March 1, 1960 L. J. COLLINS 2,926,803

AUTOMATIC CONTAINER LOCKING AND UNLOCKING CRADLE FOR ELEVATORS, AND CONTAINER THEREFOR

Filed May 5, 1958 2 Sheets-Sheet 1

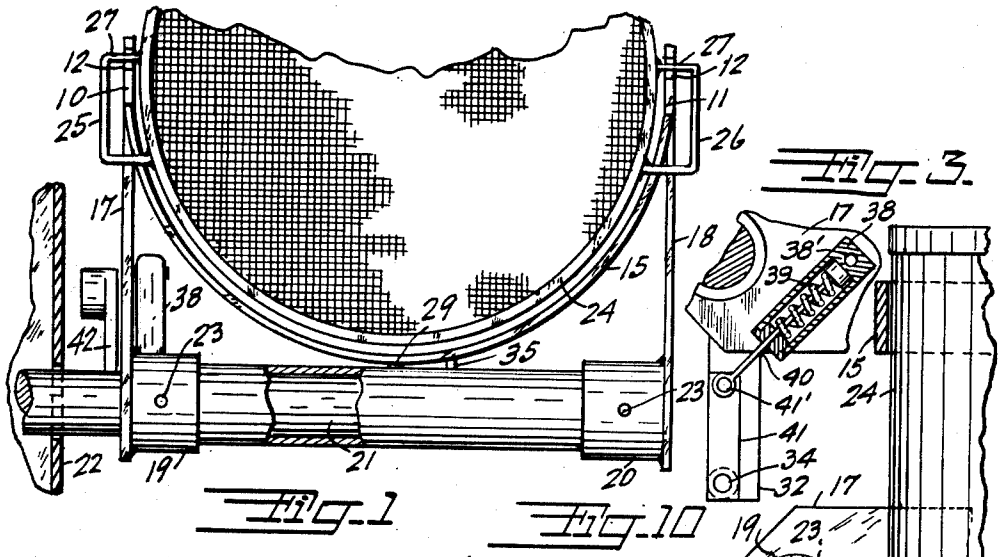


Fig. 1

Fig. 3

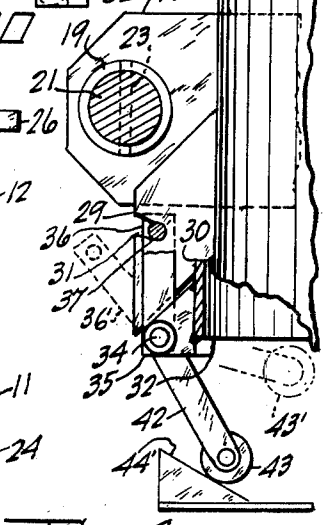


Fig. 4

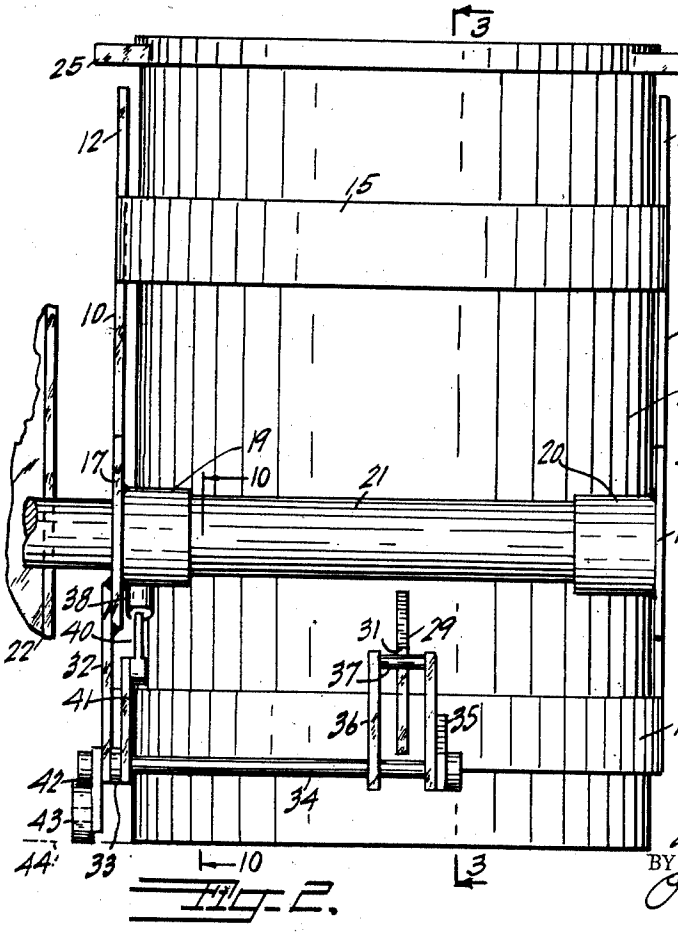
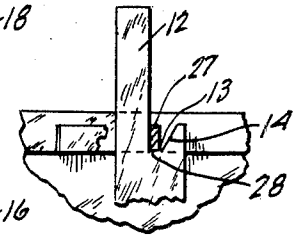


Fig. 2



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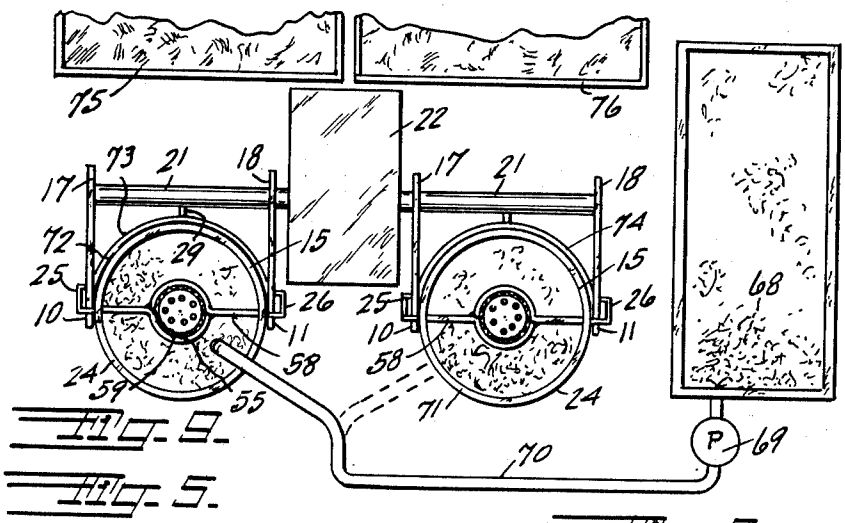


FIG. 5.

FIG. 7.

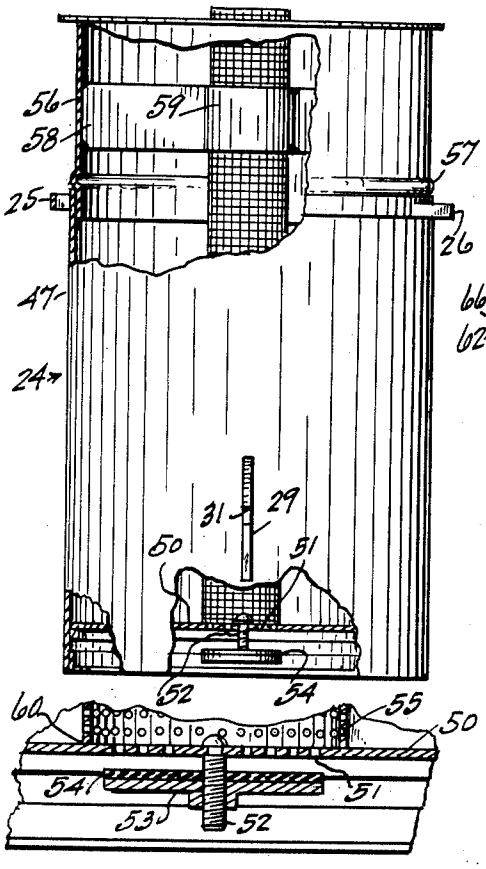


FIG. 6.

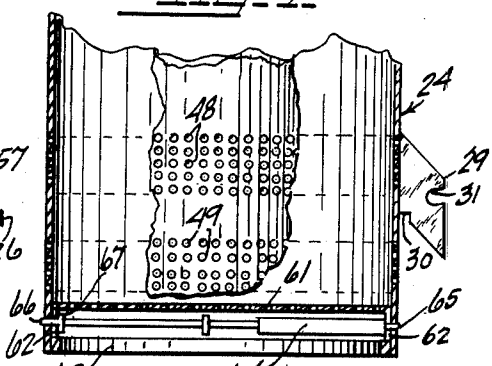
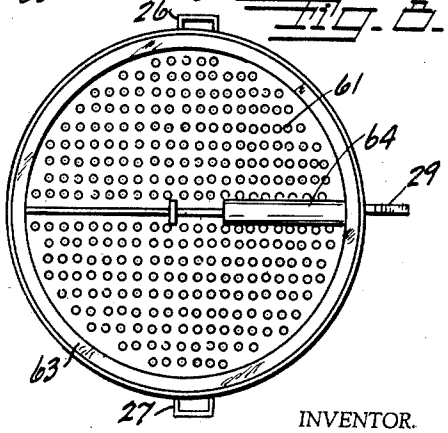


FIG. 8.



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AUTOMATIC CONTAINER LOCKING AND UNLOCKING CRADLE FOR ELEVATORS, AND CONTAINER THEREFOR

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Application May 5, 1958, Serial No. 732,886

6 Claims. (Cl. 214—313)

This invention relates to improvements in material handling apparatus, and particularly to a cradle for elevators and an interlocking container therefor for draining and for transfer of drained curd to an elevated cottage cheese mixer or the like, and provides a cradle which automatically secures the container therein coincident with initial elevating of the cradle, and releases the container during the terminal portion of lowering movement, requiring only the placing of the container in the cradle and removal therefrom.

This invention is particularly designed for use with the elevator disclosed and claimed in my copending application Serial Number 733,148, filed May 5, 1958, now Patent No. 2,899,091, though it can also be adapted to the elevator covered by my Patent No. 2,657,815, issued November 3, 1953, as also with any other elevators having rotatable carrier shafts projecting from the elevator housing.

The interlocking means cooperative between the container and cradle is positive and supports the container in any position, to permit direct dumping of the contents. The container for curd also functions as a strainer or drainer for removal of the wash water from the washed curd, and may be of either, the quick-drain type for high production of cottage cheese, or the slow drain type for normal production with an efficient and uniform drain to a predetermined moisture content, the slow drain type being provided with a sealing valve by which draining can be discontinued at will, to assure retention of the predetermined moisture content.

With this invention, the washed curd and water, or pulp, is pumped direct from the washing vat to the containers which are in place within the cradles, a flexible spout being provided from the pump to permit transfer to a second container when the first container has been filled.

The objects and advantages of the invention are as follows:

First, to provide an interlocking cradle and container for elevators, to permit inversion for dumping the contents at the terminal of up-travel.

Second, to provide a combination as outlined in which the container is automatically secured in the cradle coincident with initial up-travel of the elevator, and released during the terminal portion of down-travel.

Third, to provide a combination as outlined in which the container is of the drainage type for draining water from washed curd before delivery to a mixer.

Fourth, to provide transfer means for transferring washed curd to containers in position in the cradles and to provide the containers with drainage and drainage closure means for terminating draining to retain a predetermined moisture content in the curd.

In describing the invention reference will be had to the accompanying drawings, in which:

Fig. 1 is a top plan view of the invention, the upper portion of the container being broken away.

Fig. 2 is a rear elevation of Fig. 1.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary side view of one of the handle grips and fragmentarily showing the container top and one of the handles with a portion broken out.

Fig. 5 is a rear elevation of the valved draining container with the removable drain head mounted thereon, and portions of the front wall broken away to show the interior details.

Fig. 6 is an enlarged sectional elevation shown fragmentarily, disclosing the shut-off valve for the valved slow-drain type of container.

Fig. 7 is a fragmentary side elevation of the quick-drain type of container shown partly in section and indicating the annular band screens and removable screen bottom and locking means therefor.

Fig. 8 is a bottom plan view of Fig. 7.

Fig. 9 is a top plan view showing the cradles as applied to the carrier shafts of an elevator and with the containers in place and being filled with washed curd, and the mixers to which the drained curd will be automatically delivered by the elevator.

Fig. 10 is a fragmentary view taken on line 10—10 in Fig. 2 and is shown partly in section.

The cradle consists of two spaced uprights **10** and **11**, these uprights terminating each in a tongue **12** which terminates at the lower end in a frontal shoulder **13** with inclined guide wall **14** for guiding the container handle to seat on the shoulder and thereby forms positioning and support means for the upper end of the container.

Fixed to the uprights **10** and **11** as by welding are an upper semi-circular band **15**, and lower semi-circular band **16** and which are formed to a radius slightly greater than that of the container, just sufficient to freely receive the container.

Spaced carrier shaft bearing plates **17** and **18** project rearwardly from the uprights **10** and **11** to which they are fixed as by welding or other suitable means, and each has a carrier shaft sleeve fixed thereto as indicated at **19** and **20** and in which the carrier shaft **21** of the elevator **22** is keyed or otherwise fixed against rotation, pins **23** being indicated, the sleeves being located at a distance rearwardly to locate the carrier shaft in clearing relation to the container **24**.

The container is provided with a handle on each side as indicated at **25** and **26**, the handles being offset with respect to the axis of the container, and being substantially rectangular in form with the forward one of the arms indicated at **27** having its inner surface substantially coincident with the transverse axis of the container, to rest on the shoulder **13** as indicated at **28** following initial elevating operation by the elevator, the weight of the container in upright position being carried on that shoulder since the carrier cradle has no bottom, the cradle lowering to a plane where the tops of the tongues **12** and **13** are below the plane of the underside of the handles.

The interlocking mechanism for automatically locking the container in the cradle to permit inverting for dumping the curd into the mixer consists of a dual interlocking member including a holddown portion in the form of a plate or catch **29** the lower end of which comprises a positioning portion and is inwardly and upwardly beveled or diagonally formed to ride over and be retracted by the lower band **16** to draw the container to proper position, the inner terminal portion being provided with an engaging recess **30** to engage over the lower band and comprising a support portion, the plate **29** having a recess **31** formed in its rear edge.

Dual cooperative locking members on said cradle include a bearing plate **32** which is fixed to and depends from the carrier shaft bearing plate **17** and provided with a bearing **33** for the locking shaft **34**, and a second

bearing plate 35 is fixed to the lower band 16 slightly past its center for the other end of the shaft 34. A crank 36 is fixed on this locking shaft with the locking crank pin 37 in engaging relation to the engaging recess 30. and forms a holddown member.

The operating means for the locking crank consists of urging means such as the spring barrel 38 which is pivotally supported by the arm 17 as indicated at 38' and having a spring 39 therein for urging retraction of the plunger 40 which is attached to the lever 41 as indicated at 41' which in turn is fixed on the shaft 34 for urging the crank pin 37 into the engaging recess 31. The retractive means associated with the holddown member consists of an operating lever 42 angularly fixed on the shaft 34 and depending therefrom and is provided with a roller at its lower end as indicated at 43 for cooperation with a support.

When the cradle is in its lowermost position resting on the supporting surface 44, the lever 41 with its roller is in the retracted position indicated at 43' with the crank retracted as indicated at 36'. The container then also rests on the supporting surface with the handles 25 and 26 located in a plane above the tops of the tongues as indicated at 25' and 26' in Fig. 2.

As the cradle is raised from its supporting surface by the elevator, the tongues enter the handles, the upwardly inclined surface of the catch rides over the lower band 16 drawing the container into proper position, and as the cradle is lifted further, the recess 30 engages over the band while the spring barrel 38 urges the lever 41 forward, swinging the crankpin against the rear edge of the catch and urging it into the recess 31.

Thus, as the cradle is lifted, the handles 25 and 26 are engaged and brought to rest on the shoulders 13 to support the weight of the container in upright position, the catch 30 engages over the lower band 16 to lock the lower end of the container against swinging forward and to provide additional upright support for the container, and the crankpin engages in the recess 31 to support the container when inverted, providing for locking of the container in the cradle for any position in which it may be placed.

When the cradle is lowered, the roller 43 engages and rides down the inclined rail 44' and is thus forced forwardly and thus releases the crankpin 37 from the engaging recess 31, the catch is released from the lower band, and the tongues withdrawn from the handles simultaneously, freeing the container as the cradle is lowered to the support or base.

The container, irrespective of the type, is provided with the handles 25 and 26, and the locking member 29.

The valved type with axial drainer is illustrated in Figs. 5 and 6 and consists of a cylindrical receptacle 47, the walls being imperforate. The bottom 50 is provided with passages in the central portion only as indicated at 51 and limited to the confines of the axial drainer. The valve stud 52 is fixed centrally of the bottom and has a valve 53 which is provided with a resilient facing such as live rubber to seal the passages or perforations to terminate draining to maintain a specific moisture content in the drained material.

For draining, the valve is merely rotated to provide space between the face of the valve and the bottom of the container, as illustrated, to permit discharge of the wash water, and when the predetermined moisture content has been attained, the valve is rotated in the opposite direction to contact with the bottom of the container to close the passages and terminate draining.

The axial strainer 55 is formed of screen material or of sheet metal or plastic with closely spaced perforations formed throughout the height and is removably supported in the strainer head 56 which is provided at its lower end portion with insertion limiting means such as the bead 57, by the spider 58 which is fixed to the inner walls of the strainer head by suitable methods such as welding, and being formed of two arms which are formed semi-circularly at their inner ends and fixed together in opposed relation to form the circular passage portion 59 in which the axial screen is close fitting but slidable, for supporting the screen, permit the screen to rest on the bottom of the container, and locate the lower end of the screen to encompass the passages in the central portion of the bottom, as indicated at 60. The strainer head simultaneously increases the initial capacity of the container, for use during the filling period and until the draining has been completed.

After draining has been completed, the valve is closed to seal the bottom passages, following which the strainer head and axial screen are removed, and the washed curd is then ready for delivery to the mixer.

Another type of strainer is illustrated in Figs. 7 and 8 fragmentarily, the strainer proper consisting of annular bands of perforations 48 and 49 with intervening imperforate bands. The bottom 61 is formed of screen material such as sheet metal or plastic perforated with closely spaced perforations throughout its extent, and having an annular depending flange which rests on the inturned flange or ring 63 and which is secured in place by the spring barrel 64 having a plunger at each end as indicated at 65 and 66 which pass through registrable holes formed in the lower end of the container side walls and the depending flange, stops 67 being provided to limit insertion. Thus the bottom can be removed at will by retracting the plungers and removing the spring barrel.

The axial screen and the strainer head can also be used with this container, for initial capacity increase and increase the speed of draining.

As illustrated in Fig. 9, the pulp 68 is pumped by the pump 69 through the conduit 70 and delivered sequentially to the respective container-strainers 71 and 72 which are located within the cradles 73 and 74.

When the pulp in the container-strainers is suitably drained, the elevator is operated causing the container-strainers to be locked in the cradles followed by elevating to a suitable height for dumping the contents in the respective mixers 75 and 76.

I claim:

1. An automatic container locking and unlocking cradle for elevators having a carrier shaft, comprising, a container having a bottom, sides and a back, and having handles at the upper end and diametrically located on the sides, and having a catch located on the back adjacent the bottom of the container, a cradle comprising a semi-circular bottomless cage to receive the container and having uprights on each side and terminating each in a tongue having a recess formed downwardly in the top end thereof to engage and position the respective handles relative to the axis of the cage, an arm extending rearwardly from each upright and having each a passage with the carrier shaft extending through the passages and fixedly secured therein, a rocker shaft mounted on said cradle below said carrier shaft and having a crankpin to engage in said catch to secure and support the lower end of the container, means urging said crankpin to engage in the catch, a support for the cradle and container, and a lever arm fixed on said rocker shaft and inclinedly depending forwardly therefrom to engage and ride on said support for operating said lever arm for retracting the crankpin from the catch during terminal lowering movement of the cradle while simultaneously retracting said tongues from said handles to free the container for removal from the cradle.

2. A structure as defined in claim 1, said cradle comprising an upper semi-circular band and a lower semi-circular band connected together by said uprights, said catch comprising a plate having a crankpin receiving recess in the rear edge, and having the lower edge formed diagonally upward and forward to ride over the lower band to retract the container to proper position, with

the lower edge having a rectangular recess formed at its inner terminal to engage over the top of said lower band and lock the container in position.

3. A structure as defined in claim 1, said handles being rectangularly formed and each comprising two arms connected by a cross member with one each of the arms having the inner surface coincident with the axis of the cradle for equalized support in upright position by the cradle.

4. A structure as defined in claim 1, said handles each having an arm coincident with the diametric axis of the container and cradle, said recess including a shoulder spaced below the upper terminal end for support of said arms thereon, and a diagonal portion formed upwardly and forwardly from said shoulder for guiding the arms to seat on the shoulder.

5. Automatic interlocking means between a cradle and a container comprising, a carrier shaft for an elevator, a cradle having spaced uprights terminating each at the upper end in a tongue having a shoulder spaced below the upper end, an upper semi-circular band fixed to said uprights, a lower semi-circular band fixed to the lower portion of said uprights, an arm extending rearwardly from each upright with said carrier shaft fixedly secured in said arms, a rocker shaft mounted on said cradle below said arms and a crank fixed on said rocker shaft and having a crankpin, and having a depending forwardly inclined lever for cooperation with a supporting surface for the cradle and container for retracting the crank with the lever fixedly secured on the rocker shaft, a container having a catch comprising a plate having a rear edge and a bottom edge and projecting from the back adjacent the lower end of the container, said plate having a crank pin recess formed in the rear edge to receive said crankpin, and spring means urging said crankpin to engage in said recess and cooperative between said cradle and said rocker shaft, said plate having its bottom edge upwardly and forwardly diagonally formed and terminating in a rectangular recess to engage over said lower band for retraction of the container to locking position with the lower band engaged in said rectangular recess, said crankpin engaged in said crankpin recess, and said tongues engaging said handles as the cradle is lifted from its support by the carrier shaft.

6. A structure as defined in claim 5, said cradle having a height to the tops of the tongues less than the height of the container from the bottom to the underside of the handles to permit sliding of the container into cooperative position in the cradle and having a diameter closely fitting the container for efficient support, and said tongues each including a diagonal portion extending upwardly and forwardly from said shoulder to guide the handle to the shoulder.

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