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Rosenow

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[54] **APPARATUS FOR FLATTENING METAL CANS AND CRUSHING GLASS CONTAINERS**

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[52] **U.S. Cl.**..... **100/176,** 100/DIG. 2, 100/98, 241/DIG. 22, 241/99

[51] **Int. Cl.**..... **B30b 3/04,** B30b 7/04

[58] **Field of Search** ..... 100/176, 163, 169, 171, 100/39, 94, 98, DIG. 2; 241/99, DIG. 22, 191, 195, 230

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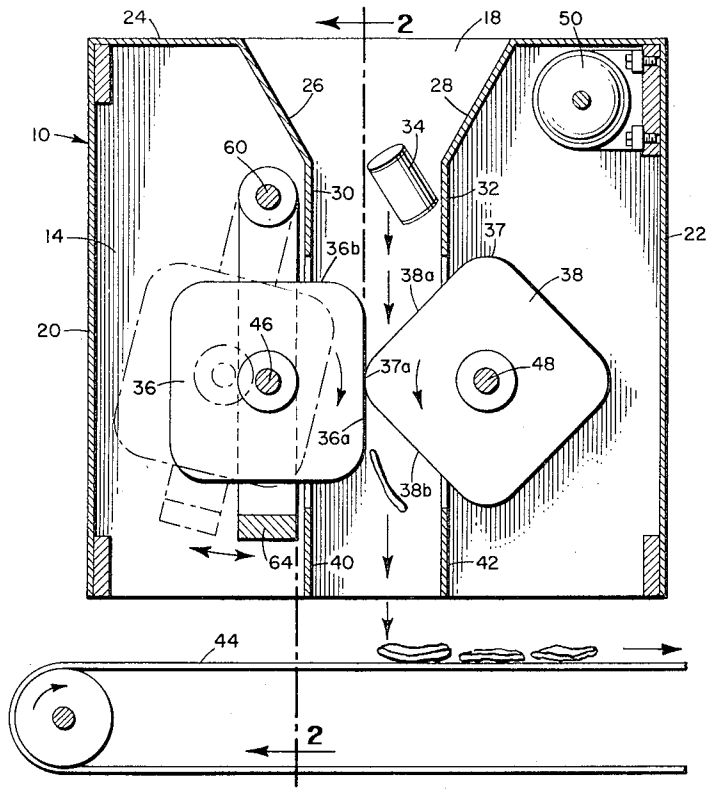
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Attorney, Agent, or Firm—Millen, Raptes & White

[57] **ABSTRACT**

The invention relates to an apparatus for flattening can containers and crushing glass containers. A pair of rollers, having substantially square cross-sections with rounded edges are turned towards each other 45° out of phase by suitable gearing and power means. Cans and bottles are flattend or crushed by the vise-like action of the flat surfaces of the rollers. One of the rollers is mounted on a spring-biased yoke member to prevent jamming of the apparatus by a foreign non-crushable object which may enter the apparatus.

3 Claims, 5 Drawing Figures



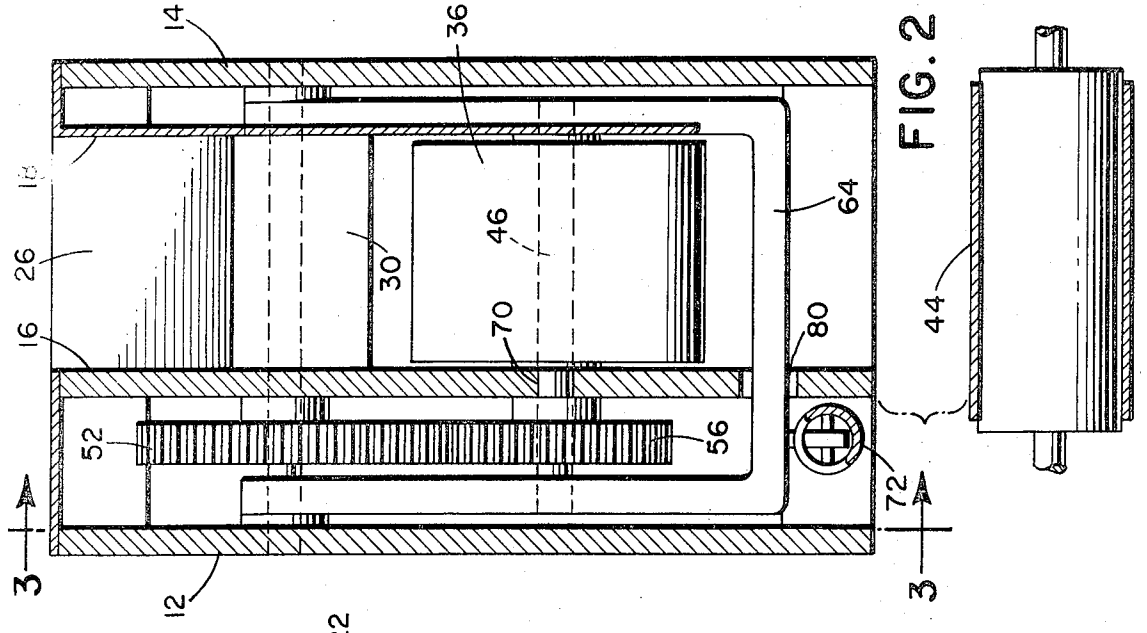

14
36
64
46
30
26
16
70
80
52
56
72
3
12
3
44

FIG. 2

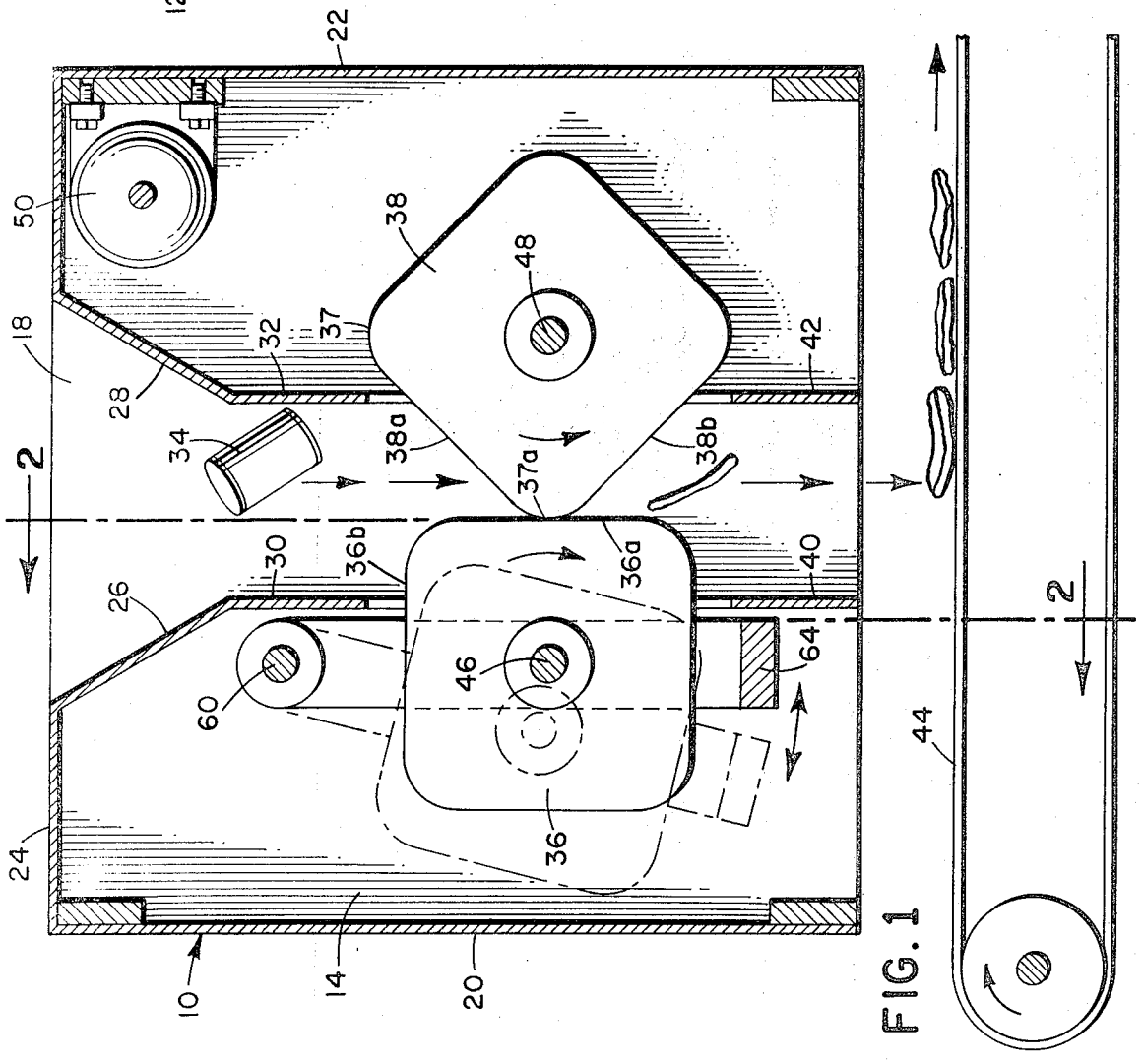

22
50
38
48
18
32
37
42
28
34
38a
37a
38b
2
30
36b
36a
40
26
64
46
60
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24
10
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20
44
2

FIG. 1

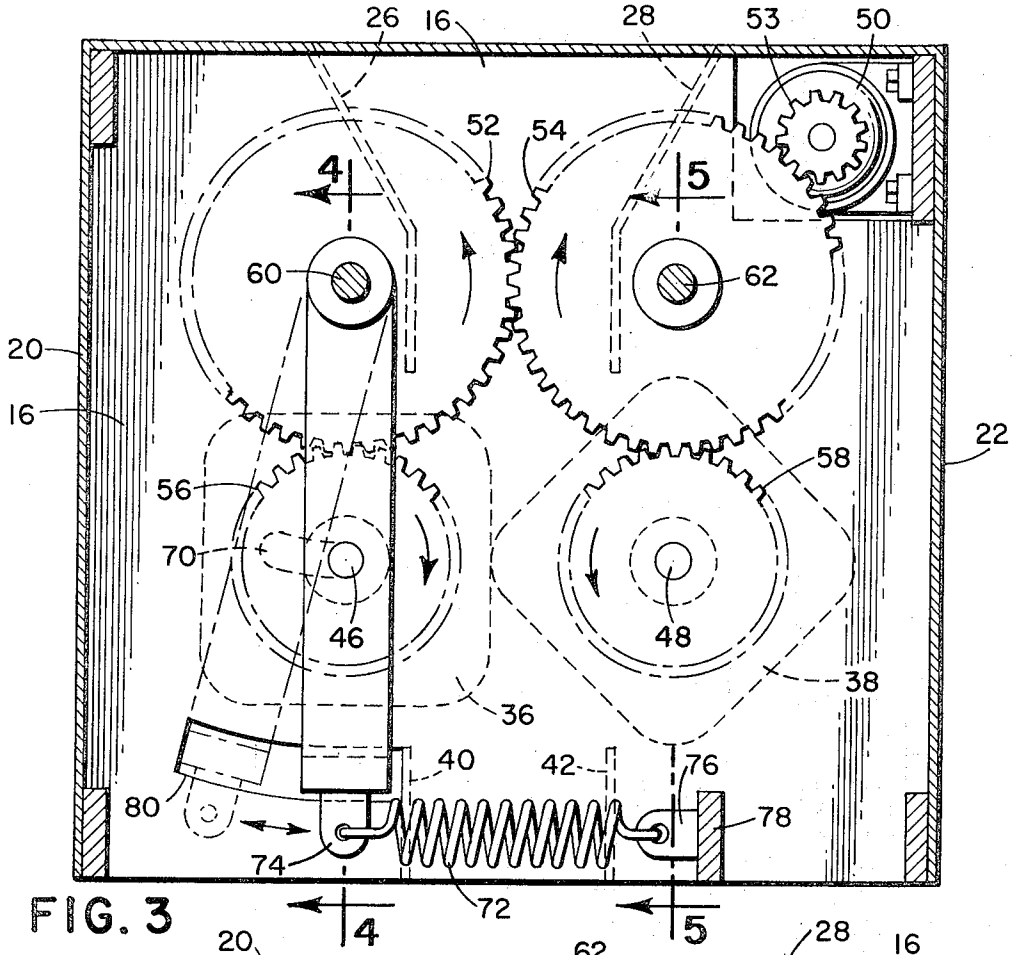


FIG. 3

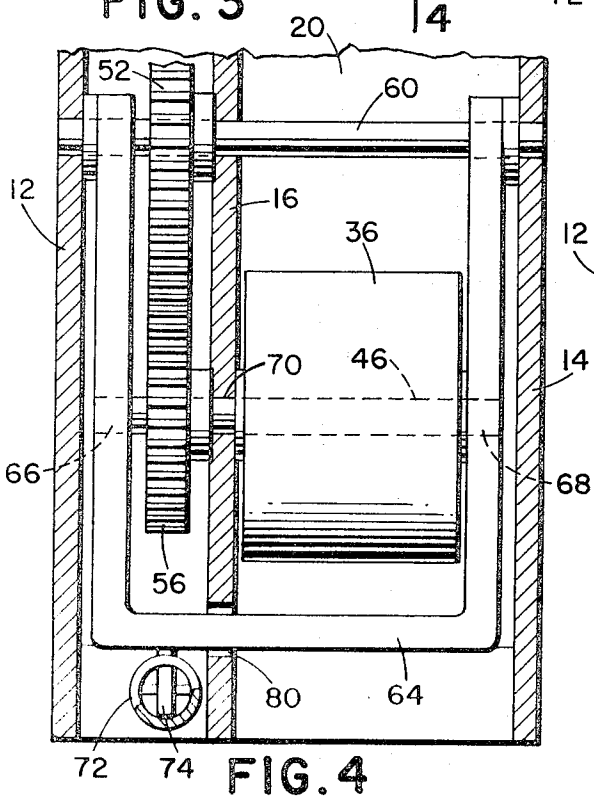


FIG. 4

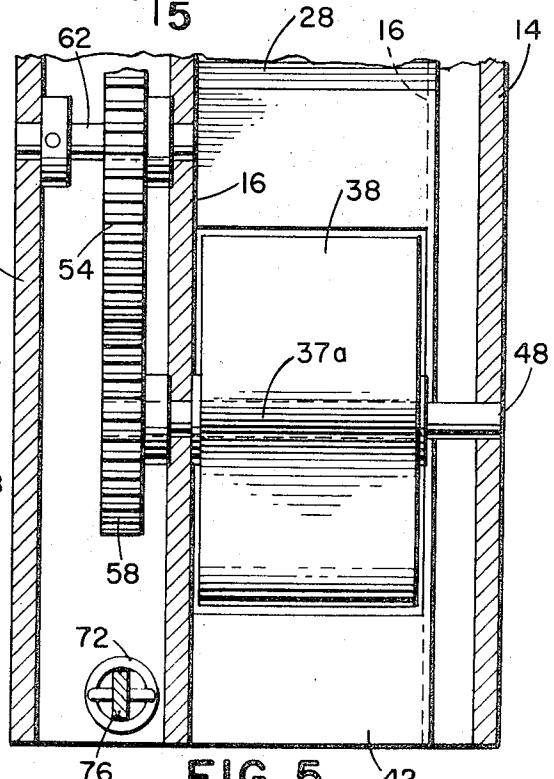


FIG. 5

APPARATUS FOR FLATTENING METAL CANS AND CRUSHING GLASS CONTAINERS

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for crushing cans, glass containers and the like.

Currently, problems involved with the disposal of trash are of high priority and many ideas are being propounded for coping with the problem. Particularly, with metal and glass containers, their disposal presents unique problems in incinerators due to the fact that they are not incinerated. In land fills, the containers are unsuitable unless crushed. Furthermore, in recycling operations intended to salvage the metal and glass, it is desirable that the metal and glass containers be in a crushed condition.

In many areas, trash collection operations include trash and garbage sorting whereby metal and glass containers are segregated. In such cases, the large bulk of metal and glass containers collected present problems in transportation to recycling plants.

SUMMARY OF THE INVENTION

It is an object of this invention to provide an apparatus for flattening metal cans and crushing glass containers.

A more specific object of this invention is to provide an apparatus comprising a pair of substantially square crushing and flattening means rotatably journaled together for flattening metal cans and crushing glass containers therebetween.

Another object of this invention is to provide an apparatus having release means associated with the rotatably journaled crushing and flattening means to prevent jamming of the apparatus.

Other features and advantages of the invention will appear from the following detailed description of one specific embodiment of thereof taken in connection with the drawings.

DETAILED DESCRIPTION OF THE INVENTION IN THE DRAWINGS

FIG. **1** is a side elevational view, partially in section of the crushing and flattening apparatus of the invention;

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

FIG. **3** is a view taken along line **3—3** of FIG. **2**;

FIG. **4** is a view taken along line **4—4** of FIG. **3**; and

FIG. **5** is a view taken along line **5—5** of FIG. **3**.

Referring now to the drawings, the crushing and flattening apparatus is generally designated by the numeral **10.** It comprises a pair of spaced side walls **12, 14** and a pair of spaced intermediate wall **16, 18** parallel thereto, and a pair of spaced end walls **20, 22.** The apparatus comprises a top closure **24** having an opening defining a hopper bounded by intermediate walls **16, 18.** The hopper comprises inclined walls **26, 28** and vertical walls **30, 32** through which containers **34** are fed into the apparatus to be flattened or crushed. Below the hopper, a pair of rollers **36, 38** are disposed adapted to flatten or crush the container **34.** Below the rollers, there is a discharge opening bounded by intermediate walls **16, 18** and vertical walls **40** and **42** through which the flattened or crushed container passes onto a conventional continuous conveyor belt **44.**

The rollers **36, 38** are mounted to rotate in spaced parallel relationship to one another, and are fixed to rotatably journaled shafts **46** and **48** respectively. The rollers **36** and **38** are geared to be driven in unison, and in opposite directions, through a series of gears by a conventional motor **50,** or the like. As shown in FIG. **3,** it is necessary that the rollers **36, 38** turn toward each other and at the same rotative speed. This is accomplished by providing gears **52, 54** of equal size, and gears **56, 58** of equal size. Gear **52** drives gear **56** and gear **54** drives gear **58.** Gear **54** also drives gear **52** and is itself driven by small pinion gear **53** on motor **50.** Gears **52** and **54** are rotatably journaled on shafts **60** and **62,** respectively, between walls **12** and **16.** Gears **56, 58** may be formed integrally with rollers **36, 38,** respectively, or separately produced and secured thereto.

Gear **54** is fixed to shaft **62,** which is rotatably journaled between walls **12, 16.** Gear **58,** enmeshed with gear **54** within walls **12** and **16,** is fixed to the end of shaft **48,** which is rotatably journaled through wall **16** and wall **14** (FIG. **5**).

Gear **52** is fixed to shaft **60,** which is rotatably journaled to walls **12, 16** and **14.** A U-bar or yoke **64** is pivotally journaled to shaft **60.** Shaft **46** is rotatably journaled within the U-bar at **66** and **68.** Shaft **46** passes through wall **16** in an arcuate elongate opening **70** (FIG. **3**). Gear **56** is fixed to shaft **46** between walls **16** and **12** and is enmeshed with gear **52.**

U-bar **64** is spring biased to permit pivotal movement thereof together with roller **36,** and gear **56** as shown in FIGS. **1** and **3.** Spring **72** is connected to member **74** on the U-bar and to member **76** of cross bar **78,** which is rigidly secured between walls **12** and **16.** The horizontal section of the U-bar **64** passes through wall **16** in an arcuate elongate opening **80** (FIG. **3**) permitting the pivotal movement thereof.

The rollers **36** and **38** are substantially square in cross-section and have rounded corners **37.** The rollers are spaced and synchronized in their rotary motion such that parts of the surfaces of both are always in contact. This is accomplished by arranging one roller to be 45° out of phase with the other roller. Thus, as shown in FIG. **1,** when surface **36*a*** of roller **36** is vertical, edge **37*a*** of roller **38** will be in contact therewith. In this manner, as the rollers rotate, succeeding portions of the surfaces of both will roll together and be in contact. The advantage of this type of contact is that during most segments of the rotary motion of the rollers, flat surfaces of each roller are pressing against each other, as for example, between surfaces **36*a*** and **38*a*** on further rotation of the rollers as shown in FIG. **1.** Accordingly, a metal can container passing between the rollers is more effectively flattened. In addition, the can is more efficiently initially gripped and caused to be moved through the rollers, because of the vise-like rotary action of the surfaces.

The spring-biased U-bar **64** provides means for prevention of jamming of the operation. Thus, if a foreign non-flattenable or non-crushable object were to find its way into the operation, the U-bar along with roller **36** and gear **56** would pivot away from contact with roller **38** as shown in FIG. **1** in phantom. At the same time, gear **56** would remain enmeshed with gear **52** and shaft **46** would move within arcuate opening **70.** Accordingly, rollers **36** and **38** would continue to rotate synchronously until the foreign object passed through the

apparatus and onto the conveyor belt 44. Thereafter, the bias of the spring would return the U-bar to its normal position and the rollers would again be in contact.

In the above operation of the apparatus, the description thereof has been mainly with the flattening of metal containers such as cans. However, the operation is equally effective with the crushing of glass containers. Thus, a glass bottle passing through the rollers would be crushed therebetween and the pieces would fall onto the belt 44.

What is claimed is:

1. Apparatus for crushing and flattening metal and glass containers, comprising

a. housing means having vertical sidewalls and intermediate walls defining upper hopper means and passage means through the central portion of said apparatus

b. a pair of crushing rollers having coacting surfaces mounted below said hopper means and extending into said passage means;

c. integral gear means on each roller adapted to be driven by a pair of coacting gear means, each of which drives a respective integral gear means thereby providing opposite rotation for said rollers;

d. driving means including gear means for said pair of coacting gear means;

e. said rollers having substantially square cross-sections with rounded edges and being mounted with relation to each other during rotation thereof such that one roller is 45° out of phase, thereby providing continuous contact between the surfaces of said rollers;

f. one of said rollers being mounted on spring-biased, yoke means which is pivotable at the center of rotation of one of said pair of coacting gear means.

2. The apparatus of claim 1 wherein said pair of coacting gear means are larger in diameter than said integral gear means on said rollers.

3. The apparatus of claim 1 wherein said yoke means, said pair of coacting gear means, and said integral gear means are rotatably journaled within said housing between said vertical sidewalls and said intermediate walls.

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