This invention is concerned with a can opening mechanism and it is a general object of the invention to provide an improved, dependable structure operable to open a can by cutting away the top thereof, together with the bead that joins the top with the side wall.

This invention is more particularly concerned with improvements in can openers of the general type set forth and claimed in my co-pending application entitled "Device for Removing the Ends of Cans," Serial No. 710,725, filed November 18, 1946.

In the can opener which is the subject of the above-identified co-pending application there is a shear member that cuts the side wall of the can immediately beneath the top bead and the can is advanced relative to the shear by a feed wheel which rotates and which engages the bead, preferably at the inner side thereof. The present invention is concerned with providing a structure whereby an effective driving or frictional engagement is maintained between the feed wheel and the bead of the can so that slippage does not occur in the course of operating the mechanism.

A general object of the present invention is to provide a can opening mechanism of the general character referred to including a shoe that cooperates with the feed wheel to the end that the bead of the can is effectively gripped and engaged by the feed wheel so that no slippage occurs between the wheel and the can as the mechanism operates.

Another object of the present invention is to provide a shoe of the general character referred to which establishes a resilient gripping engagement of the feed wheel with the bead of the can which engagement effectively accommodates itself to variations or irregularities in the bead of the can.

It is another object of the invention to provide a mechanism of the general character referred to including a yielding or resilient pressure shoe opposed to the feed wheel so that the bead of the can is gripped between the shoe and wheel which shoe is of simple, inexpensive construction and is at the same time effective and dependable in operation.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a view illustrating a can opening mechanism embodying the present invention, showing it mounted in a typical manner on a suitable support and showing a can applied thereto ready for operation of the mechanism.

Fig. 2 is a longitudinal vertical sectional view of the mechanism embodying the present invention showing a can in place ready for the mechanism to be operated. Fig. 3 is a detailed sectional view taken as indicated by line 3—3 on Fig. 2, being a view showing the parts before operation has been initiated and showing a can in position ready to be gripped and being a view showing the formation and arrangement of the shoe which embodies the present invention.

Fig. 4 is a view of the mechanism taken as shown by line 4—4 on Fig. 2, showing the mechanism in the course of operation, with the feed wheel opposite the shoe and the bead of the can gripped between the shoe and the wheel. Fig. 5 is a plan section taken as indicated by line 5—5 on Fig. 2, showing the mechanism provided for operating the feed wheel relative to the shoe. Fig. 6 is a view similar to Fig. 5 showing the parts in a different operative position. Fig. 7 is an enlarged view similar to a portion of Fig. 2 and illustrating the shoe in side elevation. Fig. 8 is a view similar to a portion of Fig. 7 showing the shoe in section.

The structure provided by my present invention is particularly applicable to a can opener mechanism designed to operate on a can having a top joined to the side wall by a bead and in which a rotating feed wheel engages the bead to advance the can in the mechanism. In the drawings I have illustrated the invention as applied to this type of mechanism and more specifically I have shown it incorporated in the form and type of mechanism which is the subject of my above-mentioned co-pending application.

The mechanism including the present invention may be mounted or handled in various manners. In the case illustrated it is shown with its body A provided with an extension 10 pivotally connected to a suitable support 11 by a bracket 12.

The mechanism is such as to act upon a can X having a top 13 joined to a side wall 14 by a bead 15. The mechanism as shown in the drawings involves, generally, a plate-like body A, a shear member B, a feed member C, operating means D for the feed member, a pressure shoe E and means F effecting relative movement between the feed member C and the shoe E and between the feed member and the shear B so that these elements' shift relative to each other between an open position where the bead 15 of the can may be introduced between the shoe and
the feed member and a closed position where the bead of the can is engaged by the shoe and the feed member while the shear is in position to cut the side wall of the can immediately beneath the bead. In the particular mechanism illustrated the shear member B and the shoe E are carried by the body A so that they are maintained in a fixed position while the feed member C is readily adjustable and through the means P shifts relative to the shoe and also relative to the shear member B.

The body A in its preferred form is preferably a base plate to which the other parts of the mechanism are connected or on which they are mounted and in the form shown there is an elongate plate disposed substantially horizontally when in operating position, as shown throughout the drawings. The shear member B is carried by the plate at or below the lower side 17 thereof and it is such as to present a shearing edge 12 that acts upon the side wall 14 of the can X. In the case illustrated the shear member B is a round flat member or disc and the edge 18 is established where the periphery 19 of the disc joins the top 20 thereof. As shown in the drawings the periphery 19 is somewhat tapered so that the disc is larger at its upper end than at its lower end and the top 20 adjacent the edge 18 is pitched or inclined somewhat so that the edge 18 is formed by parts that are at substantially 90° relative to each other.

The shear member B is mounted on or from the body A so that it is located a suitable distance below the lower side 17 of the body and in the case illustrated it is shown carried by a pivot 21 which has a bearing portion 22 on which the shear disc B rotates. A head 23 on the lower end of the part 22 retains the disc on the pin and a shank 24 projects upwardly from the bearing part 22 and threads into an opening in the body A. The shoe E provided by the present invention which will be later described in detail is preferably mounted on or carried by the pin 21 and is located between the shear disc B and the lower side 17 of the body A, as clearly shown throughout the drawings.

The feed member C is preferably a wheel or rotatable member supported by or on the plate at the under side thereof and it has a toothed periphery 25 which when the mechanism is operating is opposite the shoe E. In the preferred arrangement the feed wheel C is located outward of the shear member or toward the outer end of the body A from the shear member and it is carried by a shaft 30.

The shaft 30 forms a mounting or support for the feed wheel and is a vertically disposed shaft supported by or through the body A. An operating handle 34 is fixed to the upper end of shaft 30 at the top side of the body A and provides a means by which the shaft can be readily rotated. In the particular case illustrated the feed member C involves a wheel portion 32 which is threaded onto the lower end of shaft 30 while the handle has a hub portion 33 in which the upper end portion of the shaft is fixed.

In the mechanism being described the feed wheel 32 with its toothed periphery is shiftable between a released position where it is removed from the shoe E and which is shown in Fig. 3 and an operating position where it is opposite the shoe E and cooperates therewith, as shown in Fig. 4. To effect such shifting of the feed wheel the shaft 30 which supports the feed wheel is not only rotatable but is shiftably carried by the body A. In the case illustrated the opening 31 provided in the body A to carry the shaft 30 is an elongate slot or slot with its inner end portion 38 opposite the shoe E while its outer end portion 39 is outward of and remote from the shoe E.

The means P effects relative movement between the feed wheel or the shaft that carries the feed wheel and the shoe E and therefore between the feed wheel and the shear member as operation of the mechanism is initiated. The means P is a cam means that moves the shaft 30 through or in the slot 37. In the form illustrated the means P involves a cam disc 40 fixed to the hub 33 of the operating handle 34 and located at the upper side of body A. An abutment or pin 41 projects upwardly from the body A and cooperates with the cam 40. The cam has a periphery 42 which is generally concentric with the axis of the shaft 30 and it has a curved notch 43 that enters it from its periphery.

When the handle 31 is rotated backwards or is returned to an unactuated position such as is shown in Figs. 1 and 2 of the drawings the cam 40 and pin 41 are moved relative to each other so that the pin enters the notch 43 and through this cooperative engagement the shaft 30 is moved outward in the slot 37 to the outer end of the slot where the feed wheel is removed from the shoe E. As operation of the handle 31 is initiated in a forward direction, that is, in the direction indicated by the arrow in Fig. 6, the pin 41 moves out through the notch 43 causing shifting of the shaft 30 to the inner end of slot 37 following which the shaft 30 is maintained at the inner end of the slot 37 while the handle 31 continues in rotation turning the feed wheel 32 while it is in engagement with the bead of the can.

The pressure shoe E provided by the present invention establishes an abutment opposite the feed wheel 32 when the feed wheel is at the inner end of slot 31 and thereafter, as the shear member cuts the side of the can E, the feed wheel cooperate to maintain a tight feeding engagement with the bead 15 of the can. The engagement established by means of the shoe E is preferably a resilient or yielding engagement such as to accommodate irregularities that may occur in the bead of the can.

The shoe of the present invention involves, generally, a pressure plate 60 supported by means of a holder 61. In the case illustrated the pressure plate 60 is yieldingly supported from the holder through or by means of suitable resilient arms 62.

The pressure plate 60, as shown in the drawings, may be an elongate part extending beneath the body A and it may have a curved or concaved pressure face that conforms, generally, to the contour of the bead 15 of the can.

The holder 61 may be a washer-like member located between the shear member B and the body A. In the form illustrated the holder 61 is held tight between the bottom side 17 of the body and the shoulder 65 that occurs on the pin 21 where the bearing part 22 joins the shank 24. The holder 61 thus forms a spacer which enables the pin 21 to be screwed tightly to the body A while the shear disc is supported to rotate freely on the pin.

The resilient support of the plate 60 is gained through the arms 62 which are spring arms. The arms 62 project from or are provided on
the ends of the plate 60 and they are held by the holder 61. In the particular case illustrated the arms 62 are curved parts projecting from the ends of the plate 66 and are curved away from the feed wheel 92 and toward the holder 61 so that they have opposed ends which enter notches 65 in the sides of the holder 61. The notches 65 are opposite each other at opposite sides or edges of the holder 61 and are of such depth as to adequately accommodate the opposed ends of the arms 62 as clearly shown in Fig. 3 of the drawings. In the preferred form of the invention the plate 60 and the arms 62 with their opposed ends are formed of a continuous length of resilient material, as for instance, spring steel or the like.

The holder 61 of the shoe E is not only held or clamped tight to the body A through the construction above described, but it is preferred that means be provided for positively holding it against rotation about the axis of the pin 21. In the case illustrated in projection or lug 70 is provided on the holder 61 to enter an opening in the body A remote from the opening that receives the pin 21 as shown in Fig. 8 of the drawings.

In accordance with my present invention the shoe E is located and proportioned so that when the feed roller 32 is in operating position, as shown in Fig. 4 of the drawings, the plate 60 of the shoe E is deflected somewhat by the bead of the can toward the holder 61, with the result that the bead of the can is gripped between the shoe and the feed roller. Through this pressure or gripping engagement the teeth of the feed roller are maintained in effective engagement with the bead of the can so that as the feed roller is rotated the bead of the can is advanced between the feed roller and the shoe causing the can to advance or rotate, with the result that its side 14 is cut by the shear B immediately beneath the bead.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. An opener operable on a can having a side and a bead joining a top to the side including, a body, a shear carried by the body and adapted to engage the side of the can beneath the bead, a feed wheel carried by the body adapted to engage the inner side of the bead, and a resilient pressure shoe carried by the body, the shoe having sliding frictional engagement with the outer side of the bead opposite the feed wheel, the shoe having a concave can engaging face.

2. An opener operable on a can having a side and a bead joining a top to the side including, a body, a shear disc, a pin projecting from the body and rotatably supporting the shear disc where it is adapted to engage the side of the can beneath the bead, a feed wheel carried by the body and adapted to engage the inner side of the bead, and a shoe engaged the outer side of the bead opposite the wheel including, a holder carried in a fixed position on the body above the shear; a pressure plate with a concave face frictionally engaging the bead, and resilient arms at the ends of the plate connecting the plate and holder and forming the sole support for the plate.

3. An opener operable on a can having a side and a bead joining a top to the side including, a body, a shear carried by the body engaging the side of the can beneath the bead, a feed wheel carried by the body engaging the inner side of the bead, and a shoe engaging the outer side of the bead opposite the wheel including, a holder carried by the body and having oppositely faced notches, a pressure plate, and resilient arms on the plate with opposed ends engaged in the notches.

4. An opener operable on a can having a side and a bead joining a top to the side including, a body, a shear carried by the body engaging the side of the can beneath the bead, a feed wheel carried by the body engaging the inner side of the bead, and a shoe engaging the outer side of the bead opposite the wheel including, a holder carried by the body and having oppositely faced notches, a pressure plate and resilient arms on the plate with opposed ends engaged in the notches, the arms and plate being a continuous resilient unit.

5. An opener operable on a can having a side and a bead joining a top to the side including, a body, a shear carried by the body engaging the side of the can beneath the bead, a feed wheel carried by the body engaging the inner side of the bead, and a shoe engaging the outer side of the bead opposite the wheel including, a holder carried by the body and having oppositely faced notches, a pressure plate, and resilient arms on the plate with opposed ends engaged in the notches, the arms and plate being a continuous resilient unit.

6. An opener operable on a can having a side and a bead joining a top to the side including, a body, a shear, a pin, a resilient plate, and a resilient engaged in the side of the can, a feed wheel carried by the body engaging the inner side of the bead, a holder on the pin between the shear and body, and a resilient plate engaging the outer side of the bead opposite the wheel.
side of the bead opposite the wheel, and arm extensions of the plate supporting the plate from the holder.

10. A pressure shoe engageable with the bead of a can including a rigid flat plate-like holder applicable to a mounting pin, an elongate friction plate with a concave bead engaging face, and a resilient arm supporting the plate from the holder and spaced from an edge of the holder.

HARRY C. WILSON.

REFERENCES CITED

The following references are of record in the file of this patent:

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,008,932</td>
<td>Walther</td>
<td>Nov. 14, 1911</td>
</tr>
<tr>
<td>1,441,052</td>
<td>Andrae et al.</td>
<td>Jan. 9, 1923</td>
</tr>
<tr>
<td>1,766,109</td>
<td>Cotten et al.</td>
<td>June 24, 1930</td>
</tr>
<tr>
<td>2,070,261</td>
<td>Dazey</td>
<td>Feb. 9, 1937</td>
</tr>
<tr>
<td>2,204,368</td>
<td>Kublin</td>
<td>June 11, 1940</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>367,177</td>
<td>Great Britain</td>
<td>Feb. 18, 1932</td>
</tr>
</tbody>
</table>