly-opening notch-forming portion for receiving said pins whereby said container is swingably supported by said pins on said forks, and said releasable means normally restraining said swinging movement and being resiliently releasable for permitting the container to be dumped and for permitting return of the container to an upright latched position.

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