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SINGLE BLADE CHOPPING KNIFE

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The present invention relates to a mincing or chopping knife, and involves certain improvements which render the knife vastly superior in various respects, to kindred knives hitherto known and used in the meat processing industry for chopping, mincing or comminuting fresh or frozen meats. The knife is of the type which may be fixed upon a rotating shaft, to work within a trough as the drawings indicate, for mincing a quantity of meat carried by the trough.

One object of the invention is to provide an improved single-blade knife of the character stated, which embodies safety features preventing accidental full displacement of the knife from its rotating shaft, and such partial displacement which might mutilate or destroy nearby elements of the equipment with which the knife is associated in use.

Another object of the invention is to provide in a knife of the type referred to means for attaining accurate and normally unalterable adjustment of the blade tip in relation to the trough and other elements of the mincing apparatus, whereby performance of the knife is kept constant, and liability of the knife to cut the trough upon loosening at the shaft, is effectively and positively eliminated.

Another object is to embody in such a knife, simple and inexpensive adjustment and safety features which add nothing to the cost of producing the knife, nor of maintaining it in service.

A further object is to embody improvements in a mincing apparatus knife, to enhance the effectiveness and economy of use of the apparatus as a whole, while at the same time minimizing the hazard factor.

The foregoing and other objects are attained by the means described herein and illustrated upon the accompanying drawings, in which:

Fig. 1 is a side elevational view of the improved mincing knife embodying the present invention.

Fig. 2 is a bottom plan view of the same.

Fig. 3 is an enlarged cross-sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a side view of a knife assembly or cluster, showing the normal relationship thereof to parts of the mincing apparatus illustrated in cross-section.

Fig. 5 is a perspective view of a cluster of knives shown mounted upon a shaft.

Apparatus as commonly employed in the mincing or chopping of meat and the like, is known to comprise a trough such as 9 the wall of which is part-cylindrical in cross-section, and adapted to contain or support a quantity of meat to be chopped or minced by a series of knives, the sharpened blades 10 of which closely sweep the inside surface of the trough, as shown. The knives ordinarily are fixed upon a rotatable driven shaft 13, with the blades 10 thereof extending radially of the shaft in spaced and staggered relationship. The spacing of the knives may be maintained with the use of spacing washers 32, while the knives are secured upon the shaft by means of a nut or similar retainer 34, according to Fig. 5.

The improved knife, which is best illustrated in Figs. 1 to 3, may comprise a single blade 10 having a sharpened leading edge 14 and a trailing edge 12, the latter being reduced in thickness as by means of a chamfer 15 to reduce drag and prevent creating a suction as the leading edge of the blade advances through the material undergoing mincing. The blade 10 preferably is flat and of uniform thickness, except that one face carries the chamfer 15 and the opposite face is feathered to provide the sharp edge 14, as indicated upon Fig. 3. The free or outer end of the blade likewise is feathered, to provide the sharpened tip 16 which constitutes a continuation of the edge 14 and meets it on a slight radius.

Formed integrally with blade 10 is a hub 18, having opposed flat, axial faces 40 and 41 which is enlarged and made substantially circular in form, with a thickness approximating that of the blade. Along a line 25—25 which is substantially parallel to one of the blade edges, and which passes through the center point of the hub, the hub is slotted to provide a throat 20 bounded by a pair of spaced parallel edges 22 and 26. The throat opening 20 extends in the direction of the blade tip, and is the same width as the distance between the slot side edges 22 and 26. One of the side edges such as 22, preferably is a continuation of the trailing edge 12 of the blade.

At the base of the hub slot, an integral tongue 24 is formed from the material of the hub, and extends from the inner ends of the throat edges 22 and 26 forwardly or toward the throat opening, in the general direction of the blade tip. This tongue 24 has a tip portion 23 located substantially midway between the slot edges 22 and 26, and is adapted to butt against the periphery of shaft 13 to limit the extent to which the blade tip 16 may approach the trough 9. By reason of the contact of the tongue against shaft 13 at all times, and even though the knife accidentally may become loose on the shaft, no amount of centrifugal force acting upon the knife blade will cause the knife to leave the shaft and damage the trough or any other parts of the apparatus. As will be understood, the tongue performs as a safety stop opposing any tendency of the knife to shift lengthwise as the shaft rotates at high speed, and consequently, proper spacing of the blade tip with relation to the trough is maintained irrespective of any loosening of nut 34.

In addition to performing as a safety stop, the tongue 24 serves as an adjustment means compensating for removal of metal from the knife tip incident to sharpening of the blade from time to time. Thus, if a blade be subjected to grinding that results in shortening the blade, so that it no longer would closely sweep the trough, a proper readjustment of the foreshortened blade toward the trough may be readily achieved by merely grinding off or otherwise removing metal from the tip, tongue 24 to the degree required for properly extending the knife tip outwardly of the shaft. Such removal of metal from the tongue may be resorted to repeatedly upon dressing of the knife tip, until the entire tongue is depleted and the blade worn out. Accordingly, the safety and adjustment features of the knife are preserved throughout the useful life span thereof. As was previously pointed out herein, the safety and adjustment means are incorporated in the knife at no expense additional to the cost of producing a knife omitting such features, and moreover, the knife throughout its useful life is maintained at proper adjustment to the trough in the interests of economy and uniformity of performance.

In establishing the tongue 24 within the throat of the hub, the length of the tongue may initially be such as...
to dispose the tip 23 thereof at a lesser distance from the center point of the hub, than the length of the shaft radius. The length of throat or slot 20 will preferably exceed the shaft diameter, in order that the side edges 22 and 26 of the slot may have a full bearing upon the opposed parallel flats 28-28 of the shaft, the obvious purpose of which is to preclude rotation of the knives relative to the shaft, and to transmit rotation of the shaft to the knives without slippage. As will be understood, the distance between the flats of the shaft is but slightly less than the space between the slot side edges 22 and 26, so that a nice fitting of the knives to the shaft is assured.

The number of knives applicable to any given shaft 13 is, of course, dependent upon the number of flats formed on the shaft. For example, in Fig. 4, the shaft in order to carry six knives disposed at sixty-degree angularity to one another, would require six sets of flats, whereas if the assembly were to include knives disposed as in Fig. 5, at ninety-degree angularity, eight sets of flats would be needed on the shaft.

It is to be understood that various modifications and changes in the structural details of the device may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. A chopping and mincing knife comprising a substantially flat body including an elongate blade having a free end tip, and a slotted hub integral with the blade, the slot having a base and a throat, said throat being open in the direction of the blade tip, and a tongue extending toward the throat and in the general direction of the blade tip, said tongue adapted to abut against a portion of the periphery of a shaft upon which the blade is mounted, said tongue being reducible as to length for establishing a fixed distance between the tongue and the blade tip.

2. A chopping and mincing knife comprising a substantially flat body including an elongate blade having a free end tip, and a slotted hub integral with the blade, the slot having a base and a throat, said throat being open in the direction of the blade tip, and having a tip extending toward the throat and in the general direction of the blade tip, the tongue tip being reducible as to length for establishing a fixed distance between the tongue tip and the blade tip as the latter is worn away incident to sharpening, the tip of the tongue being disposed on a line which bisects the slot in the direction of its length.

3. A chopping and mincing knife for application to a rotary driving shaft having at least one pair of spaced parallel flats, said knife comprising a substantially flat body including an elongate blade having a free end tip, and a slotted hub integral with the blade, the slot having a base and a throat, said throat being open in the direction of the blade tip, the width of the slot and the throat being slightly greater than the distance across the flats of the shaft, whereby the shaft is receivable in the slot at the flats, a tongue integral with the hub, the tongue being located at the base of the slot, a tip on the tongue extending toward the blade tip, and adapted to abut said shaft, the tongue tip being reducible as to length for establishing a fixed distance between the blade tip and the axis of rotation of the shaft whenever the blade tip is worn away incident to dressing by grinding, said tongue tip being on a line which passes through the shaft axis and parallels the elongate blade.

4. The device as specified in claim 3, wherein the tip of the tongue within the hub slot is spaced from the center point of the hub a distance less than the length of the shaft radius, thereby to enforce off-set of the shaft axis from the hub center in the direction of the blade tip.

5. A chopping and mincing knife for application to a rotary driving shaft having at least one pair of spaced parallel flats to engage the knife, said knife comprising a substantially flat body including an elongate blade having a sharpened leading edge, a trailing edge, and a sharpened free end tip, a slotted hub integral with the blade, the slot having a base and a throat, said throat being open in the direction of the blade tip, the width of the slot and the throat being slightly greater than the distance across the flats of the shaft, whereby the shaft is receivable in the slot at the flats, said slot being bounded by spaced parallel side edges disposed in substantial parallelism with one of the aforesaid edges of the blade, a tongue integral with the hub, the tongue being located at the base of the slot, the tongue having a tip extending toward the blade tip to abut said shaft, the tongue tip being reducible as to length for establishing a fixed distance between the blade tip and the axis of the shaft whenever the blade tip is worn away incident to renovation, said tongue tip being on a line which passes through the shaft axis and parallels one of the aforesaid edges of the elongate blade.

6. The device as specified in claim 5, wherein the tip of the tongue within the hub slot is spaced from the center point of the hub a distance less than the length of the shaft radius, thereby to enforce off-set of the shaft axis from the hub center in the direction of the blade tip.

7. The device as specified in claim 5, wherein the trailing edge of the blade is chamfered to reduce drag, and one of the slot side edges is continuous with said trailing edge.

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