The invention relates to an apparatus for flattening cans 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 flattened 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
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 pro-
 pounded 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 con-
 tainers 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 contain-
ers.

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

Another object of this invention is to provide an apparatus having release means associated with the rotat-
 ably journaled crushing and flattening means to pre-
 vent jamming of the apparatus.

Other features and advantages of the invention will ap-
 pear 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 inven-
tion;
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 flat-
tening 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 ro-
tatably 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 con-
ventional 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 ac-
complished 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, re-
spectively, or separately produced and secured thereto.

Gear 54 is fixed to shaft 62, which is rotatably jour-
naled 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 jour-
naled to walls 12, 16 and 14. A U-bar or yoke 64 is piv-
 otonally journaled to shaft 60. Shaft 46 is rotatably jour-
naled 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 horizon-
tal 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 36a of roller 36 is verti-
cal, edge 37a of roller 38 will be in contact therewith. In this manner, as the rollers rotate, succeeding por-
tions 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 rol-
ers, flat surfaces of each roller are pressing against each other, as for example, between surfaces 36a and 38a on further rotation of the rollers as shown in FIG. 1. Accordingly, a metal can containing 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 pre-
vention 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. Accord-
ingly, rollers 36 and 38 would continue to rotate syn-
chronously 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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