United States Patent [19]

Müller et al.

[11] **3,739,677**

[45] **June 19, 1973**

[54] **SLICING MACHINE**

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[22] Filed: **Dec. 7, 1970**

[21] Appl. No.: **95,552**

[30] **Foreign Application Priority Data**

Dec. 5, 1969 Germany .... P 19 61 069.6

[52] **U.S. Cl.** .... **146/102 B**
[51] **Int. Cl.** **B26d 1/28**
[58] **Field of Search** .... 146/102 R, 102 H, 146/102 L, 102 B, 94 C

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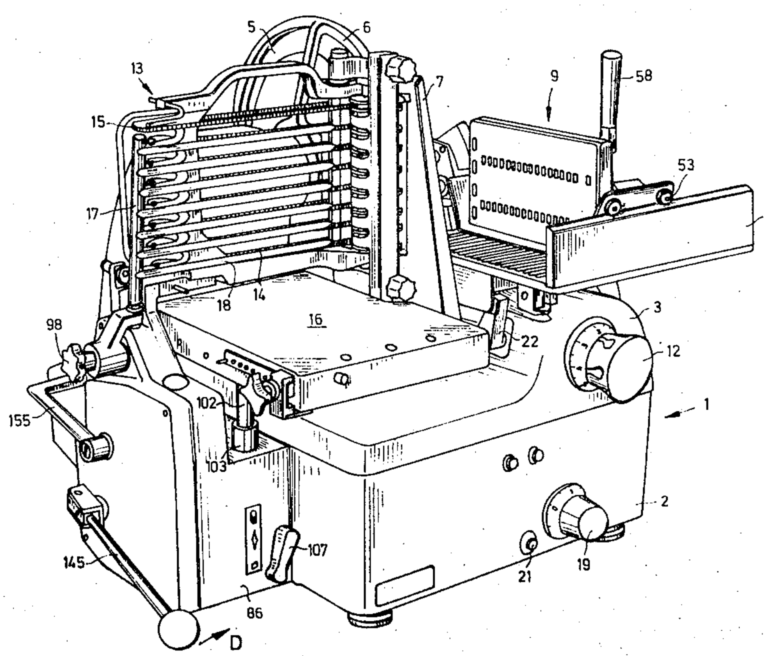
[57] **ABSTRACT**

A slicing machine which can produce slices of varying thicknesses has a rotating circular blade mounted on a machine housing. Carriage means are mounted on the machine housing for holding a material to be sliced adjacent the blade and for reciprocating movement in a direction parallel to the plane of the blade. A stacking table is mounted so as to be vertically displaceable in the downward direction during each movement of the carriage by a distance corresponding to the desired thickness of the slice. The slices are then stacked onto the stacking table by a conveying device and a kicker. The slices can either be stacked vertically on the stacking table or in a shingle-like fashion. In the latter case, the stacking tables moves horizontally instead of vertically.

6 Claims, 15 Drawing Figures



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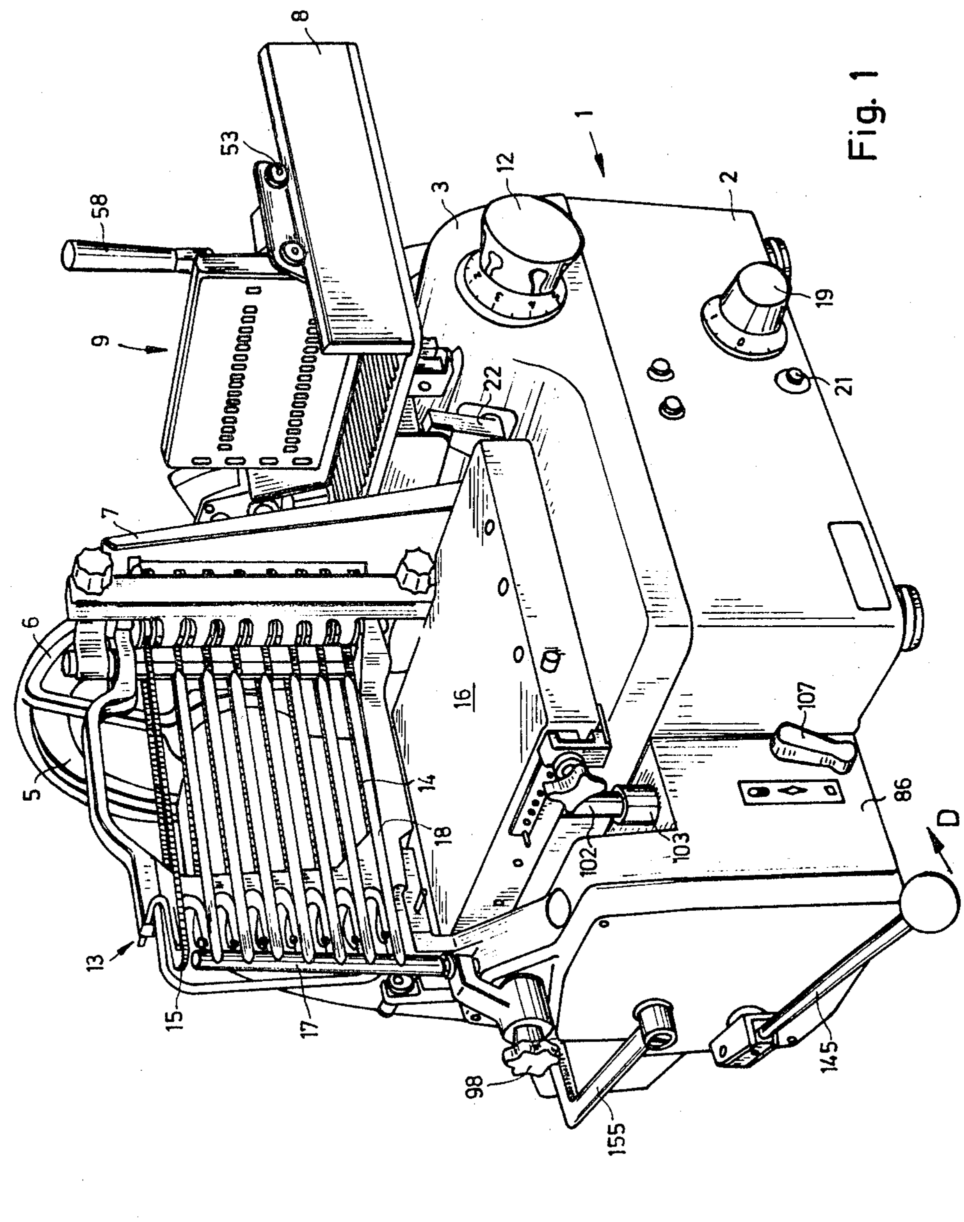

Fig. 1

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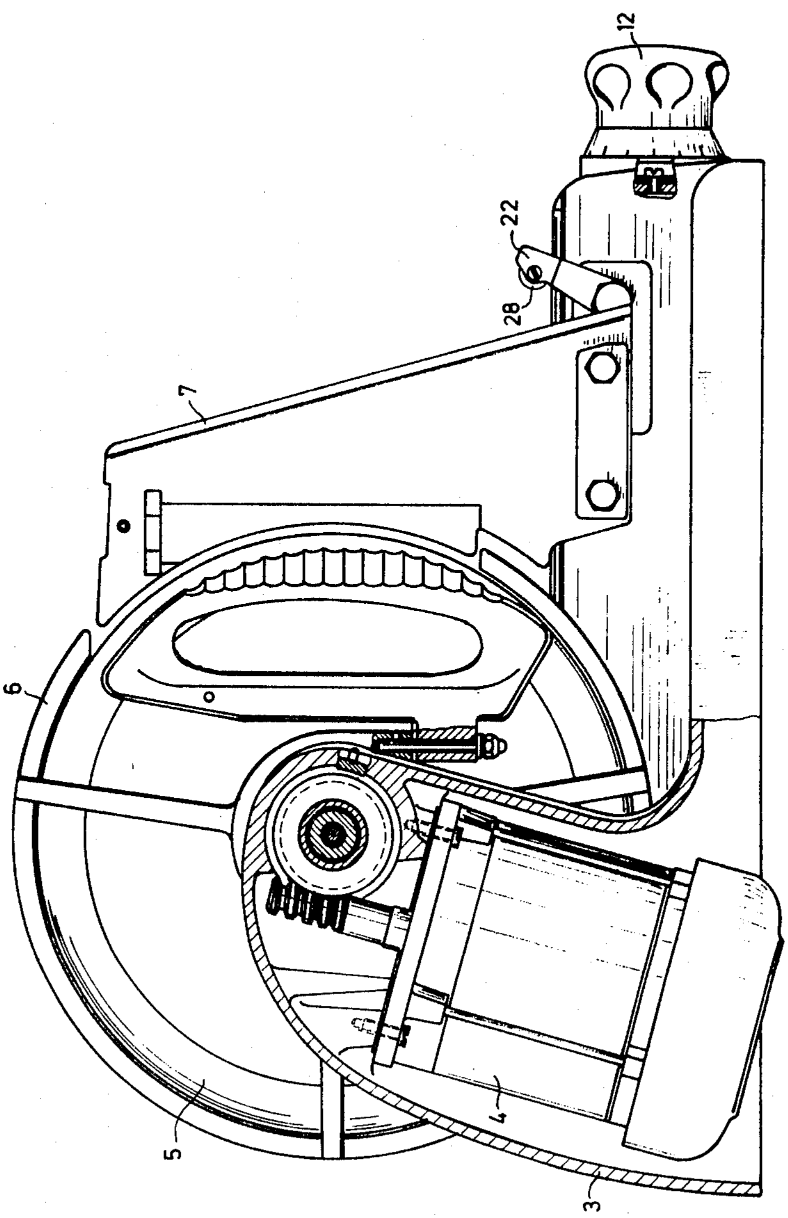

Fig.2

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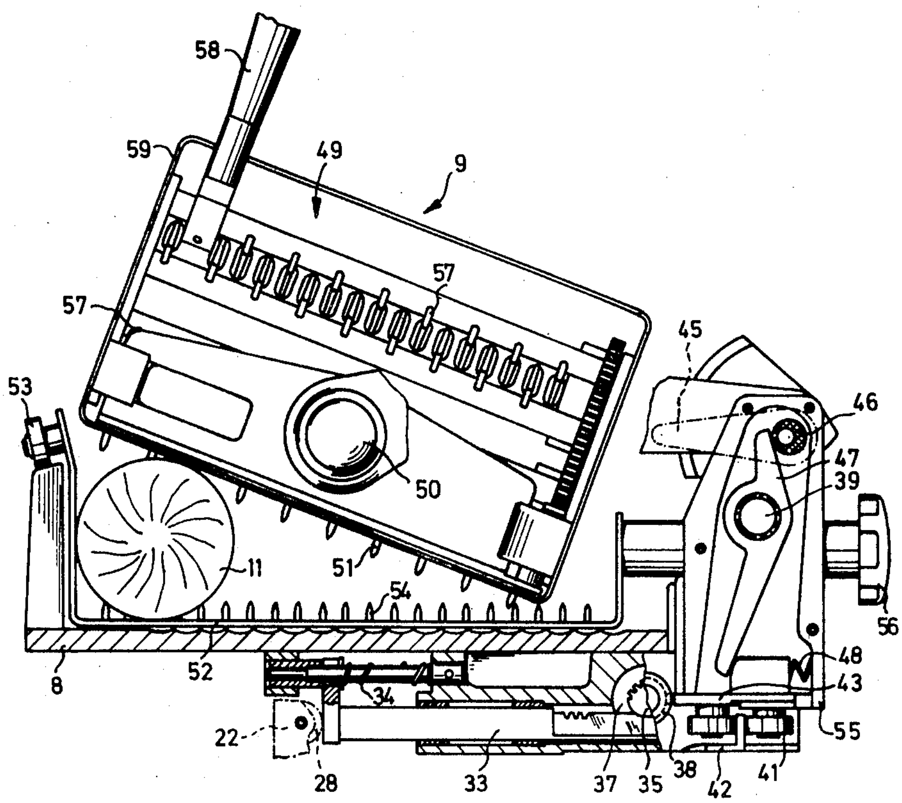

Fig. 3

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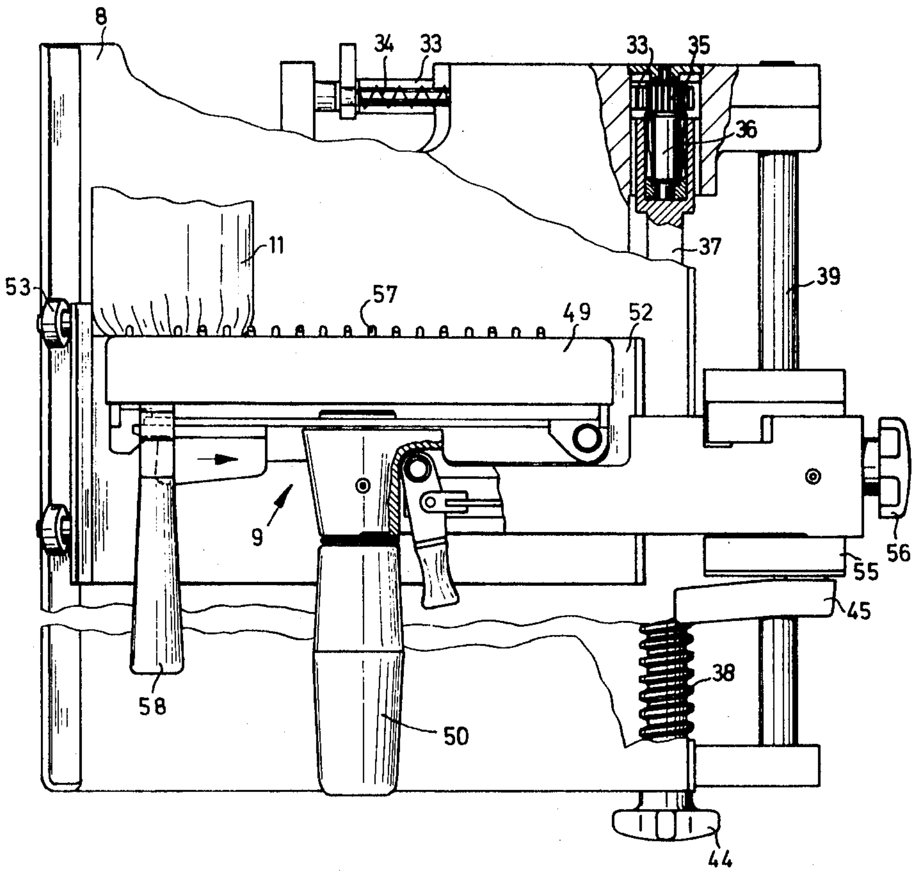

Fig. 4

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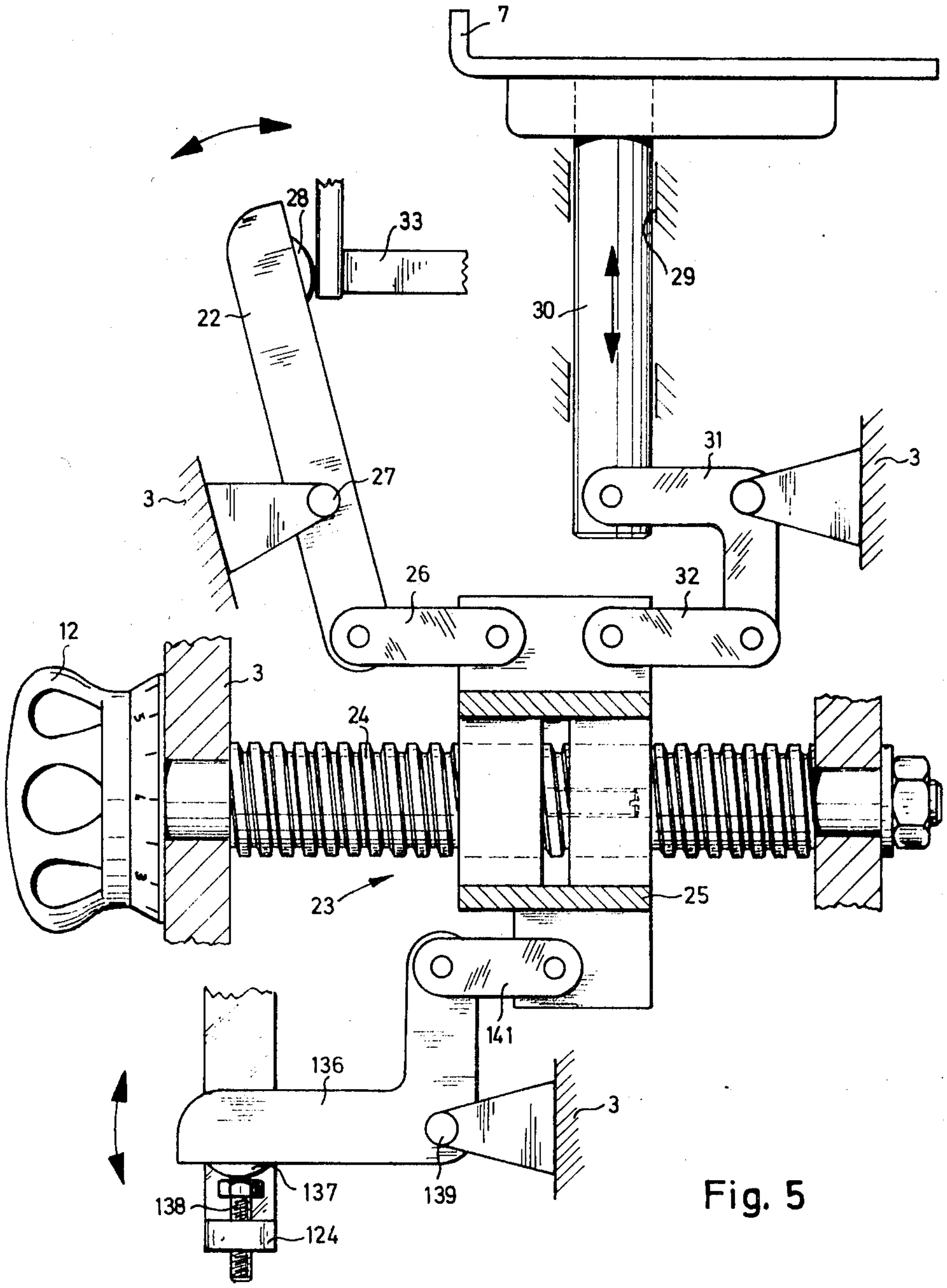

Fig. 5

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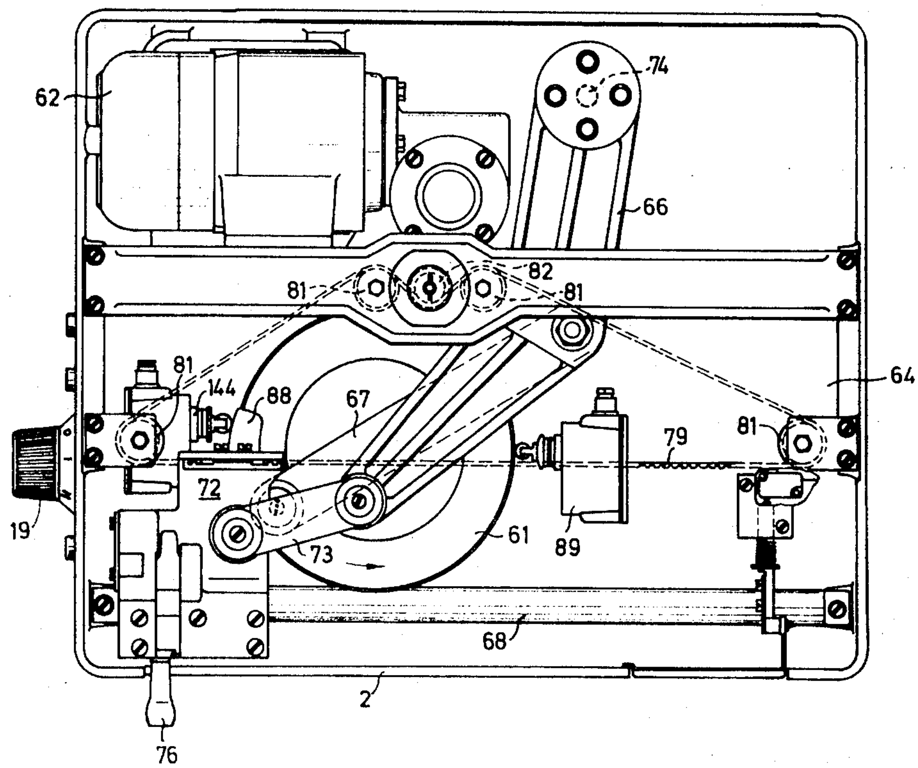

Fig. 6

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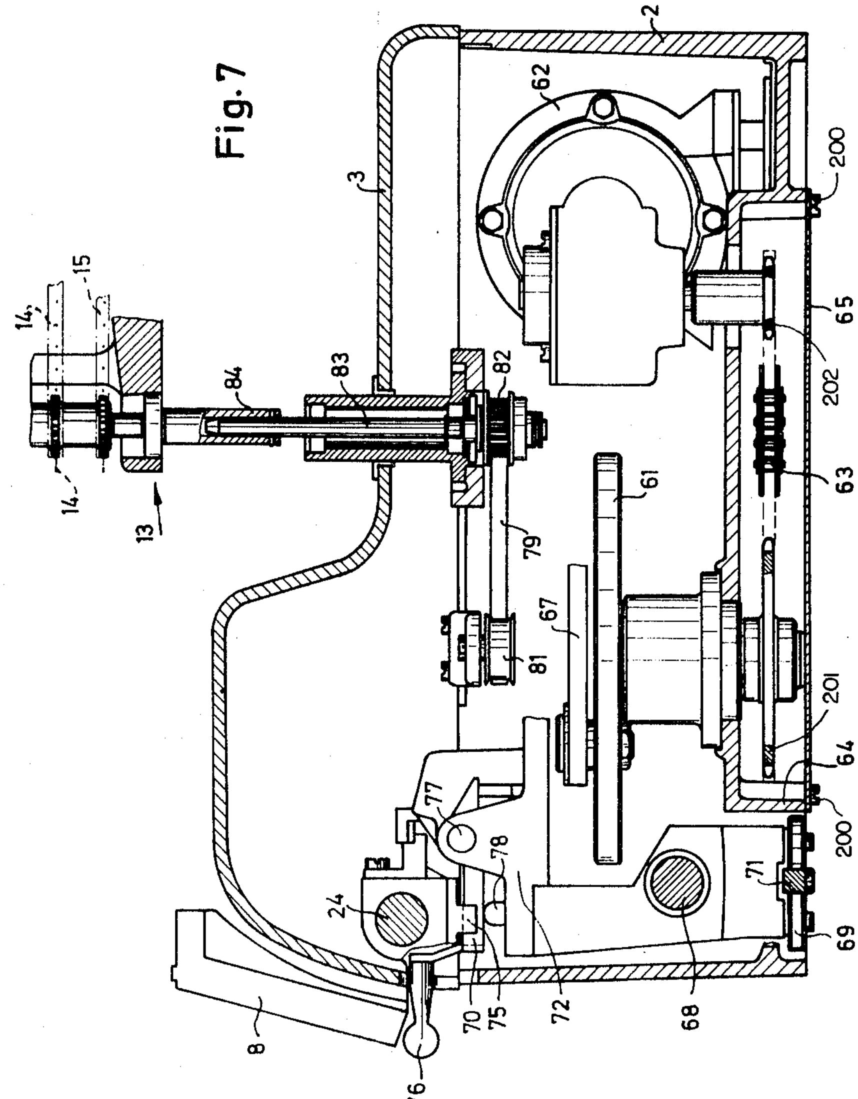
Fig. 7



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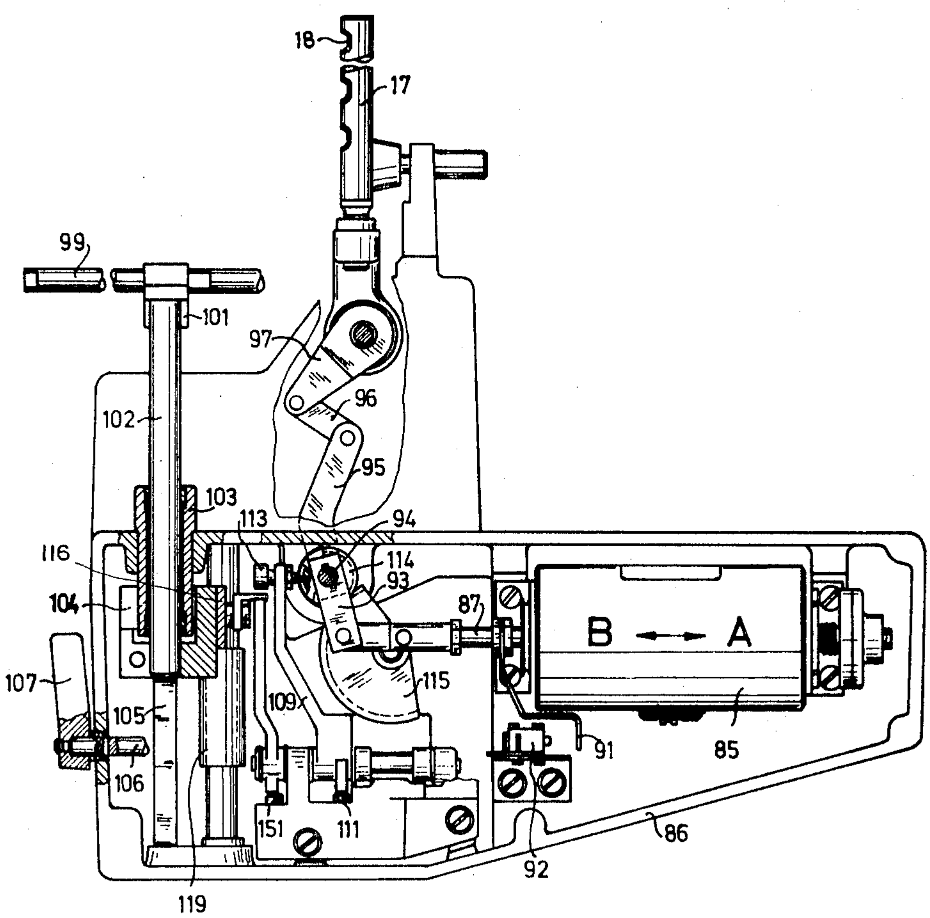

Fig. 8

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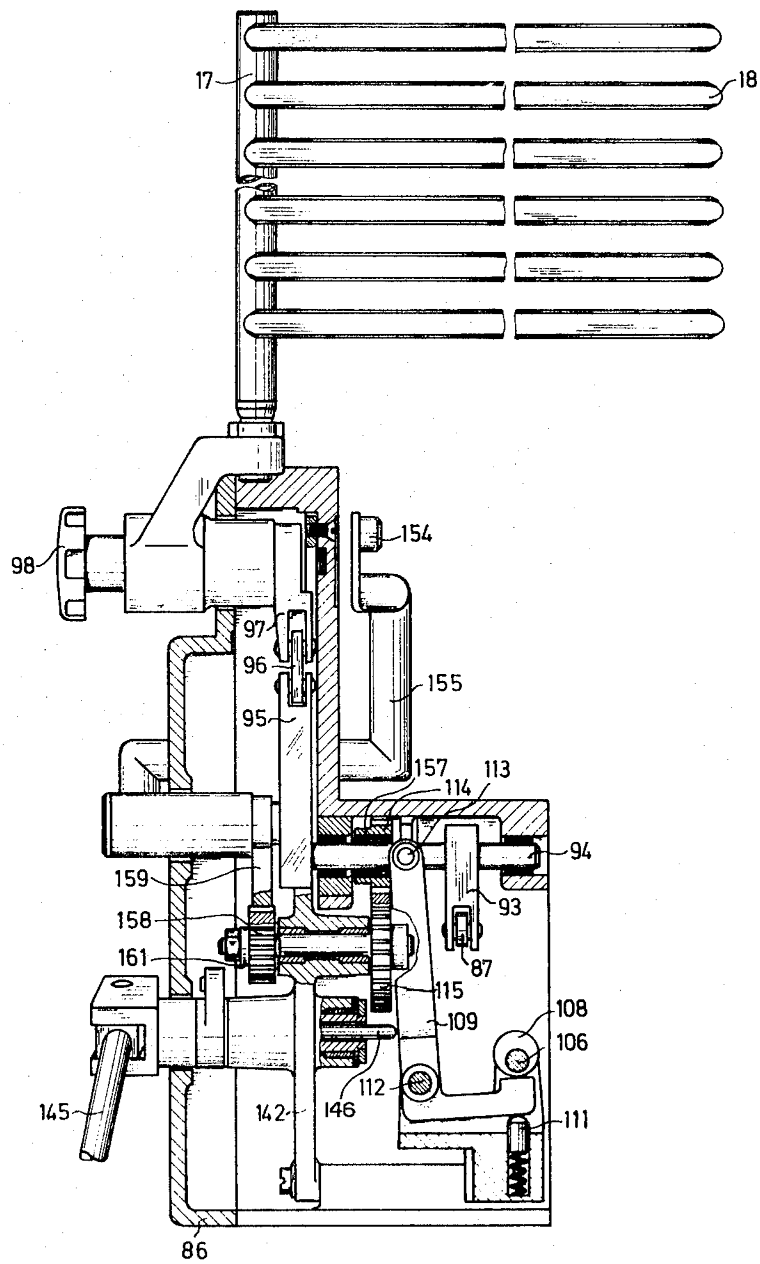

Fig. 9

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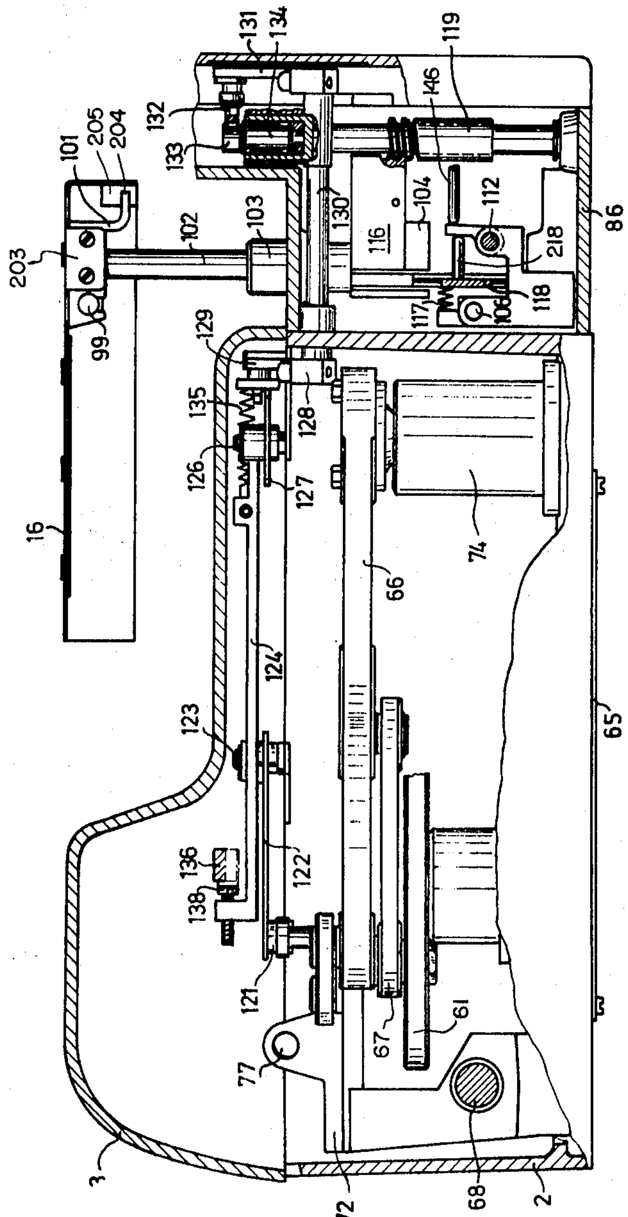

Fig. 10

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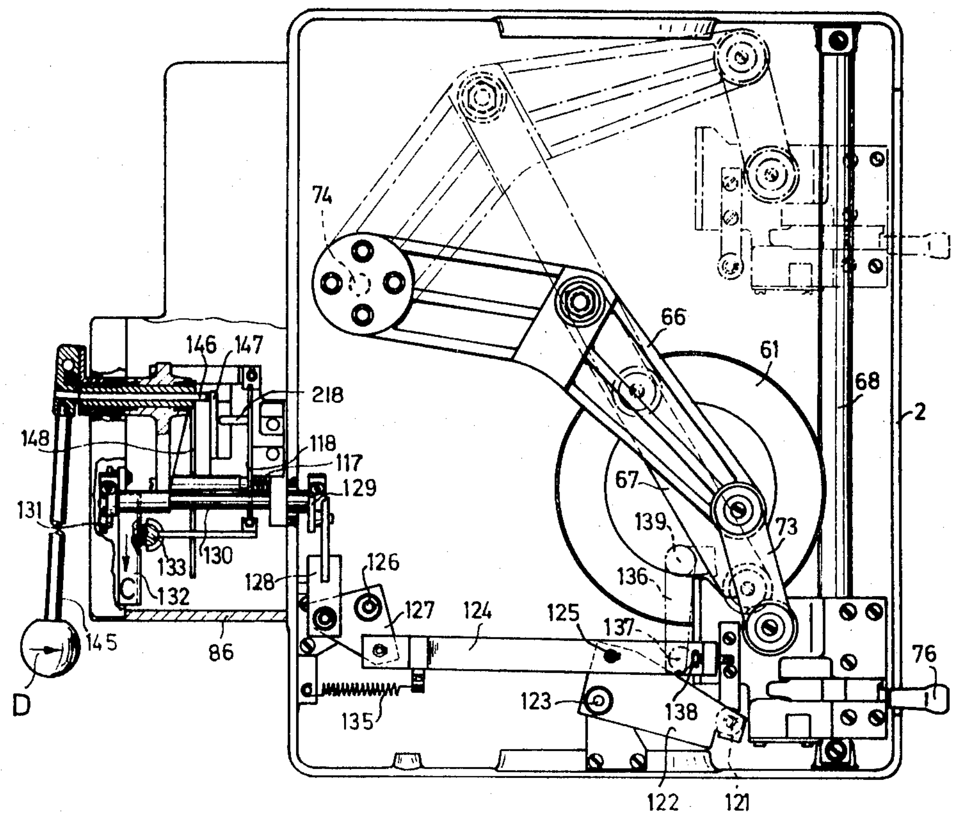

Fig. 11

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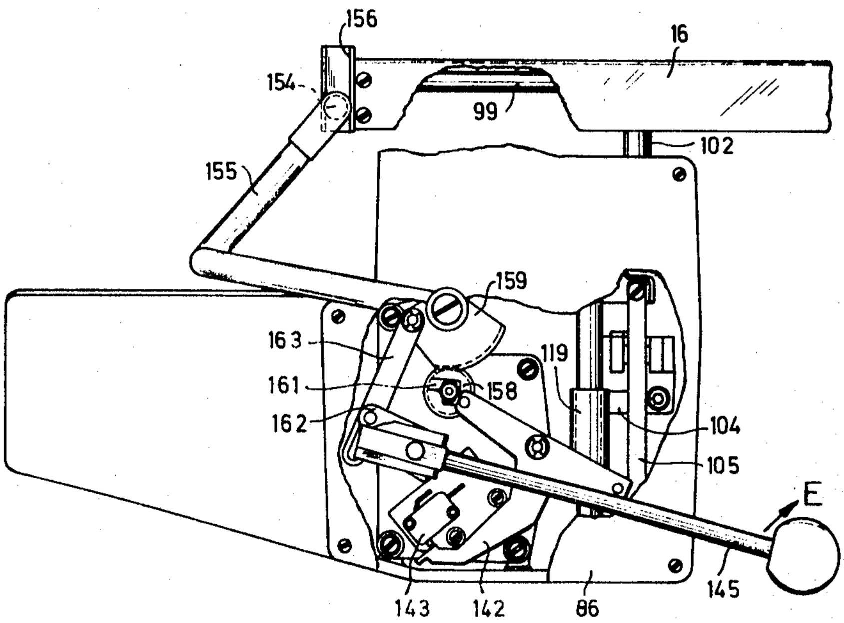

Fig. 12

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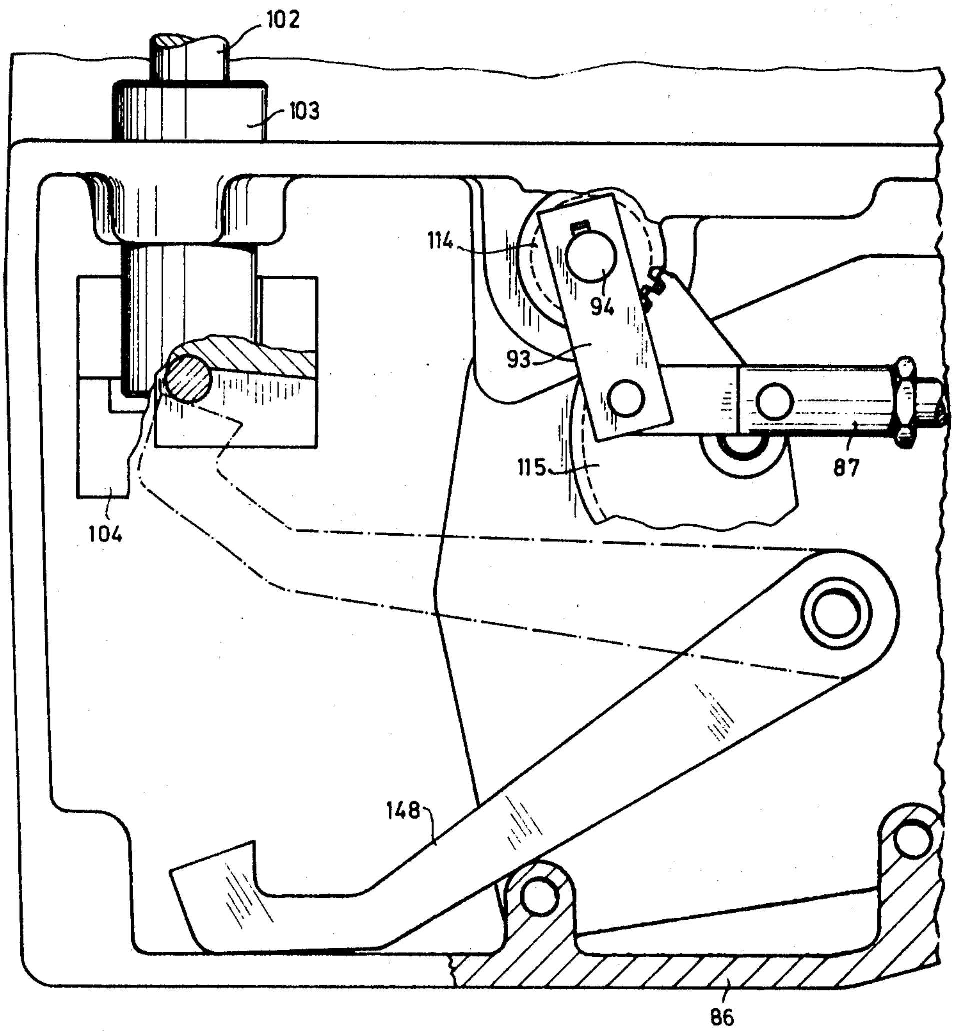

Fig. 13

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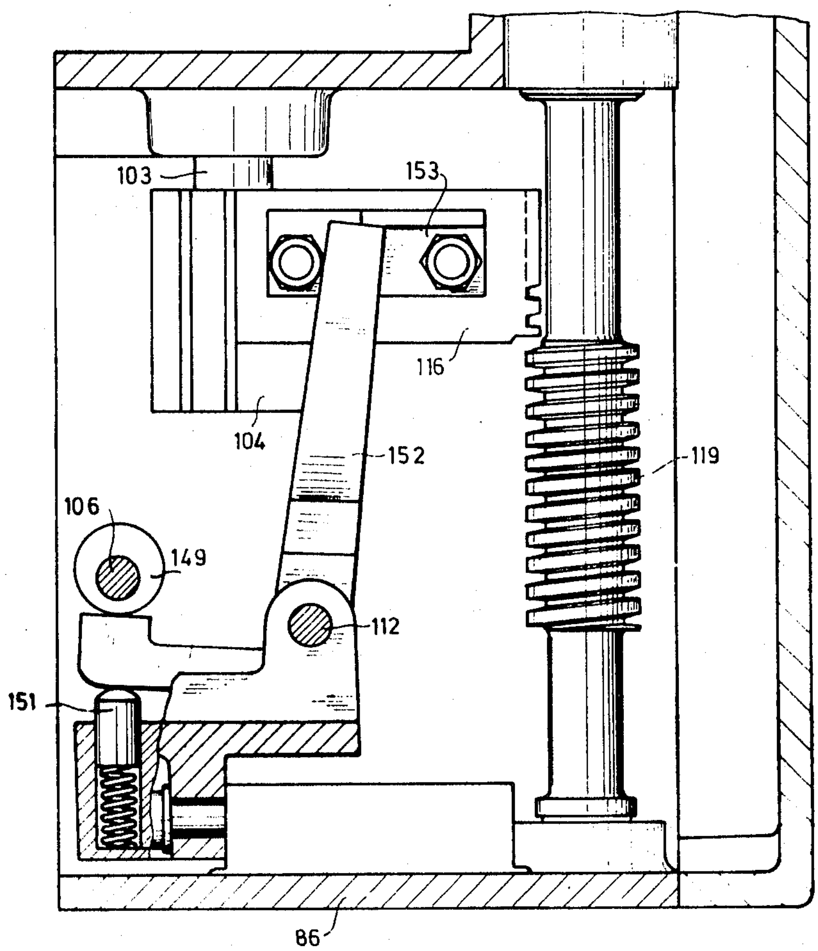

Fig. 14

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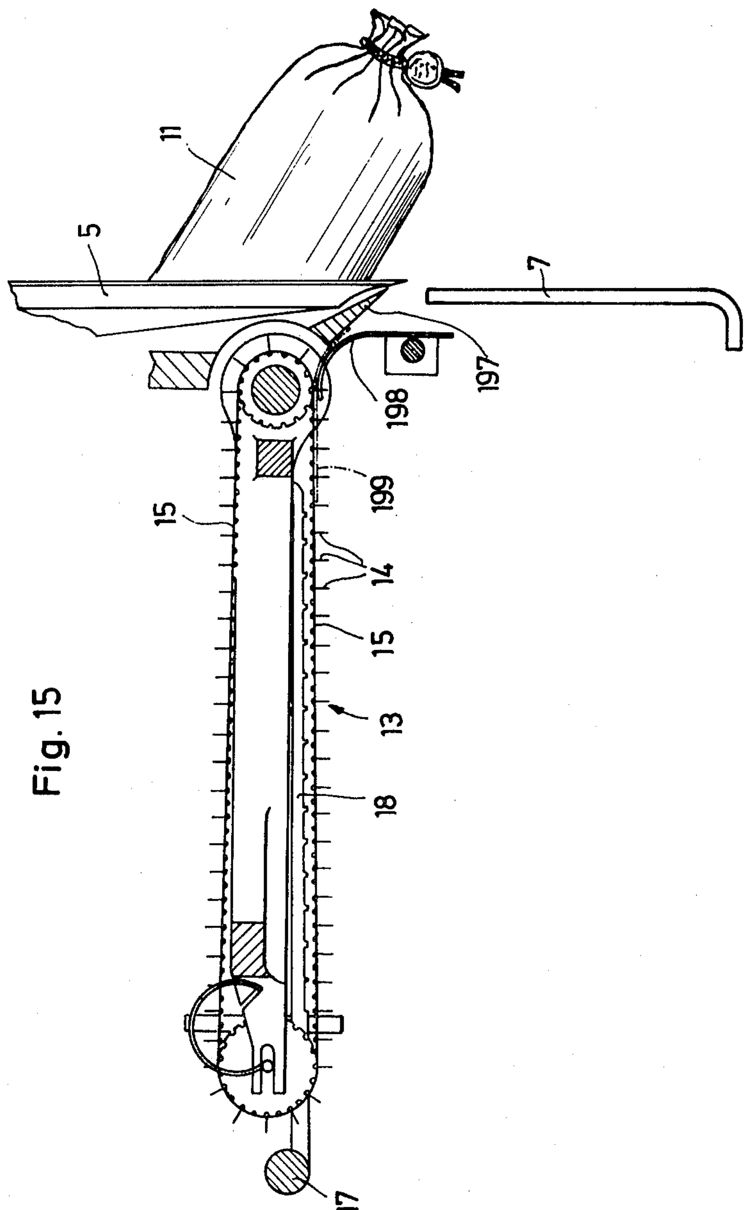

Fig. 15

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SLICING MACHINE

BACKGROUND OF THE INVENTION

The present invention relates to a slicing machine which can produce slices of varying thickness and in which a carriage for holding the material to be sliced can be moved back and forth on a machine housing in a direction relative to a rotating circular blade, and wherein the slices cut from the material to be cut are stacked on a table with the aid of a conveying device and a kicker.

The known slicing machines of this type primarily serve for slicing cold-cuts and the like. The slices are then stacked on a stacking table. These known machines have the disadvantage that the slices must be deposited at a different level each time, because the stack height continuously increases during the slicing process. This results in the individual slices not being stacked directly one on top of the other, which is rather unsightly, and in the stack, particularly when it reaches a substantial height, no longer being perpendicular to the surface of the table. With the known machines there further exists the danger, when a certain stack height has been reached, that the slices may be damaged by the kicker.

SUMMARY OF THE INVENTION

It is among the objects of the present invention to eliminate these disadvantages and to propose a slicing machine in which a stack can be produced of undamaged slices which are deposited exactly one on top of the other, which stack will remain perpendicular even when it reaches a substantial height and which will exhibit a smooth, clean outer surface.

These objects are accomplished according to the present invention by mounting the stacking table to be vertically displaceable. The table is lowered with each movement of the carriage by a distance corresponding to the set slice thickness. In this way the slices are always deposited at the same level and are not damaged, so that a neat, vertical stack of considerable height can be produced.

In a preferred embodiment of a slicing machine according to the present invention, the stacking table is vertically displaceable by means of a shaft arranged to slide in a guide, and a vertically disposed stepwise driven screw engages into a follower member connected to the stacking table. It is of advantage in this embodiment that an abutment connected with the carriage displaces a rack with each movement of the carriage by means of a linkage which is biased by a spring to a predetermined end position. The rack then turns the screw in steps through the intermediary of an overrunning clutch. It is particularly favorable in this embodiment to have the path over which the stacking table can be lowered with each movement of the carriage infinitely variably adjustable as a function of the slice thickness.

In a further preferred embodiment of the present invention, it is provided that the stacking table be displaceably mounted in a guide which is connected with the vertical lifting axis and is connectable with a drive via a clutch. The drive moves the stacking table horizontally forward a predetermined distance with each movement of the carriage without a vertical adjustment being necessary. The advantage of this embodiment is that in this way the cut slices can be stacked on the stacking table, if desired, in a partially overlapping manner; that is, in the manner of shingles. It is desirable in this connection to provide a switching member for switching between horizontal and vertical movement of the stacking table.

A further advantage of the slicer according to the present invention is achieved in that at least one limit switch is provided to cut off the drive of the carriage for the material to be sliced and, thus, the movement of the stacking table in the vertical and/or horizontal direction when the respective final position of the stacking table has been attained. The slicer according to the present invention may further be advantageously distinguished in that a common operating lever is provided for the horizontal and vertical return of the stacking table from its respective end position into its starting position.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a slicer according to the present invention.

FIG. 2 is a cross-sectional view of a circular blade with its drive as seen from the left side of the machine of FIG. 1.

FIG. 3 is a partly cut away, cross-sectional view of the slicing material carriage with its clamping device as seen from the right side of the machine of FIG. 1.

FIG. 4 is a partly cut away, top plan view of the carriage of FIG. 3 with its clamping device.

FIG. 5 is a partially schematic view, partly in cross section, of the device for continuously variably setting the slice thickness, the lowering path of a stacking table and the adjustment of a protective bar.

FIG. 6 is a top plan view of a carriage drive.

FIG. 7 is a side elevational, cross-sectional view of the carriage drive.

FIG. 8 is a side elevational, partly cross-sectional view of a drive system for a kicker.

FIG. 9 is a side elevational, cross-sectional, partly cut away view of a drive system for the kicker and the horizontal table advance.

FIG. 10 is a partly cut away, partly cross-sectional, side elevational view of a drive for vertical table movement.

FIG. 11 is a top plan view, partly in cross section, of the carriage drive and the drive for the vertical table movement.

FIG. 12 is a side elevation view, partly cut away, of the drive for the horizontal table movement.

FIG. 13 is a partial front elevational view, partly in cross-section, to explain the vertical table return.

FIG. 14 is a partial, cross-sectional, side elevational view of the control for switching from the "stacking" mode to the "shingling" mode.

FIG. 15 is a partial horizontal cross-sectional view of a slice conveying device.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In order that the present invention may be better understood, the following description will initially cover the general construction and operation of a slicing machine, or slicer, according to the present invention. Then follows a detailed description of all the particular features thereof.

A circular blade 5 is mounted on a housing 1 (FIG. 1) of two sections 2 and 3. Blade 5 is driven by a motor

4 (FIG. 2) and is arranged to rotate in a vertical plane. The cutting edge of the circular blade **5** is covered in the area not used for slicing by a stationary protective ring **6** which is mounted on housing section **3** in a known manner. The cutting area of blade **5** is shielded against unintentional contact by a protective bar **7** which is adjustable in dependence on the desired slice thickness. A carriage **8** for holding the material to be sliced is disposed on housing section **3** so that it can be moved back and forth, or reciprocated, in a direction parallel to the plane of the circular blade **5** — in FIG. **1** this is from the right front to the left rear. The drive for carriage **8** is disposed in housing section **2.** A clamping device **9** for the material to be cut **11**, such as a loaf of luncheon meat (FIGS. **3** and **4**), is disposed on carriage **8** and is displaceable in a direction transverse to the direction of movement of carriage **8.**

The clamping device **9** is driven on carriage **8** in a direction perpendicular to the direction of movement of carriage **8**, so that after a slice has been sliced off the material to be cut **11** is advanced by the predetermined thickness of one slice. That is, it is advanced with each reciprocating movement of carriage **8** toward the left in FIG. **1.** With subsequent carriage movement, the next slice can be sliced at the same predetermined thickness as the previous slice. The thickness of the cut slices can be continuously set by a control member, such as a knob **12**, over a range of, for example, about 0.1 to 10 mm. The preferred range is from about 0.5 to 8.5 mm.

A slice conveying device **13** is disposed on the side of the circular blade **5** which is opposite to the carriage **8.** This device consists in a known manner of a plurality of superimposed endless chains **15** provided with horizontally, outwardly extending pins **14** (FIGS. **1** and **7**). In front of and below the conveying device **13** a stacking table **16** is provided. The conveying device **13** has an associated kicker **17.** Cantilever mounted members **18**, which in their rest position lie between chains **15**, are attached to kicker **17** (FIGS. **1** and **9**).

The operation of the slicer which has been generally described above will now be described. The materials **11** is arranged on the carriage **8** by means of the clamping device **9.** The desired slice thickness is set by the knob **12.** A main switch **19** is now actuated to cause the circular blade **5** to rotate. Now button switch **21** is pressed, so that carriage **8** commences its reciprocating movement. With each movement of carriage **8**, a slice is sliced from the material **11** by the circular blade **5.** After each cut, the clamping device **9** advances the material **11** in the direction toward the plane of the blade **5** by a distance corresponding to the thickness of one slice. The cut slices pass between blade **5** and protective bar **7**, to be gripped by the tips **14** of chains **15** and then move in a perpendicularly suspended position to the members **18** of kicker **17.** The slices are knocked from this position by the kicker **17**, which at a suitable moment performs a sudden downward pivoting movement, and land on the stacking table **16** where they are stacked into a stack. The cut slice **199** (see FIG. **15**) is directed to the left by a stripper **197** towards a guide member **198** and is then gripped automatically by the tips **14** of the chains **15.**

It would normally be a matter of course during the above-described process that the slices be stacked at a different level with an associated increasing height of the stack. This would lead to the stack not being exactly perpendicular to the surface of table **16** and the slices being damaged by kicker **17** after the stack has reached a certain height. In order to eliminate this problem, the present invention provides that the table **16** be lowered by the preselected thickness of a slice after such a slice has been cut, so that each new slice is always deposited at the same height above the surface of table **16.** How this lowering of the stacking table **16** may occur in dependence on the set slice thickness will be explained in the following detailed description, together with further particulars of the machine.

The device by which the stacking table **16** is lowered in steps by a certain amount in dependence on the setting of the slice thickness will first be described. An abutment lever **22** (FIG. **1**) is pivotally mounted on housing section **3** and may be arranged to be set by a screw and nut drive **23.** The screw and nut drive **23** and its cooperation with abutment lever **22** are illustrated partially schematically in FIG. **5.** The knob **12** has graduations thereon and is rigidly connected with a threaded member, or screw, **24** on which a nut **25** is threadingly engaged. The nut **25** is pivotally joined in a known manner via a link **26** to one arm of the abutment lever **22** which is pivotally mounted in a known manner to housing section **3** at point **27.** By rotating the screw **24**, nut **25** is displaced and, thus, changes the end position of an abutment point **28** of lever **22.** FIG. **5** also schematically shows how the above-mentioned protective bar **7**, which is rigidly connected to a slide **30**, may be adjusted by means of a guide **29** and a bell crank lever **31** pivotally mounted in a known manner to housing section **3**, slide **30** and a link **32** when the screw **24** is turned; this setting, together with that of abutment lever **22**, may be a function of the set slice thickness or may be independent thereof. The slide **30** and together with it the protective bar **7** move in reality in a horizontal plane parallel with the axis of the circular blade **5**, whereas the lever **22** is swingable in a vertical plane. This is not shown in the partially schematic view of FIG. **5.**

A rack **33** (FIGS. **3** and **4**) is mounted on the bottom of carriage **8** to be slidably displaceable with respect to the carriage, and is biased into its starting end position — to the left in FIGS. **3** and **4** — by, for example, a suitable helical coiled spring **34.** When the carriage **8** is moved into its near end position as seen by the operator - toward the left in FIGS. **3** and **4** - the rack **33** contacts abutment lever **22** and is as a result displaced a certain distance along a path with respect to the carriage **8.** This displacement of the rack is transmitted to a screw **38** mounted on carriage **8** via a pinion **35** engaging with rack **33**, a suitable known overruning clutch **36** which engages in this direction, and a shaft **37.** When carriage **8** is moved in the opposite direction, or toward the right in FIGS. **3** and **4**, the rack **33** returns to its starting position because of the bias of spring **34.** The shaft **37** and, thus, screw **38** will remain in their rest mode because of the overruning clutch **36.**

The clamping device **9** for the material **11** is guided by a rod **39** and by means of two rollers **41** (FIG. **3**) engaging a fixed rail **42.** This arrangement permits device **9** to be displaceable on carriage **8** in a direction transverse to the direction of movement of carriage **8.** A follower member **43** firmly connected to clamping device **9** releasably engages screw **38**, so that the clamping device **9** is advanced a certain distance in a direction toward and perpendicular to the plane of the circular blade 5 with each reciprocating movement of the carriage 8. This advancement being actuated by the rack 33 which drives screw 38 in a step-by-step fashion. The amount of this advancement, which determines the slice thickness, obviously depends on the position of abutment lever 22 as set by knob 12 (FIG. 5); for, depending on the setting as lever 22, the rack 33 will abut on abutment point 28 of lever 22 sooner or later, so that the displacing movement of rack 33 also starts either earlier or later. This results in the pinion 35 and, thus, screw 38 being displaced by a longer or shorter angular distance. This angular distance is translated via the member 43 into an advancing movement for the clamping device 9. This angular distance and, thus, the slice thickness also depend on the setting or lever 22. Since lever 22 can be continuously adjusted — that is, in infinite increments — via the screw and nut drive 23 (FIG. 5), the slicing thickness is also continuously variable.

A knob 44 (FIG. 4) is mounted on the screw 38 in a known manner for manually finely setting the clamping device 9 in the direction toward the plane of the circular blade 5, for example, when the material to be sliced 11 is clamped-in. The member 43 can be moved out of engagement with the screw 38 by pivoting a crank 45 about 180°, so that the clamping device 9 can be moved manually back and forth with reference to the plane of the circular blade 5. A cam 46 (FIG. 3) is connected with lever 45 to pivot therewith and pivots a lever 47 when lever 45 is pivoted; lever 47 moving members 43, which has been pretensioned by a suitable, known spring 45, out of engagement with screw 38 by means of its lever arm disposed opposite cam 46.

Pieces of material 11 may be clamped by clamping device 9 that are even longer than carriage 8 as well as very short pieces.

The clamping device 9 (FIGS. 3 and 4) comprises a holder 49 having a housing 59 pivotally mounted to a guide block 55 in a known manner not shown in detail and provided with a handle 50. This holder 49 is provided at the underside of housing 59 with a series of pointed gripper pins 51 which grip down into the material to be sliced 11 (FIG. 3). The clamping device 9 also has a support member 52 which is displaceably guided on rollers 53 along the edge of carriage 8. Support member 52 is provided with two or more rows of mutually offset, pointed gripper pins 54 which also penetrate into the material 11. Support member 52 and holder 49 are moved together during the operation of the slicing machine in a stepwise manner by screw 38 and in the direction toward the plane of the circular blade 5. Support member 52 is, for this purpose, fastened to guide block 55 (FIG. 3) on the clamping device 9 by means of a suitable, known clamping screw 56, and can be removed from block 55 after the latter has been released. Gripper hooks 57 are provided on the side of holder 49 and arranged to face the plane of the circular blade 5. Hooks 57 are mounted in a suitable manner (not shown) to be pivoted out of and retracted into the housing 59 by means of a handle 58. These gripper hooks 57 (FIG. 4) serve to clamp-in short pieces of material 11, and are pressed into the side of the material 11 that is facing away from the plane of the circular blade 5. In this instance, holder 49 rests substantially horizontally on support 52.

The reciprocating motion of carriage 8 is achieved by means of a crank drive disposed in housing section 2. A crank wheel 61 (FIGS. 6 and 7) is driven by a conventional drive motor 62 via an endless power transmission chain 63. Chain 63 is arranged in a housing 64 and is accessible upon removal of a plate 65. Plate 65 is attached to housing 64 by suitable, known means, such as screw fasteners 200. Chain 63 coacts with sprockets 201, 202 on the shaft of wheel 61 and motor 62, respectively. The diameter of the crank wheel 61 corresponds to a fractional ratio — for example, ½ — of the path traversed by the carriage 8 in just one direction. This diameter is translated to the full carriage path by a lever 66 which is connected to the wheel 61 by means of a pivotally mounted connecting rod 67. Lever 66 is pivotally mounted in housing 2 on a pedestal 74 (FIG. 10). A clutch support 72 is joined via a link 73 to the free end of lever 66, and slides on a shaft 68 while being guided on a rail 71 by means of two rollers 69. Carriage 8 is coupled with the clutch support 72 by a clutch lever 70 mounted on the clutch support 72; the clutch lever 70 engaging in a notch or slot behind a protrusion 75 provided in carriage 8 (FIG. 7). By depressing the clutch lever 70 which is mounted to be rotatable at 77 and which is held in engagement with the notch behind the protrusion guide 75 by means of a spring bolt 78 — which is done by gripping handle 76 and moving it downwardly — the carriage 8 can be decoupled from its drive. By depressing the clutch lever 70 it is disengaged from said notch behind the protrusion 75.

For the synchronous transmission of the movement of the carriage 8 to the chains 15 of the slice conveying device 13, a toothed belt 79 is clamped to clutch support 72 (FIG. 6) and is wrapped around a gear 82 — which meshes with this toothed belt 79, if necessary, with the aid of idling gears or the like — via guide rollers 81. This gear 82 is seated on a drive shaft 83 (FIG. 7) of the conveying device 13. The conveying device 13 itself is placed on drive shaft 83 by means of a plug-in-coupler 84. When slices are cut off, they are placed in a known manner onto the tips 14 of chains 15 and are transported away from the circular blade 5 by these chains 15. When the carriage 8 has reached its reversal point in the slicing direction toward the right (FIG. 6) chains 15 come to rest. After chains 15 have stopped moving, the kicker 17, which is pivoted into a vertical end position when the slicer is switched on, performs a sudden downward pivoting movement in the direction toward the stacking table 16, so that the slice hanging on the tips 14 of chains 15 is knocked from the tips 14 onto the table 16.

The drive for kicker 17 is a reversing solenoid and plunger 85 (FIG. 8) which, together with the associated converting and control device, is mounted in a housing 86 (FIGS. 1 and 8) attached to housing section 2. When the slicer is switched on, a shaft 87 connected with the armature of the solenoid is displaced in direction A (FIG. 8). Simultaneously with the stopping of chains 15, which occurs at the point of reversal for carriage 8, the solenoid 85 is switched over by an end switch 89 (FIG. 6) which is actuated in a known manner by a switching cam 88 mounted on wheel 61. Now the shaft 87 is displaced in direction B. In the end position arrived at after displacement in direction B, the solenoid 85 actuates, via a bar 91, an end switch 92 and, thus, automatically switches itself into direction A.

The reciprocating movement of shaft 87 is translated by a link 93 into a rotary movement of a shaft 94. The rotary movement of shaft **94** is translated via a crank **95** and a coupler **96** to a further crank **97**. Crank **97** is rigidly connected to a hub to which kicker **17** is fastened by means of a clamping screw **98** (FIGS. **1** and **9**). When this linkage is placed into its end position in the direction A (FIG. **8**), the kicker **17** is perpendicularly directed and the members **18** are disposed between the chains **15** of the conveying device **13**.

The stacking table **16** is horizontally displaceable on a guide means including a shaft **99** (FIGS. **8** and **10**), and is guided during horizontal displacement by an angled guide bracket **101** (FIG. **10**) which displaceably engages in a groove **204** defined in a member **205**. After the horizontal displacement of stacking table **16** into its end position on the operating side of the machine — the right front of FIG. **1** — the table can be removed from shaft **99**. Shaft **99** and guide angle bracket **101** are fastened to a vertically oriented lifting shaft **102** by a suitable bracket **203** (FIGS. **8** and **10**). The shaft **102** is vertically displaceable and is guided in a slide made up of a guide sleeve **103**. A guide plate **104** fixed to shaft **102** slides on a slide rail **105** mounted stationary in housing **86**. (FIGS. **8** and **14**).

A shaft **106** (FIGS. **8** and **9**) has a selector lever **107** mounted on its end arranged outside of housing **86** (FIGS. **1** and **8**). An eccentric **108** (FIG. **9**) is mounted and arranged on shaft **106** in the interior of housing **86**. When selector lever **107** is pivoted into the position shown in FIG. **1**, eccentric **108** pivots a lever **109**, which is pivotally mounted on a shaft **112** and biased by a spring bold **111**, out of the position shown in FIG. **9**. This movement displaces a gear **114** mounted on shaft **94** via a trunnion screw **113**, so that it comes out of engagement with a gear segment **115**. Gear **114** is connected to shaft **94** to rotate therewith in one direction only, but can be moved back and forth on the shaft. The trunnion screw **113** engages into a groove defined at one face of gear **114** (FIG. **9**).

Let it be assumed that the stacking table **16** is in its upper, or starting, position. A follower member **116** (FIG. **10**) which is mounted on guide plate **104** in a known manner not shown in detail so as to be horizontally displaceable, is now held in engagement with a vertically oriented screw **119** by a switching plate **118**. Member **116** may be made horizontally moveable by, for example, providing slots therein. Upon return of carriage **8** into its final position on the operator's side — to the right front of FIG. **1** — an abutment roller **121** (FIGS. **10** and **11**) mounted on the clutch support **72** presses on a lever **122** and pivots it clockwise in FIG. **11** through a defined angular path. The movement of the lever **122**, which is pivotally mounted to a bracket and in a known manner at **123** is translated, via a coupler **124**, which is pivotally joined at **125** to lever **122**, to an intermediate lever **127** which is pivotally mounted to the housing **2** at **126**, and from there via a coupler **128** and a further lever **129** to a shaft **130**. A lever **131** at the opposite end of shaft **130** displaces a rack **132** in the direction of arrow C (FIG. **11**). A pinion shaft **133** meshing with rack **132** translates the displacement of rack **132**, via a suitable, known overrunning clutch **134** which engages in this direction (FIG. **10**) as a pivoting movement to the screw **119**.

The automatic return of the rack **132** and transmission elements, or linkage, **131-133** into the starting position is accomplished by a tension spring **135**, which is deflected by coupler **124** during the forward movement of carriage **8** — that is, toward the left rear in FIG. **1** — while screw **119** remains at rest because of clutch **134**.

The starting position of rack **132**, into which it is brought during each forward movement of the carriage **8** under the effect of spring **135** engaging at coupler **124**, is determined by an abutment lever **136** (FIG. **11**) against whose abutment head **137** an adjustable abutment screw **138** abuts. The coupler **124** rests against abutment lever **136** by being connected together with screw **138** and also determines the starting position of the lever **122** pivotally joined therewith at **125** (FIG. **11**). Depending on the end position of lever **122** — which is given by the position of abutment lever **136** — the abutment roller **121** contacts lever **122** sooner or later when the carriage returns and, thus, also initiates by means of transmission elements **122–131** movement of the rack **132** sooner or later. With an earlier arrival of roller **121** on lever **122**, the rack **132** traverses a longer path than when roller **121** contacts lever **122** later and, thus, rotates screw **119** through a larger angular distance. This angular distance, which is translated in a manner to be described later into a lowering movement for table **16**, thus depends on the setting of abutment lever **136**. Lever **136** is a bell crank lever mounted in housing section **3** to be pivotal at **139** — see in this connection the partially schematic representation of FIG. **5** — and is joined to nut **25** (FIG. **5**) by means of a coupling **141**. Thus, in dependence on the slice thickness set by displacing nut **25** on screw **24**, the respective lowering path of table **16** also becomes continuously variable and screw **119** lowers table **16**, with the aid of the member **116** which meshes therewith, in a step-by-step manner as a function of the presently set slice thickness — provided only that the respective lever arms and gears are appropriately dimensioned.

When the lower end position is reached, the guide plate **104** actuates a switching lever **142** (FIG. **12**) and, as a result, a limit switch **143**. The lever **142** contacts with its one arm a biased actuating knob of switch **143**. As the plate **104** abuts against the other arm of lever **142** the arm of lever **142** near the switch raises and actuates the switch. The switch **143** interrupts an electric circuit known per se.

Upon actuation of the limit switch **143**, the carriage **8** still continues into its end position on the operator's side, whereupon the carriage drive is cut off in a known manner via a further limit switch **144** (FIG. **6**). Switch **144** is actuated by a cam **88** mounted on crank wheel **61** (FIG. **6**).

A reverse or operating lever **145** is provided to return the stacking table **16** into its starting position (FIGS. **1**, **11** and **12**). This lever **145** is first pivoted in the direction of arrow D (FIG. **11**). This movement pivots switching plate **118** (FIG. **10**), via a pin **146** (FIG. **11**), a pin **218** and an intermediate plate **147**, in the same direction and, thus, member **116** is brought out of engagement with screw **119**. During the subsequent pivoting movement of operating lever **145** in the upward direction E (FIG. **12**), which is transmitted via a lever **148** (FIGS. **11** and **13**) to the guide plate **104** (FIG. **10**) and, thus, to stacking table **16** to raise table **16** into its starting position, the operating lever **145** must remain pressed in the direction of arrow D. In the upper end position, the operating lever **145** is first released against the direction of arrow D so that member **116** again comes into engagement with screw **119**. Finally, the operating lever **145** can be freely pivoted back into its lower end position. By actuating a button switch **21** the machine can now be put into operation again, so that carriage **8** can resume its reciprocating movement and the conveying device **13** with kicker **17** can start operating again.

In addition to the above-described, stepwise lowering movement of the table, with which the cut slices are always deposited by the kicker **17** at the same height above the surface of the table **16** and exactly coinciding vertically with the slice below on the stack growing on table **16**, the stacking table **16** of the machine according to the present invention also has the added capability of being horizontally displaceable without changing its vertical position. This results in a shingle-type deposition of the cut slices onto the table **16**. If such a shingle-type stacking of the slices is desired, the selector switch **107** is pivoted upwardly from the "stacking" position shown in FIG. **1** to a "shingling" position. With this, the eccentrics **108** and **149** disposed on shaft **106** of selector switch **107** (FIGS. **8, 9** and **14**) release lever **109** and a lever **152** (FIG. **14**), respectively, charged by spring bolt **111** and a spring bolt **151**, respectively, by the amount of eccentric movement of eccentrics **108** and **149**, so that both levers **109** and **152** are pivoted on their axis **112**. Lever **109** is pivoted clockwise in FIG. **9**, and lever **152** counterclockwise in FIG. **14**. Lever **109** brings gear **114**, by displacement on shaft **94**, into engagement with toothed, or gear, segment **115** (FIG. **9**). Lever **152** pivots into the vertical path of movement of an angle bracket **153** (FIG. **14**) which is screwed to the guide plate **104**. Thus, bracket **153** can not move downwardly and the stacking table **16** is held in its upper end position and can no longer be lowered.

Let it be assumed that the stacking table **16** is in its upper end position and is pushed into its rearward end position — toward the left rear in FIG. **1** — on shaft **99** (FIG. **12**). A follower pin **154** (FIGS. **9** and **12**) of an advancing lever **155** engages into a groove of a clutch segment **156** (FIG. **12**) on stacking table **16**. When kicker **17** moves upward, which corresponds to a movement of shaft **87** of solenoid **85** in the direction A (FIG. **8**), the rotary movement of shaft **94** (FIG. **9**) is transmitted via a conventional overrunning clutch **157** which engages in this direction to the gear **114**. The rotary movement of gear **114** is transmitted via toothed segment **115** and a gear **158** mounted on the same shaft with segment **115** to a further toothed segment **159**. The advancing lever **155**, which is fixedly attached to a hub of toothed segment **159**, thus pushes stacking table **16** in the direction toward the operator's side of the machine — the right front in FIG. **1** — by a certain predetermined amount. When the end position of stacking table **16** has been reached during the horizontal advancement, an abutment **161** on a face of gear **158** (FIG. **12**) actuates the limit switch **143** via switching lever **142**. This switch cuts off the carriage drive as described above.

To return the stacking table **16** into its starting position, the operating lever **145** is first again pressed in the direction of arrow D (FIG. **11**). Thus, lever **109** (FIG. **9**) is pivoted, via pin **146** (FIG. **11**) and intermediate plate **147**, about shaft **112** in the same direction as lever **109**, and gear **114** is again brought out of engagement with toothed segment **115**. In the following lifting of operating lever **145** in direction E (FIG. **12**) — where the lever must again remain pressed in the direction of arrow D — toothed segment **159** and, thus, advancing lever **155** are pivoted back via a lever **162** (FIG. **12**) and a coupler **163**, so that the stacking table **16** is retracted to its starting position. The operating lever **145** is now released against the direction of arrow D, so that lever **109** is pivoted on its shaft **112** by spring bolt **111** and gear **114** is again engaged with toothed segment **115**. Thereafter, the operating lever **145** is again pivoted into its lower end position. Actuation of buttom switch **21** then sets the machine into operation again.

It is to be understood that the particular details of the construction of the slicing machine according to the present invention that have not been set out herein are known in the art.

It will be understood that the above description of the present invention is susceptible to various modifications, changes and adaptations, and the same are intended to be comprehended within the meaning and range of equivalents of the appended claims.

We claim:

1. A slicing machine which can produce slices of varying thicknesses, comprising, in combination:

a. a rotating circular blade;
b. a machine housing;
c. carriage means for holding a material to be sliced and mounted on said housing adjacent said blade for reciprocating movement in a direction parallel to the plane of said blade;
d. a stacking table mounted to be vertically displaceable;
e. means for stacking slices sliced from the material to be sliced on said stacking table, said stacking means including a conveying device and a kicker;
f. a vertically oriented slide;
g. a shaft arranged in said slide for vertical displacement with respect thereto and connected to said stacking table for mounting it to be vertically displaceable between a starting position and an end position;
h. vertical drive means arranged to displace said stacking table vertically downwardly during each movement of said carriage means and by an amount corresponding to a slice thickness;
j. engaging means to selectively connect said vertical drive means to said stacking table;
k. means for permitting said stacking table to be vertically displaced in the downward direction with each movement of said carriage means by a continuously variable amount which is a function of a predetermined slice thickness and is set simultaneously therewith;
m. guide means connected to said vertically displaceable shaft and to said stacking table for horizontally displaceably mounting said stacking table;
n. horizontal drive means arranged to advance said stacking table horizontally by a predetermined amount with each movement of said carriage means; and
o. means connected to both said drive means and said stacking table for selectively transmitting motion from either of said drive means to said stacking table, said motion transmitting means having a switching member arranged for selectively switching between the horizontally and vertically displaceable movements of said stacking table.

2. The slicing machine according to claim 1, further including an abutment member connected to said carriage means, a rack, a linkage operably connected to said abutment member and connected to said rack to displace said rack with each movement of said carriage means, a spring biasing said linkage into a predetermined position, and an overrunning clutch connected to said linkage to permit said rack to rotate said screw in a step-by-step manner.

3. The slicing machine according to claim 2, further including adjustable abutment lever means connected to said linkage for determining the displacement of said rack as a function of a predetermined slice thickness, and a control member connected to said abutment lever means for adjustment thereof.

4. The slicing machine according to claim 1, further including at least one limit switch arranged to cut off the drive of said carriage means and to stop the movement of said stacking table when the end position of said stacking table has been reached.

5. The slicing machine according to claim 4, further including an operating lever arranged to return said stacking table to its starting position from its end position.

6. The slicing machine according to claim 1, wherein said vertical drive means comprise a vertically oriented, step-by-step driven screw, and a follower member connected to said stacking table and arranged to engage in said screw to vertically displace said stacking table, said follower member being movable out of engagement with said screw.

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