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2,997,190

BATCH BOX ASSEMBLY

Filed Dec. 9, 1959

4 Sheets-Sheet 1

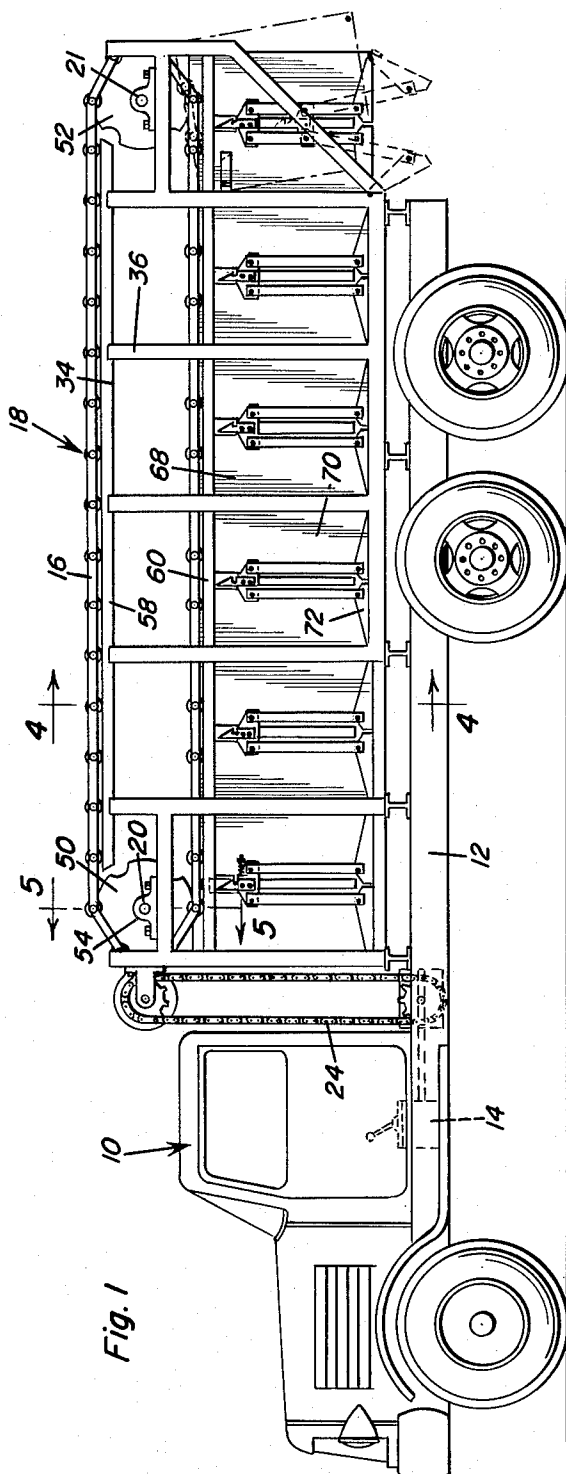


Fig. 1

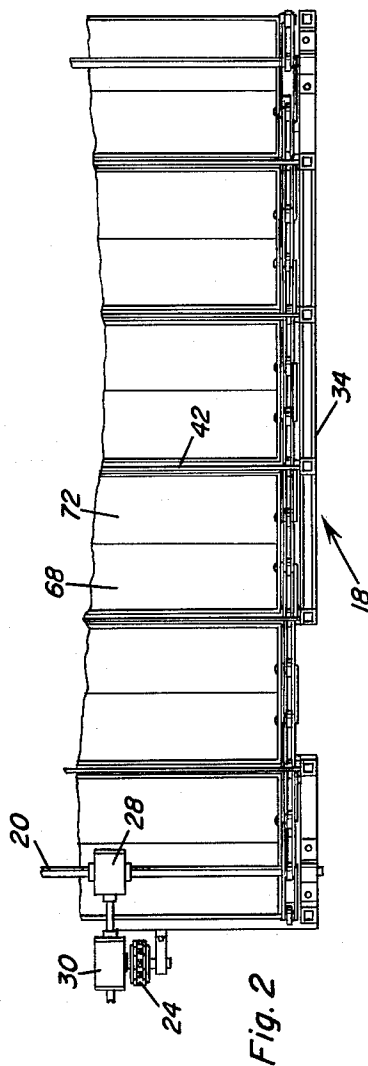


Fig. 2

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Fig. 4

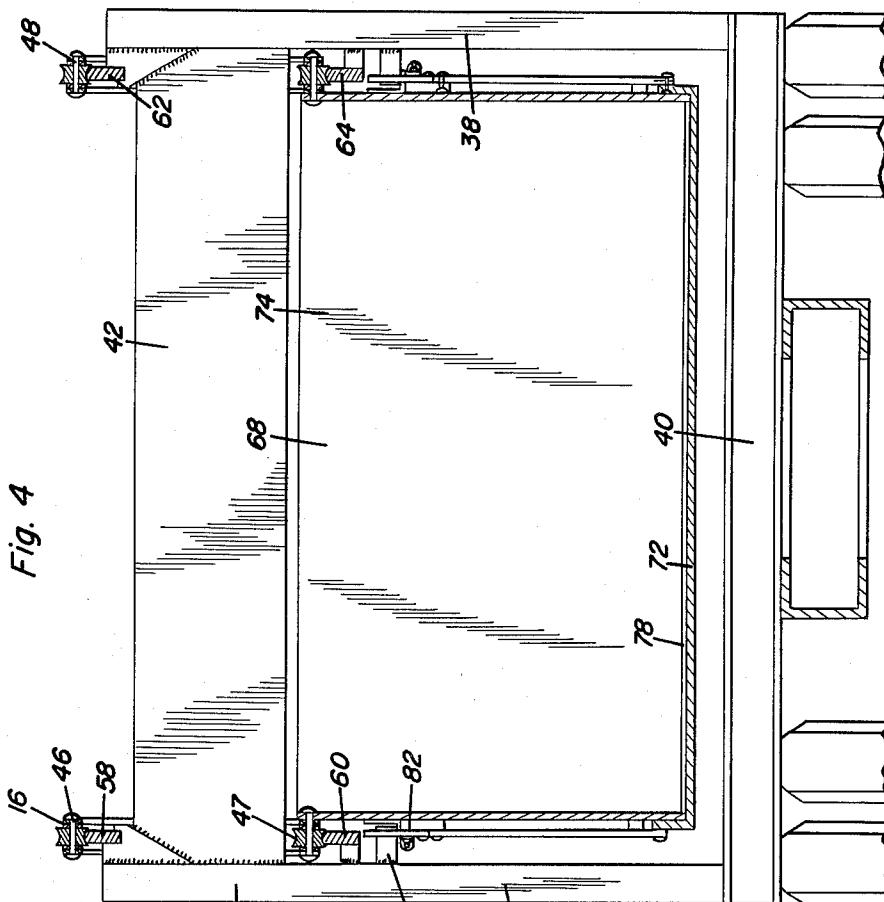
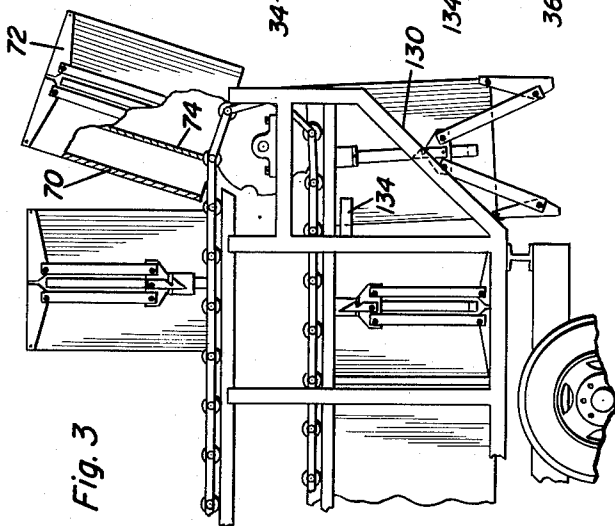


Fig. 3



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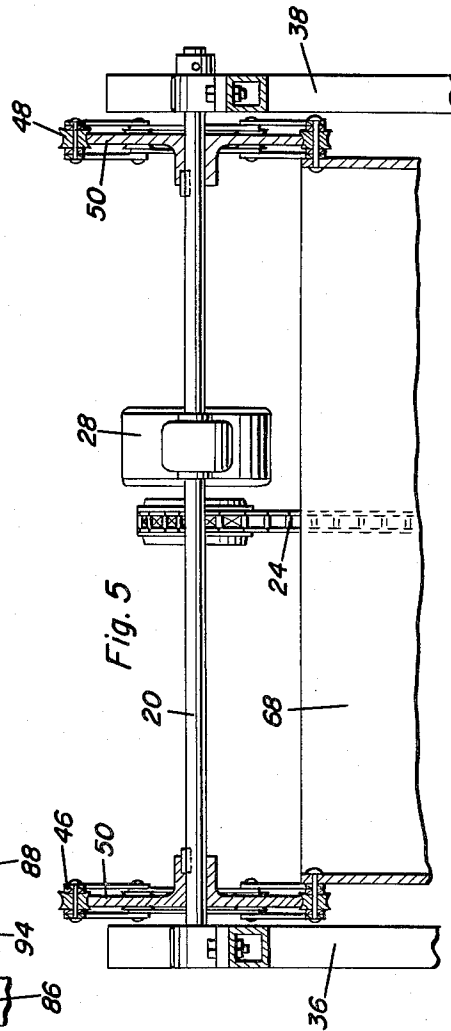
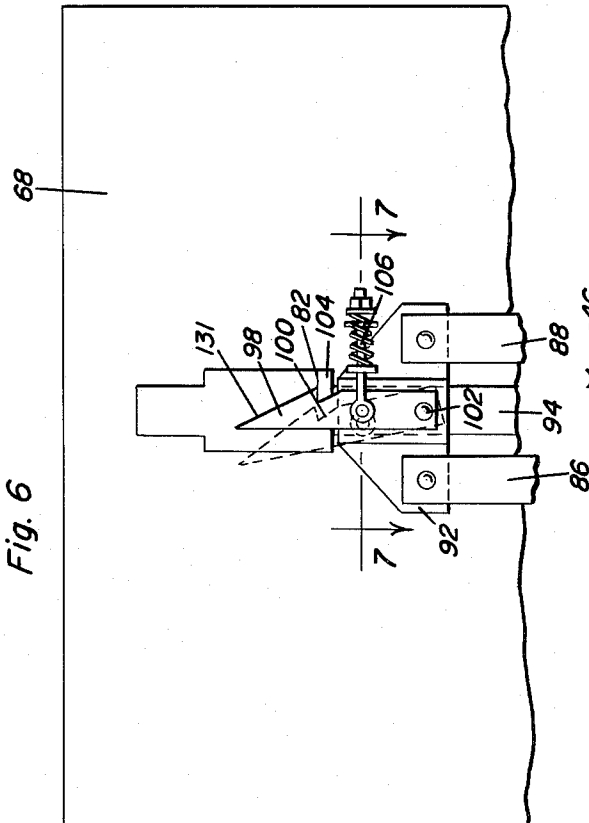
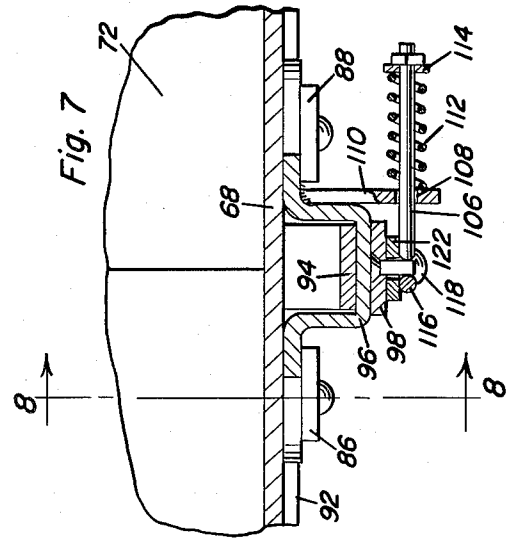
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BATCH BOX ASSEMBLY

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BATCH BOX ASSEMBLY

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9 Claims. (Cl. 214-83.36)

This invention relates to equipment to facilitate the hauling of batches or quantities of various substances.

The principal contemplated use of the batch box assembly is for loading a skip with a dry batch. In the paving of roads, the skip must be loaded with dry batches very promptly and the truck or other vehicle quickly moved away so that the skip may be moved to load the mixer and the skip returned to the ground for the next batch. The time allowed for such an operation is generally about thirty seconds, and if the dumping time is too great, the dumping obviously becomes the bottle neck of the operation.

Accordingly, an object of the invention is to provide a batch box assembly wherein essentially the whole bottom of the batch box drops out i.e. opens almost instantaneously and permits the dry batch to fall out as fast as it will flow by the pull of gravity so that the vehicle may be moved away quickly freeing the skip to load the mixer.

An important feature of the invention is that when one batch is dropped into the skip, the next batch is prepared to be dropped into the skip as soon as it returns from its excursion between the lower position to the raised position at which it loads the mixer and again to lowered position.

It is to be clearly understood that a number of embodiments of the invention will be used in connection with a truck, but that the principles of the invention are equally well applicable in connection with other vehicles, whether powered or not. In the latter instance, the movement of the entire assembly may be achieved by a tractor, a truck, etc. Furthermore, the batch box assembly need not even be used in connection with any type of vehicle, it being evident that as the description proceeds that the assembly, or at least, the embodiments, thereof may be used in capacities other than those explicitly pointed out above.

A very important feature of the invention is found in the alacrity with which the batch box opens. Further, the opening at the bottom of the box is important since the full force of gravity is availed of in promptly emptying the box. This is in direct opposition to side unloading or unloading at an angle or dumping by elevation about a fixed or non-fixed pivot.

Briefly, a batch box assembly in accordance with the invention is made of a frame having an upper conveyor, and a space beneath the conveyor to accept a number of batch boxes. The batch boxes are mechanically connected with the conveyor so that they are pulled along in a constrained path of travel. The frame end is open at the bottom so that the batch box immediately thereover is capable of being emptied by permitting the contents of the box to drop vertically down.

When the batch box is emptied, the conveyor is operated through a path of travel sufficient to move the empty batch box toward the upper flights of the conveyor and to bring the next full batch box to the unload station. This procedure continues until all of the batch boxes are emptied, after which they are returned to the lower flight to be refilled for use again.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

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FIGURE 1 is a side elevational view of the batch box assembly constructed in accordance with the invention, the assembly being shown supported on the bed of a truck, although the track illustration is merely diagrammatic showing a single, suitable manner of supporting the batch box assembly.

FIGURE 2 is a fragmentary top view of the batch box assembly in FIGURE 1.

FIGURE 3 is a fragmentary rear elevational view of the batch box assembly showing one box in the unload position and two boxes which have been already emptied.

FIGURE 4 is a cross-sectional view taken on the line 4-4 of FIGURE 1.

FIGURE 5 is an enlarged fragmentary sectional view taken on the line 5-5 of FIGURE 1.

FIGURE 6 is a fragmentary side elevational view showing a portion of the latch mechanism for one of the batch boxes.

FIGURE 7 is a sectional view taken on the line 7-7 of FIGURE 6.

FIGURE 8 is a sectional view taken on the line 8-8 of FIGURE 7.

FIGURE 9 is a side elevational view of a modified batch box.

FIGURE 10 is an enlarged sectional view showing the latch release and latch mechanism of the batch box of FIGURE 9.

FIGURE 11 is a sectional view showing the latch mechanism in the released position.

In the accompanying drawings there is an illustration of a truck 10 having a truck bed 12. The truck is absolutely conventional in nature and has a power take-off 14 used to operate the endless conveyor 16 of batch box assembly 18. Power take-off 14 is used to drive shaft 20 of batch box assembly 18, shaft 20 being located at the forward end of the assembly 18. Since the drive mechanism for the batch box assembly 18 will have to be varied depending on whether it is installed in a truck, trailer, some other type of vehicle or in some other remote way, e.g. stationarily, the details of the power transmission are only superficially treated. For instance, the power take-off 14 may be used to operate a chain and sprocket transmission 24 which in turn, operates shaft 20 through a gear transfer mechanism 28 and clutch 30. These may be mounted between the cab and the batch box assembly 18 or alongside of the cab or any other way deemed expedient from a design and engineering standpoint.

Batch box assembly 18 is made of a frame 34 having sides 36 and 38 held spaced apart by lower transverse frame members 40 and upper transverse frame members 42. The sides are preferably made of frame construction (FIGURE 1), and the upper transverse frame members 42 can be in the form of metal plates located between the upper and lower flights of conveyor 16.

Conveyor 16 is a link and roller conveyor and is made in two sections 46 and 48 respectively, the two sections being parallel and spaced. Double forward sprockets 50 and double rear sprockets 52 are mounted on shafts 20 and 21 at the front and rear of the upper part of frame 34. Conventional bearings 54 attached to members of the sides of the frame are preferably used for mounting shafts 20 and 21 for rotation. One of the two shafts, shaft 20 in the illustrated embodiment, is driven, while the other shaft 21 is an idler shaft.

There are two sets of rails (FIGURE 4) connected with the side 36 and 38 of the frame. One set includes rails 58 and 60, and the other set has rails 62 and 64, all rails being parallel, the upper edges of the rails support the rollers of the upper and lower flights respectively of the conveyor sections 46 and 48. As shown in FIGURE

1, the upper rails terminate short of the double sprockets 50 and 52 and are located between them while the lower rails extend under and slightly past the center of these double sprockets. The purpose of both sets of rails is obviously to carry the loads imposed on the conveyor sections by the weight of the batch boxes 68, each of which is identical in construction.

Typical batch box is made of a metal receptacle having an open top, side walls 70, and a bottom 72. Partition 74 is in the batch box, there being ordinarily one partition per box to separate the cement from the sand and gravel when required. The batch boxes are each supported in an identical fashion. For instance see FIGURE 4, showing that the rollers 47 of the conveyor sections 46 and 48 have elongated pins 49 which extend through openings in the upper edges of the opposing sides of a typical batch box. This type of connection is used inasmuch as when the batch boxes are loaded, the weight thereof is supported by the rails 60 and 64, and propulsion of the batch boxes is achieved by forces transmitted from the conveyor sections to the batch boxes by way of the pins 49.

Bottom 72 is made in two parts, each connected by hinge 78 to the lower edge of one wall of batch box 68. Latch 82 (FIGURES 6-8) is operatively connected to both of the hinged part of bottom 72. Inasmuch as the hinged edges of the bottom parts are at the front and rear walls of the batch box, latch 82 is operatively connected to the batch box bottom adjacent to the confronting, non-hinged edges of the parts of bottom 72. For this purpose two flat links 86 and 88 are connected by means of pivots 89 (FIGURE 8) to short upstanding walls 90 of the two parts of bottom 72. The upper parts of links 86 and 88 are pivoted to plate 92 which is vertically slidable thereby enabling the links 86 and 88 together with the parts of bottom 72 to be hingedly moved to the open position. A guide 94 is welded or otherwise secured to the side of the box and it is located between links 86 and 88. The plate 92 has an offset 96 therein (FIGURE 7) within which guide 94 is nested thereby constraining the vertical movement of the plate 92.

The latch member 98 preferably in the form of a dog having a latching notch 100 in the side thereof, is connected by pivot 102 to the plate 92. Latch keeper 104, for instance a projection, is fixed to the side of the batch box.

Resilient means are connected with and constitute a part of the latch, and they hold it in the latched position, as shown in full lines in FIGURE 6. These resilient means consist of a pin 106 extending through an opening 108 (FIGURE 7) in bracket 110 that is welded or otherwise fixed to plate 92. Spring 112 reacts on one end of pin 108, for example on an abutment 114 formed by a nut and washer on the outer extremity, and also reacts on bracket 110. There is an eye 116 at the inner end of the rod 106, and it is engaged with a pin 118 fixed to the upper extremity of latch member 98 and held free at all times by means of spacer 122 mounted on the pin. The bias of spring 112 is in a direction to maintain the latch member 98 in engagement with the latch keeper 104. However, as the batch box moves to the unload station 130 defined as the outer end of the frame 34, the upper cam edge 131 of latch member 98 strikes stationary abutment 134, for example, an arm fixed to the side of frame 34, thereby releasing the latch 82 by separating the latch member 98 from the latch keeper 104. This frees the two parts of bottom 72 so that they are promptly gravity lowered thereby unloading the full contents of the batch box. As shown in FIGURE 4, there are two identical latch assemblies, one for each side of each batch box.

Attention is now invited to FIGURES 9-11. A modified form of batch box is illustrated. Batch box 140 has the same or at least essentially the same external appearance of the previously described batch boxes. The distinction is found in the bottom 142 of batch box 140 to-

gether with a latch 144 for the batch box bottom. Typical batch box has a bottom made of two parts hinged at the front and rear edges of the batch box. However, the modification shown in FIGURES 9-11 uses only one hinge 146, and the bottom is made in one piece.

The latch 144 is made of a tube 148 equipped with a bracket 150 at the upper end thereof. Pivot 152 is used to connect the bracket 150 to the side of the batch box 140 whereby tube 148 is capable of pivotal motion as shown by the dotted line representation of FIGURE 9.

Rod 154 is axially slidably disposed in tube 148 and has an eye 156 at the lower end thereof. The pivot pin 160 is engaged in eye 156 and connected to the side flange 162 of the batch box bottom 142. Spring 164 functions as a shock absorber and therefore it is concentrically mounted on rod 154 and simply seats against the lower aperture wall 168 of tube 148. A collar 169 is secured to rod 154 intermediate the ends thereof, comes to bear against the spring 164 preventing shocks and jars or at least materially attenuating them.

The upper end of rod 154 has a latch member 170 fixed thereto. The latch member has a cam surface edge 171 thereon, and a shoulder 172 at its upper edge. The shoulder is adapted to rest on the upper edge 173 of tube 148 thereby holding the rod 154 in a fully retracted position with respect to tube 148.

Puncher assembly 180, for instance a rod 181 with a spring 182 reacting thereon and very much resembling the spring rod of FIGURE 7, incorporates a roller 183 which bears against the cam surface 171. This holds the latch member 170 in the latched position, but it is capable of being released, for example, when the rear edge 186 of the latch member 170 strikes a comparatively stationary abutment 188 which would respond in function to abutment 134 carried by the frame of the batch box assembly. Upon striking such an abutment, the spring 182 compresses, and the latch member 170 enters the bore of tube 148. The weight of the load in the batch box then, immediately forces the bottom of the batch box to the open position thereby emptying the batch box.

During the use of the assembly, as the batch boxes are unloaded, the conveyor 16 is actuated thereby bringing the empty batch boxes around the end of the conveyor and ultimately to a position above the top flight of the conveyor. As the batch boxes pass around the end of the conveyor, the bottoms automatically return by the pull of gravity to the closed and latched positions.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A batch box assembly comprising the combination of a conveyor, a plurality of batch boxes operatively connected to the conveyor for movement toward an unload station and return therefrom, each batch box having side walls and a bottom, said bottom being hinged to at least one of said side walls and adapted to be opened by the pull of gravity on the contents of the batch box and the bottom of the batch box, latch means automatically operative to release the batch box bottom in response to arrival at the unload station and gravity operated means operative to close the bottom in response to return of the batch box from the unload station.

2. The subject matter of claim 1 wherein there is a frame having a plurality of rails, said conveyor engaging said rails which constrain the movement of said conveyor and support loaded batch boxes.

3. The subject matter of claim 2 wherein said frame defines said unload station at one end thereof including an opening in the frame beneath the batch boxes as they

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enter said station so that upon emptying the batch boxes, the contents thereof falls vertically downward unimpeded.

4. In a batch box assembly, a frame having a plurality of rails, conveyor means carried by said frame and constrained in its movement by said rails, a plurality of batch boxes attached to and suspended from said conveyor, each batch box having a bottom, means hingedly connecting said bottom to the batch box, latch means connected with said bottom and retaining the bottom of the batch box in a closed position, and trip means carried by said frame at an unload station for tripping said latch mechanism to thereby release said bottom and gravity operated means responsive to continued movement of the batch boxes after unloading, for closing said bottoms.

5. The combination of claim 4 wherein said conveyor means includes an endless conveyor with an upper return flight and a lower loading flight, said batch boxes being suspended from said lower flight and movable with said conveyor after unloading the batch boxes to a position at which the batch boxes are inverted and are connected with the upper flight of the same conveyor.

6. The combination of claim 5 wherein said latch means including a spring urged latch member which re-engages to again latch said bottoms as the empty batch boxes are moved from the lower flight position to the upper flight position of the conveyor.

7. The subject matter of claim 6 wherein there are

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power operated means operatively connected with said conveyor for actuating said conveyor.

8. The subject matter of claim 6 wherein said latch means are located on the side of the batch boxes and said trip means includes a cam projection engageable with the latch means as it arrives at the unload station.

9. An unloading batch box assembly comprising, frame means having an unloading station at one end thereof, conveyor means movably mounted by the frame means in spaced relation above the unloading station, a plurality of batch boxes having unloading bottom means, each batch box being operatively connected to the conveyor means for movement within the frame means toward the unloading station in a loading position, latch means operatively connected to each batch box bottom means for holding the bottom means closed, trip means mounted on the frame means for releasing the latch means when the batch box is at the unloading station, said conveyor means including means for moving each batch box away from the unloading station in an inverted position to cause closing of the bottom means and relatching of the latch means.

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