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APPARATUS FOR OPENING WRAPPED BUNDLES

Filed Jan. 11, 1955

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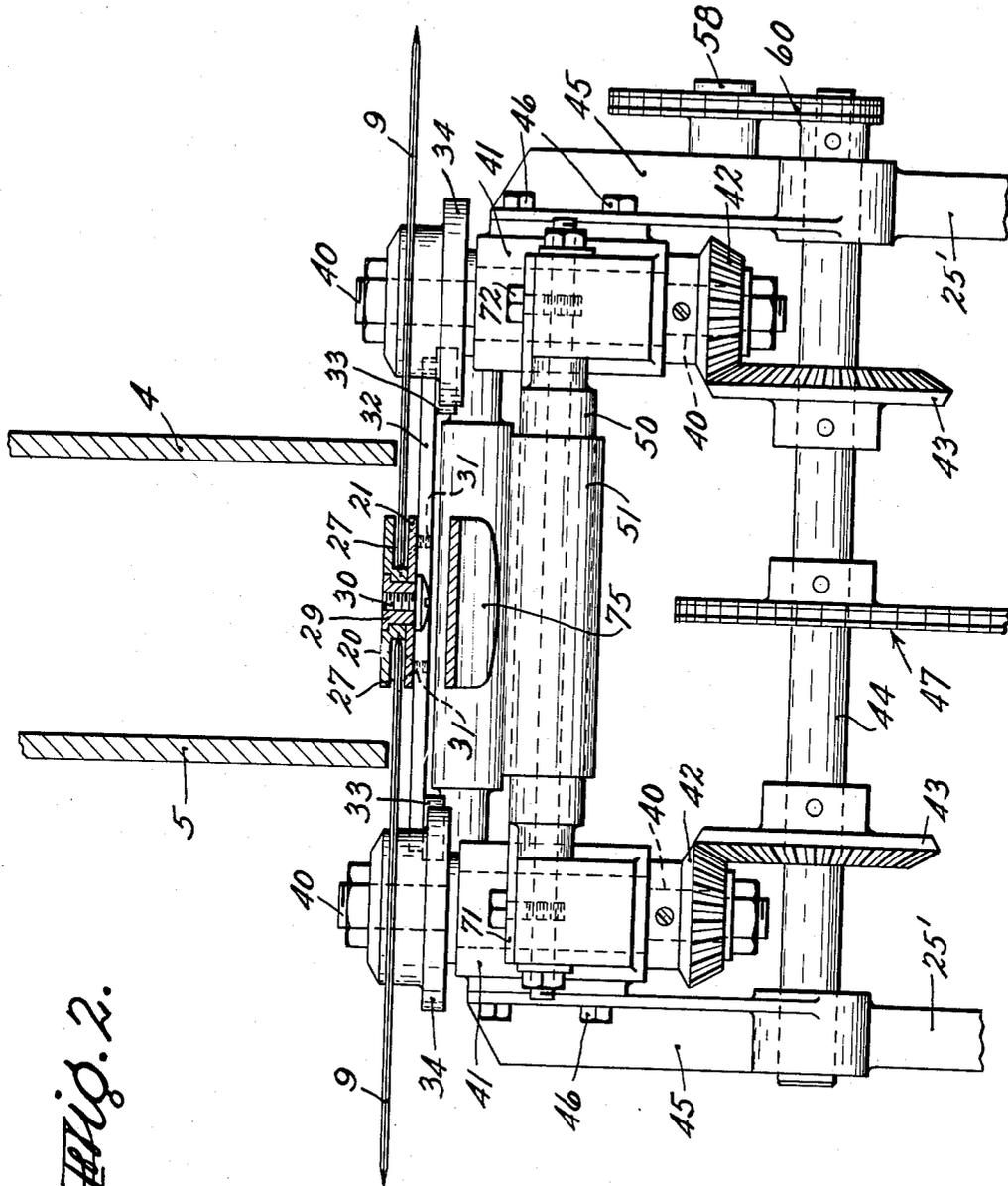


Fig. 2.

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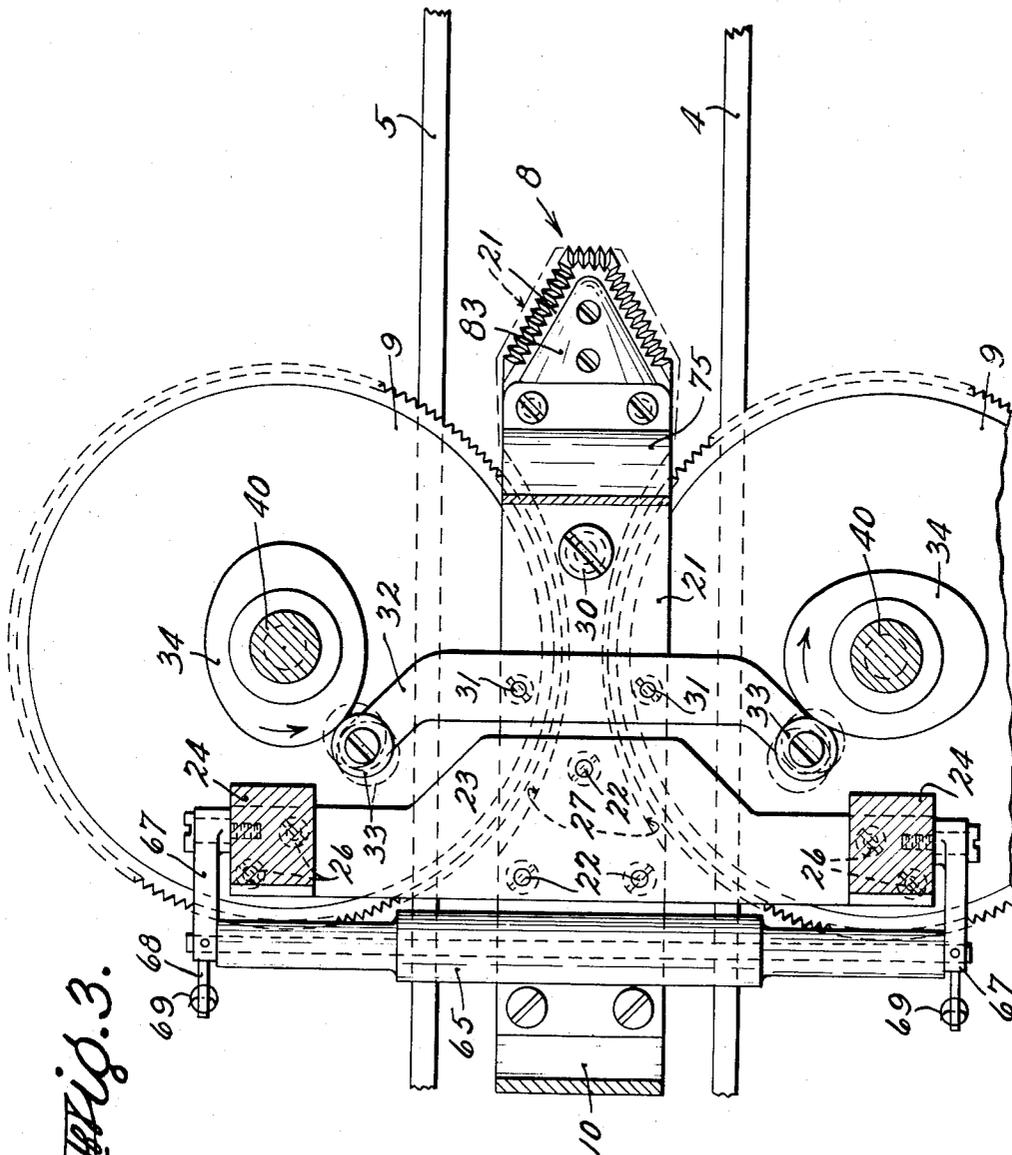


Fig. 3.

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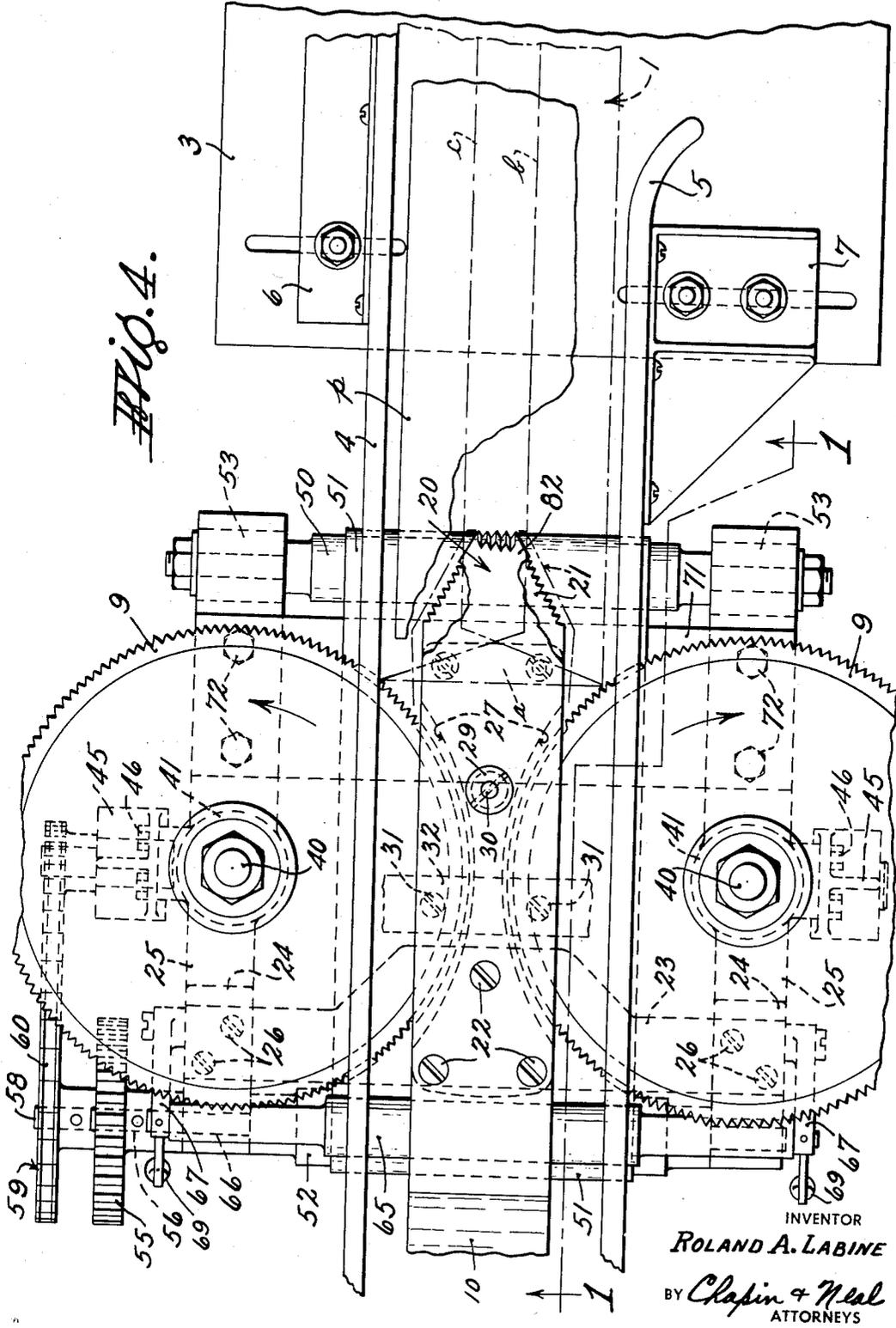
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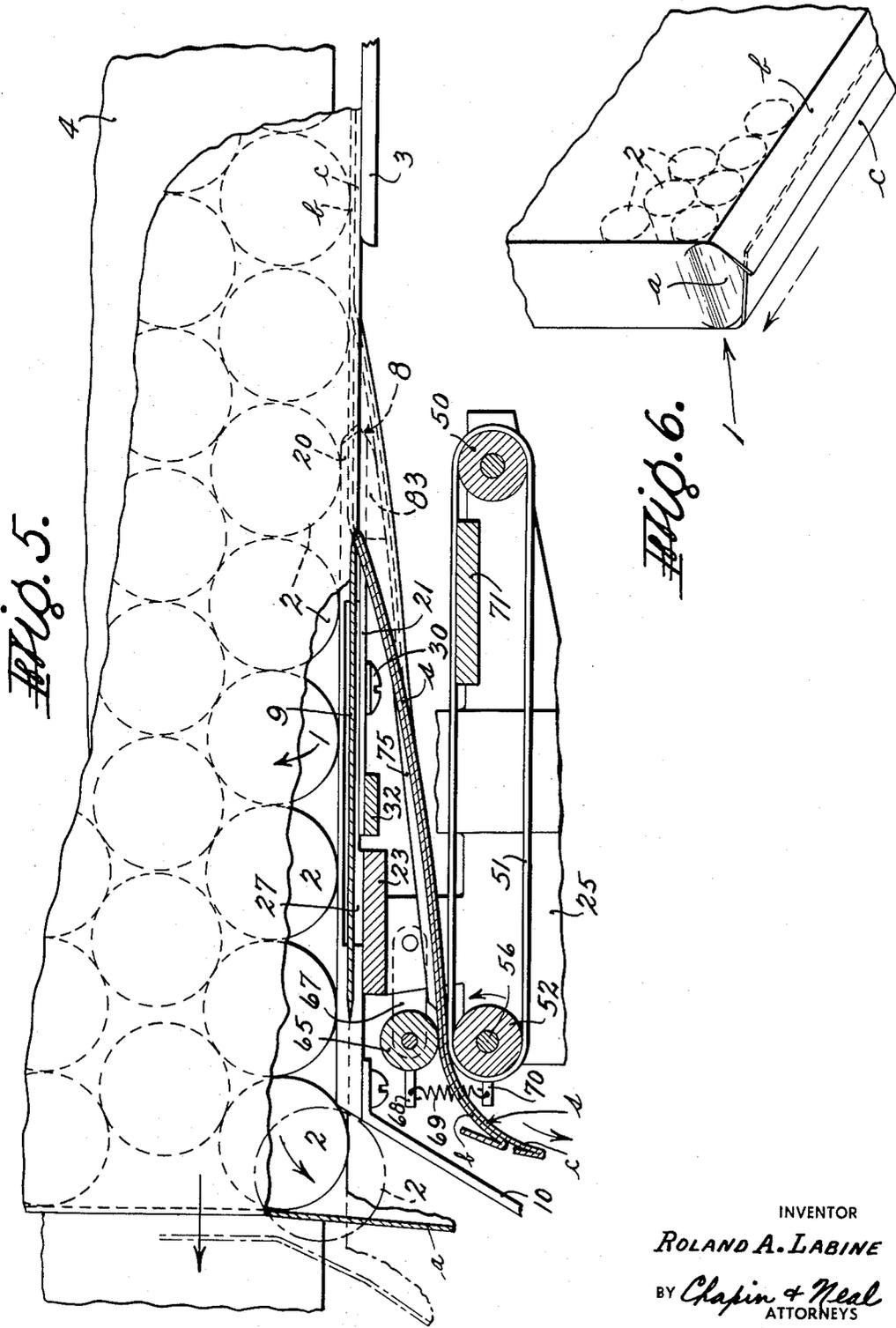


Fig. 5.

Fig. 6.

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APPARATUS FOR OPENING WRAPPED BUNDLES

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12 Claims. (Cl. 30—2)

This invention relates to a machine for opening wrapped packages or bundles of articles, such as empty cans and the like in a manner to provide for the discharge of the cans from the package in a predetermined manner as for subsequent feeding to the can line of the cannery where the cans may be processed, filled and closed, or the discharged articles otherwise treated in an orderly manner.

In the past it has been customary to ship empty cans from the manufacturer to the user in bulk, that is, stacked in tiers in the freight car, or packed in cartons or bags for handling, storage and shipment. Recently the proposal has been made to bundle cans and the like in a paper wrapper to facilitate such handling in transit from manufacturer to the cannery and in the cannery to the point of use.

It is an object of the present invention to provide apparatus to automatically open a wrapped package of such articles and more specifically to sever an edge or end wall of the package in a manner to permit a controlled discharge of the article contents from the wrapper.

Other general and specific objects and advantages of the invention will be apparent from the following description of an embodiment thereof as shown by the accompanying drawings, in which:

Fig. 1 is a side elevation, with parts in section, of the cutting head of the apparatus with drive mechanism associated therewith, and showing a can bundle advancing towards the same (see also line 1—1 in Fig. 4);

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 1 to show the drive for oscillating movement of a lower member of the wrapper stripping means;

Fig. 4 is a top plan with parts cut away to show the operation of a pair of cutting wheels for slitting a wrapper wall;

Fig. 5 is a partial side elevation similar to Fig. 1 and showing a bundle passing over the apparatus; and

Fig. 6 is a perspective view of a corner of a wrapped bundle as may be particularly adapted for use with the machine of this invention.

In Fig. 1 the cutting head and associated parts of the apparatus are shown in what may be termed the opening zone of the machine. A bundle 1 of cans 2 is shown at the infeed end or entrance thereto as from the end of any suitable conveyor mechanism or from the end of a delivery platform such as indicated at 3. The edge of platform 3 terminates adjacent the opening zone, as shown by Figs. 1 and 4, and may provide the support for a vertical back panel or guide 4 against which the bundle may be appropriately placed and passed endwise into the machine. The platform 3 may also conveniently support a vertical front wall 5 (Fig. 4) extending from the edge of the platform 3 to the other end of the machine. Thus a rectangular bundle 1 such as is indicated by Fig. 6 may be deposited on the platform 3, set against the back guide 4 and slid endwise into the opening zone between the walls 4 and 5. Suitable brackets 6 and 7,

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respectively may be provided for adjustably mounting the walls 4 and 5 for bundles of different widths.

As the bundle is moved past the edge of the platform 3 the leading lower corner of the bundle 1 is presented to the front end of an elongated cutting plow element 8 so that, upon forward movement of the package, the front end of the plow may cut and tear its way into the wrapper as at a corner fold at *a* and between the lowermost row of cans and the overlapped end edge folds of the bundle wrapper as shown at *b* and *c* (see Fig. 6 and Fig. 1).

Referring to Fig. 5 it will be seen that as the package is advanced the element 8 continues to plow its way between the lowermost row of cans of the bundle and the adjacent wrapper wall so as to tension the wrapper. When the latter is severed, as will be later described in detail the cut bottom panel or strip of the bundle wrapper as at *s* is deflected below the cutter head. The strip *s* is severed from the wrapper by the slitters or cutting wheels 9 positioned at each side of the opening channel and rotating against the path of the moving bundle (see Fig. 4). The strip *s*, as shown by Fig. 5 may be conveyed forwardly as by a takeoff mechanism below a discharge apron, carried on the cutter head as at 10, for disposal as desired. The cans of the bundle are released by gravity from the opened side wall of the bundle as the bundle contents are progressively conveyed to the discharge apron 10. From the apron 10 the cans may be deposited into any suitable chute, passageway conveyor or receptacle for suitable disposition as desired by the user.

The element 8 as shown comprises two members, an upper elongated stationary member 20 having an upper article bearing surface and a lower oscillating member 21.

The upper stationary member is fixed as by screws 22 to the central portion of a frame cross piece 23 extending between a pair of upstanding rear portions 24 of a pair of spaced frame members 25. The cross piece is fixed to the portions 24 by screws 26.

As best shown by Figs. 1, 2 and 4 the undersurface of the upper member is recessed or undercut at 27 at each side thereof to receive the edges of the toothed cutting disks or wheels 9. Below the plane of the wheels 9 and pivotally carried on a shouldered bearing sleeve 29 is the oscillating lower member 21 pivotally held on the bearing sleeve 29 and against the undersurface of member 20 by a pivot pin 30 threaded in sleeve 29. As shown by Figs. 1 and 5 the lower member 21 extends from the leading tip end of the upper member to a position rearwardly of the pivot pin 30 and forwardly of the cross piece 23. At its rear end the member 21 has fixed thereto, as by mounting screws 31, a cam follower arm or bar 32. Bar 32 (see Fig. 3 and Fig. 2) extends laterally of the element 8 and at each end is angled rearwardly and fitted with a cam follower roll 33 for contact with a cam member 34. Cams 34 are of identical formation and angularly set with respect to each other for the rapid oscillation of bar 32 and the oscillation of the lower member 21 on its pivot 29.

Cams 34 are mounted on oppositely located spaced vertical shafts 40 positioned at each side of the head. Shafts 40 also carry the cutter wheels 9 in spaced relation above the cams. The shafts are journaled (Fig. 2) in a pair of vertical bearings 41 formed in the frame members 25 and at their lower ends are fixed bevel gears 42 in mesh with oppositely facing driving gears 43. Thus the gears 42 are oppositely rotated for opposite rotation of the cutters 9 at each side of the package and in a direction opposed to the path of the package.

The oppositely faced gears 43 are fixed (Fig. 2) on a main drive shaft 44 extending between and journaled in spaced frame supports 45. These frame supports 45 are

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mounted with frame members 25 in laterally spaced positions with the members 25 bracketed to supports 45 as by bolts 46 (see also Fig. 4). The frame supports 45 include lower mounting portions as indicated at 25' in Fig. 2. The main shaft 44 is suitably powered by a sprocket and chain drive at 47 from a motor (not shown).

As shown by Fig. 1, the frame plates 25, in addition to the bearings 41 and upstanding portions 24 previously referred to, also provide for mounting a wrapper strip take-off arrangement for effectively disposing of the severed bottom wall of the bundle wrapper. The frame plates at the front ends thereof support between them a roller 50 about which an endless belt 51 is trained, the latter at the other end of its run being trained about a roller 52 supported between the rear ends of the plates 25. Roller 50 is an idler roll and adjustable for longitudinally tensioning the belt 51 by its mounting in frame plate slots as at 53. Roller 52 is driven for movement of belt 51 from front to rear along the upper run thereof by a toothed gear wheel 55 fixed on the axle 56 which extends beyond the outer side of frame plate 25 (see also Fig. 4). Gear wheel 55 on axle 56 is in mesh with a gear 57 (see Fig. 1) on a stub axle 58 carrying at its outer end a sprocket 59 driven by chain 60 from main drive shaft 44. The take-off belt 51 is thus constantly driven from the main shaft 44.

Spring pressed against the belt 51 at the top of the roller 52 is roller 65 frictionally driven on its axle 66 which is journaled in the outer ends of a pair of rocker arms 67 (see Fig. 3). Arms 67 are pivotally mounted in the upstanding portions 24 of the plates 25. Arms 67 are held downwardly pressed by tension springs 69 hooked between extensions 68 of arms 67 and extensions 70 of the plates 25 (see Fig. 1).

The upper run of belt 51 is supported by a member 71 fixed between plates 25 as by the bolts 72 (see Fig. 4).

As shown by Fig. 5 the severed bottom strip *s* is deflected downwardly away from the bundle and the cutter head by a deflector blade 75 which may be suitably fixed to the underside of the oscillating lower member. The strip is directed onto the belt 51 which frictionally carries the end thereof under the pressure roller 65. The strip is thus carried away from under the stripping means to clear the machine for the strip of a succeeding bundle.

From Figs. 3 and 4 the extent to which the lower member 21 may oscillate is indicated by the dashed line at the fore end of the plow element. The oscillating movement is to facilitate entrance of the fore end by cutting and tearing its way into the paper material of the wrapper or between the corner fold *a* of the bundle and the overlapping folds *b* and *c* of the bottom strip shown as in Fig. 1. The fore end of lower member 21 is serrated at the tip end and along the divergently angled sides. The fore end of the upper member 20 (see Figs. 1 and 4) is also serrated at the tip. This facilitates entrance through the material of the wrapper and under the cans 2 wherever the initial contact is made against the same. In order to insure against a package riding up over the nose of the plow an upper pressure shoe may be disposed to contact the bundle top and hold the leading edge of the bundle firmly in the area of initial engagement. A shoe *p* is indicated in Fig. 4 and overlying the entrance to the opening zone.

The upper member 20 of the head is also provided with a beveled front edge portion indicated at 82 so as to lift the cans away from the adjacent wrapper wall. Thus the upper bearing surface of the stationary member supports the bundle contents while the lower front deflector hood as at 83 serves to stretch the lower wrapper wall and tension the adjacent wrapper surfaces for a clean and efficient cutting action by the wheels 9 (see Fig. 5).

The cutting members as the wheels 9 preferably cut outwardly against the advancing bundle and insure a slashing action for a clean cut and insure as well that the wrapper will be hit by the knives at the corners of

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the bundle. The serrated edges at the fore end of the cutting plow, of course, also serve to break out of the corner fold at the trailing end of the bundle wrapper wall.

In handling bundles of cans in this manner the empty cans preferably are arranged within the wrapper as indicated by Fig. 5 with the cans of one row in staggered relation to the cans of a next adjacent row and the open tops of all cans facing in the same direction. The package is preferably provided with indicia indicating the side against which the open tops of the cans are disposed so as to secure the desired orientation of cans as they are discharged from the bundle at the exit end of the opener.

What is claimed is:

1. In apparatus for opening wrapped packages, the combination of a support having a surface over which a package is adapted to be advanced with one wrapper wall in contact therewith and cutting means substantially in the plane of said surface and mounted in the path of advance of the package to engage and sever the so-engaged wrapper wall as the package moves over said cutting means to open the package and release the contents from the constraint of said wrapper wall.
2. In apparatus for opening a wrapped bundle of articles the combination of a wrapper stripping means for insertion between a wrapper wall and the contents of a wrapped bundle and cutting means for severing said wrapper at each side of said stripping means.
3. The combination of claim 2 wherein said cutting means comprises a pair of members movable in a path counter to the direction of movement of a wrapped bundle over said stripping means.
4. In apparatus for opening a wrapped bundle of articles, a passageway for advancing a bundle to be opened and at the bottom of said passage a wrapper stripping element extending longitudinally of the passage, said element comprising an upper stationary member formed with a beveled front end, and a lower member having a fore end portion underlying the beveled front end of the upper member with the leading edge of said lower member being serrated, means for oscillating the fore end of said lower member to puncture a bundle wrapped wall presented thereto, said stripping element upon insertion between the bundle contents and a wrapper wall causing said contents to ride on the upper surface of the stationary member, and means to slit a wrapper panel laterally of said stripping element.
5. In apparatus for opening a wrapped bundle of articles the combination of an elongated stripping element having an upper bearing surface for supporting the contents of a bundle when said element is inserted along the inside of one of the walls of a bundle wrapper to force the latter away from said contents, and cutting means comprising a pair of rotatable cutting wheels at opposite sides of said stripping element, said wheels lying in a plane offset below the plane of said upper bearing surface, and means to rotate said wheels in a direction counter to the direction of movement of a wrapped bundle passing over said stripping element.
6. In apparatus for opening a wrapped bundle of articles the combination of an elongated stripping element with an upper bearing surface and including a member having an oscillating movement at the front end of said element, a pair of cutting wheels rotatable in a plane offset below the said bearing surface, one wheel at each side of said stripping element, and driving means for imparting rotary movement to said wheels, said driving means including cam operated means connected to said member for imparting oscillatory movement thereto.
7. In apparatus for opening a wrapped bundle of articles, an elongated stripping element for insertion between a wrapper wall and the contents of a wrapped bundle, cutting means for severing said wrapper at each side of said stripping element, and means below the

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stripper element for removing the severed portion of the wrapper.

8. In apparatus for opening a wrapped bundle of articles, an elongated stripping element for insertion between a wrapper wall and the contents of a wrapped bundle, cutting means for severing said wrapper at each side of said stripping element, said stripping element including a deflector at the underside thereof for guiding a cut wrapper wall strip below said element, and strip takeoff means for removing a cut strip from underneath said stripping element.

9. In apparatus for opening a wrapped bundle of articles, an elongated stripping element having an upper horizontal stationary member, and a movable lower member with the front end of the latter underlying the said stationary member at its fore end, said element being adapted for insertion between a wrapper wall and the contents of a bundle, a pair of spaced cutting wheels, each wheel being mounted on a vertical drive shaft laterally at each side of said element with said wheels oppositely being driven in a direction counter to the path of a bundle moving past said element, a cam on each of said vertical shafts with said movable member having a cam follower arm extending between said shafts and the ends thereof in operative contact with said cams whereby oscillatory movement may be imparted to said movable member, an endless strip conveyor belt spaced below said stripping element between said shafts for receiving a cut wrapper strip, and a spring pressed roller engaging said endless belt below the rear end of said stripping element for carrying a cut strip from underneath said element.

10. In apparatus for opening a wrapped bundle of articles, an elongated stripping element adapted for insertion between the article contents of a wrapped bundle and a wrapper wall and comprising an upper stationary member and a lower oscillating member pivotally carried at the underside of said stationary member intermediate

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the front and rear ends thereof and cutting means comprising a pair of rotatable cutting wheels one at each side of said element, said stationary member having a pair of recesses formed in the side edges thereof laterally of longitudinal center line of said member with each cutting wheel extending into an adjacent recess, means to drive said wheels including cam means for driving said oscillating member, and a follower arm fixed to the oscillating member with the ends thereof in operative contact with said cam means.

11. The structure of claim 10 in which a downwardly and rearwardly extending strip deflector plate is fixed to said oscillating member adjacent the front end thereof forwardly of the pivotal connection with said stationary member, and said follower arm is fixed to the oscillating member rearwardly of said pivotal connection, said strip take-off means being located in vertical spaced relation below said stripping element for disposal of a cut strip rearwardly of said element.

12. In apparatus for opening wrapped packages, the combination of a support over which a package is adapted to be advanced with one wrapper wall in contact therewith, means in the path of the advance of the package to sever the so-engaged wrapper wall from the balance of the wrapper, means to direct the severed wrapper wall downwardly away from the package, means to support the exposed articles in the package until the latter is advanced beyond the cutting means and a downwardly inclined guide at the forward end of said article supporting means to effect an orderly sequential gravity discharge of the articles from the package.

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