

Oct. 12, 1954

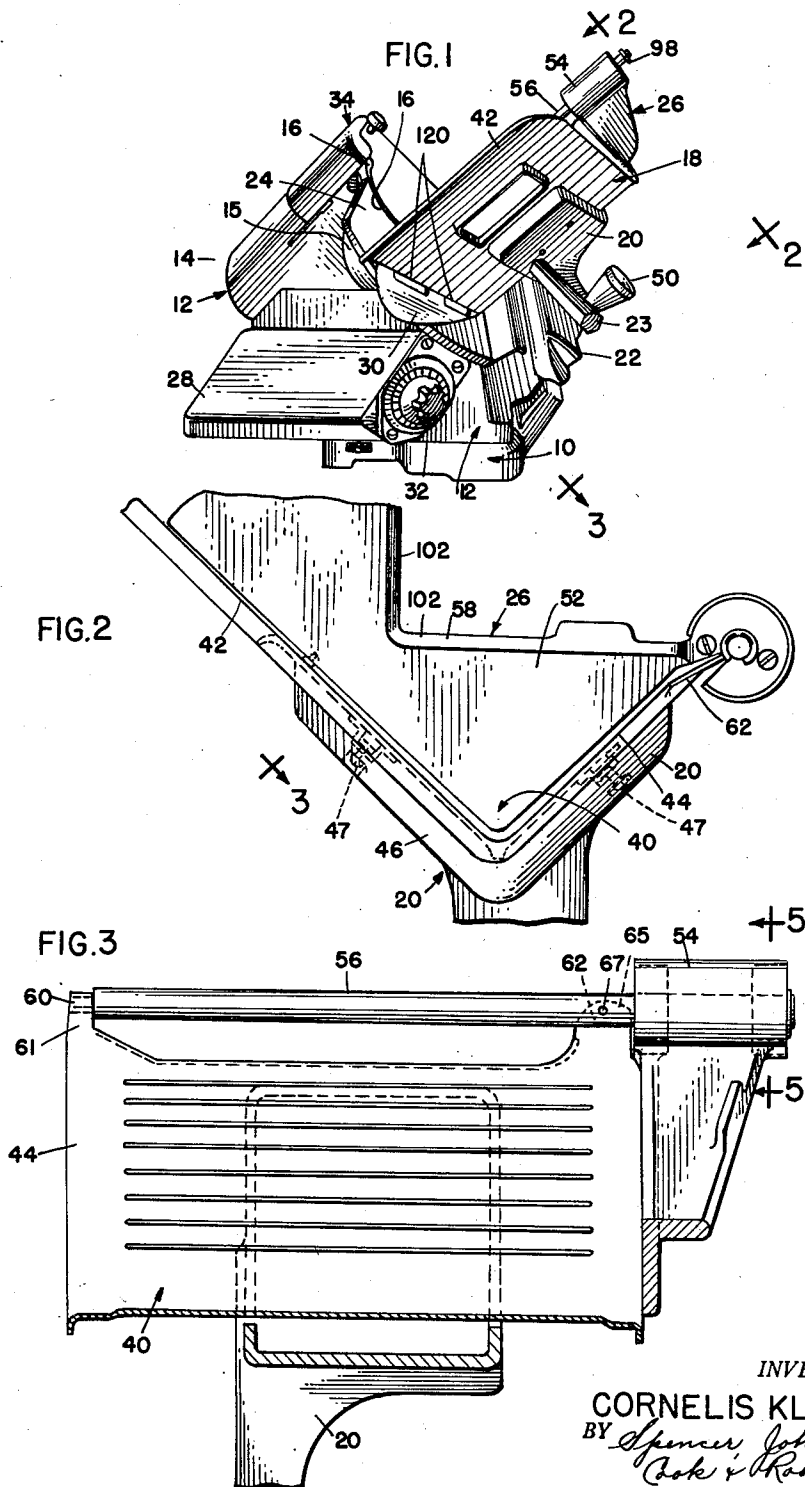
C. KLINGENS

2,691,397

PUSHER PLATE HAVING ROLLER BEARING FOR SLICING MACHINES

Filed Sept. 25, 1950

4 Sheets-Sheet 1



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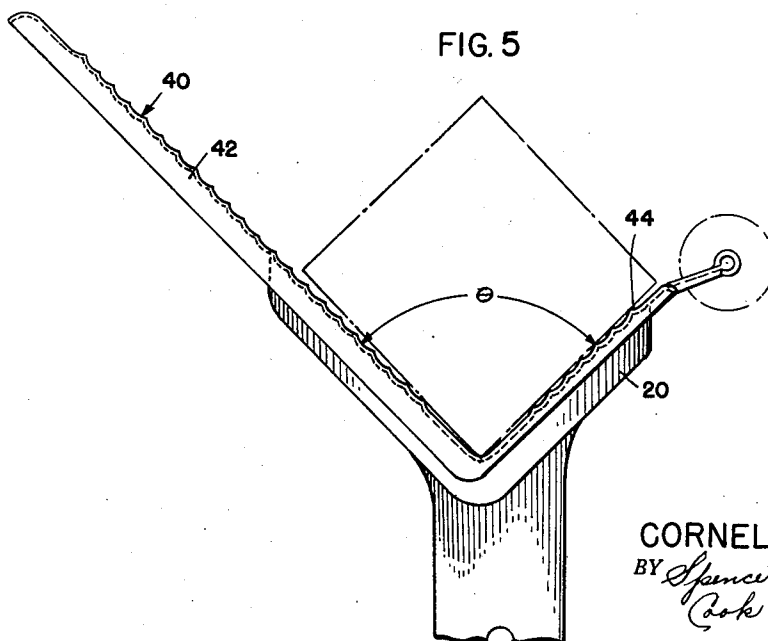
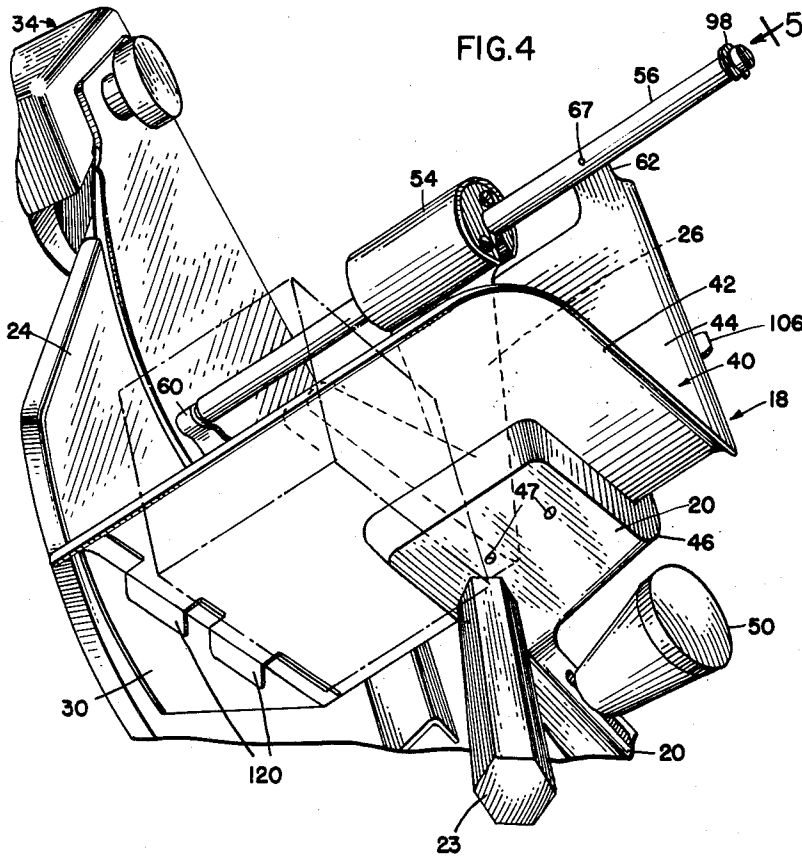
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4 Sheets-Sheet 2



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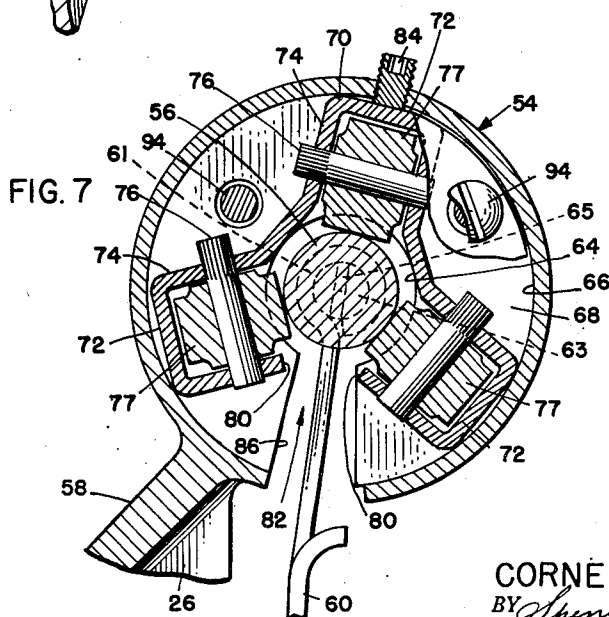
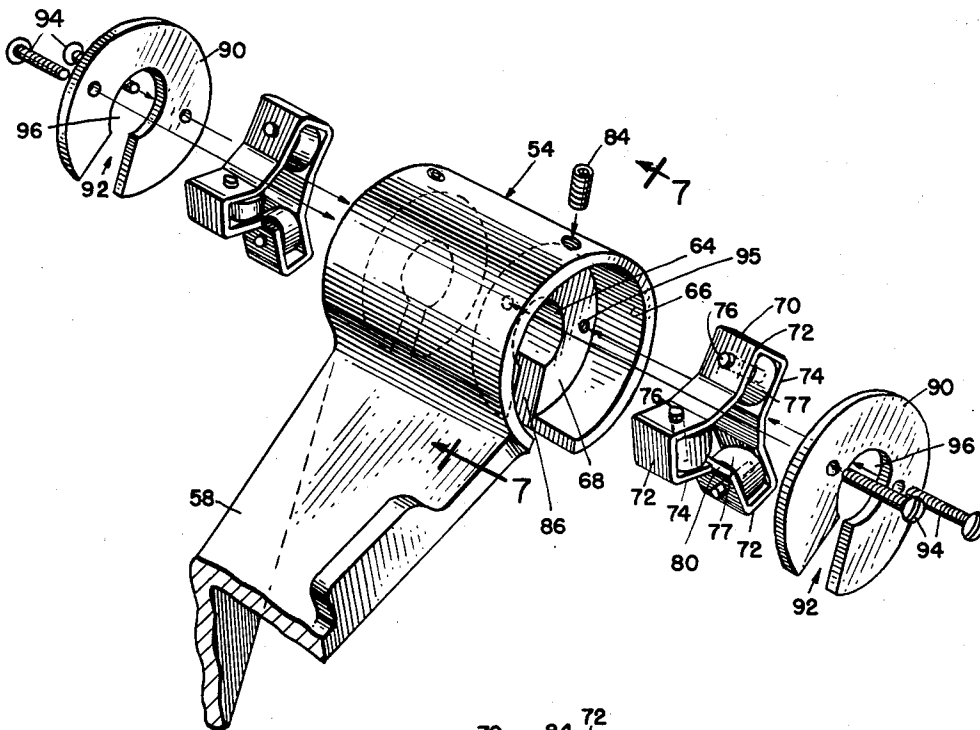
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PUSHER PLATE HAVING ROLLER BEARING FOR SLICING MACHINES¹

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4 Sheets-Sheet 3

FIG. 6



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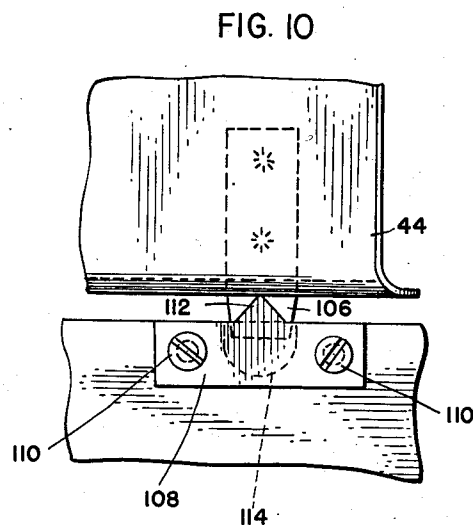
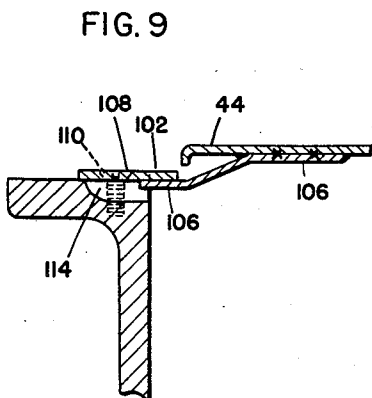
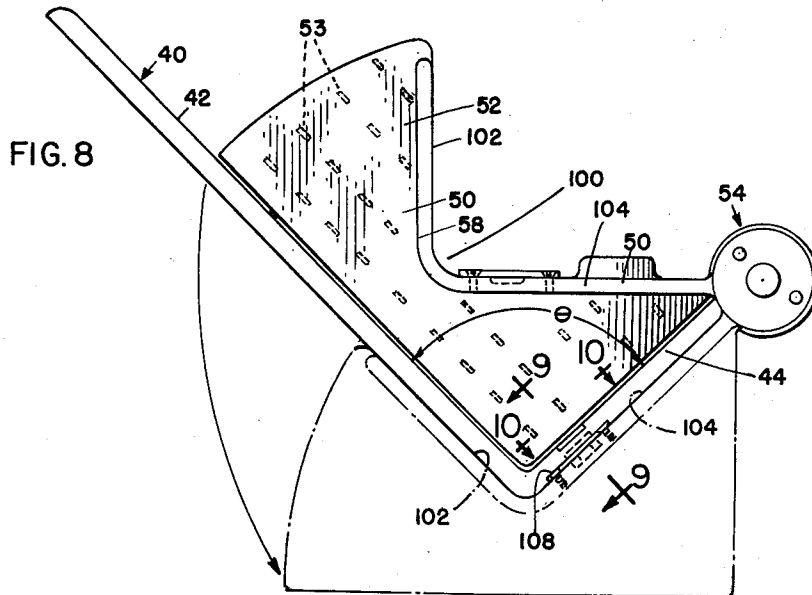
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,691,397

PUSHER PLATE HAVING ROLLER BEARING
FOR SLICING MACHINESCornelis Klingens, La Porte, Ind., assignor to U. S.
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a corporation of Indiana

Application September 25, 1950, Serial No. 186,646

5 Claims. (Cl. 146—102)

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The present invention relates to slicing machines in general and in particular to a novel meat table construction for slicing machines of the rotary knife type.

The improved food table construction comprising the present invention is applicable to slicing machines of the general type shown and described in a copending application of Cornelis Klingens, the present applicant, and James Leslie Foster, Serial No. 747,994, filed May 14, 1947 now Patent No. 2,563,120 issued August 7, 1951, and assigned to the present assignee, and also in the patent to Meyer No. 2,482,787, dated September 27, 1949, the structure of both applicants having associated therewith a food table of the V-type and the patented structure of Meyer having associated therewith a food pusher slidable along the food table.

It is among the principal objects of the present invention to provide a slicing machine of the type shown in the above-mentioned application and patent having associated therewith an improved food pusher which is provided with novel bearing means for slidably supporting the pusher on the food table.

A more specific object of the invention is to provide an improved slide bearing construction for the food pusher wherein the bearing elements are easily assembled and disassembled for purposes of inspection, cleaning, repair or replacement.

Another object of the invention is to provide a slide bearing construction for the food pusher including a slide rod and sleeve bearing therefor and in which the sleeve bearing has associated therewith a caged roller bearing unit which is capable of adjustment on the guide rod by means of single take-up operation involving a single take-up screw.

Another object of the invention is to provide a slide bearing construction for the meat pusher in which many of the operative parts thereof may be constructed of light sheet metal stampings thereby materially reducing the cost of manufacture thereof.

Another object of the invention is to provide a slide bearing for the food pusher which not only will permit the pusher to be swung to an out-of-the-way position to clear the food table and permit free use of its entire surface, but which, additionally, will serve to guide the food pusher into its out-of-the-way position when desired, while at the same time preventing accidental displacement or dislodgment of the food pusher from its support on the food table.

A still further object of the invention, in a

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slicing machine of the type outlined above, is to provide a holding means which cooperates with the pusher bearing instrumentalities and particularly with one of the food penetrating prongs provided on the pusher member for holding the pusher member in an out-of-the-way position when not in use and when it is desired to utilize the entire surface of the food table.

Still another object of the invention is to provide a gravity feed food table for slicing machines of the type illustrated in the above mentioned application and patent in which the angle existing between the operative planes of the food table sides is so proportioned that improved gravity feed of the foodstuff undergoing slicing will be attained.

Yet another object of the invention is to provide a food table for slicing machines having a thumb guard associated therewith which is formed with a viewing opening therethrough in order to enable the operator to visually ascertain the nature of the cutting operation on the foodstuff as the cutting knife penetrates the latter.

The provision of a food table construction for slicing machines which is relatively simple in its construction; one which is possessed of a minimum number of moving parts and which consequently is unlikely to get out of order; one which is rugged and durable and which consequently will withstand rough usage; one which will readily handle a large variety of foodstuffs; one which may be manufactured at a relatively low cost; and one which is pleasing in its design and attractive in its appearance are further desirable features that have been borne in mind in the production and development of the present invention.

In the accompanying four sheets of drawings forming a part of this specification,

Fig. 1 is a perspective view of a slicing machine having a food table constructed in accordance with the principles of the present invention;

Fig. 2 is an enlarged end elevational view taken from the plane indicated by the lines 2—2 of Fig. 1 and in the direction of the arrows;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is an enlarged detail perspective view of the food table showing a rectilinear block of foodstuff applied thereto;

Fig. 5 is an end elevational view taken from the plane indicated by the line 5—5 of Fig. 4 and in the direction of the arrows;

Fig. 6 is an exploded view of a food pusher bearing sleeve assembly employed in connection with the present invention;

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Fig. 7 is an enlarged sectional view taken along the plane indicated by the line 7—7 of Fig. 6 in the direction of the arrows;

Fig. 8 is an end elevational view of the food table showing the food pusher construction in side elevation;

Fig. 9 is an enlarged sectional view taken substantially along the line 9—9 of Fig. 8; and

Fig. 10 is a top plan view of the structure shown in Fig. 9.

In all of the above described views, like characters of reference are employed to designate like parts throughout.

The food table construction comprising the present invention is possessed of four features of novelty, all of which cooperate with one another to produce a food table which, when associated with a slicing machine of the type shown in the above mentioned patent to Meyer, will function to slice a block of foodstuff more efficiently than has heretofore been possible. Among these points of novelty are a novel form of bearing construction for the food pusher element, a latch mechanism made possible by the use of the novel form of bearing for retaining the food pusher in an out of the way position when not in use, a food table form wherein the angle existing between the food table sides is such as to permit a better gravity feed of the foodstuff and food pusher during slicing operations, and a novel thumb guard construction which will permit visual inspection of the foodstuff directly in the vicinity of the cutting operations. These features of novelty, in so far as practicable, will be described and discussed in the order named.

General description

The slicing machine comprising the present invention involves in its general organization a supporting structure or main frame 10 (Fig. 1) which may be formed as an aluminum or other metallic casting. The frame 10 includes an up-standing casing 12 having a motor housing section 14 adapted to enclose therein the driving motor (not shown) for the usual circular rotary knife 16 which is supported for rotation about an inclined axis by means of a knife box 18 projecting laterally from the housing section 14. An inclined food table 18 of the V-shaped type is arranged perpendicular to the slicing knife 16 so that a block of foodstuff carried by the food table will be fed by gravity to the cutting plane of the knife for cutting slices from the piece of foodstuff. The inclined V-shaped food table is removably mounted on a bracket 20 (Figs. 1 and 4) which is connected to a slidable carriage 22 whereby the food table may be reciprocated in a linear path. A manipulating handle 23 is attached to the bracket for the purpose of permitting manual reciprocation of the bracket and food table in a manner well known in the art. A gauge plate 24 is provided for the purpose of gauging the thickness of slices to be cut from the foodstuff by the slicing knife 16. A food pusher in the form of an irregularly shaped plate-like member designated in its entirety at 26 is adapted to cooperate with the food table for the purpose of assisting the block of foodstuff to move by gravity downwardly along the food table 18 toward the slicing knife, or for the purpose of permitting the operator to forcibly move the foodstuff toward the plane of the slicing knife when desirable or necessary without actually manually touching the foodstuff itself. A slice receiving table 28 is provided beneath and be-

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hind the slicing knife 16 and gauge plate 24 for the purpose of receiving thereon slices of the foodstuffs severed from the main body thereof. A thumb guard 30 extends downwardly from one side of the food table 18 for the purpose of preventing the thumb or fingers of the operator from coming into contact with the circular knife. An adjusting knob 32 is provided and is operatively connected to the gauge plate 24 for the purpose of adjusting the position thereof relative to the plane of the cutting knife 16. A knife sharpener mechanism designated in its entirety at 34 is provided for the purpose of sharpening and burring the edge of the circular knife 16 when required.

The arrangement of parts briefly outlined above forms no part of the present invention, such an arrangement being either conventional or covered in the above mentioned application and patent and no claim is made herein to this arrangement, the novelty of the present invention residing rather in the several features of novelty briefly mentioned above and which will be more fully described and subsequently claimed.

The food pusher and its bearing support

Referring now to the drawings in detail and in particular to Figs. 4 and 6, the food pusher 26 is adapted to cooperate with the foodstuff support which in the present instance comprises an inclined V-shaped trough 40 having inclined substance supporting side surfaces 42 and 44. The surfaces 42 and 44 are preferably integrally formed and are disposed at an angle to each other which is slightly in excess of a right-angle for a purpose that will be made clear presently. The trough 40 is rigidly, adjustably and detachably held in position on the supporting bracket 20 and the latter is provided with a head portion 46 which likewise is of V-shape design to accommodate reception therein of the trough 40. The means for securing the trough 40 to the head 46 is a plurality of adjusting screws, two of which have been disclosed herein at 47. The bottom of the trough is inclined inwardly and downwardly with respect to a vertical plane and is maintained substantially at right angles to the plane of the cutting knife to permit the substance or foodstuff undergoing slicing to be fed by gravity to the slicing knife 16. The handle 23 on the trough-like head portion 46 permits the food table in its entirety, together with its supporting bracket 20, to be shifted to and fro in a linear path past the slicing knife 16 to permit slices to be cut from the foodstuff in the trough 40. The handle 23 is inclined downwardly and outwardly from the head portion 46 of the bracket 20 to an angle which will maintain the hand of the operator removed from the working edge of the knife 16, thus minimizing the possibility of accidental engagement of the knife with any part of the hand. The bracket 20 is slidably mounted on a longitudinal guide rod (not shown) beneath the frame, in the usual manner of mounting food tables, to permit such linear reciprocation of the food table. The bracket 20 is of the two-piece adjustable type and a clamping knob 50 serves to permit adjustment of one part relative to the other for initial adjustment of the food table relative to the slicing knife.

The food pusher 26 is somewhat similar in its design to that shown in the above mentioned Patent No. 2,482,787 and includes a plate 52 with its bottom edges formed to conform to the shape of the food table trough 40 so that its lower edges

will contact the surfaces 42 and 44. The plate 52 is formed with a series of teeth 53 thereon designated to engage the foodstuff in the trough 40. An outer bearing or sleeve 54 of novel construction is adapted to slide on a cylindrical rod 56 and the sleeve 54 may be integrally formed with or connected to the plate 52 by an offset angle bracket 58. The tubular rod 56 is suitably supported by means of a pair of ears 60 and 62 integrally formed on the side 44 of the food table.

The sleeve 54 is provided with a central bore 64 (Figs. 6 and 7) therein of reduced diameter, the opposite ends of which communicate with enlarged bore portions 66 at the end regions of the sleeve. The net effect of the reduced bore 64 and the enlarged bores 66 is to provide a tubular sleeve-like member having cup-shaped recesses in the opposite ends thereof which communicate with each other through the bore 64 and which are provided with flat bottom surfaces or shoulders 68 surrounding the bore 64 of reduced diameter.

Each of the recesses afforded by the bores 66 is adapted to receive therein a tightly fitting roller bearing cage 70 of generally triangular shape in cross section. Each cage 70 is formed from a thin sheet of resilient strip stock bent upon itself to provide three generally flat apex portions 72 arranged substantially 60° apart and each of which merges into a pair of parallel sides 74. A stub shaft 76 extends across each of the adjacent pairs of sides 74 and carries thereon a roller 77 which is disposed between the sides 74. The sheet of strip stock from which the cage 70 is formed is not continuous and the ends 80 thereof are separated from each other, thus providing a slit 82 in the cage structure which permits the cage to have a certain degree of flexibility whereby it may be expanded or contracted to bring the axes of the rollers 77 closer to each other or to spread these axes apart. The reduced bore 64 of the sleeve 54 is adapted to loosely receive therein the bearing rod 56 so that the sleeve may slid along the rod in either direction. Each cage 70 is positioned within its respective recess in the sleeve 54 so that the apex 72 of the cage remote from the slit 82 is in register with an adjusting screw 84 which passes through the wall of the enlarged bore 66 and bears against the apex 72. With the adjusting screw 84 loosened, the three apices 72 may bear against the inner wall of the bore 66 with the rollers 77 widely separated so as to admit the bearing rod 56 in the reduced bore 64, in which it has a loose fit. Upon tightening of the adjusting screw 84, the particular apex of the cage 70 with which it is in register is forced inwardly of the bore 66 so that its respective roller 77 is moved inwardly of the bore 66 to engage the rod 56 and force the same into engagement with the two other rollers 77. Thus, the three rollers 77 may be caused to lightly engage or bind the rod 56 so that there is no lateral play of the sleeve 54 on the rod 56 and so that the six rollers carried by the two bearing cages 70 may form the sole bearing support for the bearing sleeve 54 upon the rod 56.

The body portion of the sleeve 54 is provided with a radial slit 86 therein which extends completely through the sleeve 54 from the periphery thereof to the internal bore 64, and the direction of extent of the slit 86 is such that its outer region is in close proximity to the angle bracket 58 of the food pusher 26. A pair of retaining members 90 in the form of flat ring-like washers having a radial slit 92 formed therein are adapted

to be received on the ends of the bearing sleeve 54 and secured in position by means of anchoring screws 94 which are threadedly received in threaded openings 95 provided in the shoulder portions 68 of the bearing sleeve for retaining the cage members 70 in position within the recesses 66. Each of the cap members 90 is provided with a central bore 96 which fits closely around the bearing rod 56 and serves in a large measure to prevent entrance of food particles or other foreign substances into the bearing sleeve 54. The slits 92 provided in the cap members 90 are maintained in register with the slit 86 provided in the body portion of the sleeve 54.

When the food pusher 26 is in its operative position within the V-shaped trough 40, the slit 86 in the sleeve bearing member 54 and the slits 92 of the retaining members 90 are in register with the upper ear 62 by means of which the bearing rod 56 is attached to the food table so that the pusher member may be slid rearwardly and upwardly to cause the bearing member 54 to pass completely over the ear 62 to an extreme position wherein the upper cap member 90 engages an annular flange or shoulder 98 in the form of a split washer provided adjacent the end of the rod 56 and which serves as a limit stop to prevent complete removal of the bearing sleeve 54 from the rod 56.

With the bearing sleeve 54 in its upper limiting position wherein the cap member 90 engages the shoulder 98, the food pusher 60 just clears the upper end of the trough 40 so that the pusher may be swung in the direction of the arrows indicated in Fig. 8 to a lower dotted line position wherein it assumes an out of the way position out of register with the trough 40.

To insure compactness of the food table as a whole when the food pusher assumes its out-of-the-way position as shown in dotted lines in Fig. 8, the body portion thereof is provided with a substantially right angular recess 100 therein, thus providing side edges 102 and 104 which closely underlie the sides 44 and 42, respectively, of the trough 40 when the food pusher 26 is in its out-of-the-way position.

The food pusher hanger construction

In order to retain the food pusher 26 in its out-of-the-way position, a supporting clip 106 is welded or otherwise secured to the underneath surface of the side 44 of the trough 40 and extends slightly beyond the extreme upper edge thereof. A hanger element 108 in the form of a metal strip is secured by means of screws 110 to the food pusher 26 adjacent one edge thereof and projects beyond this edge and is designed to rest upon the clip 106 when the food pusher 26 is moved to its out-of-the-way position. The extent of the clip 106 and the extent of the hanger element 108 are such that when the upper cap member 90 is in engagement with the limit stop or shoulder 98 on the rod 56, the end regions of the clip 106 are positioned directly in the path of movement of the hanger 108 as the food pusher is swung toward its out-of-the-way position so that the food pusher may not be swung beyond its out-of-the-way position, and when not in use it must at all times assume its out-of-the-way position with the hanger 108 resting upon the supporting clip 106.

The hanger 108, as shown in Figs. 9 and 10, is in the form of a flat strip of metal which is attached by means of screws 110 to the food pusher 26 and the portion thereof which overlies the

edge of the food pusher is in the form of a pointed prong 112, this prong extending in the general direction of the teeth 53 on the pusher body 50. The overlying prong 112 in effect, therefore, constitutes an additional tooth on the pusher plate 50 and is adapted to penetrate the foodstuff or substance in the trough 40 when the pusher is in its operative position within the trough.

A recess 114 is gouged out of the metal of the food pusher 26 beneath the hanger or strap 108 and provides a clearance to facilitate cleaning of the parts in the vicinity of the hanger, as well as to accommodate reception of the extreme end of the clip 106 when the food pusher is in its out-of-the-way position.

The thumb guard

Referring now to Fig. 1, the thumb guard 30 is so situated on the food table 18 as to partially overlie the peripheral regions of the circular rotary knife 16. Ordinarily, the thumb guard as provided on conventional slicing machines is imperforate and the actual penetration of the foodstuff by the knife is concealed from the eye of the operator. According to the present invention, however, a pair of openings 120 are formed in the thumb guard adjacent its juncture with the side 42 of the food table, thus exposing the extreme peripheral region of the knife to the eye through the openings, so that the operation of the knife during slicing operation will be apparent to the operator. In actual practice it has been found that a perfectly sharpened knife will penetrate the foodstuff on the food table and make a clean cut with no "tailings" or shreds of the foodstuff being present in the vicinity of the cut. Particularly where the foodstuff is in the form of meat, as for example bacon, ham or meat loaf of one variety or another, if the knife edge is not as sharp as it actually should be for perfect cutting operations, this fact is indicated by the presence of "tailings" or shreds of the meat which appear to hang onto the substance undergoing slicing in the vicinity of the knife or to fly off from the knife indiscriminately. Ordinarily, with an imperforate thumb guard it is difficult for the operator to visually ascertain the condition of the cutting knife. Sometimes he is aware of the fact that the knife is not functioning properly when he perceives the presence of "tailings" as they fly outwardly from beneath the thumb guard. However, these "tailings" do not always loosen themselves from the food substance undergoing slicing and because of the fact that the thumb guard is imperforate their presence is not apparent to the operator. By means of the slots 120 provided in the thumb guard at a region directly overlying the peripheral regions of the knife, the operator may at any time observe the action of the knife as it penetrates the foodstuff and determine whether the knife needs sharpening.

Food table trough construction

Referring now to Figs. 2, 5 and 8, means are illustrated wherein a better gravity feed of the foodstuff toward the knife along the food table may be obtained. It has been found that in connection with certain foodstuff, especially cheese of the softer variety, when the angle between the two sides 42 and 44 of the food table is a right angle, difficulty has been encountered in obtaining a satisfactory gravity feed due to the fact that the rectilinear block of cheese tends to adhere to both sides of the food table and will

not readily slide down the incline provided for it. It has been found, however, that if the angle between the two sides 42 and 44 be increased by a very slight angle, as for example 1° (and in any event less than 3°), making the total angle between the two sides 91° instead of the conventional 90°, much of the frictional resistance offered to the movement of the foodstuff between the sides of the food table will be eliminated and the block of foodstuff will readily slide along the food table toward the plane of the cutting knife. Since the angle designated at θ in Fig. 8 is slightly in excess of 90°, as for example 91°, and since a vertical plane extending through the apex of the food table substantially bisects this angle, the greater portion of the mass of the block of foodstuff is supported at the bottom of the V-shaped trough and whether the block tends to lean in one direction or another very little frictional resistance to sliding movement thereof down the incline provided for it is offered. Where relatively soft blocks of foodstuff are concerned there may be a tendency for gravitational distortion of the foodstuff as it rests in the V-shaped trough of the food table, thus tending to spread the lower sides of the foodstuff outwardly so that both sides thereof engage both sides 42 and 44 of the food table. In other words, due to the mass distribution of the block of foodstuff due to gravity when placed in the trough 40, the cross sectional area of the block of foodstuff will change from a true square or rectangle to a wide angled parallelogram, so that both lower sides of the block of substance will engage both sides 42 and 44 of the trough 40 coextensively. However, due to the inherent mass resiliency or nature of the foodstuff tending to resist such gravitational deformation of the foodstuff, the pressure on each side of the food table will be less than would be the case were the angle between the trough sides a true right angle. The actual degree of angularity between the two sides of the food table over and above a right angle becomes critical at approximately 93°, and it has been found that where an angle in excess of 93° is employed the foodstuff will tend to favor either one side of the food table or the other and rest fairly heavily on the favored side so as to defeat the very purpose of the slightly widened angle between the sides beyond the conventional 90° angle. It is within the scope of the present invention that a vertical plane passing through the bottom of the V-shaped trough 40 need not exactly bisect the angle of the trough, it being sufficient that this plane merely substantially bisect the angle of the trough. As actually manufactured, it has been found that if one or the other sides of the trough makes a 45° angle with the vertical plane, the angle with the other side of the trough may assimilate any angularity in excess of 90°.

Changes may be made in the form, construction and arrangement of parts from those disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. A food pusher construction for cooperation with the food table of a slicing machine comprising a cylindrical rod secured to the food table, a tubular bearing member surrounding said rod and slidable therealong in opposite directions, a food pusher carried on said bearing member, an

anti-friction bearing unit disposed between the bearing member and rod, said anti-friction bearing unit comprising a deformable strip bent to form a cage member secured within said tubular bearing member and a plurality of bearing rollers mounted for free rotation within said cage member about respective axes which are spaced from and extend at right angles to the axis of said rod, the peripheries of said rollers abutting said rod tangentially, and means associated with one of said rollers for adjusting the position of all of said rollers in a direction radially of said rod.

2. A food pusher construction for cooperation with the food table of a slicing machine comprising a cylindrical rod secured to the food table, a tubular bearing member surrounding said rod and slidable therealong in opposite directions, a food pusher carried on said bearing member, an anti-friction bearing unit disposed within said tubular bearing member between the latter and the rod adjacent each end of the bearing member, said anti-friction unit comprising a yieldable spring metal strip bent upon itself to provide a bearing cage and a plurality of bearing rollers mounted for rotation within said cage member and bearing tangentially against said rod at spaced points therearound, and means for deforming the metal of said cage to adjust the position of at least one of said rollers.

3. A food pusher construction for cooperation with the food table of a slicing machine comprising a cylindrical rod secured to the food table, a tubular bearing member surrounding said rod and slidable therealong in opposite directions, a food pusher carried on said bearing member, an anti-friction bearing unit disposed within said tubular bearing member between the latter and the rod adjacent each end of the bearing member, said anti-friction unit comprising a yieldable spring metal strip bent upon itself to provide a bearing cage and a plurality of bearing rollers mounted for rotation within said cage member and bearing tangentially against said rod at spaced points therearound, and means extending through said tubular bearing member and engaging said cage member for deforming the latter to adjust the position of at least one of said rollers.

4. A food pusher construction for cooperation with the food table of a slicing machine comprising a cylindrical rod secured to the food table, a tubular bearing member surrounding said rod and slidable therealong in opposite directions, a food pusher carried on said bearing member, an anti-friction bearing unit disposed within said tubular bearing member between the

latter and the rod adjacent each end of the bearing member, said anti-friction unit comprising a yieldable spring metal strip bent upon itself to provide a bearing cage and a plurality of bearing rollers mounted for rotation within said cage member and bearing tangentially against said rod at spaced points therearound, and means extending through said tubular bearing member and engaging said cage member for deforming the latter to adjust the position of at least one of said rollers, said means also serving to anchor the cage within said tubular bearing member.

5. A food pusher construction for cooperation with the food table of a slicing machine comprising a cylindrical rod secured to the food table, a tubular bearing member surrounding said rod and slidable therealong in opposite directions, a food pusher carried on said bearing member, an anti-friction bearing unit disposed within said bearing member between the latter and the rod adjacent each end of the bearing member, said anti-friction bearing units forming the sole sliding connection between the bearing unit and the rod, said anti-friction units each comprising a sheet metal strip bent upon itself to provide a plurality of supporting sides arranged in pairs, a bearing roller rotatably supported on and disposed between each pair of supporting sides, the periphery of each of said rollers being adapted to engage the surface of said rod in tractional sliding relationship, and an adjusting screw extending through said tubular bearing member and engaging a portion of said cage for deforming the shape of the latter to adjust the tension of said rollers on said rod.

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