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Mundinger et al.

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[54] **LOCKING HANDLE FOR PNEUMATIC DISCHARGE TUBE**

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[52] **U.S. Cl.** ..... **302/52,** 105/308 E, 220/57, 292/259

[51] **Int. Cl.** **B65g 53/04**

[58] **Field of Search** ..... 220/46, 57; 292/257, 292/259; 302/52; 105/377, 308 E

[56] **References Cited**

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Assistant Examiner—W. Scott Carson
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[57] **ABSTRACT**

A closure cap assembly for a pneumatic tube of a railway hopper discharge device and having a cap member closing off the tube and being fixedly held in position by a locking handle and bail unit including a locking handle with an eccentric adjustable pivot point which provides secure locking by being movable to compensate for dimensional differences and wear between assembled parts. The locking handle also includes an over center self locking feature.

6 Claims, 4 Drawing Figures

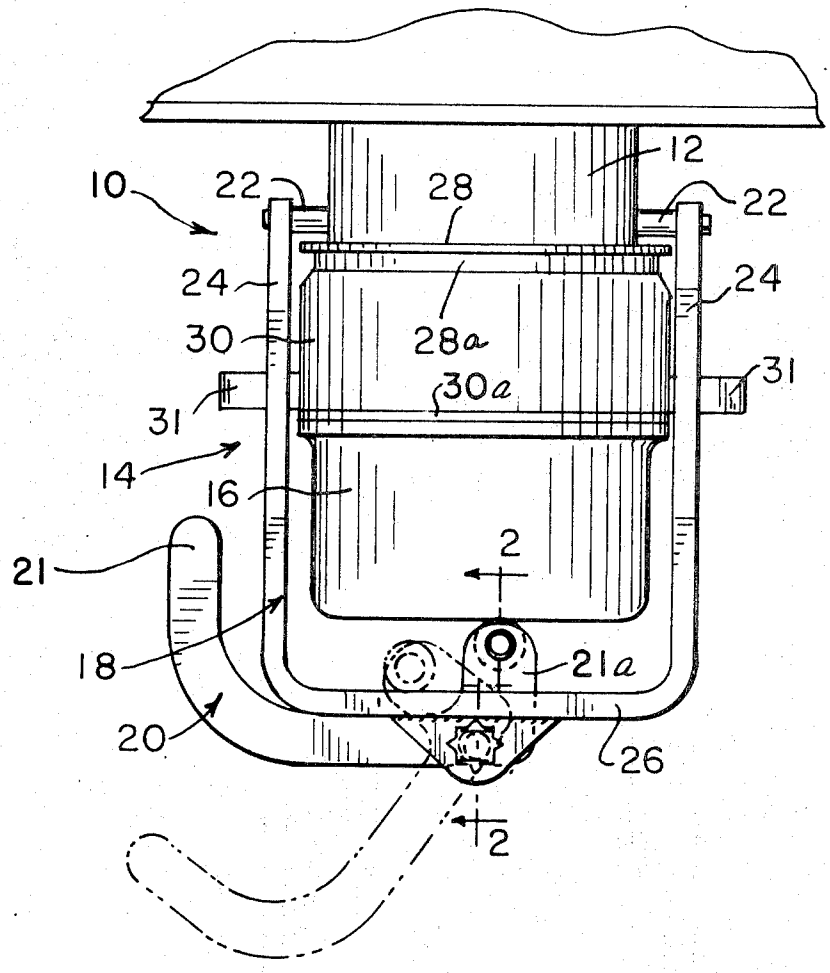


FIG. 1

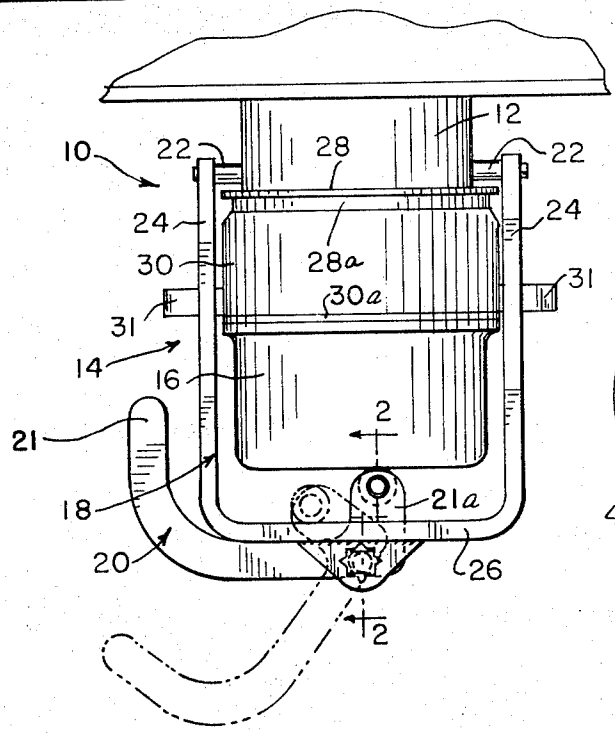
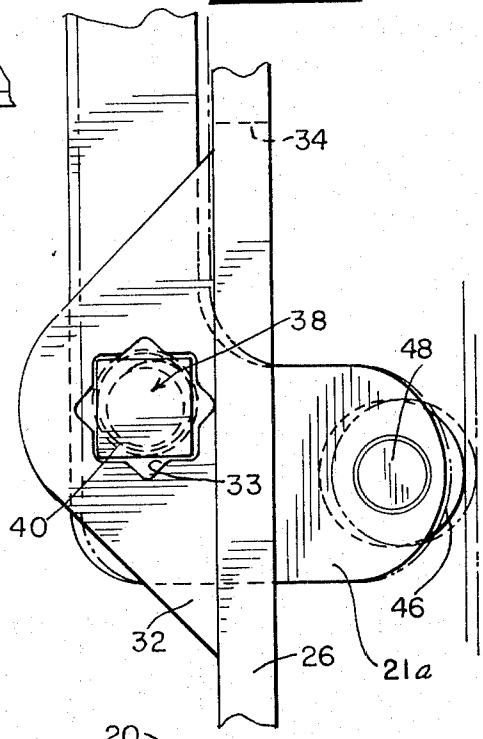


FIG. 3



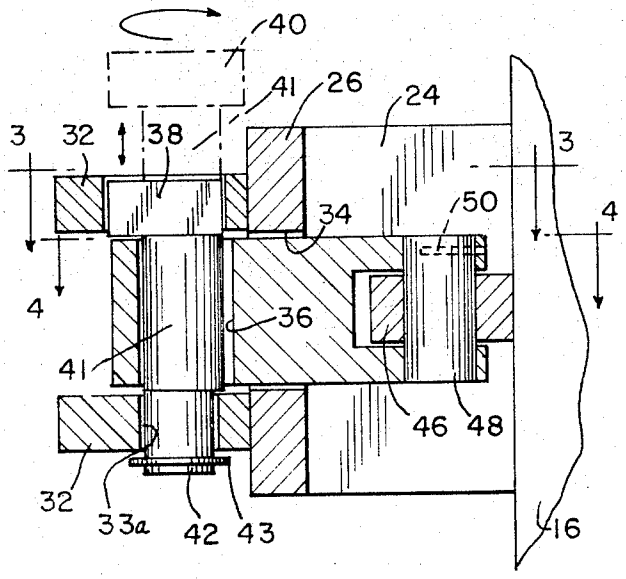


FIG. 2

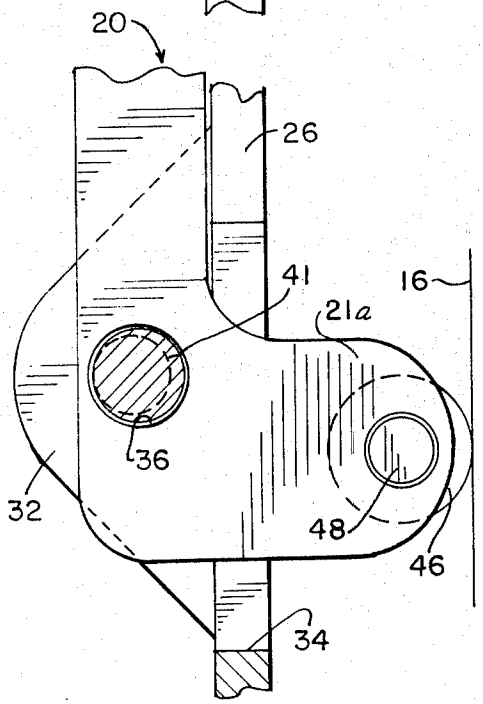


FIG. 4

LOCKING HANDLE FOR PNEUMATIC DISCHARGE TUBE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a pneumatic hopper discharge device having a locking handle associated with a closure cap member.

2. Description of the Prior Art

The closure arrangement on pneumatic discharge tubes comprising a closure cap member and an associated bail with a locking handled contained therein is the subject of a multitude of dimensional build ups and also cumulative wear between the locking handle and the closure cap. Prior art attempts to overcome this dimensional problem have included confining the closure cap with a bail which is restrained by nuts on threaded hold-down lugs which may be tightened to take up dimensional tolerances. These threaded locking bail members are undesirable since they become contaminated with trackside debris and rain and snow will result in corrosion thereby rendering the locking member difficult to operate. The present invention provides a pneumatic discharge tube closure arrangement which is easily and reliably operated and is adjustable to compensate for dimensional variations between the assembled components and to compensate for wear which occurs during the operation of the locking device.

SUMMARY

The present invention relates to a hopper discharge arrangement employing a pneumatic discharge tube having a closure cap and locking handle assembly for securely sealing off the open end portions of the pneumatic discharge tube. The locking arrangement comprises a pivoted locking handle having a roller member which engages the closure cap and the locking handle is pivoted on an eccentric pin which provides a selectively adjustable pivot point for the locking handle.

It is an object of the present invention to provide a pneumatic discharge tube closure arrangement which is easily and rapidly operated to lock and unlock a pneumatic discharge tube and which also includes an adjustable pivot for the locking handle to allow for compensation of dimensional variations which may occur.

It is another object of the present invention to provide a discharge tube locking handle including a roller member engageable with the tube closure cap and eccentrically spaced from the lever pivot to provide a self locking handle.

These and other objects of the invention will become apparent from reference to the following description, appended claims and attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the hopper discharge device with portions removed and showing in particular a locking handle arrangement;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a sectional view with portions removed taken along line 3—3 of FIG. 2; and

FIG. 4 is a sectional view taken along line 4—4 of FIG. 2.

THE DESCRIPTION

Referring now to the drawings and in particular to FIG. 1, there is illustrated a hopper discharge structure 10 including a pneumatic discharge tube 12 fixedly attached to the underside thereof and operative to discharge lading from within a hopper. The discharge tube 12 includes a closure assembly 14 for shutting off the end portions of the tube. A generally cylindrical cap member 16 fits over the end portion of the discharge tube and is surrounded by a U-shaped bail member 18. A locking handle 20 having a hand grasp portion 21 and a roller conveying portion 21a is pivotally attached to the bail member. The bail pivots on the pivot pins 22 which extend radially from the discharge tube 12. The bail arms 24 are attached to the pivot pins and extend along the sides of the discharge tube beyond the closure cap member 16. A connecting portion 26 extends between the arm members 24 to thereby define the U-shaped bail member.

A thin ring member 28 extends around the outer periphery of the discharge tube and forms an abutment flange portion. The gasket 28*a* abuts the ring member 28. The collar 30, which has handle portions 31, is fixedly attached to a rotating valve member which extends the length of the pneumatic discharge tube 12 and is operable to regulate the flow of lading into the pneumatic discharge tube during unloading. The operation of this rotatable collar member is described in the applicant's U.S. Pat. 3,527,503 issued Sept. 8, 1970 which is incorporated herein by reference. A second gasket seal 30*a* is positioned between the collar 30 and the cap member 16.

The mounting lugs 32 form a protruding portion of the bail side member connecting portion 26 and are utilized for providing a pivotal mounting point for the locking handle 20. The upper lug includes a star shaped opening 33 and the lower lug includes a generally circular opening 33*a*. The locking handle 20 includes a portion protruding through a slot 34 in the bail 18. The handle 20 includes the opening 36 which is in alignment with the lug openings 33, 33*a*. The eccentric pin 38 is inserted through the upper and lower lugs 32 and through the handle opening 36. The head 40 of the eccentric pin 38 is positioned within the opening 33 of the top lug 32 and restrained from rotational movement by the sides of the openings 33. In position the head portion 40 will rest on the handle 20. The eccentric portion of the pin 38 is positioned within the opening 36 of the locking handle 20. The lower portion of the eccentric pin 38 includes a cylindrical portion concentric with the head 40 of the eccentric pin 38. A retaining ring 43 is fitted into the lower portion 42 to restrain the eccentric pin to only limited vertical movement.

The closure cap contacting portion of the locking handle 20 carries a roller member 46 rotatable about a roller pin 48 which may be secured in position in the locking handle as by the roll pin 50.

THE OPERATION

The operative features of the invention are more fully appreciated when it is understood that a large dimensional variation is possible due to the number of assembled parts which are included in the closure assembly involved to seal off the opening at the end of a pneumatic discharge tube. A gasket 28*a* abuts the associated ring member 28 prior to placing the collar 30 around

the discharge tube portion and placing the associated valving member within the discharge tube. The gasket member **30***a* is positioned between the collar **30** and the closure cap **16** to effect a moisture proof seal between those two members. When the U-shaped bail **24** is pivoted into a horizontal position adjacent the closure cap **16** and the locking handle **20** is moved from the phantom position illustrated in FIG. **1** to the solid line position indicated, a tolerance build up can occur which prevents obtaining a consistent sealing force from the locking handle. The adjustable pivot provided by the eccentric pin **38** for the pivoted locking handle **20** provides a control of the locking force which is provided and guarantees dimension variation and adverse tolerance build ups will not preclude a secure closing of the pneumatic discharge tube.

Should wear or dimensional tolerance build up require a moving of the pivot pin of the locking handle **20,** a simple adjustment is possible by dislodging the retaining ring **43** from the lower cylindrical portion **42** of the eccentric pin **38** and moving the pin vertically until the head **40** is clear of the upper lug **32.** Then the pin is rotated to allow the eccentric portion of the pin to produce a horizontal movement of the locking handle to the required position at which point the pin is dropped back into position within the confines provided by the star shaped opening **33** in the upper lug **32.** By simply replacing the retaining ring **43** the eccentric pin is once again locked in position and the handle now has a new pivot point closer to the closure cap as would be required when the roller **46** would become worn or other members perhaps would become worn during operation of the discharge device **30.**

The roller member **46** also provides an improved contact surface between the pivoted handle and the closure cap **16.** It is contemplated that the roller **46** would be of a hard thermoplastic material such as nylon. It is also pointed out that the pivot of the roller **46** is spaced horizontally (as shown in FIG. **4**) from the pivot of the locking handle **20.** This eccentric positioning of the locking handle pivot and the closure contacting member will provide an over center self locking handle arrangement when the locking handle is in the arrangement of the fully closed position as illustrated in FIG. **1.** This self locking feature provides a safety element which prevents unintentional opening movement of the locking handle from the locked position.

The foregoing description and drawings merely explain and illustrate the invention and the invention is not limited thereto, except insofar as the appended claims are so limited, as those skilled in the art who have the disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.

What is claimed is:

1. A hopper means for storage of lading and having discharge portions for removal of said lading from the hopper means, said discharge portions having pneumatic devices attached thereto and having a portion communicating with the lading and having opposed open end portions and closure cap members adaptable to close off said end portions, and bail means adjacent the associated cap member, the improvement comprising:

a pivoted locking handle assembly including a pivotable locking handle having a closure cap engaging portion positioned between the bail and the cap and said locking handle being rotatable to supply a biasing closing force between the bail and the cap member for sealing an associated end of the discharge tube;

said bail having lug means for mounting the handle on the bail;

said locking handle assembly including an adjustable pivot means;

said adjustable pivot means including a pivot pin having an eccentric cam portion and connecting the handle with the bail and providing for pivotal movement of the handle, said pivot pin rotatable to adjust the biasing closing force between the cap contacting portion and the bail contacting portion and having an adjustment head portion with a plurality of sides providing for graduating the adjustment of said biasing closing force between the cap contacting portion and the bail contacting portion;

said lug means including a pair of handle mounting lug members spaced about said locking handle and including both an upper lug and a lower lug;

one of said lug members having an irregular opening therein adapted to receive the head portion of said pivot pin and thereby provide for rotatable indexing of the pivot pin.

2. The invention according to claim **1,** and:

said pivot pin having a square head and a spaced lower pin portion concentric with said head;

said eccentric portion being positioned between the head and the lower pin portion and said eccentric portion defining a bearing surface for said rotatable handle member.

3. The invention according to claim **1,** and:

said closure cap engaging portion of the rotatable locking handle member being laterally spaced outwardly of said pivot pin to thereby provide an over center locking handle assembly.

4. The invention according to claim **1,** and:

said closure cap engaging portion of the locking handle member including a roller member pivotally attached to said handle member and having a portion extending outwardly of the locking handle for locking engagement with said closure cap member.

5. The invention according to claim **1,** and:

said irregular opening in one of said handle attaching lug members comprising a eight cornered aperture adapted to provide for eight position indexing of the associated adjustment head portion of the handle pivot pin.

6. The invention according to claim **1,** and:

said locking handle including an opening extending therethrough and cooperative with the eccentric cam portion of the pivot pin for adjusting movement of the locking handle with respect to the associated closure cap member;

said pivot pin including a lower bearing surface extending through the associated lower lug and having a pin retaining means contained therein;

said pin retaining means being adjacent the lower mounting lug and cooperating with said indexing head portion of the pivot pin to thereby provide a locking handle retaining means for fixedly positioning said locking handle on the associated bail member.

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