

United States Patent [19]

Heiser

[11] 3,916,780

[45] Nov. 4, 1975

[54] CAN CRUSHER

[76] Inventor: **Warren R. Heiser**, 934 N. Mildred,
Dearborn, Mich. 48128

[22] Filed: **Mar. 12, 1974**

[21] Appl. No.: **450,422**

2,619,150	11/1952	Smith.....	100/49
3,034,422	5/1962	Howell.....	100/DIG. 2
3,659,520	5/1972	Garrett et al.	100/216
3,817,169	6/1974	Bischoff.....	100/216 X

Primary Examiner—Billy J. Wilhite

Attorney, Agent, or Firm—Hauke, Patalidis & Dumont

[52] U.S. Cl. **100/49; 74/50; 100/53; 216;**
100/218

[51] Int. Cl.² **B30B 15/30**

[58] Field of Search 100/DIG. 2, 49, 215, 216,
100/218, 53; 241/99; 74/50

[56] **References Cited**

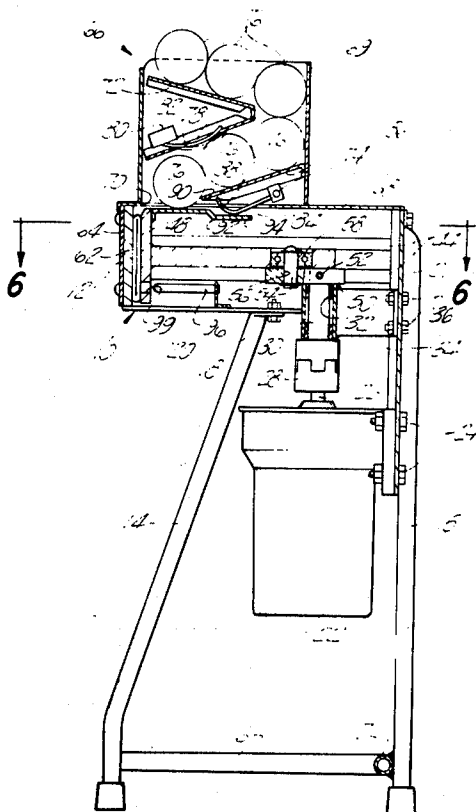
UNITED STATES PATENTS

2,055,041 9/1936 Miller 74/50

[57] ABSTRACT

An apparatus for crushing empty cans, comprising a feed chute leading to a space between a stationary platen and a reciprocating platen. The empty cans are loaded in the chute and lead one by one between the platens, crushed and dumped one by one by gravity into a receptacle.

5 Claims, 6 Drawing Figures



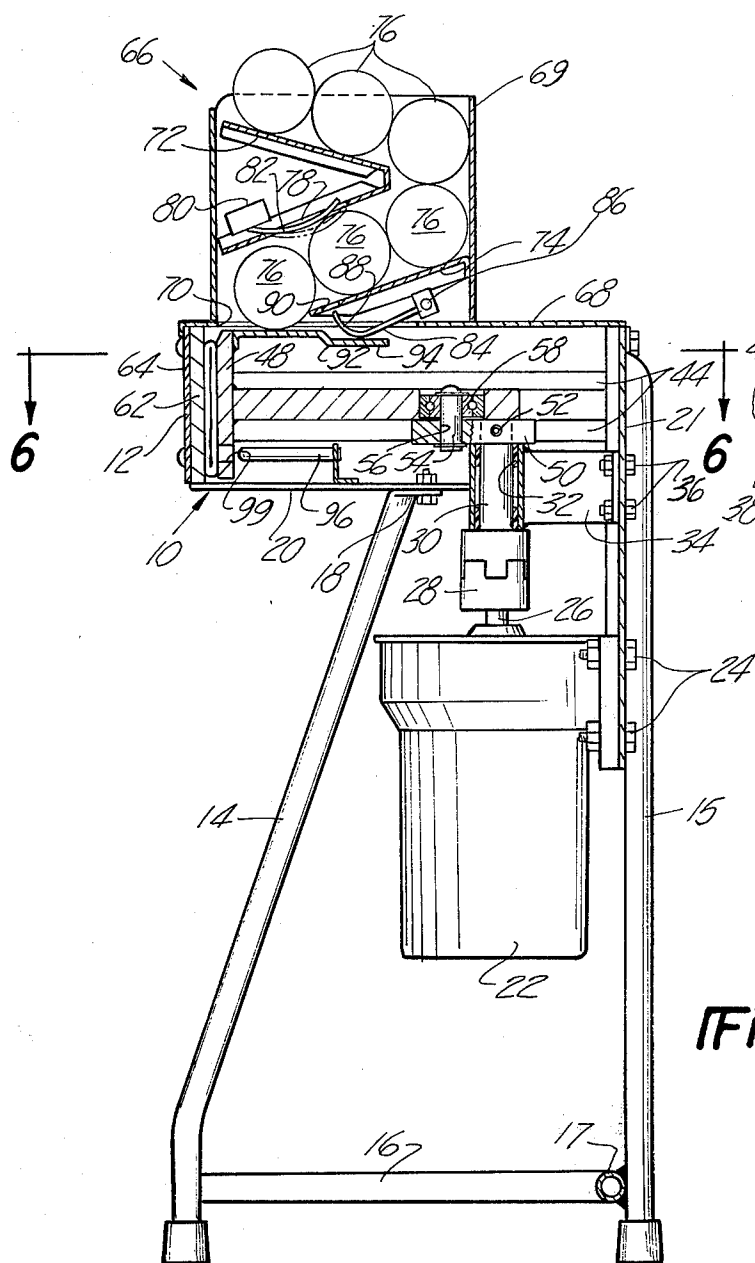


Fig-3

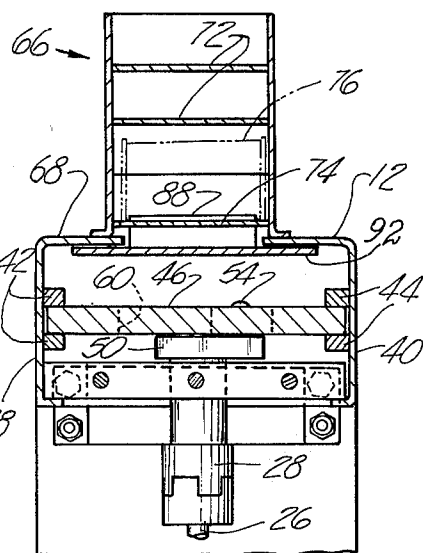


Fig-5

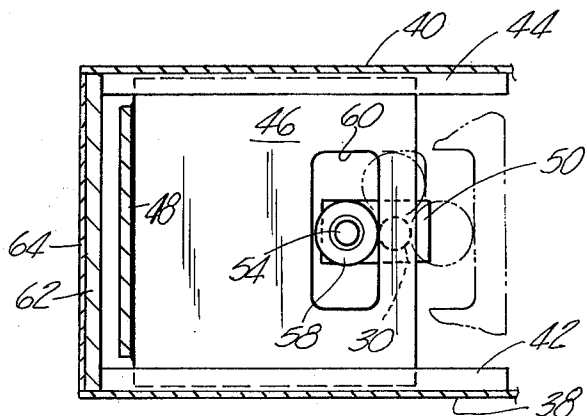


Fig-6

CAN CRUSHER

BACKGROUND OF THE INVENTION

The present invention relates to an apparatus for disposing of empty cans, such as empty beer cans and the like, by crushing the empty cans to a flattened configuration, for substantially reducing the volume occupied by the refuse for easy and economical disposal thereof.

The invention has particular applications in homes, restaurants, stores, and bars and in places where food and more particularly drinks are dispensed, such food and drinks being packaged in metallic cans, generally of a specific size, which creates a considerable amount of bulky trash. When such bulky trash is stored in trash containers for disposal, the amount of empty cans which may thus be stored is relatively small. However, after crushing the cans to a substantially flat configuration, the tonnage of trash that can be stored prior to disposal is considerably increased for a given volume, which results in savings in the space necessary for storing the refuse.

The operation of the can crusher of the invention is for the most part automatic. The loading of empty cans in the hopper or chute automatically starts the operation of the apparatus. The empty cans are automatically fed one by one into the crushing portion of the apparatus and dropped one by one in a flattened condition into an appropriate receptacle. As soon as all the cans but one, as will be hereinafter explained, have been crushed, the can crusher stops automatically.

SUMMARY OF THE INVENTION

The present invention has therefore as its principal object to provide a simple, effective and relatively inexpensive apparatus for crushing empty cans and the like to a flattened configuration affording less bulk for easy storage and disposal, which is automatic in operation, fool-proof, requires no particular skill to operate and which can be used for crushing either a single can or a plurality of cans in succession.

Other objects and advantages of the present invention will become apparent to those skilled in the art when the following description of the best mode contemplated for practicing the invention is read in conjunction with the drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a can crusher according to the present invention;

FIG. 2 is a front elevation view thereof;

FIG. 3 is a longitudinal section thereof along lines 3—3 of FIG. 2;

FIG. 4 is a partial view similar to FIG. 3 but showing the operating mechanism of the invention in a position other than that illustrated at FIG. 3;

FIG. 5 is a partial cross section thereof as seen from line 5—5 of FIG. 4; and

FIG. 6 is a sectional view thereof as seen from line 6—6 of FIG. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As illustrated at FIGS. 1—3 of the drawing, a can crusher according to the present invention comprises a support frame 10 consisting of a substantially parallelepipedal enclosure or housing 12 supported away from the ground by means of two pairs of tubular legs

14—14 and 15—15. The legs are braced and interconnected at their lower end by means of tubular reinforcing longitudinal member 16 and cross member 17, which are welded or brazed to the legs. The front legs

14—14 support the enclosure 12 by way of an appropriate bracket 18, best shown at FIG. 3 bolted to the lower panel 20 of the enclosure 12. The enclosure 12 is provided with a rear panel 21, extending downwardly, and which is preferably welded or brazed, or otherwise fastened, to the rear legs 15—15. An electric motor 22 is fastened to the rear panel 21 by being bolted thereon, as shown at 24. The electric motor 22 has an output shaft 26 coupled by means of a coupling, such as the flexible coupling 28, to a drive shaft 30 journaled by means of bearings 32 through a pillow box 34 in turn welded or bolted to the rear panel 21 as shown at 36.

The enclosure 12 has a pair of lateral walls 38 and 40, best shown at FIGS. 5 and 6, which by means of linear bearings 42 and 44 slidably support a substantially horizontally disposed slide 46, in the form of a rectangular plate. One end of the slide is provided with a platen 48, best seen at FIGS. 3 and 4, which is welded or otherwise fastened thereon. The slide 46, and the platen 48, are reciprocable by being driven by the shaft 30 through an appropriate mechanism transforming the rotation of the shaft 30, driven by the electric motor 22, into a reciprocating motion of the assembly consisting of the slide 46 and the platen 48. Such coupling between the shaft 30 and the slot 46 is accomplished in the example illustrated by an eccentric consisting of a crank 50, which may be in the form of a disc or a plate, which is fastened to the end of the shaft 30 for rotation thereby by any appropriate means such as a key and keyway assembly and/or a set screw as shown at 52.

The crank 50 has an eccentric in the form of a pin 54 disposed with its axis parallel to the shaft 30 into an appropriate bore 56 in the crank. The pin 54 supports at its free end the inner race of a bearing such as the ball bearing 58. Proximate the end of the slide 46 opposite to its end on which is mounted the platen 48, there is formed a transverse slot 60 in which is disposed the outer race of the bearing 58 such that one revolution of the shaft 30 causes a full stroke of the slide 46 and platen 38 relative to a stationary platen 62, mounted parallel to the platen 48 on the front wall 64 of the enclosure 12, for example, from the first position illustrated at FIG. 4, wherein the platens 48 and 62 are away from each other, to a second position as illustrated in FIG. 3, wherein the platens are in their closest proximity to each other, and back to the first position of FIG. 4.

A gravity feed chute 66 is mounted on the top of the upper wall 68 of the enclosure 12. The gravity feed chute 66 is in the form of a topless and bottomless enclosure 69 fastened over a rectangular aperture 70 formed in the enclosure upper wall 68. A first inclined plane 72 is mounted on the interior of the chute enclosure 69 and a second inclined plane 74 is disposed below the first inclined plane 72 but having its inclination plane directed in an opposite direction towards the aperture 70. In this manner, when empty cans, as shown at 76, are dropped into the gravity feed chute 66, they are caused to roll down the first inclined plane 72 according to its slope until they reach the end of the inclined plane, at which time they are caused to drop into the lower inclined plane 74. The labyrinth-like structure of the gravity chute thus prevents direct straight line access by hand through the aperture 70 in

the panel 68 to the can crushing mechanism.

A plate 78 which, as shown, may be formed of a bent over portion of the sheet of metal forming the inclined plane 72 is disposed above and substantially parallel to the second inclined plane 74, in a spacial relationship thereto permitting the passage therebetween of the empty cans 76, FIG. 4. An electric switch 80 for operating the electric motor 22 is disposed in the enclosure 69 of the gravity feed chute and is actuatable from a closed to an open state, and vice versa, by means of a reed 82. As long as the reed 82 is in the position shown in phantom line at FIG. 3, the switch 80 is normally open and the electric motor 22 is deactivated. This corresponds to the situation existing when the gravity chute 66 is empty. However when cans 76 are placed in the gravity chute, the cans rolling down the inclined plane 74 cause the reed 82 to be displaced to the position shown in full line at FIGS. 3 and 4, thus energizing the motor 22 and causing a full stroke operation of the slide 46 and platen 48, as will be hereinafter explained.

Proximate the end of the inclined plane 74, that is proximate the aperture 70 in the top panel 68 of the enclosure 12, there is provided a movable stop means taking the form of a rod member 84 pivotably supported on an end, as shown at 86, and having its other end bent upwardly at approximately a 90° angle projecting through an aperture 90 disposed in the panel forming the inclined plane 74. A bracket 92 is welded, or otherwise fastened, in a substantially horizontal position, to the top of the platen 48 such as to be displaceable thereby, and the bracket 92 acts as a trap door opening or closing the aperture 70, according to whether the reciprocable platen 48 occupies the position indicated at FIG. 4, i.e. away from the platen 62, or the alternate position indicated at FIG. 3, i.e. proximate to the platen 62. The bracket 92 is provided with a bent down end portion 94 which engages and supports the rod 84 with its end 88 in its retracted position when the platens 48 and 62 are proximate to each other as illustrated in FIG. 3. The bracket 92 causes the end 88 of the rod 84 to project through the aperture 90 in the inclined plane 74 in the path of the cans 76, thus preventing the first can from dropping through the aperture 70 into the space between the platens, when the reciprocable platen 48 is in its position away from the stationary platen 62, as illustrated at FIG. 4.

A can support plate 96 is mounted a short distance above the lower panel 20 by means of appropriate means such as a bracket 98. The free end of the support plate 96 projecting through a transverse slot 99 in the reciprocable platen 48, is disposed a short distance away from the stationary platen 62, thus defining therebetween an eject space or aperture 100 for the flattened cans 76', FIG. 3, a corresponding aperture 102 being disposed in the bottom panel 20 to also provided a passage therethrough for the flattened cans which, as seen at FIG. 1, are allowed to drop by gravity into a receptacle 104 placed on the ground in an appropriate location between the legs 15-15 and 14-14.

The can crusher of the invention is normally inoperative although it may constantly be connected to a source of electrical power, not shown, by means of a conventional electrical cord, not shown, as a result of the switch 80 normally opening the circuit of the electric motor 22. If a plurality of empty cans 76 is dropped in the gravity feed chute 66, the cans orient themselves with their longitudinal axis substantially parallel to the planes of the platens 62 and 48 and roll down the in-

clined plane 72 until they drop onto the inclined plane 74. The rest position of the reciprocable platen 48 is illustrated at FIG. 4. Under that condition, the upper step of the bracket 92 engages the rod 84 and causes the end 88 thereof to project through the aperture 90, thus stopping the first can 76 in the position illustrated at FIG. 4. The switch reed 78 engaging the side of the can turns the switch 80 on, activating the electric motor 22 and causing a reciprocation of the platen 48 to the position illustrated at FIG. 3. In that position, the rod 84 is caused by gravity to engage the stepped down portion 94 of the bracket 92, thereby retracting the end 88 of the rod below the surface of the inclined plane 74. The first can 76 thus drops on the top of the bracket 92. When the reciprocable platen 48 returns to its first position illustrated at FIG. 4, the first can 76 is allowed to drop on the top of the can holding plate 96, and is thus disposed between the stationary ram 62 and the reciprocable ram 48. The second can is now prevented from rolling further down the inclined plane 74 by the end 88 of the rod 84 projecting through the aperture 90, and the switch 80 remains closed because the reed 78 still engages the side of a can. The reciprocable platen 48 is again reciprocated to its position proximate the stationary platen 62 (FIG. 3), thus crushing a can between the two platens. Upon the return stroke of the reciprocable platen 48 to the position indicated at FIG. 4, the crushed can 76' drops through the eject aperture 100 between the end of the support plate 96 and the stationary platen 62 and the corresponding aperture 102 in the housing lower panel 20. The crushed cans 76' are stored in the receptacle 104.

It can thus be seen that the operation of the can crusher apparatus of the invention is automatic and continuous as long as there is at least one can at the bottom of the inclined plate 74 engaging the stop means defined by the projecting end 88 of the rod 84, thus keeping the switch 80 turned on by lifting the switch reed 78. As soon as the last can is dropped between the platens 48 and 62 on the support plate 96, as illustrated at FIG. 4, the reed 78 of the switch 80 drops into the position illustrated in phantom line at FIG. 3, and the circuit of the motor 22 is open, thus stopping the reciprocation of the reciprocable slide 46 and the reciprocable platen 48. It can also be seen that when the can crusher is stopped there remains a can above the plate 92 or between the two platens 48 and 62 according to whether the reciprocable platen 48 stops close to the stationary platen 62 or away therefrom, due to the slight overrun caused by the inertia of the apparatus moving parts. The remaining can is crushed as soon as a can is dropped into the gravity feed chute 66, thus operating the switch 80 when the can reaches the bottom of the inclined plane 74.

Having thus described the invention by way of an example of a specific example thereof, what is claimed as novel is defined as follows:

1. A can crusher comprising a frame, a stationary platen mounted in said frame in a substantially vertical position, a reciprocable platen slidably supported in said frame in a substantially parallel relationship to said stationary platen, power means for reciprocating said reciprocable platen through a single cycle from a first position away from said stationary platen to a second position proximate to said stationary platen and back to said first position, a gravity feed chute for feeding cans in sequence between said platens, an aperture at the bottom of said gravity feed chute directing said cans

5

between said platens, means for feeding a single one of said cans at a time through said aperture when said platens are away from each other, said means comprising movable stop means disposed proximate the bottom of said gravity feed chute, means actuated conjointly with said reciprocable platen for controllably disposing said stop means in the path of said can in said chute when said reciprocable platen is in said first position and for retracting said stop means when said reciprocable platen is in said second position, and for preventing said can from dropping between said platens until said reciprocable platen is reciprocated to a position proximate to said first position, said last mentioned means comprising a trap door defining bracket fastened in a substantially horizontal position to said reciprocable platen for closing said aperture when said reciprocable platen is reciprocated proximate to said stationary platen and opening said aperture when said reciprocable platen is reciprocated away from said stationary platen, control means energized by the presence of a can in said chute for actuating said power means, and a plate member disposed for supporting said single can between said platens when away from each other, said plate member having a terminal edge disposed in substantially parallel spaced relationship relative to said stationary platen for defining a gravity eject aperture for a crushed can upon return of said reciprocable

6

platen from said second position to said first position.

2. The can crusher of claim 1 wherein each of said cans is fed between said platens with the longitudinal axis of said can substantially parallel to said platens.

3. The can crusher of claim 1 wherein said means for reciprocating the reciprocable platen comprises a slide having said reciprocable platen mounted on an end thereof, linear bearing means for guiding and supporting said slide, a drive shaft, prime mover means for said drive shaft, a crank mounted on said driveshaft for rotation thereby, a roller eccentrically mounted on said crank, and a laterally extending slot formed on the other end of said slide, said roller being disposed in said slot.

4. The can crusher of claim 1 wherein said reciprocable platen has a substantially horizontally disposed slot and said plate member is fixedly mounted on said frame with the terminal edge thereof extending through said slot when said reciprocable platen is reciprocated away from said second

5. The can crusher of claim 1 wherein said gravity feed chute comprises at least a first and a second inclined plane, disposed one above the other and defining a baffle preventing straight line hand access to said platens.

* * * * *

30

35

40

45

50

55

60

65

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,916,780 Dated November 4, 1975

Inventor(s) Warren R. Heiser

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 44, "38" should be --48--.

Column 6, line 21, following "second", insert
--position back to said first position--.

Signed and Sealed this
twenty-fourth Day of February 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks