Dec. 7, 1954 V. A. MUGAVERO 2,696,254

APPARATUS FOR SALVAGING METAL FROM CANS

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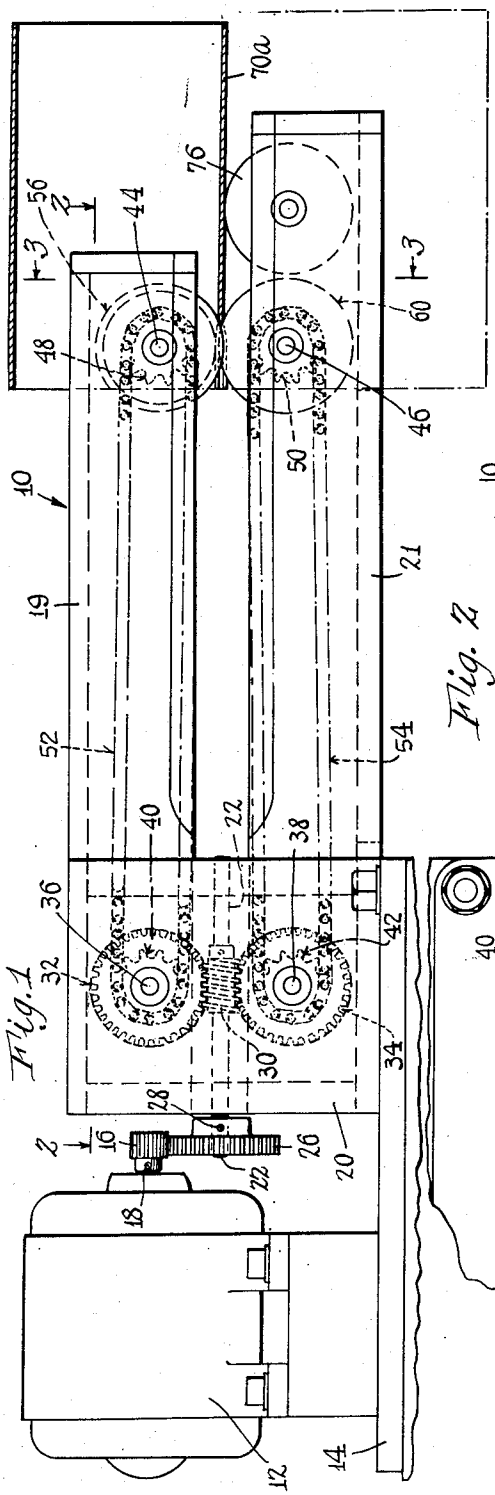

Fig. 1

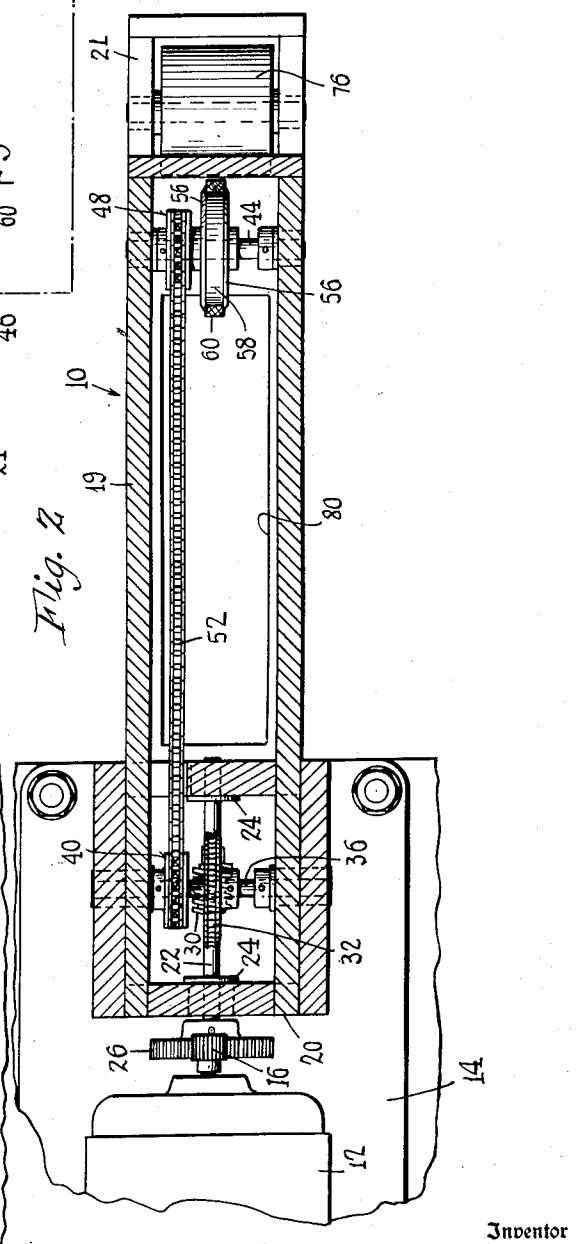

Fig. 2

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Fig. 3

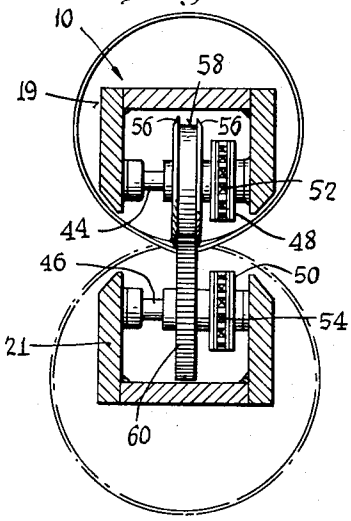


Fig. 4

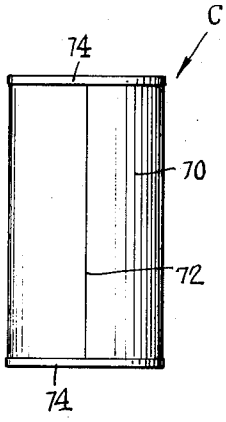


Fig. 5

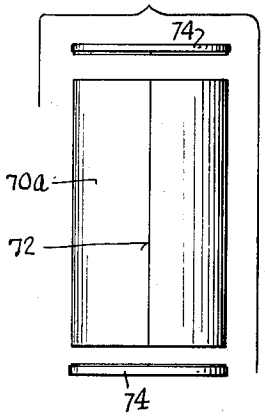


Fig. 6

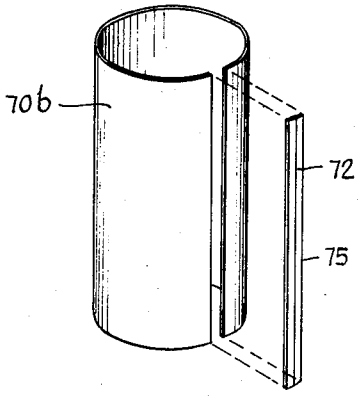
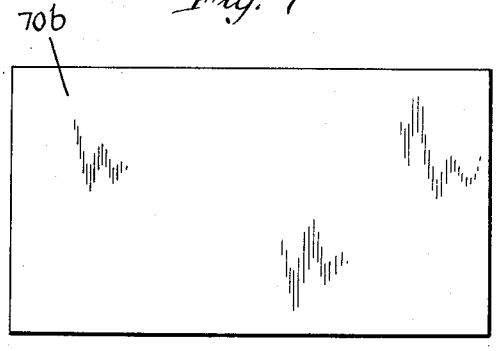


Fig. 7



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APPARATUS FOR SALVAGING METAL FROM CANS

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Application February 15, 1951, Serial No. 211,125

5 Claims. (Cl. 164—61)

The present invention relates to apparatus for dismantling metallic containers or cans for reclamation thereof and especially for performing the cutting operations during such dismantling.

Many commodities, such as canned fruits, vegetables, beverages, etc., are packed and shipped in metallic containers or cans which, after being opened and the contents thereof removed, are considered as valueless and are discarded. In some cases where considerable quantities of cans are used, some efforts are expended to save them for sale as junk. In these cases, however, the cans saved would occupy so much storage space if they were allowed to remain in cylindrical form that they are normally bent and flattened by any convenient means so as to be more compact and require less space. As a result, the cans are so distorted and bent that they are unfit for any further use except to be crushed and used as raw materials for a completely new cycle of fabricating processes.

It is a purpose of the present invention to provide for apparatus to cut the metallic containers, or cans, in such a manner that the major portion thereof may be readily reclaimed.

It is a further purpose of the present invention to provide for apparatus to cut the cans in such a manner that the portions to be reclaimed will lie flat and occupy less storage space.

It is a still further purpose of the present invention to provide for apparatus to cut the cans in such a manner that the major portion of the material thereof will have an immediate use directly without going through a completely new cycle of fabricating processes.

An advantageous feature of the present invention is the provision of a simple device capable of readily cutting and dismantling cans with a minimum of time and effort involved.

Other purposes, advantages and features of the present invention will become apparent from the following description of the preferred embodiment of the invention referring to the accompanying drawings, in which:

Figure 1 is a view in elevation of the apparatus for cutting open the body portion of the cans to be salvaged.

Fig. 2 is a fragmentary cross-sectional plan view taken on the line 2—2 of Fig. 1.

Fig. 3 is a cross-sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a view in elevation showing a cylindrical container or can of the conventional type.

Fig. 5 is an exploded view of the can shown in Fig. 4 with the ends removed.

Fig. 6 is a perspective view showing the manner of cutting and removing the seam portion.

Fig. 7 shows the flattened body portion of the can.

In the embodiment of the invention shown in the drawings, the container cutting apparatus **10** is driven by a motor **12** mounted as by bolts upon a stand or base **14**. A motor shaft extends from the motor and has mounted thereon a driving pinion **16** which is secured thereto by any convenient means such as a set screw **18**.

If desired, the motor **12** may be replaced by a crank or a handle and the driving pinion **16** may be rotated manually, but such requires considerably more dexterity on the part of the operator and has been found to be more time consuming. However, such modification is possible and does exist and, where merely a small quantity of containers are to be run through the cutting apparatus **10**, is found to be preferable to the motor driven type. In

such a case, the handle should be positioned so as to be convenient for the use of the operator.

A container positioning and cutting frame **20** is mounted upon the base **14** and has a shaft **22** rotatably mounted therein by means of bearings **24, 24**. A gear **26** is mounted on shaft **22** and is secured thereto as by a set screw **28** and meshes with driving pinion **16** so as to be driven thereby.

A worm gear **30** is secured to shaft **22** by any desired means, such as a set screw, so as to rotate therewith and meshes with worm wheels **32, 34** located above and below the worm **30**. These worm wheels **32, 34** are mounted for rotation upon shafts **36, 38** spaced from and positioned at right angles to the worm shaft **22**. Sprocket wheels **40, 42** are mounted on shafts **36, 38** so as to rotate therewith.

The frame **20** extends outwardly in a direction away from motor **12** and has an upper arm **19** and a lower arm **21** which provides supports for rotatable shafts **44, 46** respectively, said shafts being mounted to extend parallel to shafts **36, 38**. Sprocket wheels **48, 50** of the same size and number of teeth as sprocket wheels **40, 42** are secured to shafts **44, 46** as by set screws, and sprocket chains **52, 54** are looped around sprocket wheels **40, 48** and **42, 50** respectively, in driving connection.

Consideration of Figs. 1 and 2 will reveal that the shafts **44, 46** may be driven at equal speeds by motor **12** through the described gear train and sprocket mechanism.

As shown in Figs. 1 and 3, cutting members **56, 56** are mounted on the upper shaft **44** and are secured thereto to rotate therewith. The cutting members **56, 56** are separated by a spacing member or flange **58** so as to present two spaced cutting edges.

A feed wheel or roller **60** is mounted on the lower shaft **46** and is secured thereto to rotate therewith. The thickness and size of the feed wheel **60** is such that its outer edges enter snugly between the cutting members **56, 56** so as to form a pair of shearing members therewith. The periphery of the feed roller may be coined or knurled or otherwise scored to give it a better gripping surface, for purposes to become apparent hereinafter.

The spacing member **58** and the feeding roller **60** may be made in sets of various thicknesses and it is apparent that the distance between the shearing surfaces may thus be preselected for any desired width. The faces of the feed rollers should be ground smooth so as to cooperate more accurately with the sharpened edges of the cutting members **56, 56**.

In Fig. 4 is shown a cylindrical receptacle C of the conventional type comprising a body portion **70** which is rolled into its cylindrical shape and the edges are rolled, overlapped or butted and welded, or soldered, or otherwise joined to form a tight lengthwise seam **72**. Circular discs or end members **74** close the top and bottom of the cylindrical body portion **70** and in such a fashion the container C is formed.

The first step in the dismantling of the can is the removal of the end members **74**, which operation may be performed by any of the well known cutting devices on the market which are capable of cutting off the entire top and bottom of the can. The result of this first step is shown in Fig. 5 and the remaining body portion **70*a*** now has become an open, hollow cylindrical member. It is on this form of the container that the apparatus of the present invention is best suited to function.

The body portion **70*a*** is fed into the bite or nip of the cutting members **56, 56** and the feed roller **60** so that the lengthwise seam **72** lies between the cutting edges. The coined or knurled face of the feed roller immediately seizes the edge of the can which is then drawn into the body of the cutting apparatus and the seam **72** is cut out along with a narrow segment of the adjacent body portion in the form of a narrow strip **74**, as shown in Fig. 6.

The remaining portion **70*b*** is thus freed of the seam **72** as well as the end portions **74** and may be easily rolled out flat by any desired machine which can be made of a series of rollers like a wire straightener. The rolled out flattened body portion **70*b*** is shown in Fig. 7.

The flat pieces **70*b*** may then be passed through washing or scrubbing devices in a continuous cleaning process.

If desired, soaps or detergents may be used, or brushes and a spray treatment, to clean the pieces. The nature of the cleaning will, of course, vary as to the nature of the former contents of the can. When clean, the flat pieces may be reused as desired and are not limited to use for making other cans.

In some cases it has been found advisable to position an idler guide roller **76** in front of and in alignment with the feed roller **60** so as to assist in the presentation of the body portion **70***b* to the cutting wheels. If desired, this guide wheel may be positioned in alignment with the cutting wheels, or may even be driven in positive fashion to assist in the positioning and cutting.

The body portion **70***a* is illustrated in Figs. 1 and 3 as being presented around the upper arm **19** of the frame **20** but it is to be observed that the body portion could be presented around the lower arm **21** of the frame **20**, as desired. The sizes of the arms **19** and **21** determine the minimum diameter of can which may be dismantled and reclaimed and the preferred apparatus illustrated in the drawings will accommodate cans from a #2 size (2½ cups) up to a #10 size (13 cups). However, such is to be considered as merely illustrative of the present invention and not limitative thereof, and the invention could be applied to cans of the 8 oz. size, or smaller, if desired, or necessary.

An opening **80** may be provided in the bottom of the arm **21** to permit the cut strip **75** to fall therethrough and be collected in a receptacle and disposed of as junk for any desired purpose.

It is not essential that the cutting elements be driven, although such is preferable. It has been found that stationary cutting elements could be used in lieu thereof, provided the coined or scored peripheral edges of the feed wheel possesses sufficient gripping action on the cylindrical surface of the can to force it past the cutting elements to accomplish the required shearing action.

The invention is not to be considered as limited to use with cylindrical containers but also finds use with containers having cross sections which are oblong, rectangular, oval, or any similar shape.

Other variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. In apparatus of the character described for removing a longitudinal strip from a tubular member, a cutting device comprising an elongate supporting means, a pair of cutting wheels mounted at the end of said supporting means to rotate with their cutting edges in planes extending axially of said supporting means, means to separate said cutting wheels by a predetermined distance to form a space therebetween, a rotatable feed wheel having a thickness to enable entry of said wheel into the space between said cutting wheels, supporting means mounting said feed wheel to extend between said cutting wheels, at least one of the supporting means and wheel carried thereby being of a size to pass longitudinally through the tubular member, means to drive said cutting wheels and feed wheel, said drive means being so mounted on said supporting means and connected to the wheels as to leave the space between said supporting means unobstructed, said feed wheel having a roughened gripping surface to advance and feed the member to be cut and said wheel having side surfaces to cooperate with said cutting wheels to cut the member, whereby the member being advanced and fed has cut out of and removed therefrom a longitudinal strip of a width equal to the spacing between said cutting wheels.

2. In a salvage apparatus for cutting the lengthwise seam out of a can, a cutting device comprising a support, a pair of cutting elements carried by the support to rotate with their cutting edges in planes extending axially of said support, means to separate said cutting elements by a predetermined distance to form a space therebetween having a greater width than said seam, a second support in spaced parallel relation with said first support, and a rotatable feed wheel mounted on said second support and having a thickness permitting entry thereof into the space between the cutting elements, at least one of said supports and elements carried thereby being of a size to pass longitudinally through the can, said wheel having a gripping surface roughened to advance and feed the cylindrical body portion of a can between said feed wheel and said cutting elements with the lengthwise seam thereof extending into said space and said wheel having side surfaces to cooperate with said cutting elements in shearing relationship, means to drive said cutting elements and wheel, said drive means so mounted and connected to the means driven as to leave the space between said supports unobstructed, whereby the lengthwise seam is advanced into said space and will be cut out of and removed from the cylindrical body portion of the can in the form of a strip equal to the space between the cutting element.

3. In salvage apparatus for cutting the lengthwise seam out of a can, an elongate support, a cutting device comprising a pair of cutting elements located at the end of said support to rotate with their cutting edges in substantially parallel planes extending axially of the support, means to separate said cutting elements by a predetermined distance to form a space therebetween having a greater width than said seam, a second support in spaced parallel relation with said first support, a rotatable feed wheel mounted on said second support and having a thickness permitting entry thereof into the space between said cutting elements, at least one of said supports and the elements carried thereby being of a size to pass longitudinally through the can, means to guide the cylindrical body portion of a can over said support and between the feed wheel and said cutting elements, said feed wheel having a scored peripheral surface to grip and advance the cylindrical body portion of a can between said feed wheel and said cutting elements with the lengthwise seam thereof extending into said space and having side surfaces to cooperate with said cutting elements in shearing relationship, means to drive said cutting elements and wheel, said drive means so mounted and connected to the means driven as to leave the space between said supports unobstructed, whereby the lengthwise seam being advanced into said space will be cut out of and removed from the cylindrical body portion of the can in the form of a strip having a width equal to the spacing between said cutting elements.

4. In salvage apparatus for cutting the lengthwise seam out of a can, an elongate support, a cutting device comprising a pair of rotatable cutting elements located at the end of said support to rotate with their cutting edges in substantially parallel planes extending axially of the support, means to separate said cutting elements by a predetermined distance to form a space therebetween having a greater width than said seam, a second support in spaced parallel relation with said first support, a rotatable feed wheel mounted on said second support and having a thickness permitting entry thereof into the space between said cutting elements, drive means carried within the supports to rotate said feed wheel and said cutting elements and leave the space between said supports unobstructed, at least one of said supports and the elements carried thereby being of a size to pass longitudinally through the can, and means to guide the cylindrical body portion of a can along the support and between the feed wheel and said cutting elements, said feed wheel having a scored peripheral surface to grip and advance the cylindrical body portion of a can between said feed wheel and said cutting elements with the lengthwise seam thereof extending into said space and said wheel having side surfaces to cooperate with said cutting elements, whereby the lengthwise seam being advanced into said space will be cut out of and removed from the cylindrical body portion of the can in the form of a cut strip having a width equal to the spacing between said cutting elements.

5. In salvage apparatus for cutting the lengthwise seam out of a can, an elongate support, a cutting device mounted at one end of said support and comprising a pair of power driven rotatable cutting wheels having their cutting edges rotating in substantially parallel planes extending axially of the support, means to separate said cutting wheels by a predetermined distance to form a space therebetween having a greater width than said seam, a second support in spaced parallel relation with said first support, a power driven rotatable feed wheel mounted at one end of said second support and having a thickness slightly less than the space between said cutting wheels to enable entry thereof between said cutting wheels, the power means for driving the cutting wheels and feed wheel rotating said cutting wheels and the feed wheel at equal speeds and including connecting means extending along the supports as to leave the space between said supports unobstructed, at least one of said

supports and the elements carried thereby being of a size to pass longitudinally through the can, and means to guide the cylindrical body portion of a can over the support and between the feed wheel and said cutting wheels, said feed wheel having a scored peripheral surface to grip and advance the cylindrical body portion of a can between said feed wheel and said cutting wheels with the lengthwise seam thereof extending into said space and having side surfaces to cooperate with said cutting wheels, whereby the lengthwise seam being advanced into said space will be cut out of and removed from the cylindrical body portion of the can in the form of a strip having a width equal to the spacing between said cutting wheels.

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