Dec. 2, 1930. E. DARQUÉ 1,783,534

MACHINE FOR OPENING TINS OF CANNED GOODS

Filed May 21, 1928 3 Sheets-Sheet 1

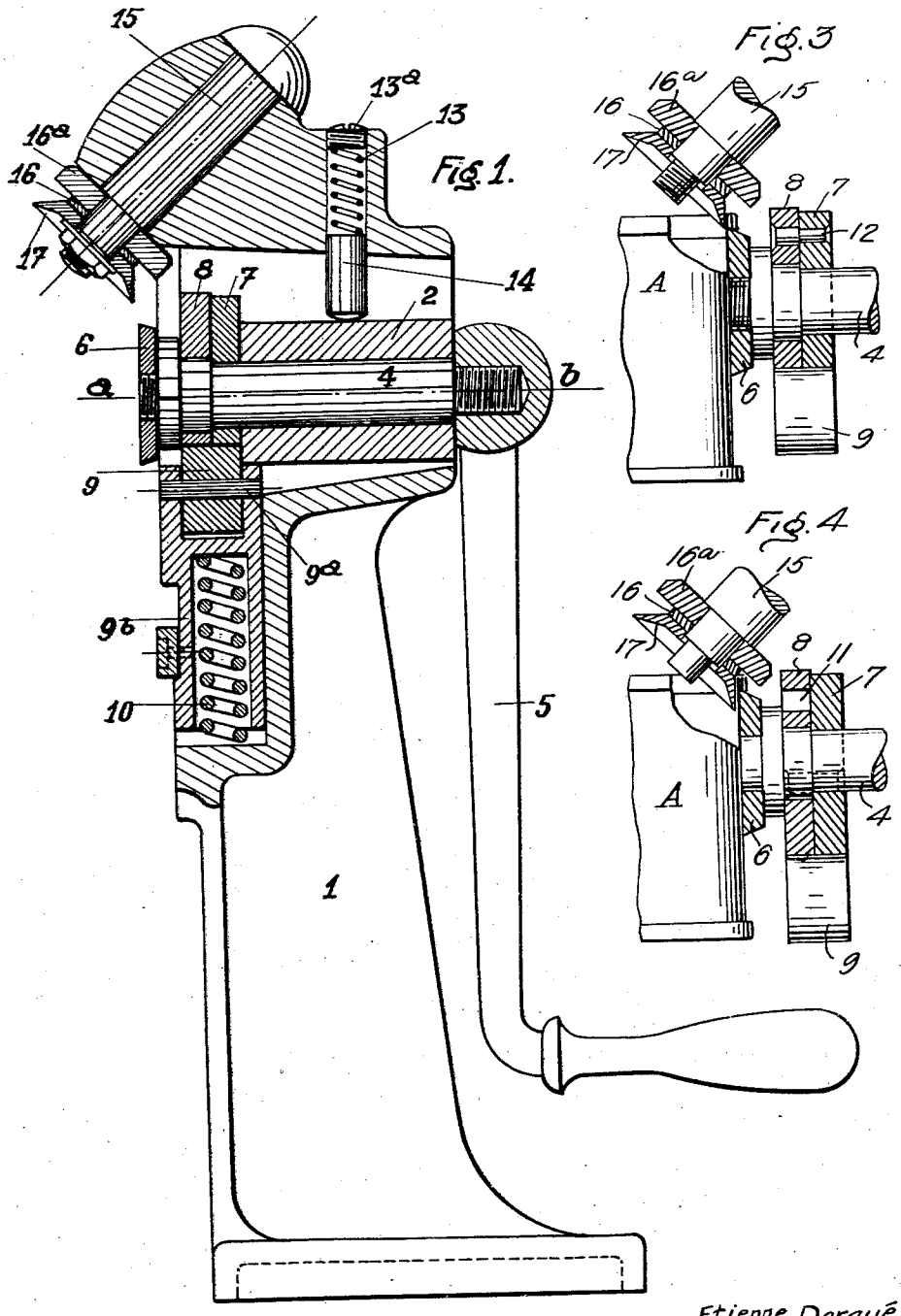


Fig. 1.

Fig. 3

Fig. 4

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MACHINE FOR OPENING TINS OF CANNED GOODS

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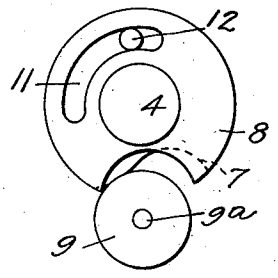
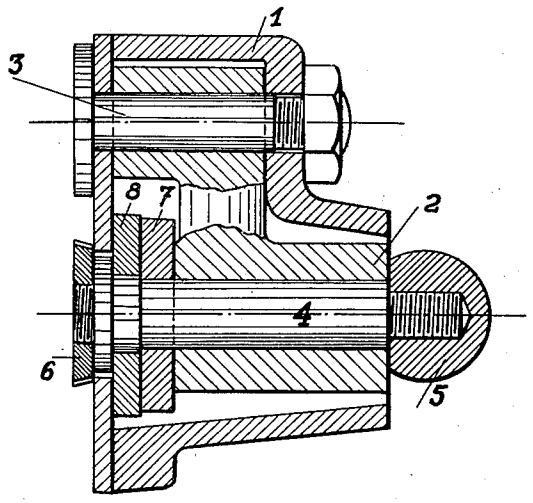


Fig. 6

Fig. 1bis



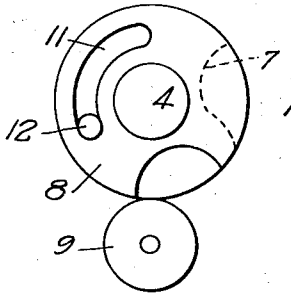


Fig. 7

Fig. 2.

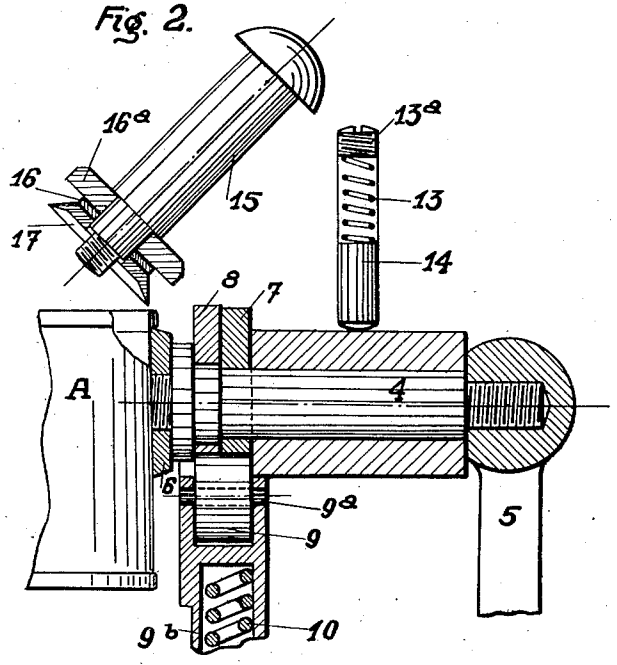
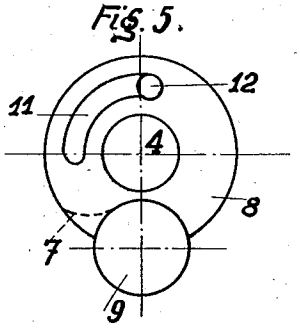


Fig. 5.



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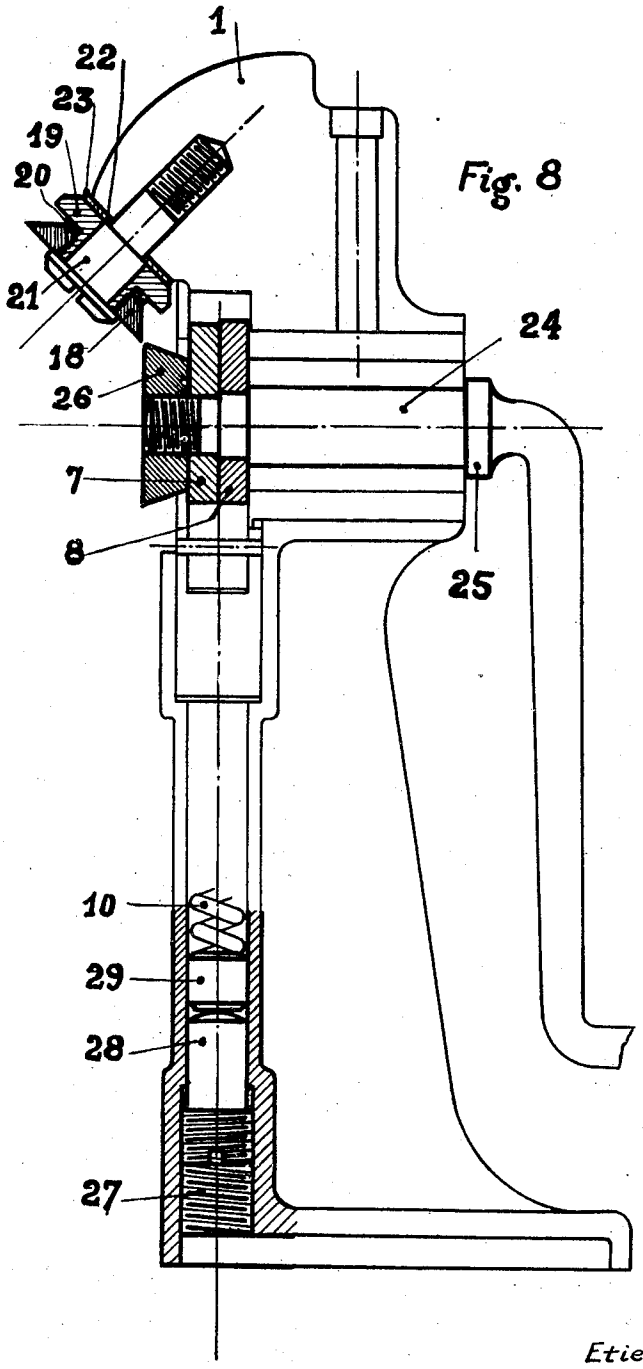


Fig. 8

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UNITED STATES PATENT OFFICE

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MACHINE FOR OPENING TINS OF CANNED GOODS

Application filed May 21, 1928, Serial No. 279,312, and in France June 1, 1927.

The subject of the present invention is a machine for opening tins of canned goods, set and counter-soldered, of round, oval, square or irregular shape.

This machine comprises two milled wheels between which the edge of the tin is held, one of which wheels is fixed to a circular cutting device.

In machines existing to the present, the two milled wheels are fitted to axles that are parallel, taking up a position perpendicular to the bottom of the tin whilst it is being opened. The circular cutting device then cuts the edge of the tin under the bottom. As a result, if the tin contains a liquid, part of it runs out while the tin is being opened. Moreover, inside the tin a lip is made that is liable to hinder the exit of the tin's contents and to spoil the latter. Finally, with such machines, the tin has to be held during the opening operation.

The machine established according to the present invention is free from those inconveniences and furthermore, the tin is held between the milled wheels and released therefrom, automatically.

One of its features is the fact that one of the milled wheels is arranged in such a way that it forms a support for the soldered rim of the tin which is kept tight against that milled wheel by the other similar wheel in an overhead position, in such a way that the rotation of one of the milled wheels causes the tin, which is suspended between the milled wheels by its rim, to revolve on its own axis. The circular cutting device, on which the upper milled wheel is fixed, cuts into the bottom of the tin at the very edge of the rim by which the tin is held suspended.

In practice, the lower milled wheel is fitted on a horizontal actuated shaft and the upper milled wheel is fitted to another shaft that forms an acute angle (45° for instance) with the other shaft.

To obtain a cut without any lip in the case of all tins, the cutting device is hollowed out in such a way that its exterior surface can be at once at a tangent with the edge of the tin and perpendicular to the bottom at the cutting point.

Another feature of the machine established according to the present invention is a mechanism which causes the lower milled wheel to rise and consequently causes the edge of the tin to be held tight when the actuating shaft is turned in a given direction; on the other hand the lower milled wheel descends and leaves the edge of the tin when the same shaft is made to revolve in an opposite direction.

The adjoining drawing shows, for indication purposes, one of the ways in which the subject of the invention can be established.

Fig. 1 is a general view, of a section along a plane which passes through the axes of the milled wheels.

Fig. 1 bis is a horizontal section of the foregoing, along *a*—*b*.

Figs. 2, 3 and 4, like Fig. 1, show the principal parts of the machine during the different phases of its operation.

Figs. 5, 6 and 7 show the aspect of the tightening and releasing mechanism which operates automatically on the edge of the tin, for those same phases.

Fig. 8 shows another way in which the subject of the invention can be established.

The parts of the machine are held in place by a framework intended to be fixed to a table.

Room is provided in the upper portion of the framework, for a lever 2 to move about a horizontal shaft 3 (Fig. 1 bis). The end of the lever 2 forms a bearing for a shaft 4 parallel to shaft 3 which on the one hand is used for fixing the actuating handle 5, and on the other hand for the lower milled wheel 6. The milled wheel 6 is cone-cut so as to offer a sharp edge towards its outer surface. It is ribbed on its contour.

Behind the milled wheel 6, the shaft 4 carries two circular cams, 7 and 8, the first being fixed and the other free. Cam 8 has a diameter that exceeds that of the other cam 7 by a few millimeters. At a point in their periphery these two cams have a piece cut away in the form of an arc of a circle forming a recess for part of a lower friction roller 9, fixed to a horizontal axis 9*a* carried by a slide 9*b* guided vertically in the framework

and pushed towards the cams by a spring 10.

In the case of the cam 7, one of the edges of the cut-away portion joins up to the circular profile of the cam by a curved surface. The cam 8 is perforated with a curved opening 11, concentric to the shaft 4 and cam 7 carries a stud 12 which fits into that opening. The opening 11 on cam 8 forms an arc of a circle that is about 5° bigger than the one corresponding to the hollow part on cam 7.

Cams 7 and 8 are maintained applied against the friction roller 9 by means of an upper spring, 13. The latter acts on the lever 2 through a button 14 which slides in the recess of the spring 13, the same recess that houses the spring 13, said recess being closed at its upper end by a cap screw 13*a*.

Set in angular relation to the shaft 4 is a shaft 15 which carries the upper milled wheel 16, the latter being provided with cogs on its periphery. This shaft 15 is inclined at an angle of 45° on the shaft 4. It turns freely in a bore of the framework 1.

In addition to the milled wheel 16, the shaft 15 carries, behind the wheel, a disc 16*a* of greater diameter than the wheel and in front of it, the rotary cutting device, 17. This device is of hollowed out cone-cut shape with a sharp edge. The inclination of the exterior surface of the cutting-device 17 on its axis is such that the lower portion of said surface is vertically disposed when coming above the milled wheel 6.

Operation

The tin A, to be opened, is taken in the left hand. The under part of its setting edge is pressed on the sharp edge of the milled wheel 6 (Fig. 2). With the right hand turn the handle 5 clockwise. The shaft 4, the cam 7 and the milled wheel 6 turn at the same time. The curved portion of the cam 7 comes into contact with the friction-roller 9 and the said cam rises on that friction-roller causing the lever 2 to pivot towards the top in such a way as to cause the milled wheel 6 to rise with the tin pressed against the sharp edge of the milled wheel 6.

In that ascending movement, the cutting-device 17 takes up a position on the inside and against the edge of the hollow formed by the setting of the tin (Fig. 3).

Continuing to turn the handle 5, the cam 7 continues to make the tin rise and the bottom is pierced by the circular cutting-device 17 (Fig. 4). Finally, the extreme edge of the curved part is reached and the friction-roller 9 is in contact with the circular portion of 7. The pressure made on the friction-roller 9 by the spring 10 and that pressure which the roller imparts to the milled wheel 6 causes the ribs of the latter to come up hard against the set edge of the tin, which edge is held on top by the milled wheel 16 which, in its turn, forces its ribs into the upper part of the said edge. The latter finds itself caught and held tight between 6, 17, 16 and 16*a*, it is obliged to follow the impulsion given to it by the rotation of the milled wheel 6 and moreover it will be used as medium to produce the rotation of the circular cutting device 17 since the propulsion of the milled wheel 16 is produced by the penetration of its ribs into the upper part of the edge of the tin.

By continuing to turn the handle 5, the cutting-device 17 cuts the soldered bottom at the very edge, without leaving any lip thus enabling the contents of the tin to be removed without injury.

But when the hollow formed by the curved edge of the cam 7 again comes opposite the friction roller 9, the milled wheel 6 would drop a distance equal to the hollow of the cam if nothing stopped it. In that case there would be produced a break in the cutting of the tin and it is now that the cam 8 comes into play to allow of a continuous cutting movement.

At the beginning of the operation, that is to say when the machine is at rest, the position of the cam 7 in relation to 8 is that shown in Fig. 5. When a rotation is given to the handle 5 to open a tin, the cam 7 alone is displaced and it causes the milled wheel 6 to rise as indicated previously. During that time the cam 8 has remained in the rear, held back, owing to its larger diameter, by the friction-roller 9 (Fig. 6). This restraint continues until the stud 12 on the cam 7 comes up against the extremity of the aperture 11 in the cam 8 and drags the cam along by force.

At that moment the curved portion and the hollow of the cam 7 are covered by a circular portion of the cam 8 in such a way that 7 and 8 form a cylinder which rolls on the friction roller 9, maintains the shaft 4 in its uppermost position and ensures cutting of the soldered bottom without any interruption no matter the number of turns given to the handle before the entire bottom is cut.

To loosen the edge of the tin it is merely necessary to turn the handle 5 in an opposite direction counter-clockwise. In that case, as at the beginning of the operation, only the cam 7 enters into movement. Owing to its larger diameter, the cam 8 is held in check by 9 and only joins the movement of the cam 7 when the stud on the latter comes up against the other end of the aperture 11 of the cam 8 to drag it along by force.

At that moment the profiles of the cams 7 and 8 come together and form a hollow in such a way that a moment arrives, the hollow being opposite the friction-roller 9, when the shaft 4 and the milled wheel 6 descend at the same time releasing the edge of the tin, thanks to the thrust exerted by the spring pressed button 14 on the lever 2.

The shape and inclination given to the ex-

terior surface of the cutting-device 17 enables it to follow the contour of bottoms of tins of all shapes. The flexible fitting of the slide 9b carrying the friction roller 9 has the effect of making the pressure of the milled wheel 6 flexible under the soldered edge of the tin and in that way to compensate any inequalities that might be due to countersoldering or differences in the width of the setting.

A description will now be given of a modified construction of machine embodying the invention which is directed to the improvement of the mechanism, so as to render assembling thereat more simple and rapid, and to decrease the cost of the construction.

This construction shown in Fig. 8 is seen to comprise the solid circular cutting-device 18 which is screwed on to the part 19 with the washer 20 between the two. The washer is milled on its periphery in such a way that it gears, so to speak, with the tin to be opened, ensuring a better operation of the cutting device. Instead of being milled, the said washer can be cogged. These parts are held by a screw 21 that is threaded into the framework 1 of the machine. This screw is provided with a shoulder 22, which is adapted to retain the washer 23 tight against the framework 1; the threaded frame work 1 acting as a nut for the screw 21. The ensemble of the cutting-device 18, the washer 20 and the piece 19, forms a unit which is held tightly so that it revolves on the screw 21 as axis, the piece 19 bearing with light friction contact on the washer 23.

The handle is preferably made integral with the shaft 24; said shaft is then inserted in position by fitting it into the framework from the handle side. A shoulder 25 retains the shaft 24 in place. Said shaft also carries the cams 8 and 7, the cam 7 being positioned between the cam 8 and the part 26 which terminates the shaft 24.

The tension of the spring 10 is made adjustable by extending its housing recess to the lower portion of the framework 1; this recess is tapped as at 27 for a portion of its length, engaging with a screw 28. The screw 28 is threaded for a portion of its length and forms a bearing-block of the lower end of the spring 10. If desired a spacer part 29 may be interposed between the screw 28 and the lower end of spring 10. The tension of the said spring 10 is adjusted by screwing or unscrewing the screw 28 more or less.

It will thus be seen that there is provided devices in which the several objects of this invention are achieved and which are well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matters herein set forth or shown in the accompanying drawing are to be interpreted as illustrative and not in a limiting sense.

What I claim is:

1. In a can-opening machine, a first rotatable gripping roller, a second rotatable gripping roller resiliently mounted, said first and second rollers being adapted to coact with one another so as to grip the edge of a can, cutting means positioned adjacent one of said rollers and adapted to cut into the surface of a can held between said rollers, said cutting means and rollers having a fixed relative position laterally of each other and means for rotating one of said rollers.

2. In a can-opening machine, a shaft journalled in a fixed bearing, cutting means mounted on said shaft, and resiliently supported means operative to move a can surface into contact with said cutting means and to displace said can surface relatively to said cutting means, said cutting and resiliently supported means having a fixed relative position laterally of each other.

3. In a can-opening machine, a first shaft, cutting means mounted on said shaft, a first gripping roller mounted on said shaft, a second shaft, a second gripping roller mounted on said second shaft, said first and second rollers being positioned so as to grip the edge of a can when moved towards one another, means for resiliently moving said rollers towards one another, and means for rotating said second shaft, said roller moving means and shaft rotating means being interconnected for simultaneous actuation.

4. In a can-opening machine, a first shaft, cutting means mounted on said shaft, a first gripping roller mounted on said shaft, a second shaft, yieldable means for mounting said second shaft, a second gripping roller mounted on said second shaft, said first and second rollers being positioned so as to grip the edge of a can and move a can surface into contact with said cutting means when the two rollers are moved towards one another, and means operative by rotation of said second shaft for controlling said yieldable mounting means to move said rollers towards one another.

5. In a can-opening machine, a fixed frame, a first shaft mounted on said frame, cutting means and a first gripping roller mounted on said shaft, a second shaft positioned so that its axis forms an angle with the axis of the first shaft, a second gripping roller mounted on said second shaft, a resilient mounting for said second shaft said first and second rollers and said cutting means being positioned so that the rollers may grip a can and move one of the surfaces thereof into contact with the cutting means when said rollers are displaced towards one another, and means operative by rotation of the second shaft for controlling said shaft

mounting to move said rollers towards one another.

6. In a can-opening machine, a first shaft, cutting means and a first gripping roller mounted on said shaft, a second shaft, a second gripping roller mounted on the second shaft, said rollers and cutting means being positioned so that the rollers may grip the edge of a can and move one of the surfaces thereof towards the cutting means when the rollers are moved towards one another, means operative by the rotation of said second shaft in a predetermined direction to move the rollers towards one another and into position for exerting a gripping action on the edge of a can, and resilient means operative on said lever bearing to maintain said rollers in gripping position as long as said second shaft is rotated in said predetermined direction.

7. In a can-opening machine, a first shaft, cutting means and a first gripping roller mounted on said shaft, a second shaft journalled on a lever bearing, a second gripping roller mounted on said second shaft, said rollers and cutting means being positioned so that the rollers may grip the edge of a can and move one surface thereof into contact with the cutting means when the rollers are moved towards one another, and resilient means controlling said lever bearing and operative by the rotation of said second shaft in one direction to move the rollers towards one another, said means operative by rotation of said second shaft in the opposite direction to permit said rollers to move away from one another.

8. In a can-opening machine, a fixed frame, a first shaft mounted on said frame, cutting means and a first gripping roller mounted on said shaft, a second shaft, a cam rigidly connected to said second shaft, a pin rigidly connected to said cam, a cam loosely mounted on said second shaft, said last-named cam having a groove formed therein positioned so as to coact with said pin and being of slightly greater maximum diameter than said first-named cam, a second gripping roller mounted on said second shaft, a cam roller positioned to contact with said cams, and means for rotating said second shaft.

9. In a can opening machine, a pair of rollers mounted for rotation on axes extending in angular relation to each other and adapted to releasably grip a bead of a flat end closure of a can between them, one of said rollers having a wedge-shaped peripherial edge formed to engage under the closure bead, a yielding support for said wedging roller, a rotary means supported adjacent the other of said rollers for cutting the flat end closure, means for rotating said wedging roller, and means actuated selectively by the last mentioned means for releasing said closure bead from gripping action of said rollers and for gripping said bead during the cutting of said closure.

10. In a can-opening machine, a pair of rollers mounted for rotation on axes extending in angular relation to each other and adapted to releasably grip a bead of a flat end closure of a can between them, a rotary means supported adjacent one of said rollers for cutting the flat end closure, means for rotating the other roller, and a pair of spring pressed members actuated by said last mentioned means for controlling the releasing and gripping action of said rollers.

11. In a can opening machine, a pair of rollers mounted for rotation on shafts extending in angular relation to each and adapted to releasably grip a bead of a flat end closure of a can between them, one of said shafts being relatively fixed, means carried by said fixed shaft for cutting the flat end closure, a lever bearing for journalling the other of said shafts, and spring pressed means coacting with said bearing controlling the releasing and gripping action of said rollers, said rollers and cutter having a fixed relative position laterally of each other.

12. In a can opening machine, a frame, a pair of shafts supported by the frame in angular relation, a roller mounted on each in cooperative relation adapted to releasably grip a bead of a flat end closure of a can between them, means for cutting the flat end closure carried by one of said shafts, a lever bearing for journalling the other of said shafts and opposing resilient means interconnecting the bearing with the frame for controlling the releasing and gripping action of said roller, said rollers and cutter having a fixed relative position laterally of each other.

Signed at Clichy, this 2nd day of May, 1928.

ETIENNE DARQUÉ.