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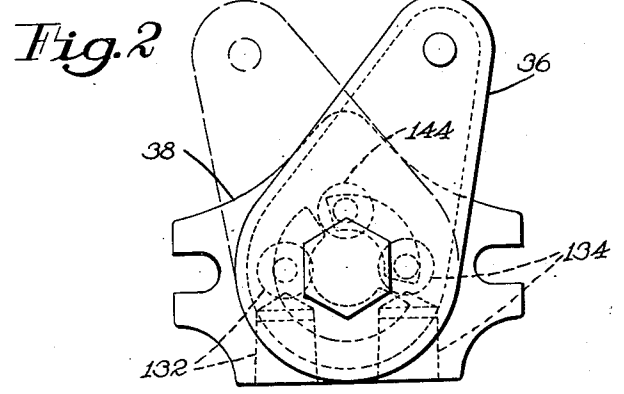
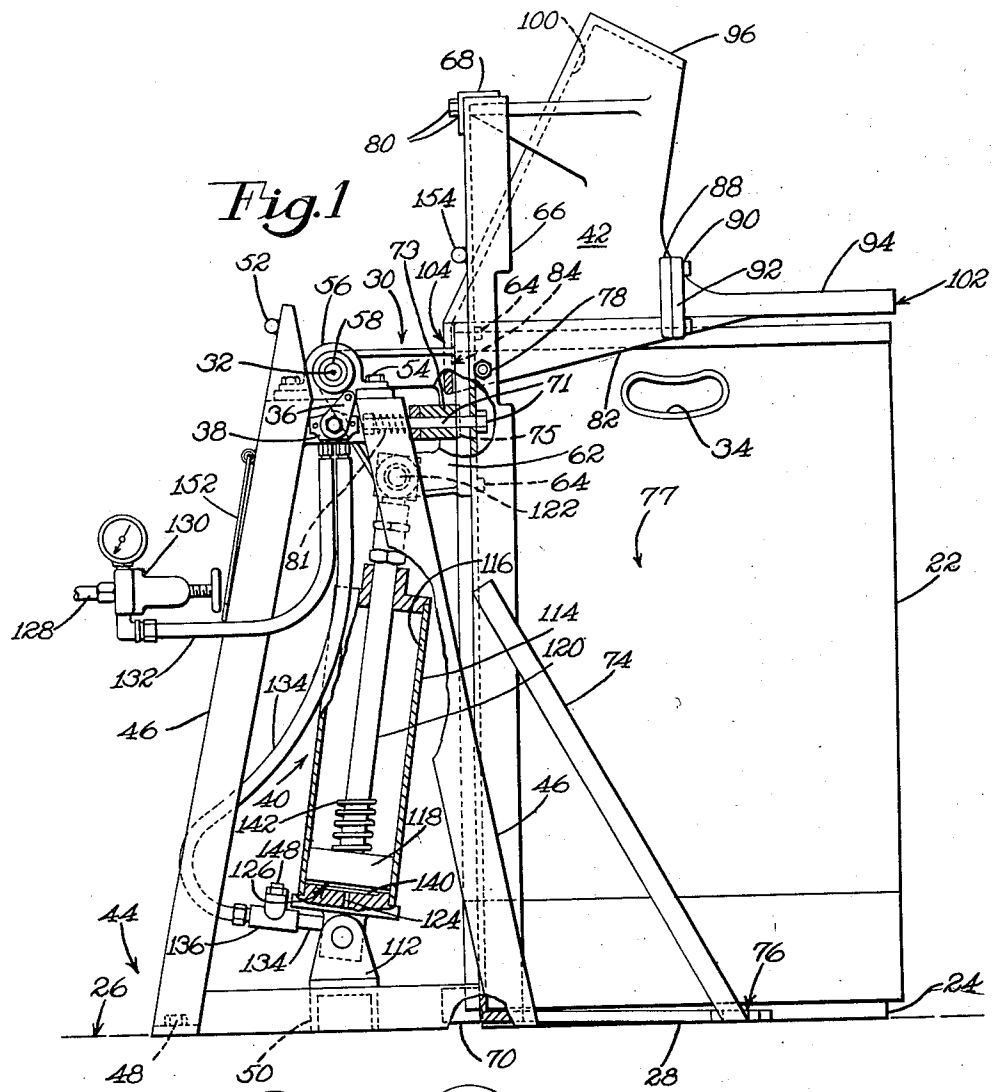
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2,822,113

CONTAINER LIFTING AND EMPTYING APPARATUS

Filed Oct. 16, 1956

3 Sheets-Sheet 1



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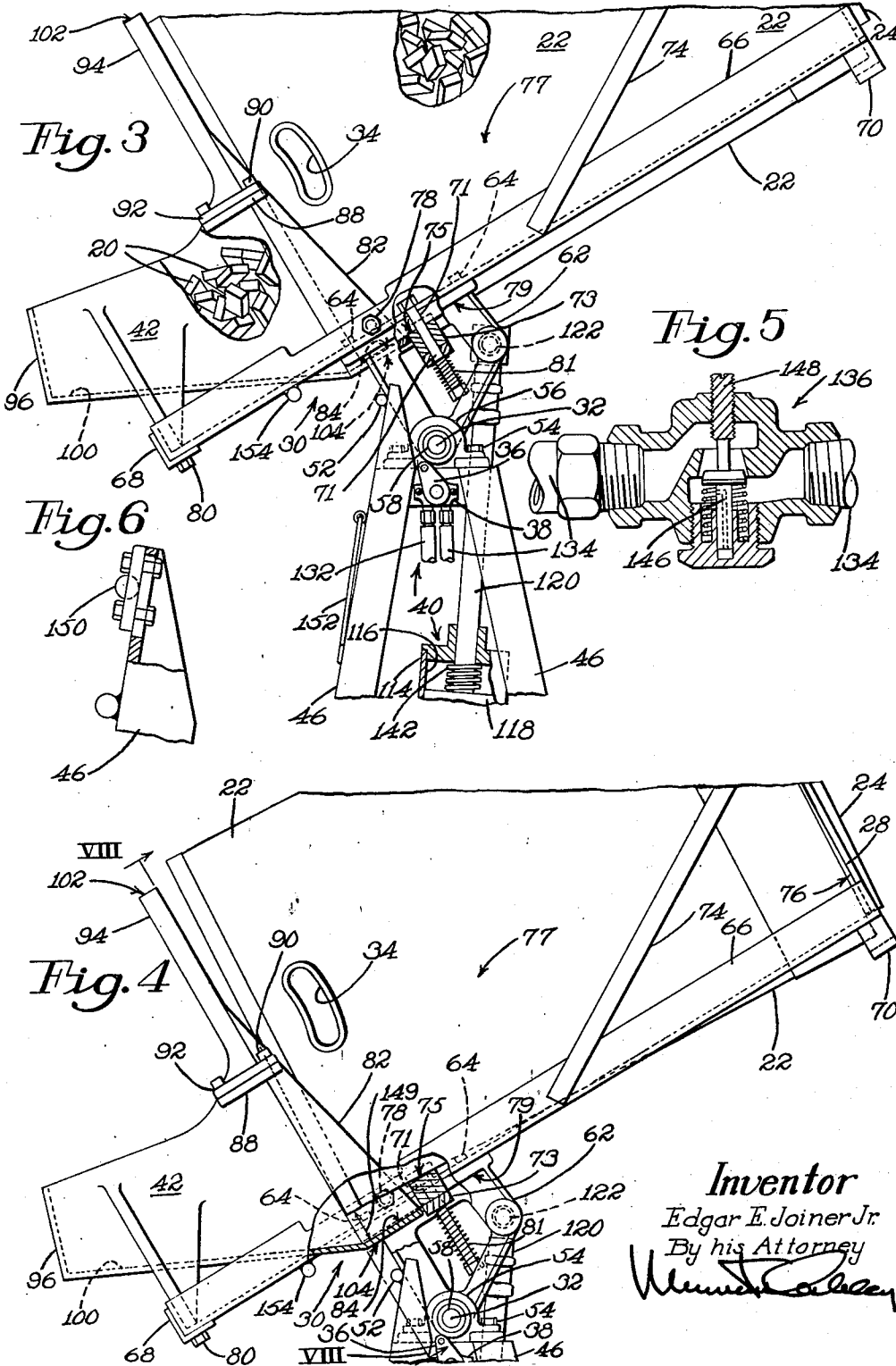
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3 Sheets-Sheet 2



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CONTAINER LIFTING AND EMPTYING APPARATUS

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3 Sheets-Sheet 3

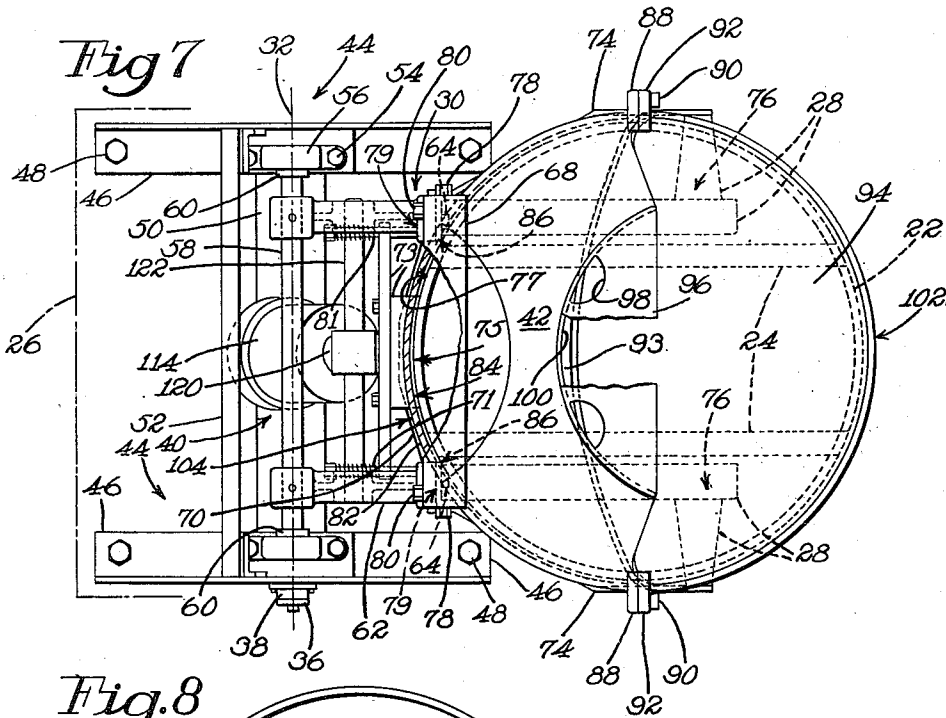
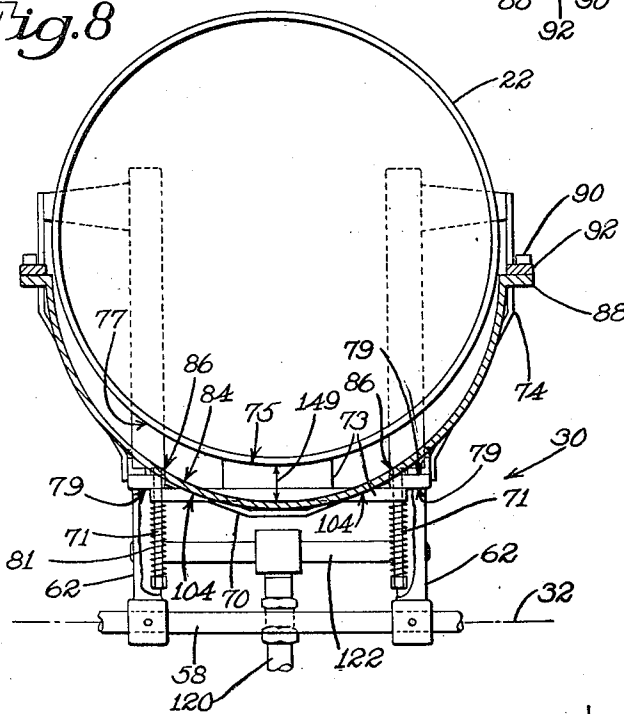


Fig. 8



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2,822,113

**CONTAINER LIFTING AND EMPTYING APPARATUS**

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Application October 16, 1956, Serial No. 616,222

8 Claims. (Cl. 222—165)

This invention relates to container lifting and emptying apparatus and is illustrated herein as embodied in an apparatus for receiving a barrel which is filled with articles such, for example, as wood heel blocks, and for tipping said barrel to a predetermined position in order to render said articles, dumped from the barrel as a result of the tipping operation, readily available. The present application is a continuation-in-part of an application Serial No. 396,663, filed December 7, 1953 in my name.

The present invention consists in the novel features hereinafter described, reference being had to the accompanying drawings which disclose one embodiment of the invention selected for purposes of illustration, said invention being fully disclosed in the following description and claims.

In the drawings,

Fig. 1 is a side elevation, partly in section, showing an illustrative power operated container lifting and emptying apparatus in an idle position, a barrel containing wood heel blocks being arranged for reception by a cradle which forms part of said apparatus and is in a loading and unloading position;

Fig. 2 is an enlarged view of a valve for controlling fluid pressure means which moves the cradle from its barrel loading and unloading position to a barrel emptying position;

Fig. 3 is a view similar to Fig. 1, partly broken away and partly in section, showing the apparatus with its cradle in its barrel emptying position while the barrel mounted thereon is substantially filled with heel blocks;

Fig. 4 is a view similar to Fig. 3 illustrating the position of the barrel on the cradle after the wood heel blocks have slit out of the barrel into a trough or bin which is secured to the cradle;

Fig. 5 shows in section a check valve for use in controlling the speed at which the cradle returns to its loading and unloading position;

Fig. 6 shows a modified stop which is engaged by the cradle and determines the barrel emptying position thereof;

Fig. 7 shows in plan the apparatus illustrated in Fig. 1, the showing of the wood heel blocks in the barrel having been omitted; and

Fig. 8 is a section on the line VIII—VIII of Fig. 4.

The illustrative apparatus is described with reference to lifting and emptying wood heel blocks 20 (Fig. 3), which are delivered to the apparatus in a container such, for example, as a cylindrical barrel 22 having runners 24, to cause said blocks to slide into a trough or bin 42 of the apparatus where they are readily available for removal one at a time by the operator. The barrel 22 containing the blocks 20 is slid in an upright position by a

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“barrel boy” over a floor 26, upon which the apparatus is mounted, to its position shown in Fig. 1 where the runners 24 are arranged between and the bottom of the barrel overlies platforms 28 of a cradle 30, which is pivoted for movement about an axis 32, between a loading and unloading position shown in Fig. 1 and an emptying position shown in Fig. 3. The barrel 22, which has a closed end or bottom and an open end or top, is made of light rugged material such, for example, as fibre board and is usually reinforced at its closed and upper ends and has a pair of hand holes 34.

When the barrel 22 has been slid over the platforms 28 of the cradle 30 approximately to its position shown in Fig. 1, a lever 36 of a valve 38 is swung from its full-line position to its dash-line position shown in Fig. 2, thereby causing fluid pressure means 40 to tilt the cradle counterclockwise as viewed in Fig. 1 about the axis 32 thus moving the barrel to its position shown in Fig. 3, the heel blocks 20 in the barrel 22 sliding under the influence of gravity into the trough or bin 42 which, as will be explained later, is secured to and may be described as forming part of the cradle.

When the heel blocks 20 to be operated upon have all been removed from the trough 42 by the operator the lever 36 of the valve 38 is moved back to its full-line position thus rendering the fluid pressure means 40 inactive and causing the cradle 30 to be moved, by means hereinafter described, back to its loading position preparatory to removing the empty barrel 22 from the cradle 30 and presenting another barrel containing heel blocks to be operated upon to the apparatus.

The cradle 30 is mounted for pivotal or tilting movement upon a fabricated pedestal or frame 44 comprising a pair of side brackets 46 which are secured by screws 48 to the floor 26 and are rigidly secured together by a foot channel 50 and a rod 52 welded to said brackets. Secured by bolts 54 to the side brackets 46 are bearings 56 in which is journaled a shaft 58 having fixed to it collars 60 which engage opposing inner faces of the bearings. Pinned to end portions of the shaft 58 is a pair of cradle brackets 62, the brackets being secured by screws 64 to side bars 66 of the cradle 30, opposite ends of said side bars being welded to a straight angle iron upper crossbar 68 and an outwardly bent strip lower crossbar 70, respectively, of the cradle. Welded to the side bars 66 and to the crossbar 70 are the platforms 28, outwardly extending flanges of which are welded to struts 74 having upper ends which are welded to median portions of the side bars 66.

When the apparatus is idle the forward ends of the platforms 28 are in engagement with the floor 26, said platforms extending along said floor at a very slight angle to the plane of the floor as shown in Fig. 1, the construction and arrangement being such that the bottom of the barrel 22, the runners 24 of which are arranged between the platforms, is arranged just above and substantially parallel to flat upper surfaces 76 which are formed on the platforms and lie in a common plane.

The trough or bin 42 is secured by bolt and nut connections 78, 80 to the cradle 30 and comprises a saddle or saddle portion 82 an inner concave face 84 of which is spaced slightly from an outside or peripheral face 77 of the barrel 22 when said barrel is in its dispensing position in engagement with corners 86 of the side bars 66 respectively as shown in Fig. 7. Secured to the cradle brackets 62 and to the side bars 66 adjacent to the saddle

portion 82 of the cradle 30 are bearing rods 71 respectively which have slidably on them a two-part block 73 having a concave face 75 complementary to the outside or peripheral face 77 of the barrel 22, said block being constantly urged to a rest or retracted position, in which lateral projections of the block engage faces 79 of the brackets, by springs 81 which surround the guide rods and opposite ends of which are in engagement respectively with the block and the heads of the rods. When the machine is in its position shown in Figs. 1 and 7 with the loaded barrel 22 presented to it, the block 73 is in a projected position in which the lateral projections of the block are spaced substantial distances from the faces 79 of the bracket 62, the concave face 75 of the block being positioned somewhat behind corners 86 of the side bars 66. The barrel 22 is slid along the floor on its runners 24 and over the platforms 28 to its upright position shown in Fig. 1, said barrel 22 being pressed against the concave face 75 of the block and thus moving said block to its projected position, the barrel being so positioned that its peripheral face is in substantial engagement with the corners 86 of the side bars 66. When the barrel 22 is thus positioned in the apparatus it rests on its runners 24 and its bottom is slightly spaced above the surface 76 of the platforms 28. The platforms 28 are suitably spaced so that the runners 24 of the barrel 22 shall be received between them and may be defined as being positioned adjacent to the floor 26 when the cradle 30 is in its loading and unloading position and as being arranged to be overridden by the bottom of the barrel 22.

Formed integral with the trough or bin are flanges 88 secured by screws 90 to flanges 92 of a planar barrier or abutment 94 which is positioned opposite a substantial portion of the open end of the barrel 22 and which, when the cradle 30 is in its emptying position shown in Fig. 3, closes off the upper half of the open end of the barrel, the heel blocks sliding through an opening 93 formed between the trough and the lower end of the barrier. The trough 42 is preferably of frusto conical shape, forms a continuation of the open end of the barrel 22 on the cradle 30 and has a closed end 96 provided with small openings 98 which are flush with a frusto conical heel block supporting surface 100 of the trough and through which chips and other debris may be readily swept, if desirable. The trough or bin 42 may be described as arranged adjacent to or contiguous with the lower portion of the upper end of the barrel or with the lower portion of the rim of the open end of the barrel when the cradle 30 is moved to its emptying position.

A cylindrical surface 102 of the outer rim of the barrier 94 and a cylindrical surface 104 of the saddle 82 of the trough 42 collectively have an outline slightly greater than that of the open end of the barrel 22, the construction and arrangement being such that when the cradle 30 is tilted to its emptying position the heel blocks 20 in the barrel will be slid out of said barrel through the opening 93 and into the upper portion of the trough. When the cradle 30 is tilted to its emptying position the median longitudinal portion of the heel block supporting face 100 of the trough 42 is approximately horizontal. When the cradle 30 is in its emptying position the barrier 94 is arranged opposite the open end of the barrel 22 in the cradle and thus closes off said upper portion, the surface 100 of the trough 42 being substantially continuous with the then lower portion of the rim of the open end of the barrel. The trough 42 and the barrier 94 may be considered as forming parts of the cradle. When the cradle 30 is in its emptying position shown in Fig. 3 the upper margin of the closed end of the trough 42 is arranged at substantially the same elevation as a point midway between the lower end of the barrier 94 and a lower rear end of the trough.

When the barrel 22 has been slid over the platforms 28

of the cradle into substantial engagement with the corners 86 of the side bars 66 to its position shown in Figs. 1 and 7, it is not supported by the cradle but as soon as the cradle moves counterclockwise, as viewed in Fig. 1, from this position the platforms 28 and the side bars 66 of the cradle cooperate to support the barrel. As the cradle 30 approaches its emptying position shown in Fig. 3 the barrel 22 has a tendency to slide slightly down the side bars 66 into engagement with the barrier 94. The struts 74 are so constructed and arranged that when the barrel 22 is supported by the cradle 30 the peripheral face 77 of the barrel is substantially in engagement with the struts thereby insuring against the barrel being displaced upon the cradle lengthwise of the axis 32 of the shaft 58.

The fluid pressure means 40 for moving the cradle 30 from its loading to its emptying position will now be described. Welded to the foot channel 50 is a boss 112 (Fig. 1) having pivoted to it a cylinder 114 provided with a guideway 116 in which reciprocates a piston 118 having secured to it a piston rod 120 the upper end of which is pivotally connected to a rod 122 pinned to the cradle pivot brackets 62.

Fluid, such for example as air under pressure, is admitted through a passage 124 (Fig. 1) formed in the lower head of the cylinder 114 to a pressure surface 126 of the piston 118 to cause the cradle 30, to which the barrel 22 has been presented, to be lifted from its loading and unloading position to its emptying position when the lever 36 of the valve is moved from its closed or full-line position (Fig. 2) to its open or dash line position so as to connect an intake line 132 with a transfer line 134 leading to the passage 124.

Air from a compressor (not shown) is admitted through a pipe 128, a reducing valve 130, the intake line 132, the valve 38 and the transfer line 134 which includes a check valve 136 to the passage 124 and accordingly to the pressure surface 126 of the piston 118. When air under pressure is admitted to the surface 126 of the piston 118, the cradle 30 is moved counterclockwise from its loading position shown in Fig. 1 to its emptying position shown in Fig. 3, counterclockwise movement of the cradle about the axis of the shaft 58 being limited by the engagement of the cradle pivot brackets 62 with the rod 52 which serves as a stop and may be so defined.

Surrounding the connecting rod 120 and having one of its ends in engagement with the piston 118 is a compression spring 142 the upper end of which, when the machine is idle, is spaced a considerable distance from an upper end of the cylinder. Just before the side bars 66 of the cradle 30 reach a horizontal position during movement of the cradle to its emptying position, the spring 142 engages the upper end of the cylinder, causing said spring to be compressed and accordingly to oppose upward movement of the piston thereby resisting and thus slowing down the movement of the cradle and cushioning the force with which said cradle engages the rod 52.

The cradle 30 is normally held in its emptying position by the air pressure acting on the surface 126 of the piston 118 until such time as the wood heel blocks 20 to be operated upon have been removed from the trough 42. When the operator is ready for a new supply of heel blocks 20 the valve 38 is moved to its closed or full-line position shown in Figs. 1 and 2, causing the chamber 140 to be open to an exhaust line 144 leading to the atmosphere with the result that the energized or compressed coil spring 142 forced against the upper end of the cylinder 114, as shown in Fig. 3, forces the piston 118 downward and accordingly moves the cradle clockwise toward its loading position. The spring 142 ceases to act on the piston 118, as above described, after the side bars 66 of the cradle 30 have been moved approximately to their horizontal positions, said cradle thereafter being moved back to its loading position by the action of

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gravity. During movement of the cradle 30 toward its loading position, the check valve 136 restricts the passage of air flowing from the chamber 140 thereby insuring that the speed of the cradle back to its loading position shall be slow and cushioned. It will be noted that during movement of the cradle 30 from its loading to its emptying position, a spring-pressed plunger 146 of the check valve 136 offers little, if any, resistance to air which is under pressure and is being supplied to the chamber 140. The amount of cushioning of the cradle 30 by the check valve 136 may be varied by setting a stop screw 148, limiting the complete closing of the valve, in different adjusted positions.

As the barrel 22 shown in Fig. 3 is emptied it becomes lighter and the block 73, which is acted upon by the springs 81 and in engagement with an opposing portion of the peripheral face 77 of the barrel, moves the barrel to its position best shown in Fig. 4 in which said opposing portion is spaced a substantial distance away from the face 84 of the saddle portion 82 of the trough or bin 42 to form a gap 149, the barrel being held in this position in the cradle 30 during the time that the cradle is returned to its barrel loading and unloading position. The cradle 30 may be described as being fulcrumed on the side brackets 46 which constitute a frame, between the loading and unloading position shown in Figs. 1 and 7 and the emptying position in Fig. 3 in which the barrel is supported by the cradle on its side with its open end lowermost. The platform 28, which may be collectively considered as a single platform and may be described as such, is adapted to engage the closed end of the barrel. The heel block supporting surface 100 of the trough or bin 42 and the face 84 of the saddle portion 82 of the trough or bin may be described as the inner face of said bin or trough.

When the cradle 22 has moved to its barrel emptying position shown in Fig. 3 the barrel is positioned on the cradle with a lower rim portion of the open end of the barrel in contiguous relation with the inner face portion 84 of the bin 42. The spring-pressed block 73 may be described as being moved by spring action in response to the emptying of the barrel 22 on the cradle 30 to its retracted position, to cause the lower portion of the rim of the open end of the barrel to be moved a substantial distance from the inner face of the bin 42 to form the gap 149 through which refuse left in the bin may be dumped when the cradle having the barrel on it is moved back to its loading and unloading position. The corners 86 of the side bars 66 may be collectively referred to as a stop, and the block 73 may be referred to as a spring-pressed member adapted to be engaged by the upper portion of the outside peripheral cylindrical face of the barrel and as being adapted to be displaced by the barrel filled with heel blocks.

With the above construction it will be clear that refuse such, for example, as sawdust and imperfect blocks which have been left in the trough or bin 42 will fall through the gap 149 and onto the floor instead of returning into the barrel 22 when the cradle 30 with the barrel on it is moved back to its loading and unloading position.

The spring 142 in the cylinder 114 may be defined as being compressed by power means during movement of the cradle 30 to its emptying position for cushioning impact of the cradle against the stop or rod 52 and for initially tilting the cradle, together with the barrel on it, toward its loading position when the power means is rendered inactive.

In order to vary the emptying position of the cradle 30 and accordingly the rate at which the heel blocks 20 slide from the barrel 22 into the trough 42, there is provided a modified stop 150 which may be substituted for the stop 52 and is illustrated in Fig. 6 and may be moved into different adjusted positions heightwise upon the side brackets 46 of the apparatus. In order to insure that in the event of a failure of air pressure in the system the

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cradle 30 shall be maintained in its emptying position, a hook 152 attached to one of the side brackets 46 of the frame may be latched into an eye 154 secured to one of the side bars 66 of the cradle.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a container lifting and emptying apparatus, a frame adapted to be fixed to a floor, a cradle fulcrumed upon the frame for movement between a loading and unloading position in which a container, which has open and closed ends respectively and which is arranged upright and is filled with articles, is ready to be loaded onto the cradle, and an emptying position in which the container is supported by the cradle on its side with its open end lowermost, said cradle comprising a platform which when the cradle is in its loading and unloading position is substantially engaged by the closed end of the container, a bin secured to the cradle and having an inner face, said cradle being adapted so to position the container during movement of said cradle to its emptying position that a rim of the open end of the container is contiguous with the inner face of the bin whereby to allow articles in the container to be moved smoothly by gravity into the bin, and means responsive to the emptying of the container on the cradle at its emptying position for causing the rim of the open end of the container to be moved a substantial distance away from the inner face of the bin to form, between said inner face of the bin and the rim of the open end of the container, a gap through which refuse left in the bin may be dumped when the cradle bearing the container is moved back to its loading and unloading position.

2. In a barrel lifting and emptying apparatus, a frame adapted to be fixed to a floor, a cradle mounted upon the frame for movement about an axis between a loading and unloading position in which a barrel which has open and closed ends respectively and which is arranged upright and contains articles, is ready to be loaded onto the cradle, and an emptying position in which the barrel is supported by the cradle on its side with its open end lowermost, said cradle comprising a stop and a platform adapted to engage the closed end of the barrel, a bin secured to the cradle and having an inner face, and a spring-pressed member which is adapted to be engaged by one upper portion of a peripheral face of the barrel containing articles and is adapted to be displaced by said barrel until another upper portion of said peripheral face engages said stop whereby to cause a rim portion of the open end of the barrel to be moved into contiguous relation with the inner face of said bin to allow articles moved by gravity from the barrel to be transferred smoothly into the bin, said spring-pressed member being adapted after the weight of the barrel has been reduced by reason of articles having been removed therefrom to cause said barrel to move to a position in which said rim portion of the open end of the barrel has been moved a substantial distance above said inner face of the bin thus forming a gap between the inner face of said bin and the rim portion of the open end of the barrel, said gap being of sufficient width to insure that refuse left in the bin may be dumped onto the floor and not into the barrel as the cradle having the barrel mounted on it is moved from its emptying to its loading and unloading position.

3. In a barrel lifting and emptying apparatus, a frame fixed to a floor, a cradle, and a bin secured to the cradle and having an inner face, said cradle being mounted upon the frame for movement between a loading and unloading position ready to receive a barrel which has open and closed ends respectively and contains articles and which is arranged upright, and an emptying position in which the cradle supports the barrel on its side with the open end of the barrel lowermost and adjacent to the bin thereby allowing articles to slide freely and smoothly from the barrel into the bin, said cradle having a platform which is arranged adjacent to the floor when the

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cradle is in its loading and unloading position and which is adapted to receive the closed end of the barrel, and having a stop and a biased member adapted constantly to urge the open end of the barrel away from the stop, said barrel containing articles being adapted to apply pressure to said member when the cradle is in its emptying position whereby to move the member to a projected position until the barrel engages said stop at which time a rim portion of the open end of the barrel is contiguous with said inner face of the bin, said biased member being adapted to move the open end of the barrel a predetermined distance away from said stop when the articles have been removed therefrom whereby to form between said inner face of the bin and said rim portion of the open end of the barrel a wide gap thereby insuring that refuse remaining in the bin shall not be dumped back into the barrel when the cradle having the barrel on it is moved back to its loading and unloading position from its emptying position.

4. In a container lifting and emptying apparatus, a frame adapted to be secured to a floor, a cradle pivotally mounted on the frame for movement between a loading and unloading position and an emptying position, said cradle comprising a platform which is arranged adjacent to the floor when the cradle is in its loading and unloading position and is adapted to be overridden by a closed end of the container which has an open end and is loaded with articles, a bin secured to the cradle and having an article receiving face, said cradle comprising a stop which is engaged by the container on the cradle in its emptying position whereby to position a rim portion of the open end of the container in substantially contiguous relation with the article receiving face of the bin to insure that articles shall be smoothly fed by gravity from the container into said face of the bin, a block which is mounted for movement on the cradle, and a spring for urging the block to a retracted position on the cradle, said block being moved to its projected position against the action of the spring by the article filled container and when said articles have been transferred from the container into said bin being adapted to move the container away from the stop to a position in which said rim portion of the open end of the container is spaced from the inner face of the bin by a wide gap through which refuse is dumped from the bin when the cradle having the container mounted on it is moved back to its loading and unloading position thereby insuring that said refuse in the bin shall not be dumped back into the barrel.

5. In a barrel lifting and emptying apparatus, a frame adapted to be fixed to a floor, a cradle journaled upon the frame for movement between a loading and an unloading position in which a barrel which has open and closed ends respectively and which is arranged upright and contains articles is ready to be received by the cradle, and an emptying position in which the barrel is supported by the cradle on its side with its open end lowermost, said cradle comprising a platform adapted to be engaged by the closed end of the barrel, a bin secured to the cradle and having an inner face, a block which is mounted for movement on the cradle, and a spring for moving the block to a retracted position on the cradle, said cradle being so constructed that when it is in its emptying position the barrel mounted thereon has a rim portion of its open end in contiguous relation with the inner face of the bin whereby to allow articles in said barrel to slide smoothly under the force of gravity into the bin, said block after the barrel has been substantially emptied being rendered active by the action of said spring to move said rim portion of the open end of the barrel away from the inner face of the bin thereby forming between said inner face of the bin and said rim portion of the barrel a gap of sufficient width to insure that refuse remaining in the bin after the barrel has been emptied shall not be dumped back into the barrel as the cradle having the empty barrel on it is moved back to its loading and unloading position.

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6. In a container lifting and emptying apparatus, a frame adapted to be fixed to a floor, a cradle journaled upon said frame for movement between a loading and unloading position in which a container, which has open and closed ends and which is upright and filled with articles, is received by the cradle, and an emptying position in which the container is supported by the cradle on its side with its open end lowermost, said cradle comprising a stop and a platform which is arranged adjacent to the floor and over which the closed end of the container is positioned when the cradle is in its loading and unloading position, a bin which is secured to the cradle and has an inner article receiving face, and a spring-pressed block mounted for movement on the cradle and adapted to be displaced to a projected position by the container which is mounted on the cradle and has articles mounted in it, until said container engages said stop thereby positioning a lower portion of a rim of the open end of the container in contiguous relation with said inner face of the bin, said spring-pressed block as the container is emptied being adapted to move said lower portion of the rim of the open end of the container a substantial distance away from said inner face of the bin thus forming between the open end of the barrel and said inner face of the bin a gap through which refuse left in said bin is dumped as the cradle bearing the container is moved back to its loading and unloading position.

7. In a container lifting and emptying apparatus, a frame adapted to be fixed to a floor, a cradle mounted upon the frame for movement between a loading position, in which a container loaded with articles and having an open end is in an upright position upon the floor ready to be received by the cradle, and an emptying position in which the cradle supports the container on its side with its open end lowermost thereby allowing said articles to slide from the container, said cradle comprising platforms which are arranged adjacent to the floor and over which the container is slid when the cradle is in its loading position and also comprising bars for centralizing the container on the cradle, a planar barrier which is secured to the cradle and is shaped and arranged to be engaged approximately by the upper portion of the open end of the container in the cradle in its emptying position, a dispensing trough which is approximately continuous with and is open to the lower portion of the open end of the container when the cradle is in its emptying position and which has a planar closed end inclined at a substantial angle to the planar barrier, the upper margin of the closed end of the trough, when the cradle is in its emptying position, being arranged at substantially the same elevation as a point midway between the lower end of the barrier and a lower rear end of the trough, and power means for moving the cradle between loading and emptying positions.

8. In a container lifting and emptying apparatus, a frame adapted to be fixed to a floor, a cradle pivotally mounted upon the frame for movement between a loading position, in which a container loaded with articles and having an open end is arranged in an upright position ready to be received by the cradle, and an emptying position in which the cradle supports the container on its side with its open end lowermost thereby allowing said articles to slide from the container, said cradle comprising platforms which are arranged adjacent to the floor when the cradle is in its loading position and over which the container is slid with a bottom of said container overlying the platforms and also comprising bars for centralizing the container widthwise on the cradle, a planar barrier secured to the cradle and shaped and arranged to be engaged substantially by the open end of the container positioned in the cradle, a saddle having a concave face which is approximately in engagement with a side of the container positioned in the cradle adjacent to the open end of said container and which has an exit end, a trough which has an open entrance end continuous

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with the exit end of the saddle and which has a closed end and a bottom and sides which have the general shape of a frustum of a cone and elements of which are inclined at a substantial angle to a general plane of the barrier, fluid pressure means operatively connected to the cradle, means for rendering the fluid pressure means active to cause the cradle to be moved from its loading to its emptying position and for rendering said fluid pressure means inactive to allow the cradle to move back to its

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loading position, a resilient element energized in response to movement of said fluid pressure means as the cradle nears its emptying position and adapted to move said cradle away from its emptying position when said fluid pressure means is rendered inactive, and a check valve associated with said fluid pressure means for retarding movement of the cradle back to its loading position.

No references cited.