Dec. 29, 1942. P. R. BUNDY 2,306,426

BAG OPENING DEVICE

Filed April 22, 1941

Fig. 1.

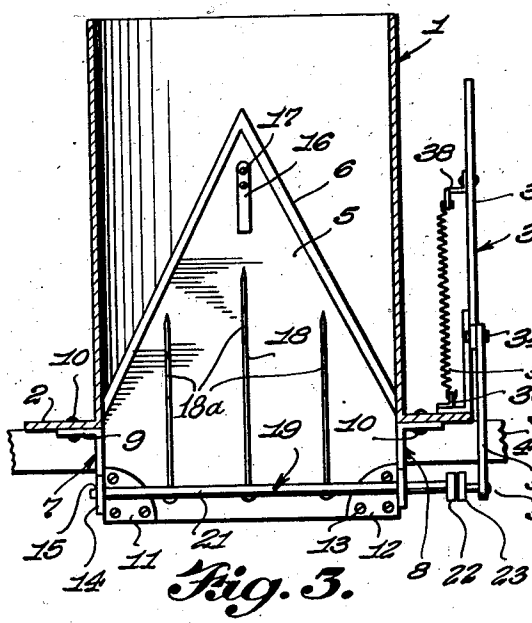


Fig. 2.

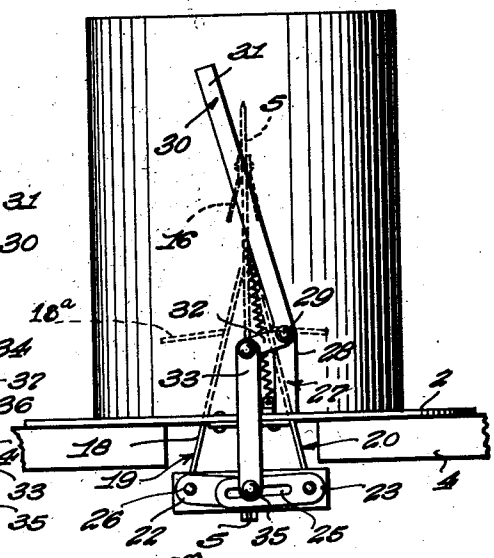


Fig. 3.

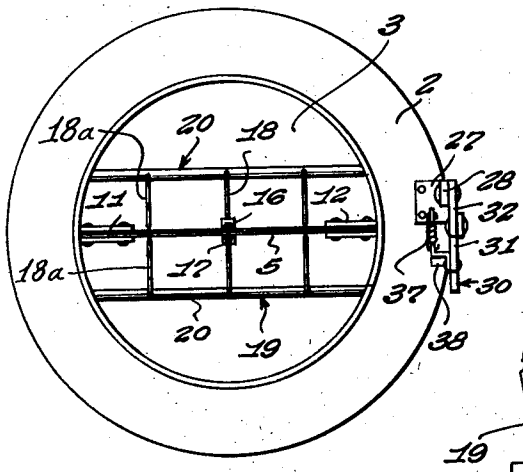
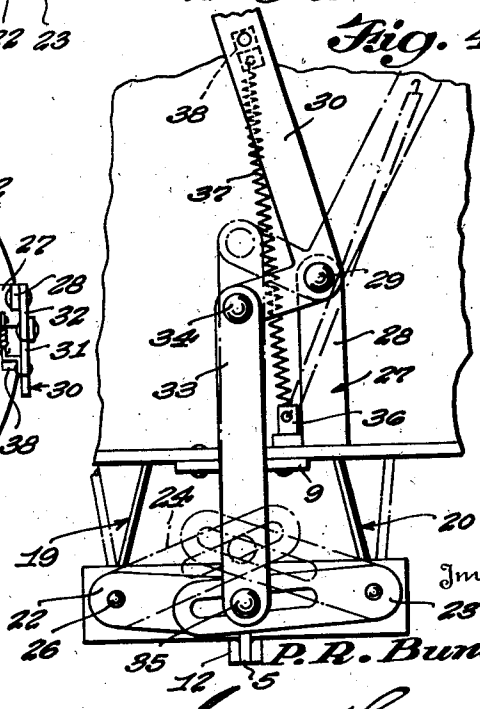


Fig. 4.



Inventor

P. R. Bundy

By Lacy & Lacy, Attorneys

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BAG OPENING DEVICE

Philander R. Bundy, Indianapolis, Ind.

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12 Claims. (Cl. 214—1)

This invention relates to dispensers and more particularly to an improved bag opening device.

One object of the invention is to provide a bag opening device which will operate in a highly efficient manner for opening bags, sacks or similar containers, particularly those containing lime, carbon, cement or other powdered material.

Another object of the invention is to provide a bag opening device wherein means are employed for spreading the sides of the bag so that the contents thereof may be fully and completely discharged.

Another object of the invention is to provide a bag opening device which may be removably mounted on a hopper and can, therefore, be readily transferred from one hopper or machine to another.

Still another object of the invention is to provide a device of this character wherein the cutting blade employed may be readily removed and sharpened when necessary.

And another object of the invention is to provide a bag opening device wherein means is employed for urging the opening fingers toward operative or inoperative position.

Still further objects of the invention, not specifically mentioned hereinbefore, will become apparent as the description proceeds.

In the drawing forming a part of my application:

Figure 1 is a vertical sectional view of my improved bag opening device,

Figure 2 is a side elevation of the invention,

Figure 3 is a top plan view, and

Figure 4 is an enlarged detail side elevation particularly showing the shifting mechanism for the opening fingers.

Referring now to the drawing in more detail, the numeral 1 indicates in general a tubular body which is preferably formed of sheet metal of a suitable weight. The body 1 is formed with a laterally and radially extending mounting flange 2 which is normally engaged with the margin defining an opening 3 in a hopper, a portion of the top wall of which is shown at 4. It should be understood that the body 1 is of sufficient height and diameter to accommodate conventional bags of the type employed for transporting lime, carbon, cement or other dusty material.

Mounted in the body 1 and extending upwardly throughout the major portion of the height thereof and diametrically thereof is an inverted V-shaped cutting blade 5, said blade being flat and having a cutting edge 6. Removably mounting the cutting blade in the lower end of the body 1 are brackets 7 and 8, said brackets being disposed at diametrically opposite points on the body and each having a mounting leg 9 secured to the flange 2 by a stud 10. As will be seen, the brackets 7 and 8 include clips 11 and 12 which engage the lower end corners of the blade 5 and are removably fastened thereto by means of screws 13. It should be understood that, while I have shown three screws extending through each of the clips, one screw or bolt extending through each of said clips may be substituted if desired. In other words, one screw, it is believed, will be sufficient in all ordinary applications. The brackets 7 and 8 also are each formed with a supporting arm 14, the supporting arms of said brackets being disposed in horizontal alinement and being formed with alined openings defining bearings 15, the purpose for which will be described in more detail hereinafter.

Mounted on the blade 5 medially of the width thereof and near its point are spreading elements 16. One of the spreading elements is mounted on each side of the blade and said elements are connected to the blade by means of studs 17. The elements 16 are, furthermore, positioned with their free end portions extending downwardly and outwardly. The purpose for the spreading elements will be set forth in more detail hereinafter.

In order to spread the mouth of a sack or bag to full open position to permit full discharge of the contents of the bag or sack, I provide spreading fingers 18 which form parts of spreading finger assemblies 19 and 20. The spreading finger assembly 19 is mounted at one side of the blade and the assembly 20 is mounted on the other side thereof. The assemblies 19 and 20 are of identical construction so that a description of one will suffice for both. The spreading finger assembly 19 includes a rock shaft 21 which has its opposite ends journaled in alined bearings 15 of the arms 14. The assembly 19 also includes the fingers 18 which are, as shown, three in number and are disposed in spaced relation along the rock shaft. It should be understood that, while I have shown but three of the fingers 18, any suitable number of them may be employed. They may be of equal length or, as shown in Figure 1, the center finger may be slightly longer than the fingers disposed at each side of said center finger. The fingers 18 are formed of wire or other desired material and are sufficiently stiff so that they will not easily become bent. As best shown in Figures 2 and 3

of the drawing, the fingers are normally disposed with their upper ends in engagement with the opposite faces of the blade 5. The upper ends of the centermost fingers, as will be seen, terminate in vertically spaced relation to the lower ends of the elements 16.

In order that the rock shafts 21 of the assemblies 19 and 20 may be rocked for shifting the fingers from inoperative to operative position, and vice versa, I provide shifting mechanism which will now be described. At corresponding ends of the rock shafts 21 are mounted shifting links 22 and 23. As seen in Figures 1 and 2, the shifting links 22 and 23 extend toward each other so that their major portions lie in substantially close spaced relation to each other. The links 22 and 23 are provided with slots 24 and 25 respectively, said slots being disposed in substantially horizontally alined position. As shown at 26, the ends of the shafts 21 which are mounted in the links 22 and 23 are squared so that relative movement of said links and said shafts will be prevented. Mounted on the upper face of the flange 2 near the edge thereof is a mounting bracket 27, said mounting bracket being of substantially reverse L-shape and including a vertically extending arm 28. Pivotally mounted on the upper end portion of the arm 28 of the bracket 27, by means of a pivot bolt 29, is an operating lever 30, said lever having a relatively long arm 31, which is manually engageable, and having a relatively short arm 32 which is connected with the links 22 and 23 by a connecting link 33 and by pivot bolts 34 and 35, said bolt 34 extending into the end portion of the arm 32 and said bolt 35 extending through the slots 24 and 25 of the links 22 and 23. Mounted on the bracket 27 is a lug 36 which has anchored thereto the lower end of a retractile spring 37, the upper end of said spring being connected to the arm 31 of the lever 30 by means of a lug 38.

The operation of my improved bag opening device will now be described.

It is first presumed that my improved bag opening device has been positioned on a hopper or other container which is to receive the contents of a bag of cement, carbon, lime or the like. A bag to be emptied is inverted and its lower end is inserted in the upper end of the body 1. The bag or sack is forced downwardly for engaging the points of the cutting blade 5. By forcing the lower end of the bag or sack against the cutting blade, said cutting blade will slit the lower end of the bag so that the contents thereof will be free to be discharged. As the lower end portions of the bag, which lower end portions were defined by slitting the lower end of said bag, move downwardly along the blade 5, the elements 16 will cause these lower end portions to spread slightly and thus to clear the upper ends of the fingers 18 which are, in inoperative position, caused to bear against the opposite faces of the blade 5 by tension of the spring 37. When the bag has been moved to its fullest extent within the body 1, the lower end portions of the side walls of the bag will be disposed near the lower end of the blade 5. In order that the contents may be fully and completely discharged, the lever 31 is manually engaged and is shifted for raising the links 22 and 23 and thus rocking the fingers outwardly to the position shown in dotted lines in Figure 4. When the fingers are thus moved outwardly, the mouth of the sack or bag will be opened to its fullest extent for permitting full discharge of the contents into the hopper or other container which is disposed beneath the device. In order that the operation of the shifting mechanism may be more completely understood, it is desired to state that shifting of the lever 30 will be imparted to the links 22 and 23 through the link 33 and the pivot bolts 34 and 35. Said pivot bolt 35 will, of course, be capable of sliding movement within the slots 24 and 25 in the links 22 and 23. The spring 37 is mounted in such a manner that it will exert its tension for moving the lever toward operative or inoperative positions. That is to say, the spring is mounted so that, when it is in vertical position, it is on dead center and when it is moved to either side of vertical position, it will exert equal pulling or tensioning stress on either side of dead center. Therefore, the spring will urge the lever toward the inoperative position shown in Figure 2, after dead center has been passed, or it will urge the lever toward the operative position shown in dotted lines in Figure 4, on the other side of dead center.

It is desired to call attention to the fact that, inasmuch as the body 1 completely surrounds the lower end of the sack or bag, there will be no possibility of diffusion of the contents in the form of dust. Thus it will be seen that waste is largely prevented and that cleanliness of the establishment within which the device is used is enhanced. Moreover, as best seen in dotted lines in Figure 2, the fingers 18 are provided with rods 18^a to limit downward movement of the bag along said fingers.

It is also desired to call attention to the fact that my improved bag opening device may be readily removed from one hopper or container and installed on another, when desired. The invention is characterized by the utmost simplicity in construction.

It is now thought that the construction and operation of my improved bag opening device will be thoroughly understood.

Having thus described the invention, what is claimed as new is:

1. A bag opening device including a body, a cutting blade, means mounting the cutting blade in the body, said cutting blade being engageable with the lower end of a bag for opening said bag within the body, means carried by the cutting blade for initially spreading the opened lower end of the bag, and means carried by the body and operable for secondarily spreading the mouth of the bag for permitting full discharge of the contents thereof through the body.

2. A bag opening device including a body, a cutting blade in the body for opening a bag, means on the blade and engageable with portions of the bag for initially spreading the mouth of the bag, and means carried by the body below the cutting edge of the blade and movable from an inoperative position adjacent the blade to an operative position extending toward the wall of the body for secondarily spreading the mouth of the bag.

3. A bag opening device including a body, a cutting blade in the body for opening a bag, means on the blade and engageable with portions of the bag for initially spreading the mouth of the bag, means carried by the body below the cutting edge of the blade and movable from an inoperative position adjacent the blade to an operative position extending toward the wall of the body for secondarily spreading the mouth of the bag, said last-mentioned means including a finger, and a rock shaft operatively mounting the finger.

4. A bag opening device including a body, a blade, means removably mounting the blade in the body, said blade being operative for slitting the lower end of a bag in the body, and means in the body below the cutting edge of the blade for spreading the mouth of the bag after slitting of the lower end thereof whereby complete discharge of the contents of the bag may take place, said means including a rock shaft, a finger on the rock shaft, and means for imparting rocking movement to the rock shaft.

5. A bag opening device including a body, a cutting blade in the body, said cutting blade having an edge engageable with a bag for slitting the lower end thereof, fingers carried in the body and engageable within the bag upon downward movement of said bag along the blade, and means for shifting the fingers away from the blade for spreading the mouth of the bag.

6. A device of the class described including a body, a blade operatively mounted in the body and engageable with a bag for slitting the lower end thereof, a plurality of fingers engageable within the bag as said bag is moved downwardly along the blade for spreading the mouth of the bag, a rock shaft mounting the fingers, means operatively connecting the rock shaft with the body, and means for imparting rocking movement to the rock shaft.

7. A device of the class described as recited in claim 6 wherein said penultimate means removably mounts the blade within the body.

8. A device of the class described including a body, a blade mounted in the body and being engageable with a bag for slitting the lower end thereof, a rock shaft, means operatively connecting the rock shaft with the body, a finger carried by the rock shaft and extending upwardly along the blade, an operating link carried by the rock shaft, an operating lever, means operatively connecting the operating lever with the body, and means operatively connecting the lever with the operating link, said lever being engageable for shifting the link and rocking the rock shaft whereby the finger will be swung away from the blade for spreading the mouth of the bag and thus permitting complete discharge of the contents thereof through the body.

9. A bag opening device including a body, a blade, means operatively mounting the blade in the body, said blade being engageable with a bag for slitting the lower end thereof, a pair of rock shafts, one of said rock shafts being mounted on each side of the blade, fingers carried by the rock shafts, said fingers being arranged in spaced relation to each of said shafts, operating links carried by the shafts and extending toward each other and in parallel relation throughout portions of the links, said operating links having slots, an operating lever, means operatively connecting the operating lever with the body, and means operatively connecting the operating lever with the operating links, said lever being shiftable for shifting the operating links and rocking the shafts whereby the fingers on each shaft will be swung away from the blade for spreading the mouth of the bag after the lower end thereof has been slitted whereby complete discharge of the contents from the bag will be permitted.

10. A bag opening device including a body, a cutting blade, means removably mounting the cutting blade in the body, said cutting blade being engageable with the lower end of a bag for slitting the same, spreading elements carried by the blade and engageable with portions of the bag for initially spreading the mouth of the bag, rock shafts, means operatively connecting the rock shafts with the body, links carried on the rock shafts, an operating lever, means operatively connecting the operating lever with the links, fingers on the rock shafts and extending upwardly along the blade, said fingers being engageable within the bag as said bag is moved downwardly along the blade, said fingers having their upper ends in engagement with the walls of the blade in operative position, said operating lever being shiftable for rocking the shafts and swinging the fingers away from the blade into operative position secondarily spreading the mouth of the bag, and means connected between the body and the operating lever and urging said operating lever toward operative or inoperative positions.

11. A device of the class described as recited in claim 10 wherein said last-mentioned means is constituted by a retractile spring, said spring having one end connected with the operating lever and the opposite end connected with the body.

12. A device of the class described as recited in claim 6 including means on the fingers for limiting downward movement of the bag.

PHILANDER R. BUNDY.