

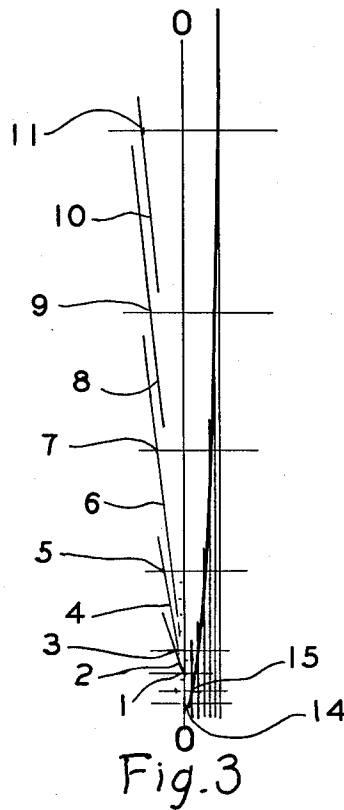
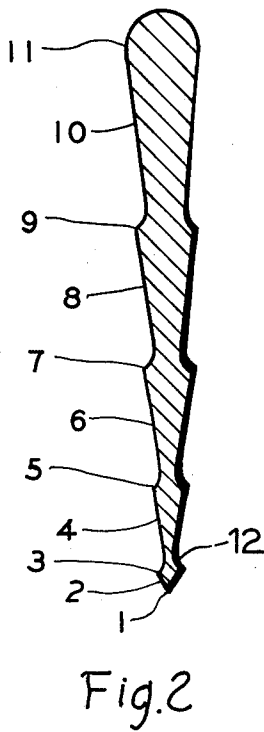
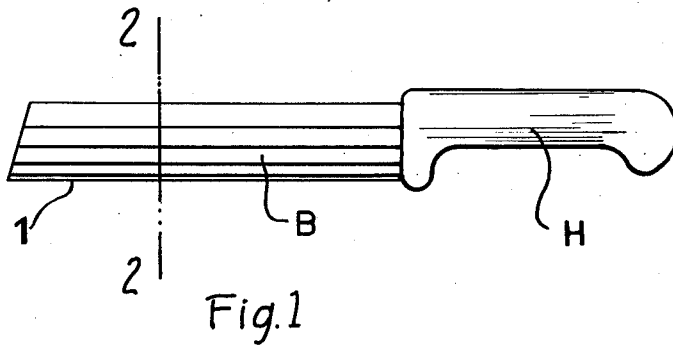
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SLICING KNIFE

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## SLICING KNIFE

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This invention relates as indicated to a slicing knife, and more particularly to a knife especially suited for slicing materials of a relatively soft and sticky nature such as cheese, butter, boiled potato, mush, soft cake and other materials of similar consistency. These materials stick to the blade of an ordinary knife, rendering it difficult to cut a slice of the thickness desired, and further making it difficult to disengage the blade from the material.

A time honored means of cutting soft and sticky material is by use of a stretched wire, which overcomes the adhesion problem, but is difficult to control and leaves the handling of the cut-off portion as a separate problem.

A wire-like or beaded edge in combination with a solid blade offers considerable improvement. Thin slices may be cut where the severed portion is free to curl away, but on deep cuts the material is apt to reclose against the blade and again present the adhesion difficulty.

Characteristics which I deem necessary to enable a knife blade to satisfactorily slice sticky and soft material are:

(1) contact between the blade and the material cut should be limited to the narrowest possible areas or zones with reference to the width of the blade.

(2) The angle between the blade and the material cut should be such that deflection takes place, rather than parallel slipping.

(3) Repeated deflections are necessary in a blade of desirable width, since the material constantly tends to reclose and deflecting surfaces must be adequate to support the material in intermittent contact, touching only the high points of the blade as it passes through, never allowing complete contact to be established.

A primary object of this invention is accordingly to provide a knife which will not stick to the material being cut, thereby facilitating slicing, affording better control of the thickness of the slice and permitting easy handling of the cut slice.

A further object is to provide such a knife which may subsequently be easily cleaned.

Still another object is to provide such a knife of a design facilitating high production, low cost manufacture.

Other objects of the invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features herein-after fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

FIG. 1 is a side elevation of a knife embodying the principles of the invention;

FIG. 2 is a transverse section through the blade of such knife taken on the line 2—2 on FIG. 1; and

FIG. 3 is a diagram illustrating a method of laying out a knife blade cross-section in a preferred manner to obtain the advantages of my invention.

Referring generally to FIG. 1 of the drawing, the handle H may be in integral part of the knife, as when the entire item is molded of rigid synthetic plastic material, or the handle may be separately produced and subsequently attached. The blade B is shown as being of

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uniform cross-section throughout its length. This is preferred functionally, as the greatest possible length of deflection surfaces is provided when they are continuous.

Another advantage of the uniform section blade is the ease with which it can be produced by the extrusion process. I have had exceptionally fine results with knives produced by cutting to length the extruded section, trimming one end to form a tang and attaching a handle. The cutting edge 1 may preferably be of greater length than the back of the blade.

Referring to FIG. 2 wherein the cross-section of the blade is shown, it will be seen that the cutting edge 1 is sharpened on a somewhat wider angle than a conventional knife, and that the sloping sides 2 are interrupted at point 3 which is only slightly behind the cutting edge. At 3, the blade is abruptly thinned, the surface curving inward on a smooth curve 12 which blends into a second sloping surface 4 which is wider than the sides 2, but at lesser angle of inclination, and encompasses a portion of the blade which is thicker than at 3, before being terminated at 5. At 5, the blade is again thinned and the surface blended into sloping portion 6, which is wider and less inclined than 4, and terminates at 7 where the blade is thicker than at either 3 or 5. In similar manner the blade is thinned and blended into surfaces 8 and 10 respectively. The upper edge of the blade is preferably blended into a radius, as shown.

I have shown five inclined surfaces 2, 4, 6, 8 and 10 on each side of the blade including the surfaces which originate at the cutting edge 1, separated by four narrowed-in portions originating at 3, 5, 7 and 9 respectively. The exact number of such surfaces is not an essential feature of my invention; rather it is the shape and relative arrangement of the various elements which determines the success of the blade. Consideration of the manner in which the material being cut reacts will make clear that this is true.

It will be seen that material split by the blunt point 1 will tend to resist separation and consequently will exert considerable pressure on surfaces 2. To avoid build-up of the pressure which could result in sticking, if continued, the surfaces 2 are made relatively narrow. The material split at 1 is unable to reclose immediately against the narrowed section at 3, but will instead impinge upon the slope 4 at some point part way up the slope toward 5, being thereby further deflected. From 5, the material will again skip over to a point on slope 6, then skipping at 7 and 9 to surfaces 8 and 10 respectively.

The arrangement of the various surfaces in decreasing angularity and increasing width results in the cut material being forced apart most rapidly by and near the cutting edge 1. Side pressure against the blade is thus concentrated near the entering edge of the blade, and diminishes to nearly nothing toward the back of the blade. This diminishing pressure on the material promotes a tendency for the material to flow by the blade without sticking.

It will be observed that the terminal edges of the deflecting surfaces at 3, 5, 7, 9 and 11 fall into a curve which is convex toward the outside surface of the blade. If these were in a straight line, the result would be to sustain the side pressure on the blade, while if the curve were concave outwardly, the result would be to cause a building up of pressure toward the rear of the blade; neither of these latter conditions is desirable.

Reference may now be had to FIG. 3 where there is illustrated a convenient method of laying out the cross-section of a knife embodying the features of my preferred construction. Starting with a vertical center line O—O which will be the center line of the blade, a point of origin on this line is selected and a horizontal axis is drawn. Equal horizontal distances are laid off to right

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and left of the center line on this horizontal axis and vertical lines are drawn upward through each such division point. On each of these vertical lines a distance is laid off measured from the horizontal axis upward, which is equal in each case respectively to the square or second power of the corresponding horizontal distance from the vertical center line. Proportions of the blade are easily adjusted by using different units on the vertical distances than on the horizontal ones; the example shown in FIG. 3 has been thus heightened.

Thus, in FIG. 3 the origin point is 14, and the first point 15 is one horizontal and one vertical division removed therefrom while point 3 is at two horizontal and four vertical units removed, point 5 is three horizontal and nine vertical units removed, and so on for points 7, 9 and 11. It will be seen that the resulting points define a curve related to a parabola, deviating from a true parabola only in the use of different scales for the scales for the horizontal and vertical ordinates. These points are taken as the terminal points of the various flat deflecting surfaces as identified on the blade cross-section in FIG. 2.

The actual point of origin 14 could be taken as the cutting edge, but because of the excessively thin section which results I prefer to use instead the second point 2 as the first terminal point and draw through this point the inclined lines which enclose the desired included angle for the cutting edge. A 45° included angle has proved satisfactory functionally and is producible by either molding or extrusion without need for subsequent resharpening.

The intersection of the lines defining the sides of the cutting edge with the center line locates the actual edge of the blade, designated 15. The next deflecting surfaces are then defined by connecting the apex with the various points which have been located. The surfaces toward the rear of the blade tend to become too flat where this construction is followed on all surfaces; hence it is preferable that the rearward surfaces be made parallel to each other, that is, the angle of inclination becoming constant. The curves such as 12 by which the various terminal points of one surface are connected to the next succeeding surface may be of a uniform radius which is used in all cases.

The above-described method is not the only means of producing a satisfactory blade in accordance with this invention; blades which closely conform to the outlined formula are satisfactory, however, and it is to be recommended.

It will be seen from the foregoing that I have provided a slicing knife of novel cross-section providing a series of successive inclined surfaces of general wedge-like contour, each surface terminating in a shoulder where the next succeeding surface commences and such shoulders defining points on an outwardly convex curve. Stated in another manner, each shoulder projects further laterally outwardly than the corresponding point on a straight line interconnecting the two shoulders on either side thereof. The blade may be of extruded material such as aluminum or synthetic plastic, or of molded synthetic plastic such as high impact polystyrene, phenol formaldehyde resins, nylon or Teflon (tetrafluor-ethylene), or of rolled stainless steel. In fact, any appropriate rigid material may be utilized. The shoulders or ripples on the sides of the blade repeatedly deflect the severed material away from the blade, such shoulders or ripples being rather abrupt toward the back side of the blade to facilitate separation of the material being cut therefrom. There should be at least three successive shoulders of the type indicated and, of course, a larger number may be employed as shown for a wider blade. A very sharp or keen cutting edge is ordinarily not desired and the material should be initially separated and deflected by a relatively blunt edge portion which may, for example, have an included angle of approximately 45°.

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My new knife is not only exceptionally effective for the stated purpose of slicing materials such as cheese and the like, but is also effective in separating previously sliced materials which have subsequently become stuck together without inadvertently cutting into the same in undesired places. In other words, my new knife with its blunt edge and successive outwardly deflecting lateral planes will both follow an established cut and will effectively separate the material.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A slicing knife having a blade provided with a plurality of at least three longitudinally extending side surface portions on at least one side of said blade each inclined toward the cutting edge of the blade, whereby shoulders intervene between each said portion and the next succeeding portion toward the back of said blade, and in which each intermediate shoulder projects laterally outwardly farther than a corresponding point on a straight line between the next adjacent shoulders on each side thereof.

2. The knife of claim 1, wherein said edge is blunt, having an included angle on the order of 45°.

3. The knife of claim 1, wherein said shoulders are all parallel to said cutting edge and extend the entire length of said blade.

4. The knife of claim 1, wherein said shoulders are all parallel to said cutting edge and extend the entire length of said blade, and said blade is of uniform cross-section throughout its length.

5. The knife of claim 1, wherein said side surface portions are of successively greater width toward the back of said blade.

6. The knife of claim 1, wherein said side surface portions are of successively greater width toward the back of said blade, and the corresponding shoulders likewise project laterally to a greater extent than the next adjacent shoulder toward such edge.

7. A slicing knife having a blade provided with a plurality of at least three longitudinally extending substantially flat side surface portions on at least one side of said blade each inclined toward the cutting edge of the blade, whereby shoulders intervene between each said portion and the next succeeding portion toward the back of the blade, said side surface portions being of successively greater width toward the back of said blade, said shoulders being parallel to said cutting edge and extending continuously the entire length of said blade, each shoulder projecting laterally to a greater extent than the next adjacent shoulder toward such edge and projecting farther than a corresponding point on a straight line between the next adjacent shoulders on each side thereof, and said blade being of uniform symmetrical cross-section throughout its length.

8. A knife blade having a cutting edge with divergent sloping surfaces on each side of the centerline of the blade terminating abruptly, and multiple deflecting surfaces paralleling the cutting edge, such deflecting surfaces having their origins depressed relative to the adjacent surfaces on the edge nearer to the cutting edge, terminating abruptly at their edges more remote from the cutting edge; wherein the included angles defined by lines drawn through the terminal points of said sloping surfaces and the apex or cutting edge are smaller on each remotely situated surface than on the surface closest to said cutting edge.

9. A knife blade having a cutting edge with divergent sloping surfaces on each side of the centerline of the blade terminating abruptly, and multiple deflecting surfaces paralleling the cutting edge, such deflecting surfaces having their origins depressed relative to the adjacent sur-

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faces on the edge nearer to the cutting edge, and sloping away from the centerline in a direction receding from the cutting edge, terminating abruptly at their edges more remote from the cutting edge; said deflecting surfaces being of progressively increasing width considered from the cutting edge toward the rear of the blade.

10. A knife blade having a cutting edge with divergent sloping surfaces on each side of the centerline of the blade terminating abruptly, and multiple deflecting surfaces paralleling the cutting edge, such deflecting surfaces having their origins depressed relative to the adjacent surfaces on the edge nearer to the cutting edge, and sloping away from the centerline in a direction receding from the cutting edge, terminating abruptly at their edges more remote from the cutting edge; said deflecting surfaces being disposed at progressively diminishing angles of inclination relative to the center line of the blade.

11. A knife blade having a cutting edge with divergent sloping surfaces on each side of the centerline of the blade terminating abruptly, and multiple deflecting surfaces paralleling the cutting edge, such deflecting surfaces hav-

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ing their origins depressed relative to the adjacent surfaces on the edge nearer to the cutting edge, and sloping away from the centerline in a direction receding from the cutting edge, terminating abruptly at their edges more remote from the cutting edge, several successive such deflecting surfaces being so disposed that the prolongation of their plane surfaces will pass through the cutting edge of the blade.

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