Feb. 19, 1963 F. H. BUNKE ET AL 3,077,827

CAN CRUSHER

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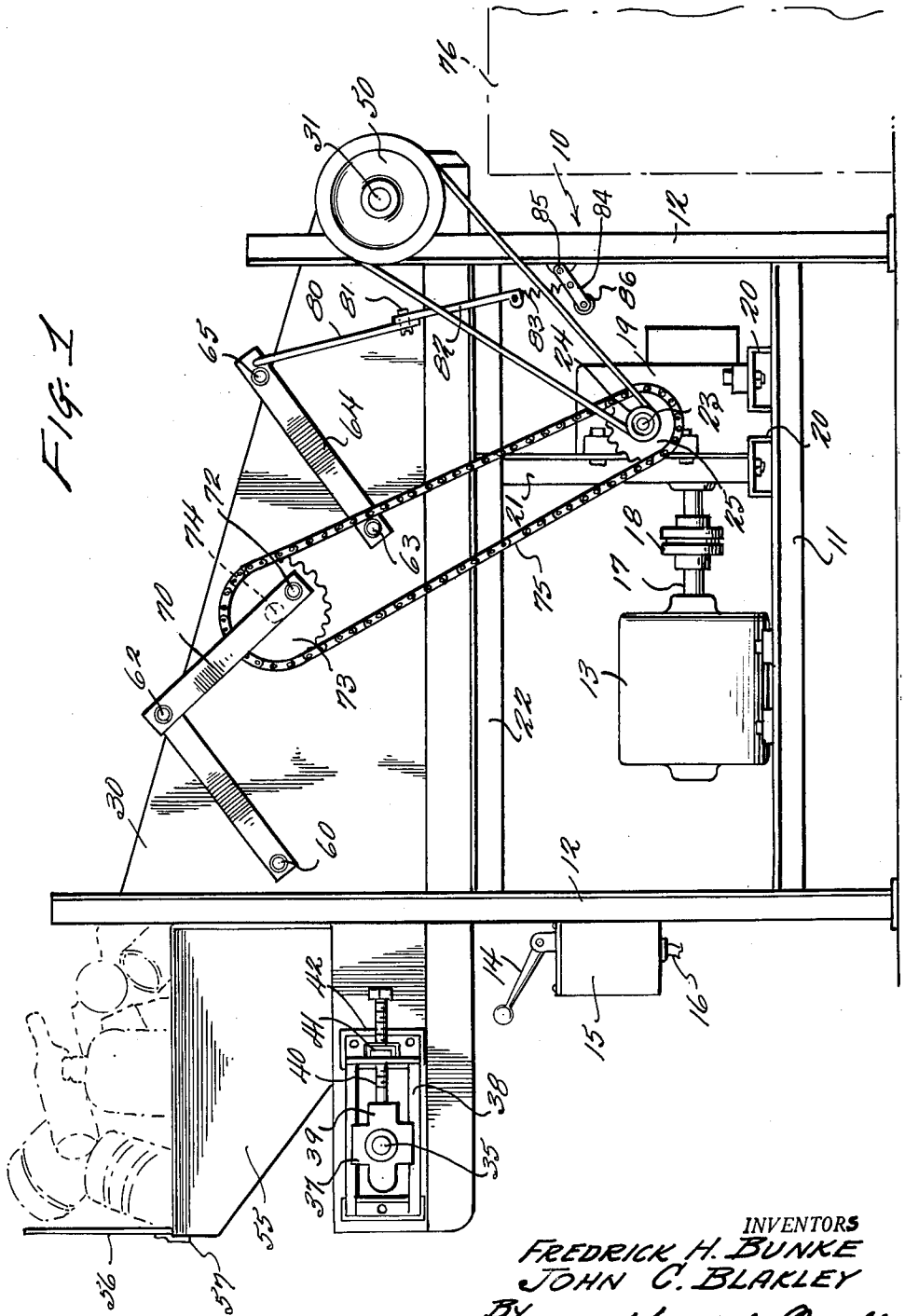
FIG. 1



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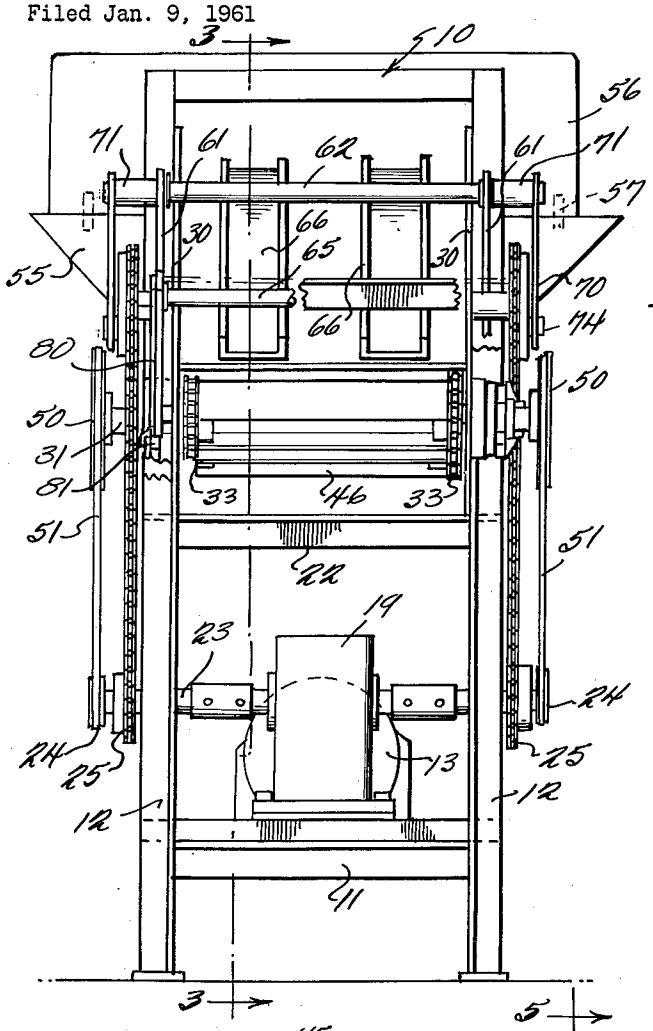

FIG. 2

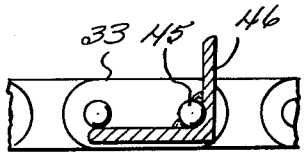

FIG. 5

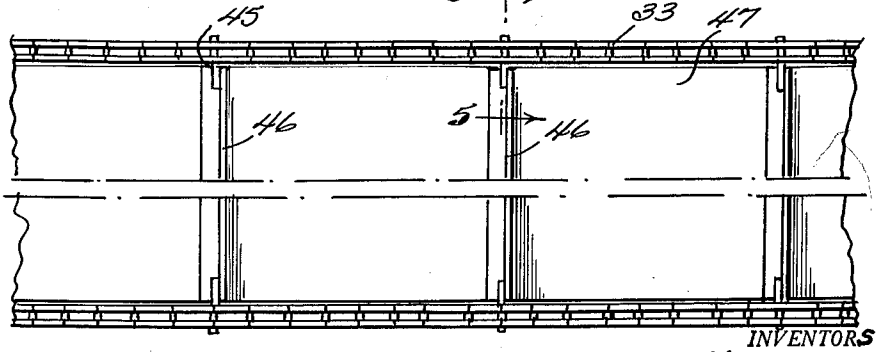

FIG. 4

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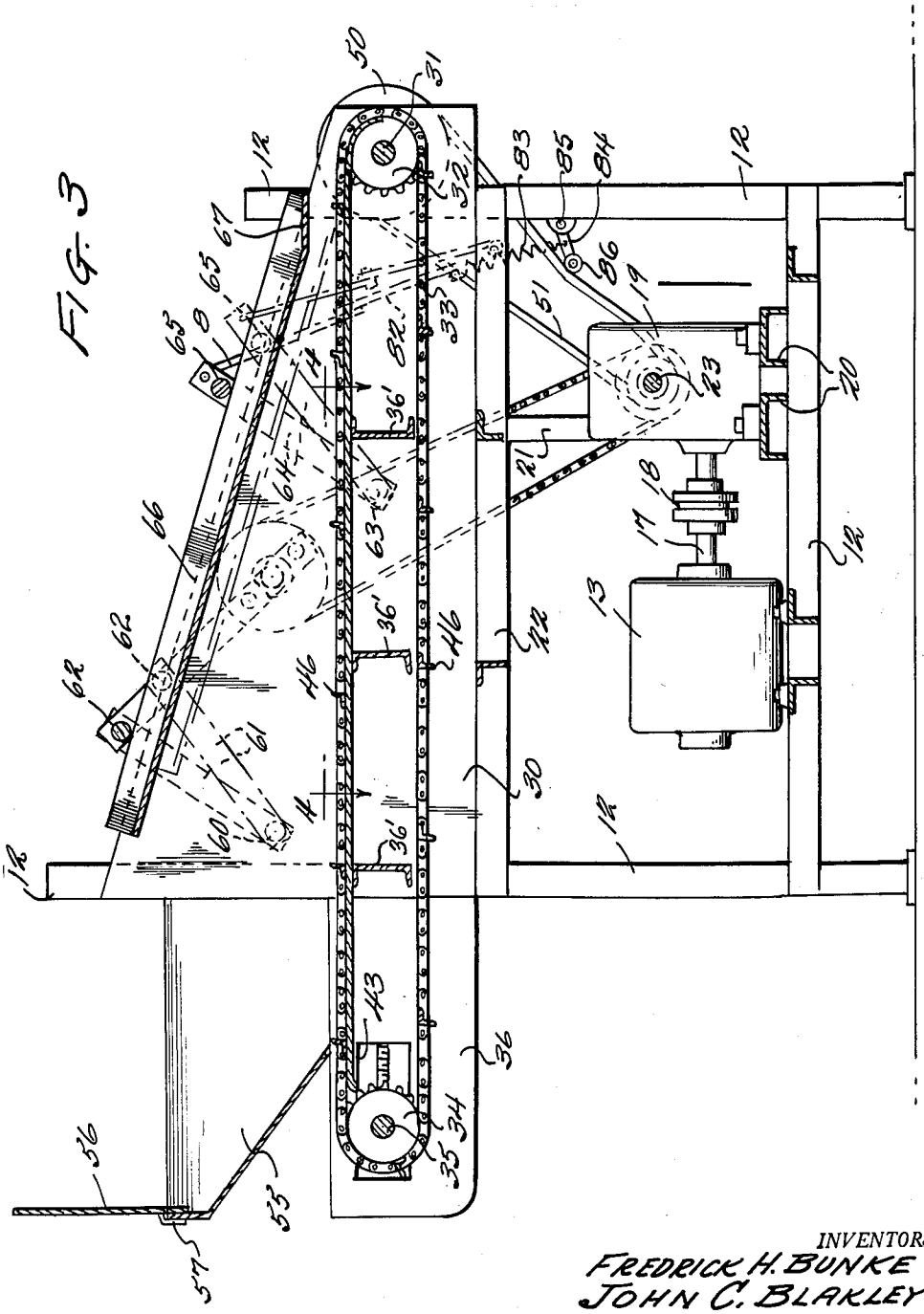
FIG. 3



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CAN CRUSHER

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This invention relates to a can crusher, and has as its primary object the provision of an improved apparatus for crushing cans, bottles, and similar bulky articles for storage before disposal, in order to save space.

An additional object of the invention is the provision of such a device including a removable hopper from which the cans are fed beneath a reciprocating crusher plate, by means of an endless belt, the crusher plate being inclined and tapering downwardly toward the belt to form a restricted opening through which the crushed cans are passed.

An additional object of the invention is the provision of a device of this character wherein the cans are substantially completely flattened or crushed, and conveyed from the crusher to a suitable receptacle for storage or other purposes.

Still other objects reside in the combinations of elements, arrangement of parts, and features of construction.

Other objects will in part be obvious, and in part be pointed out as the description of the invention proceeds, and shown in the accompanying drawings wherein there is disclosed the preferred embodiment of this inventive concept.

In the drawings:

FIGURE 1 is a side elevational view of one form of can crusher embodying elements of the instant invention.

FIGURE 2 is an end elevational view of the structure of FIG. 1 as viewed from the right.

FIGURE 3 is a sectional view taken substantially along the line 3—3 of FIG. 2 as viewed in the direction indicated by the arrows.

FIGURE 4 is a sectional view taken substantially along the line 4—4 of FIG. 3 showing a portion of the conveyor belt in plan, and

FIGURE 5 is an enlarged fragmentary detail sectional view taken substantially along the line 5—5 of FIG. 4 as viewed in the direction indicated by the arrows.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Having reference now to the drawings in detail, the can crusher of the instant invention includes a frame generally indicated at **10**, which includes a base plate **11** supported by four oppositely disposed legs **12**.

Base plate **11** carries a suitable motor **13**, which is preferably electric, and which is controlled by an operating handle **14**, mounted on a control box **15**. Suitable cables extend from the control box **15** to any desired source of power, as shown at **16**, and conventional electric circuitry connects the control box **15** with the motor **13**. Motor **13** is provided with a drive shaft **17**, which extends through a friction clutch **18** to a gear reduction box **19**, which is mounted on a pair of transversely extending channel members **20**, and secured to an upright **21**, which in turn is secured to the underside of an upper transverse frame portion **22**. A drive shaft **23** extends transversely from gear reduction box **19** and is provided with a pulley **24**, and a sprocket **25**, the purpose of which will be more fully described hereinafter. It is to be noted that each end of the shaft **23** extends outwardly of the gear reduction box **19**, and is provided at each of its ends with a pulley **24** and sprocket **25**.

Side plates **30** disposed on opposite sides of the upper portions of legs **12** above the upper frame portion **22** carry at one end a transversely extending axle **31**, which

carries a pair of sprockets **32** adjacent its opposite ends, over each of which extends a chain **33**. The chains **33** extend in endless chain relation about sprockets **34** mounted on opposite ends of a transversely extending axle **35** mounted between projecting side portions **36** of side plates **30**. Transversely extending supports **36'** extend between the upper and lower flights of the endless chains **33**, and provide reinforcement both for the side plates **30** and the remainder of the apparatus.

Means are provided for the adjustment of the axle **35** to tension the chains **33**, and take the form of a pair of oppositely disposed slidably mounted brackets **37** in which the ends of axle **35** are journalled. Each bracket **37** is slidable on oppositely disposed parallel horizontal tracks **38**, and each bracket includes a projecting lug **39** having an interior bore in which is rotatably journalled the end of a screw member **40**. Each screw member **40** passes through a threaded lug **41** carried by the mounting bracket **42** which carries one end of the tracks **38**. Obviously, rotation of the opposed screws **40** will serve to move the axle **35** forwardly and rearwardly, with the corresponding tensioning of the chain. The interior side of the tracks **38** is positioned adjacent an elongated opening **43** in each side plate extension **36** to permit longitudinal movement of axle **35**.

The chains **33** are provided at spaced intervals with inwardly projecting pins **45**, to which are welded L-shaped angle irons **46**. The undersides of angle irons **46** are secured to an endless belt **47** which travels with the chains **33**. Cans or the like falling on the belt, in a manner to be more fully described hereinafter, will thus be conveyed by the belt **47** and the upright legs of the angle irons **46** interiorly of the crusher, in a horizontal path, or to the right as shown in FIGS. 1 and 3.

The axle **31** has mounted on the opposite ends thereof pulleys **50**, which are connected by means of endless V-belts **51** to pulleys **24**, to be driven by shaft **23**, and in turn to drive the sprockets **32** to move the chains **33** and their associated endless belt.

A funnel-shaped hopper **55** is positioned at one end of the apparatus, and has an opening which extends between the uprights **12** and the space between the side plates **30**, for conveying cans or bottles or other material to be crushed therebetween. A backing plate **56** may be employed to retain additional cans in the hopper **55**, and held in position on the rear wall thereof by means of spring fingers or clips **57**.

The side plates **30** are roughly triangular in configuration, as best shown in FIG. 1, and provided adjacent the opening of the hopper **53** with a pair of oppositely disposed pins **60**. Pins **60** have pivotally mounted thereon a pair of oppositely disposed links **61**, which in turn are pivotally connected at their opposite ends to a transverse rod **62**, which extends across the top of the triangular side plates **30**, it being noted that the hypotenuse or inclined portion of the side plates **30** is located at the top and extends downwardly or convergingly towards the end of the apparatus away from the hopper **55**. A second pair of pins **63** are positioned on opposite sides of the plates **30**, and carry the ends of a second pair of links **64**, the opposite ends of which in turn are connected to a transverse rod **65**. The pins **60** and **63** are substantially equidistantly spaced from the upper edges of plates **30**, and consequently are inclined relative to the horizontal frame portion **22**, in a direction toward the discharge end of the device.

A pair of spaced parallel crusher shoes **66** which extend longitudinally of the apparatus are connected to the undersides of rods **62** and **65**, and are reciprocated, in a manner to be more fully described hereinafter between the full line position indicated in FIG. 3 and the dotted

line position. The lower or discharge ends of shoes **66** are tapered as indicated at **67** in FIG. 3 to extend in parallelism to the conveyor belt **47**, to provide a discharge opening, through which the crushed cans pass.

Oppositely disposed links **70** are connected at one end to the ends of rod **62**, being separated from the links **61** by means of spacers **71**. The opposite ends of links **70** are pivotally connected to pins **72** which are eccentrically mounted on oppositely disposed sprockets **73**, which in turn are rotatably mounted on stub axles **74** carried by the side plates **30**. The sprockets **73** are in turn rotated by chains **75** which are in turn driven by the previously described sprockets **25**. The arrangement is thus such that upon energization of the motor **13** cans are fed from the hopper **55** onto the belt **47**, and conveyed by the angle irons **46** inwardly toward the discharge opening of the device. At the same time the combined reciprocating action of the crusher shoes **66** serves further to distort and compress the cans, until they are ultimately discharged at the end of conveyor belts **47** into a storage receptacle **76** or the like (see FIG. 1).

The motion imparted to the crusher shoes **66** is thus both oscillatory and reciprocatory, movement in a vertical direction being indicated by the dotted line positions shown in FIG. 3. This motion in combination with the incline of the crusher shoes and the feeding effected by the conveyor belt **47** moves the cans from the hopper **55** through the apparatus progressively effecting their flattening and crushing, until discharged in substantially crushed condition from the end of the apparatus into the receptacle **76**.

Means are provided for stopping the conveyor belt **47** during the crushing action effected by movable crusher shoes **66** to prevent breaking of the drive belt **51**, and takes the form of a lever **80** pivotally connected to the end of link **64**. Lever **80** is in turn connected through an adjusting clamp **81** to an extension **82**, to which is attached one end of a coil spring **83**. The other end of spring **83** is attached to a lever **84** which is pivotally mounted as at **85** on leg **12**. The free end of lever **84** carries a tension roller **86** which normally engages belt **51**, as best shown in FIG. 3. With the roller in this position, belt **51** is tensioned to drive pulley **50** and hence through sprockets **32** and chains **33**, belt **51**. When the crusher shoes **66** are moved to crushing position, in the manner previously described, and link **64** moves to the dotted line position of FIG. 3 or the position of FIG. 1, the roller **86** moves to the position shown in FIG. 1, at which time belt **51** slips on the drive pulley **50** and conveyor belt **47** stops.

From the foregoing it will now be seen that there is herein provided an improved can crusher, which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative, and not in a limiting sense.

We claim:

1. A can crusher comprising, in combination, a frame having side and end portions, generally triangular plate members mounted on the side portions of said frame, portions of said plate members projecting from one end of said frame, a horizontally disposed endless conveyor positioned between said triangular plate members and the projecting portions thereof, a hopper positioned adjacent the projecting portions of said triangular plate members and having a dispensing opening in overlying relation to said conveyor, a pair of spaced longitudinally extending crusher shoes mounted between said triangular plate members above said endless conveyor and inclined towards the same at the end thereof remote from said hopper, spaced first and second transverse rod members secured to said crusher shoes, a first pair of link members, each having one end connected to one end of said first transverse rod member, each of said link members having its other end pivotally secured to one of said triangular plate members, a rotary sprocket mounted on each of said triangular plate members, a second pair of link members, each of said second pair of link members having one end pivotally and eccentrically mounted on one of said sprockets and the other end connected to one end of said first transverse rod member, a third pair of link members, each having one end thereof connected to one end of said second transverse rod member and the other end of each of said third pair of link members pivotally connected to one of said triangular plate members, a motor on said frame, a gear reduction box on said frame driven by said motor, said gear reduction box drivingly connected to said sprockets to impart a rotary reciprocatory movement to said pair of crusher shoes, and said gear reduction box further drivingly connected to said endless conveyor whereby cans carried by said conveyor are adapted to be crushed between the crusher shoes and the conveyor.

2. A can crusher as defined in claim 1 which further includes means operatively connected to one of said third pair of links and to said conveyor drive means to stop said conveyor during the crushing action of said crusher shoes.

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