

[54] **KNIFE**
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[73] Assignee: **Bettcher Industries, Inc.**, Birmingham, Ohio
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[51] **Int. Cl.**.....**B26b 29/00**
[58] **Field of Search**.....**30/276, 264, 286, 293, 283, 30/284**

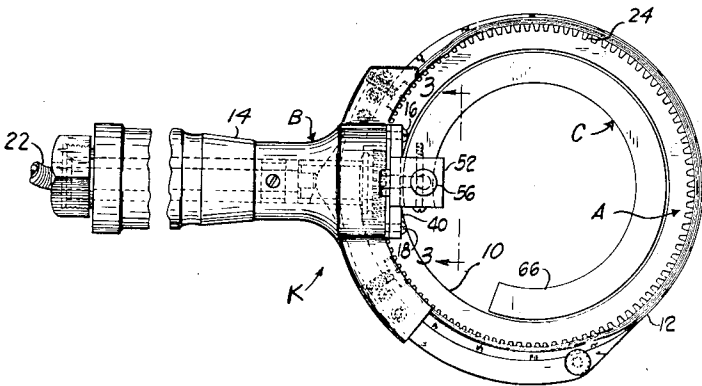
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[57] **ABSTRACT**
A manually held and manipulated motor drive meat product trimming and slicing knife comprising a ring-like rotary blade of considerably greater diameter than its axial length supported in a handle assembly including a hand grasp portion extending radially outwardly of the blade having an inwardly facing peripheral cutting edge at one axial end thereof, and an annular or a semi-annular ring-like member carried by the handle assembly within the blade and adjustable axially of the blade adapted to bear upon the product being cut and limit the penetration of the blade into the product.

6 Claims, 3 Drawing Figures



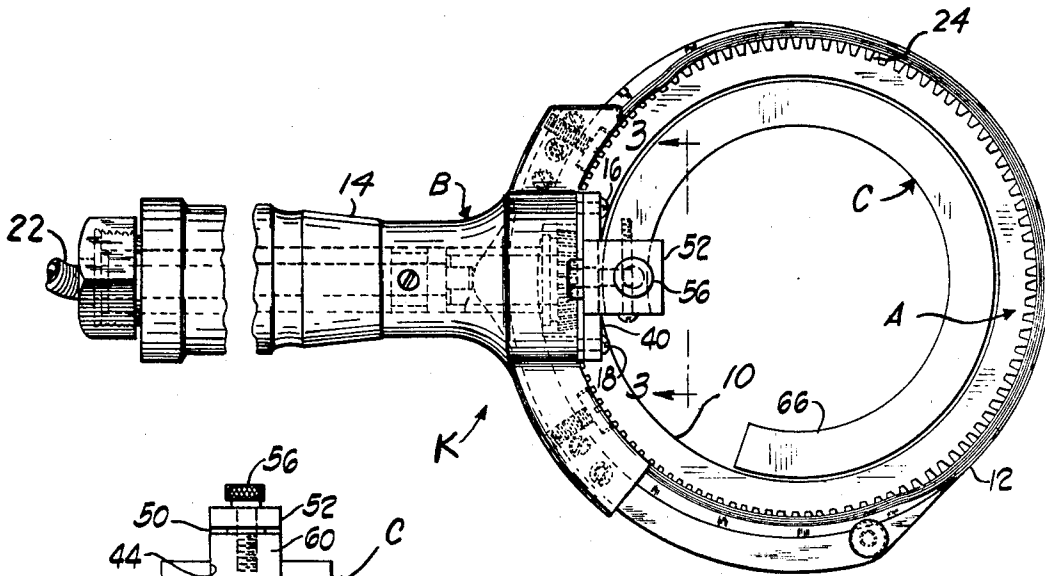


Fig. 1

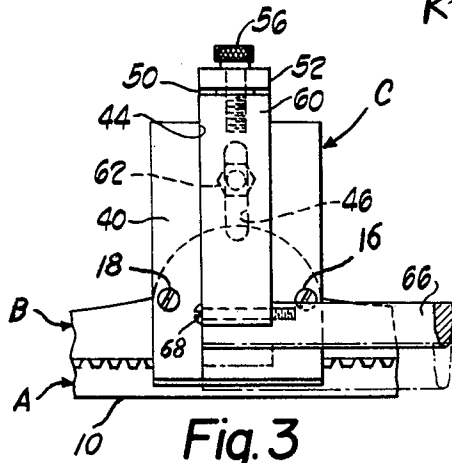


Fig. 3

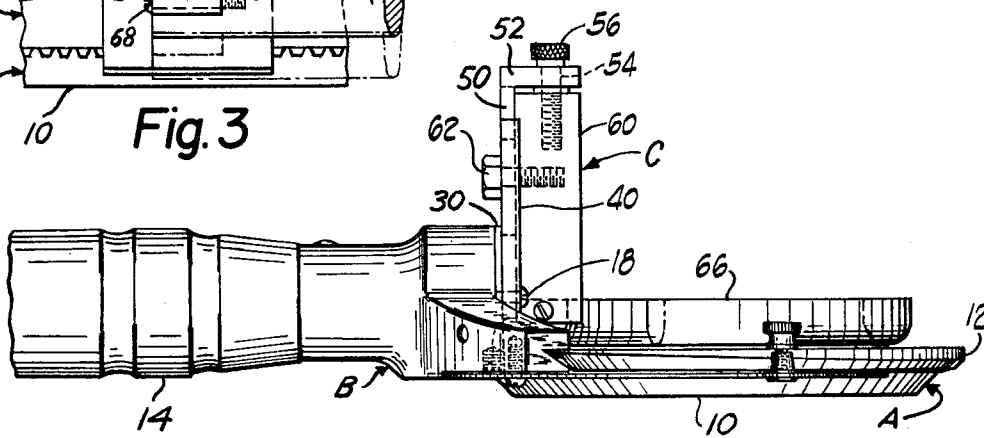


Fig. 2

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KNIFE

FIELD OF INVENTION

The invention relates to manually held and manipulated power driven knives used in trimming and slicing comestible products, especially meat, having a ring-like rotary blade of relatively short axial length with an inwardly facing peripheral cutting edge at one end used principally in the packing house and meat distribution industries.

PRIOR ART

Manually held and manipulated knives having a power driven ring-like rotary blade with an inwardly facing peripheral cutting edge and including a, so-called, "depth control plate" are known, but such devices have not been entirely satisfactory, being unreliable in operation and/or interfering with the desired manipulation of the knife, etc.

SUMMARY OF INVENTION

The invention provides a novel and improved manually held and manipulated knife especially designed for trimming and slicing meat products having a power driven ring-like annular blade of relatively short axial length with a radially inwardly facing peripheral cutting edge at one end supported in a handle assembly and an annular, open center, or partly annular ring-like depth of cut gauge member at least in part located in the blade and having one side adjustably connected to the handle to provide flexibility of the working area, and of the gauge axially of the blade for controlling or assisting in controlling the depth of cut made by the blade.

The invention also provides a novel and improved product thickness gauge for attachment to a hand-held knife of the character referred to above and having a power driven ring-like blade, which gauge comprises an annular, open center, or partly annular ring-like depth of cut gauge member adapted to be located at least in part within the blade when attached to a knife and adjustable members at one side for connecting it to a knife for adjustment axially thereof and limited flexing of its working area during use.

The invention will be better understood and further advantages, as well as objects, thereof will become apparent from the accompanying drawings and the following description of the preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a knife embodying the invention;

FIG. 2 is a side elevational view, with parts broken away and in section approximately on the line 2—2 of FIG. 1; and

FIG. 3 is a fragmentary elevational view looking from the line 3—3 of FIG. 1.

DESCRIPTION OF PREFERRED EMBODIMENT

The knife K which forms the preferred embodiment of the invention and shown in the drawing comprises an annular ring-like rotary blade A of relatively short axial length and having a radially inwardly facing peripheral

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cutting edge 10 at one end. The blade A is rotatably supported in an annular member 12 of a handle assembly B. The member 12 is attached to a hollow tubular hand group 14 by screws 16, 18 and the blade A is rotated in the member 12 by a gear rotatably supported in the member 14 and driven in a suitable manner as by a flexible shaft 22 connected thereto and to an electric motor, not shown. The gear is continuously in mesh with annular gear teeth 24 cut in the end of the blade A opposite to the cutting edge 10. The tubular handle member 14 projects from the member 12 in a direction normal to the axis of rotation of the blade A and the end facing the axis of the blade is closed by a member 30 secured thereto by the screws 16, 18.

The apparatus thus far described is constructed and used in a manner similar to that disclosed in U.S. Pat. No. 3,024,532, to which reference is made for a more detailed description thereof.

In addition to the parts thus far referred to, the knife K has a gauge assembly, designated generally by the reference character C, attached to the handle assembly B by the screws 16, 18. The knife K is especially designed for trimming and slicing meat products and the gauge assembly C is to control or assist in controlling the thickness of the cut made by the knife blade. The gauge assembly, as shown, comprises a plate-like support member 40 provided with suitable apertures for detachable connection to the handle assembly B by the screws 16, 18. Other suitable means for connecting the gauge assembly C to the handle assembly B may be employed.

The plate-like member 40 of the gauge assembly C is provided with a longitudinal groove 44 in its right-hand face, extending parallel with the axis of the blade A, when attached to the handle assembly of the knife. The member 40 is further provided with an elongated aperture 46 opening into the bottom of the groove 44 and extending parallel of the length of the groove, an upwardly extending section 50 of a width equal to that of the groove or slot 44 and having its right-hand face, as viewed in the drawings, flush with the bottom of the slot, and an angular extension section 52 at the top of the section 50 extending toward the axis of rotation of the blade. The annular extension section 52 of the bracket 40 has an aperture therein for the reception of a screw 54 rotatably supported therein against axial movement relative to the bracket. The end of the screw 54 above the projecting section 52 of the bracket is provided with a knurled head 56 and the opposite end is threaded into a member 60 slidable in the groove 44 in the member 40. The member 60 is adapted to be secured in any adjusted position relative to the member 40 by a screw 62 projecting through the slot 46 in the member 40 and threaded into a suitable tapped aperture in the member 60. The head of the screw 62 normally engages the left-hand face of the member 40.

A gauge member per se in the form of an arcuate or ring-like member 66 of short axial length is secured to the bottom of the member 60 as by a screw 68, or the like. For better attachment of the member 66 to the lower end of the member 60, the top side of the member 60, as viewed in the drawings, is provided with a radial slot into which the lower end of the member 66 projects. The bottom side of the member 66, as viewed in the drawings, is semi-circular, as viewed in cross sec-

tion. The member 66 is supported with its axis concentric with the axis of the blade A and the outside diameter thereof is preferably only slightly less than that of the cutting edge of the blade A. The construction is such that the member 66 can be adjusted axially of the axis of rotation of the blade A from a position where the bottom side thereof is below the cutting edge of the blade or spaced a desired distance thereabove.

The ring or arcuate member 66 of the preferred embodiment is not a complete circle or ring. One end is connected to the adjustable member 60 of the gauge assembly and from there the member 66 extends in a clockwise direction approximately 280° to 290° with its side or edge in a plane parallel with the plane of the cutting edge of the blade. It is to be understood, however, that the member 66 may be a complete circle or anything less to about a semi-circle. For right-hand personnel, the part of the knife predominately used is the upper one-third or so of the knife, as viewed in FIG. 1.

While the size or dimensions of the member 66 are not critical the axial dimension of the member is preferably about equal to the axial dimension of the blade A, i.e., about one-eighth its maximum diameter, and in cross section the radial dimension is about the same as its axial dimension with about the lower one-half being semi-circular to provide rounded corners on the side adjacent to the cutting edge of the blade to facilitate the flow or passage of product being cut thereabout and lessen the tendency of the product to stick and adhere to the gauge member.

From the foregoing description of the preferred embodiment it will be apparent that the objects of the invention heretofore enumerated have been accomplished and that there has been provided a novel and improved hand-manipulated motor driven knife of the character mentioned especially designed for the trimming and slicing of meat products in the packing house industry, comprising a ring-like rotary blade and a ring-like gauge within the blade and adjustable axially thereof to limit the penetration of the blade into a product being cut, and a gauge of the character referred to for a knife of the character mentioned.

While the preferred embodiment has been described in considerable detail, it is to be understood that the invention is not limited to the construction shown and it is the intention to hereby cover all adaptations and modifications thereof which come within the practice of those skilled in the art to which the invention relates and the appended claims.

Having thus described my invention, what I claim is:

1. A hand-manipulated knife comprising a blade supporting structure substantially annular in shape and including a handle projecting from one side thereof, a ring-shaped blade of short axial length rotatably supported in said structure with a cutting edge at one end projecting from one side of said structure and gear teeth at its other end, a pinion adjacent to said handle in mesh with said gear teeth on said blade for rotating said blade, a first member at the end of said blade opposite said cutting edge connected to said supporting structure adjacent said handle and extending therefrom parallel with the axis of said blade, a second member offset from the axis of said blade connected to said first member for adjustment lengthwise of the axis of said blade, and a ring-like gauge member having a side fixed

to said second member with its axis concentric with the axis of said blade, said ring-like gauge member having a maximum dimension in cross section equal to about one-eighth of the interior diameter of said blade and at least part of its radially outer side facing in the direction of said cutting edge being a convex arc, whereby said gauge member is cantilevered from said supporting structure adjacent said handle, the working area yieldable and the center of the knife open.

2. A hand-manipulated knife comprising a blade supporting structure substantially annular in shape and including a handle projecting from one side thereof, a ring-shaped blade of short axial length rotatably supported in said structure with a cutting edge at one end projecting from one side of said structure and gear teeth at its other end, a pinion adjacent to said handle in mesh with said gear teeth on said blade for rotating said blade, a first member at the end of said blade opposite said cutting edge connected to said supporting structure adjacent said handle and extending therefrom parallel with the axis of said blade, a second member offset from the axis of said blade and connected to said first member for adjustment lengthwise of the axis of said blade, and a ring-like gauge member extending about 280° to 290° having one end fixed to said second member with its axis concentric with the axis of said blade, said ring-like gauge member having a maximum dimension in cross section equal to about one-eighth of the interior diameter of said blade and at least part of its radially outer side remote from said handle facing in the direction of said cutting edge being a convex arc, whereby said gauge member is cantilevered from said supporting structure adjacent said handle, the working area yieldable and the center of the knife open.

3. A hand-manipulated knife comprising a blade supporting structure substantially annular in shape and including a handle projecting from one side thereof, a ring-shaped blade of short axial length rotatably supported in said structure with a cutting edge at one end projecting from one side of said structure and gear teeth at its other end, a pinion adjacent to said handle in mesh with said gear teeth on said blade for rotating said blade, a plate-like first member at the end of said blade opposite said cutting edge connected at one end to said supporting structure adjacent said handle and extending therefrom with the plane thereof parallel with the axis of said blade, a second member spaced from the axis of said blade connected to said plate-like first member for adjustment lengthwise of the axis of said blade, and a ring-like gauge member having one side fixed to said second member with its axis concentric with the axis of said blade, said ring-like gauge member having a maximum dimension in cross section equal to about one-eighth of the interior diameter of said blade and at least part of its radially outer side facing in the direction of said cutting edge being a convex arc, whereby said gauge member is cantilevered from said supporting structure adjacent said handle, the working area yieldable and the center of the knife open.

4. A hand-manipulated knife comprising a blade supporting structure substantially annular in shape and including a handle projecting from one side thereof, a ring-shaped blade of short axial length rotatably supported in said structure with a cutting edge at one end

projecting from one side of said structure and gear teeth at its other end, a pinion adjacent to said handle in mesh with said gear teeth on said blade for rotating said blade, a plate-like first member at the end of said blade opposite said cutting edge connected at one end to said supporting structure adjacent said handle and extending therefrom with the plane thereof parallel with the axis of said blade, said plate-like first member having a longitudinal guide surface therein, a second member spaced from the axis of said blade connected to said plate-like first member and adjustable along said guide surface lengthwise of the axis of said blade, said adjustable connection between said first and second members comprising a first screw member for moving said second member lengthwise of said guide surface on said first member and a second screw member for selectively clamping said members together, and a ring-like gauge member having one side fixed to said second member with its axis concentric with the axis of said blade, said ring-like gauge member having a maximum dimension in cross section equal to about one-eighth of the interior diameter of said blade and at least a part remote from said handle having its radially outer side facing in the direction of said cutting edge being a convex arc, whereby said gauge member is cantilevered from said supporting structure adjacent said handle, the working area yieldable, and the center of the knife open.

5. A gauge for a hand-manipulated knife having a blade supporting structure substantially annular in shape and including a handle projecting from the side thereof, a ring-like blade of short axial length rotatably supported in the structure with a cutting edge at one end projecting from the structure and gear teeth at its other end, and a pinion adjacent to the handle in mesh with the gear teeth on the blade for rotating the blade, said gauge comprising a ring-like gauge member having a maximum diameter less than the interior diameter of the blade of the knife and a maximum dimension in

cross section equal to about one-eighth of the interior diameter of the blade of the knife and at least part of its radially outer edge facing in the direction of the cutting edge of the blade of the knife a convex arc, a first member connected to said ring-like gauge member adjacent one side thereof and extending parallel with the axis thereof, a second member adapted to be connected to the supporting structure of the knife adjacent the handle thereof and extend parallel with the axis of the blade of the knife, and means connecting said first member to said second member for adjustment thereof and said ring-like gauge member lengthwise of the axis of the blade.

6. A gauge for a hand-manipulated knife having a blade supporting structure substantially annular in shape and including a handle projecting from the side thereof, a ring-like blade of short axial length rotatably supported in the structure with a cutting edge at one end projecting from the structure and gear teeth at its other end, and a pinion adjacent to the handle in mesh with the gear teeth on the blade for rotating the blade, said gauge comprising a ring-like gauge member extending about 280° to 290° having a maximum diameter less than the interior diameter of the blade of the knife and a dimension in cross section equal to about one-eighth of the interior diameter of the blade and at least part of its radially outer edge facing in the direction of the cutting edge of the knife a convex arc, a first member connected to said ring-like gauge member adjacent one side thereof and extending parallel with the axis thereof, a plate-like second member adapted to be connected to the supporting structure of the knife adjacent the handle thereof and extend parallel with the axis of the blade, first screw means connected to said first and second members for adjustment of said first member and said ring-like gauge member lengthwise of the axis of the blade, and a second screw means for fixedly connecting said first and second members together.

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