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(54) **Can opener with circular blade and assembling method thereof**

(57) The can opener with circular blade includes a pair of levers (2, 3) that are mutually pivoted in a scissor-like fashion toward one end and are provided, at the opposite end, with two handles (5, 6); a can drive assembly (7), which is mounted on one of the levers (2); a cutting assembly (8) with a circular blade (9), which is mounted on the other one of the levers (3); the drive

assembly (7) is constituted exclusively by a pair of mutually connected parts including a knurled roller (10) and a knob (11). An assembly method is also provided, which can be performed on robotized production lines, for reducing production costs.

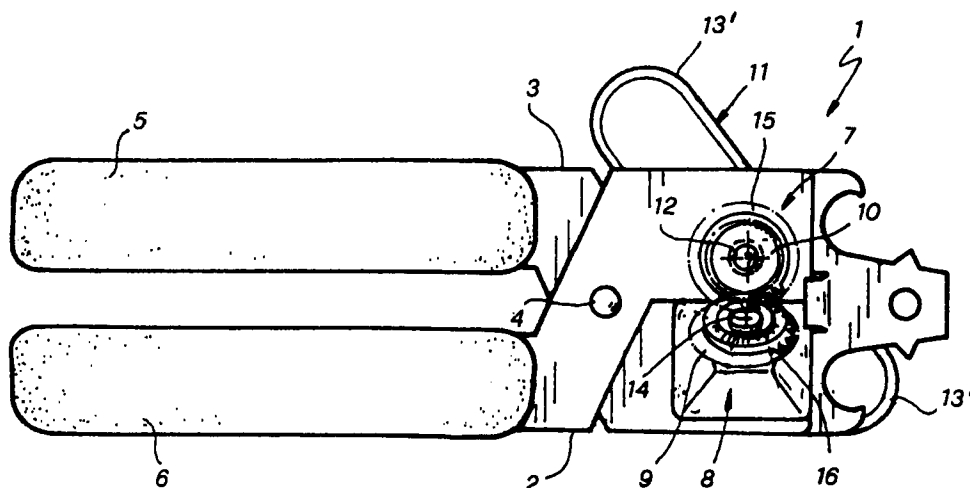


FIG. 1

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Description

The present invention relates to a can opener with a rotating circular blade of the type used to open ordinary tin cans containing food preserves and the like. The invention also relates to a method for assembling the can opener.

Conventional can openers having a circular blade generally include two levers made of metal plate that are pivoted in a scissor-like fashion toward one end and are provided with grip handles at the opposite ends.

A knurled traction roller and a circular blade are mounted, respectively on the two levers, between the ends that lie opposite to the handles and the pivoting point, in positions that are equidistant from the pivoting point; during use of the can opener, the roller and the blade interact with the edge of the lid of the can to be opened.

The roller is connected to an actuation knob, generally by an axial pivot which is rotatably inserted into a frictionless bush associated with the respective lever.

Italian utility model application No. VI94U000053 discloses a can opener having a flat reinforcement member fixed to the end of the lever or metal plate body that supports the roller. The reinforcement member is parallel and partially spaced relative to the lever body, so as to form a guiding slot for the corresponding end of the lever.

Both the circular blade and the roller are generally coupled to meshing toothed wheels to transmit the motion between the two components.

These toothed wheels are usually mounted on the respective members with an interference mounting, by means of the pressure exerted by a screw, or by keying the toothed wheel on an axial appendage of the member. These types of mounting require very precise working tolerances and a particular care in assembling. It is also required to manipulate very small and numerous parts.

A first drawback of conventional can openers is their high production cost also due to the fact that the assembly requires great labor and is scarcely automated.

A further drawback is the poor reliability of the interference connection of the toothed wheels with their respective support members.

The main aim of the present invention is to eliminate the drawbacks mentioned above by providing a can opener that has a simple and economic structure and is constituted by a few and easily assembled parts.

A further object is that of providing an assembly method of the can opener which can be performed with automatic apparatus in a reduced time and with minimum labor.

This aim and this object are achieved by an improved can opener with circular blade according to claim 1.

A can opener according to the invention comprises a pair of levers or plates that are mutually pivoted in a

scissor-like fashion at one end and are provided, at the opposite end, with two handles; a can rotating drive assembly, which is mounted on one of the levers; a blade assembly with a circular blade, which is mounted on the other lever; characterized in that the drive assembly is constituted exclusively by a pair of mutually connected parts.

Preferably, said pair is constituted by a knurled roller and by a knob provided with a connecting pivot having a threaded end.

The drive assembly comprises a first toothed wheel rigidly associated with said knurled roller, the blade assembly comprises a second toothed wheel rigidly associated with said circular blade.

A method for assembling can openers of the type described above is characterized in that it comprises the steps of: a) forming a first lever; b) mounting a blade assembly, comprising at least one circular blade rotating at a pivot, on said lever; c) forming a second lever; d) mounting a drive assembly on said lever, said drive assembly comprising a knurled roller fastened to an operating knob by means of a second pivot; e) pivoting said first and second levers at a connecting rivet.

The circular blade can be rigidly associated with a first toothed wheel by inserting an axial appendage of the blade in a polygonal central hole of the toothed wheel and by punching and/or riveting the appendage or protrusion.

The roller can be rigidly associated with a second toothed wheel by inserting an axial appendage of the roller in a polygonal central hole of the toothed wheel and by punching and/or riveting the appendage, or protrusion.

The configuration of the can opener according to the invention allows to considerably reduce production and assembly costs, ensuring higher reliability and strength with respect to known existing can openers.

Further characteristics and advantages will become apparent from the detailed description of one of the preferred but not exclusive embodiments of the can opener according to the invention, with the aid of the accompanying drawings, wherein:

FIG. 1 is a schematic side view of a can opener according to the invention;

FIG. 2 is an exploded perspective view of two details of the can opener of FIG. 1;

FIG. 3 is an exploded perspective view of two further details of the can opener of FIG. 1;

FIG. 4 is a perspective view of the assembly formed by the parts shown in FIG. 2 assembled together;

FIG. 5 is a perspective view of the assembly formed by the parts shown in FIG. 3 assembled together;

FIG. 6 is an exploded side view of an alternative

embodiment of a subassembly of the can opener of FIG. 1, before assembly;

FIG. 7 is a side view of the subassembly of FIG. 5 after assembly.

With reference to the above figures, the can opener according to the invention, generally designated by the reference numeral 1, includes two levers or plates 2 and 3 made of pressed and/or drawn metal plate. Levers 2 and 3 are pivoted in a scissor-like fashion at a front end by a rivet 4 and are provided, at the opposite ends, with two handles 5 and 6 that have an elongated shape to be gripped by a user.

Between the front end and pivoting rivet 4, levers 2 and 3 respectively rotatably support a drive assembly 7, that is suitable to interact with the edge of a can to make it rotate, and a cutting assembly 8 that includes a circular blade 9 that is meant to score the lid of the box, cooperating with the drive assembly 7.

A particular characteristic of the invention resides in that the drive assembly 7 is constituted only by a pair of mutually connected members mounted on the respective lever 2.

Namely, drive assembly 7 is constituted by a knurled roller 10 that is connected to an actuation knob 11 by an axial pivot 12 that passes through a hole of the corresponding lever 2 and is arranged transversely to the surface thereof.

Pivot 12 has an end rigidly associated with knob 11 and an opposite threaded end 12' engaged in an internal threading of knurled roller 10.

Knob 11, of a per se known type, is made of plastic and has a central body 13, in which the head of axial pivot 12 is embedded, and a pair of wings 13' radially protruding from the central body.

In the cutting assembly 8, circular blade 9 is rotatably mounted on lever 3 on a rotation axis that is tilted with respect to the axis of knurled roller 10 of drive assembly 7, so that the cutting edge of the blade grazes the outer face thereof. Circular blade 9 is fixed to lever 3 by a second pivot 14 with an enlarged head and having an opposite end associated with lever 3.

In a first embodiment of the invention, drive assembly 7, before being mounted on lever 2, is formed by a toothed wheel 15 rigidly associated with knurled roller 10. Similarly, cutting assembly 8 is formed by second toothed wheel 16 rigidly associated with circular blade 9.

Toothed wheels 15 and 16 are shaped so as to mutually mesh, in order to simultaneously turn roller 10 and blade 9 during the actuation of knob 11 by the user.

Each one of toothed wheels 15 and 16 has an axial polygonal, or square, hole 17, 18 for the insertion of respective tubular protrusions, or appendages, 19 and 20 formed on knurled roller 10 and on circular blade 9 and protrudes axially from them.

The torsional locking of toothed wheels 15 and 16, respectively on roller 10 and on blade 9, is obtained by

inserting the corresponding tubular protrusions 19 and 20 in the axial holes 17 and 18 of toothed wheels 15 and 16 and by punching and/or riveting the ends of protrusions 19 and 20 so as to expand them inside the holes 17 and 18 and form respectively a roller assembly 21 and a blade assembly 22, shown in FIG.s 4 and 5.

FIG.s 6 and 7 illustrate a further embodiment of the can opener according to the invention, which is simplified and cheaper than the preceding one and differs in the absence of toothed wheels coupled to the knurled roller and to the circular blade and in that the knurled roller and the axial pivot connecting to the knob are formed monolithically in one piece and define a single roller-pivot member 23, formed, for example, by machining and/or punching.

Another particular characteristic of the invention resides in that the knurled roller 10' and the axial pivot for connection to the knob are formed monolithically, forming a monolithic roller-pivot part 23.

Roller-pivot member 23 includes a roller portion 10' that is joined to a pivot portion 12' that is provided with longitudinal grooves 24 and is keyed in an axial hole 25 of a plastic knob 11'.

Roller-pivot 23 can be rotatably mounted on the respective lever 2 without any intermediate member, such as for example the antifriction bushes used in the conventional can openers.

Circular blade 9' on lever 3 is driven in its rotation by the friction exerted by the lid of the can on the blade itself during cutting.

The structure of the can opener according to the invention allows a considerable constructive simplification and a reduction of the component parts. Besides reducing the assembly and production costs the can opener according to the invention is more reliable than similar conventional products.

A particularly advantageous method of assembly comprises the steps of: a) forming a first lever; b) mounting a blade assembly, comprising at least one circular blade rotating at a pivot, on said lever; c) forming a second lever; d) mounting a drive assembly on said lever, said drive assembly comprising a knurled roller fastened to an operating knob by means of a second pivot; e) pivoting said first and second levers at a connecting rivet.

The circular blade is rigidly associated with a first toothed wheel by inserting an axial appendage of the blade in a polygonal central hole of the toothed wheel and by punching and/or riveting the appendage.

The roller is rigidly associated with a second toothed wheel by inserting an axial appendage of the roller in a polygonal central hole of the toothed wheel and by punching and/or riveting the appendage.

Such assembly method can be completely automatic and performed by robotized production lines in order to considerably reduce production costs with respect to the traditional can openers.

The can opener according to the invention is susceptible of numerous modifications and variations, all of

which are within the scope of the inventive concept defined by the accompanying claims. All the details may be replaced with other technically equivalent ones. The materials and the dimensions may vary according to the requirements.

Claims

1. An improved can opener with circular blade, comprising: a pair of levers or plates (2, 3) that are mutually pivoted in a scissor-like fashion toward one end and are provided, at the opposite end, with two handles (5, 6); a can drive assembly (7), which is mounted on one of said levers (2); a cutting assembly (8) with a circular blade (9), which is mounted on the other one of said levers (3); characterized in that said drive assembly (7) is constituted exclusively by a pair of mutually connected members (10, 11). 5
2. The can opener according to claim 1, characterized in that said pair is constituted by a knurled roller (10) and by a knob (11) having a connecting pivot (12) with a threaded end. 10
3. The can opener according to claim 2, characterized in that said drive assembly (7) comprises a first toothed wheel (15) rigidly associated with said knurled roller (10), and said cutting assembly (8) comprises a second toothed wheel (16) rigidly associated with said circular blade (9). 15
4. The can opener according to claim 3, characterized in that said first toothed wheel (15) and said second toothed wheel (16) are adapted to mesh together, in order to simultaneously move said circular blade (9) and said knurled roller (10). 20
5. The can opener according to claim 4, characterized in that each of said toothed wheels (15, 16), has a respective axial hole (17, 18) having a substantially polygonal or square shape for the insertion of substantially cylindrical axial protrusions (19, 20) that are formed on said knurled roller (10) and on said circular blade (9). 25
6. The can opener according to claim 5, characterized in that said axial protrusions (19, 20) are torsionally locked on the respective toothed wheels (15, 16) by punching and/or riveting of said protrusions (19, 20) toward the outside. 30
7. The can opener according to claim 1, characterized in that said drive assembly comprises a first roller-pivot member (23) having an enlarged portion (10') defining a knurled roller and a reduced portion (12') defining a pivot for the interference coupling of said knob (11'). 35
8. The can opener according to claim 7, characterized in that said roller-pivot member (23) is a monolithic member produced by machining or stamping and has longitudinal grooves (24) on its reduced portion (12') adapted to force said knob (11') into a dead hole (25). 40
9. A method for assembling can openers of the type comprising a pair of mutually associated levers having respectively a drive assembly and a cutting assembly adapted to interact, characterized in that it comprises the steps of:
 - a) forming a first lever; b) mounting a blade assembly, comprising at least one circular blade rotating at a pivot, on said lever; c) forming a second lever; d) mounting a drive assembly on said lever, said drive assembly comprising a knurled roller fastened to an operating knob by means of a second pivot; e) pivoting said first and second levers at a connecting rivet. 45
10. The method according to claim 9, characterized in that said circular blade is rigidly associated with a first toothed wheel by inserting an axial appendage of the blade in a polygonal central hole of the toothed wheel and by punching and/or riveting the appendage. 50
11. The method according to claim 9, characterized in that said roller is rigidly associated with a second toothed wheel by inserting an axial appendage of the roller in a polygonal central hole of the toothed wheel and by punching and/or riveting the appendage. 55

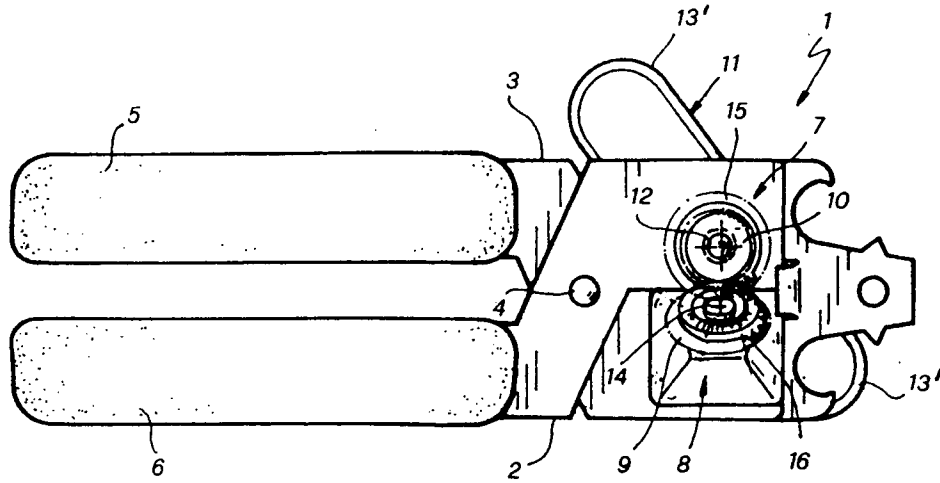


FIG. 1

FIG. 2

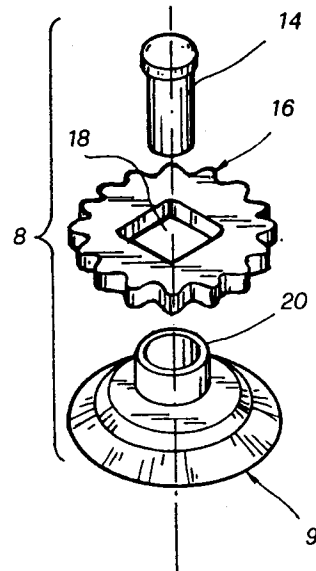
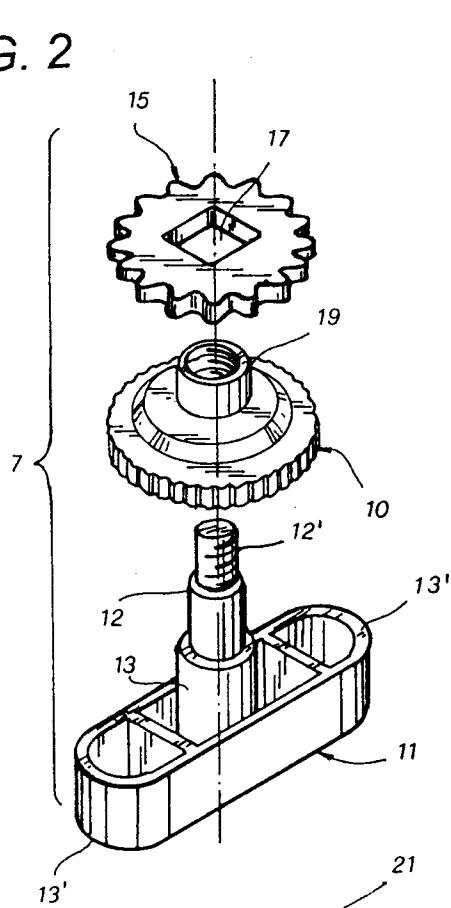


FIG. 3

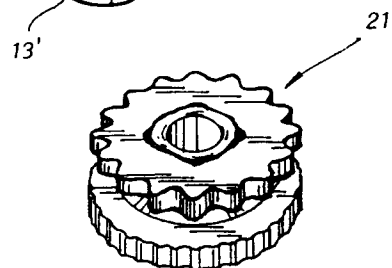


FIG. 4

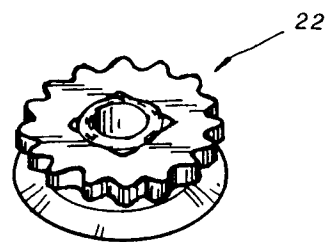


FIG. 5

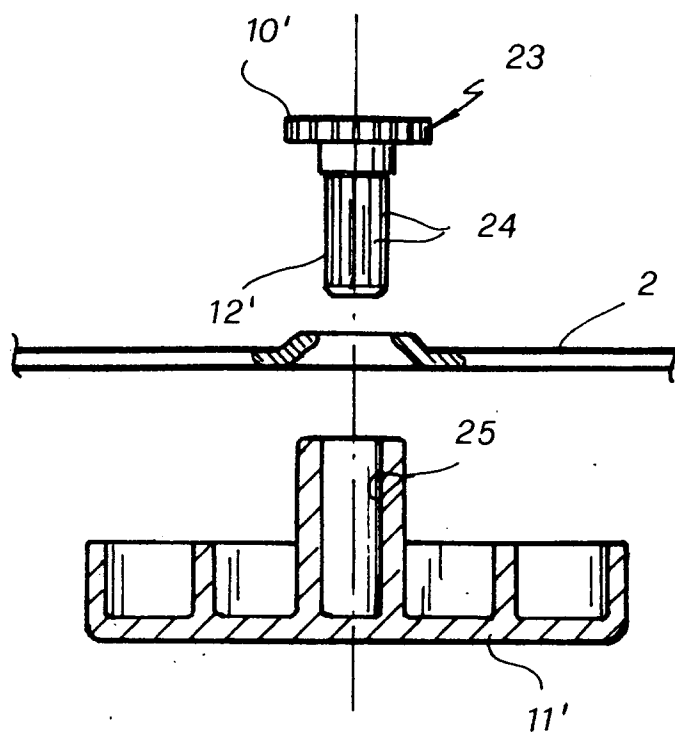


FIG. 6

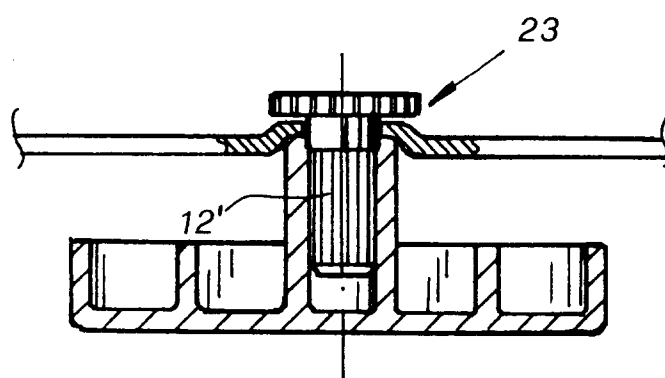


FIG. 7



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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 1496

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	FR-A-2 296 357 (MONOPOLWERK USBECK & SOHNE)	1-4	B67B7/72
A	* figures 1,2 *	9	
Y	EP-A-0 104 152 (AB SVEN JOHANSSON & CO.) * page 3; figure 1 *	1-4	
A	WO-A-92 02445 (WILLIAM LEVENE LIMITED) * figures 2,3 *	1,9	
A	EP-A-0 574 214 (MIKE & KREMEL LIMITED) * figure 1 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B67B
Place of search		Date of completion of the search	Examiner
THE HAGUE		22 October 1996	Martínez Navarro, A.
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