Oct. 16, 1934. A. VAN DUYN 1,977,463

FEEDING MECHANISM FOR SLICING MACHINES

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Fig. 1

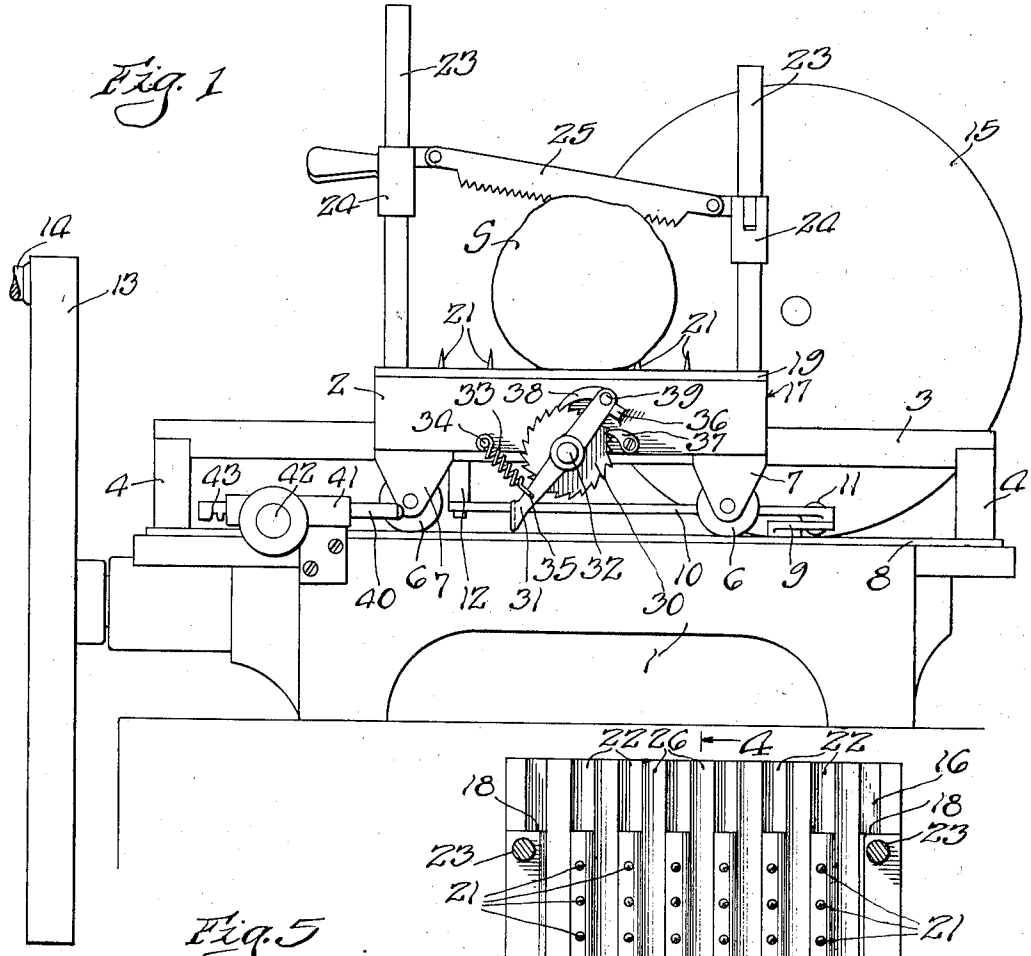


Fig. 5

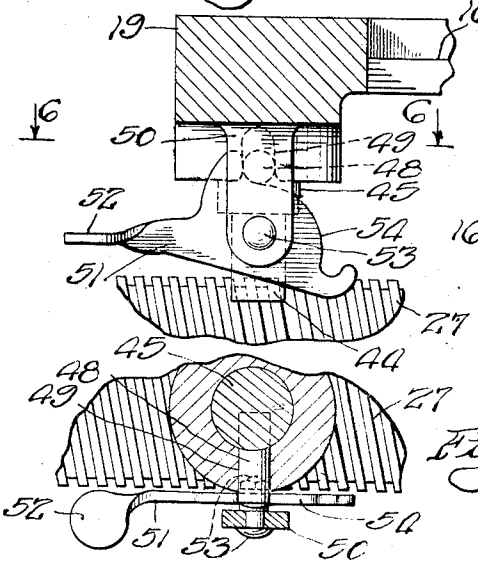


Fig. 6

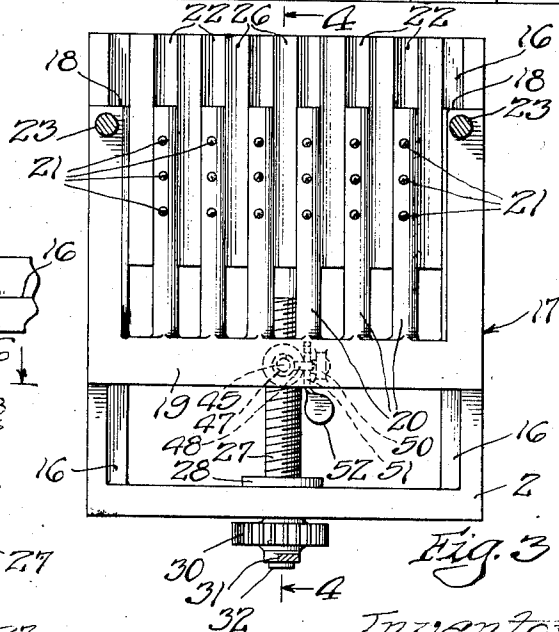


Fig. 3

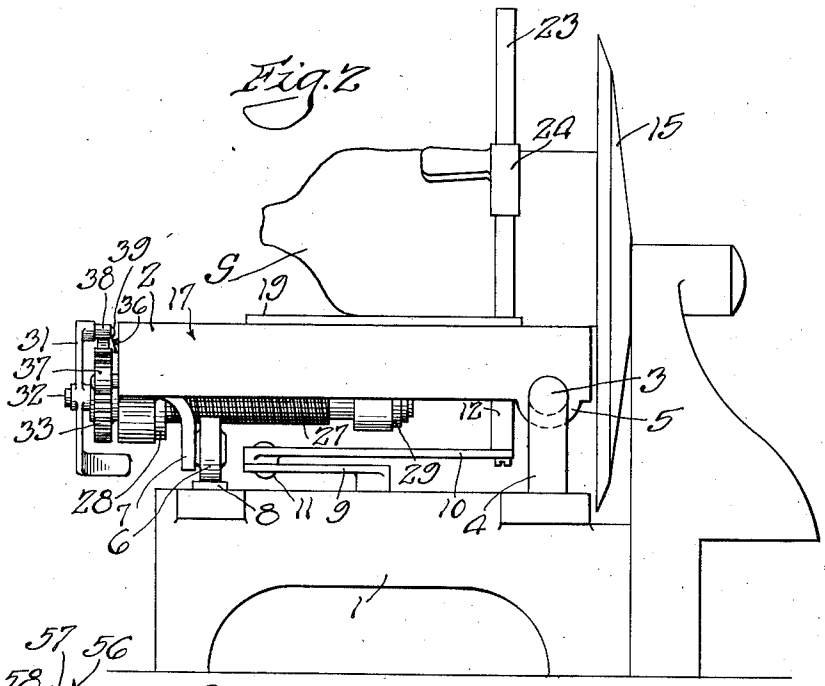
Inventor:
Adrianus van Duyn,
By Chas. M. Nissen,
Atty.

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FEEDING MECHANISM FOR SLICING MACHINES

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Fig. 2



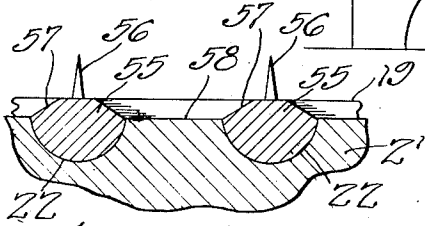


Fig. 8

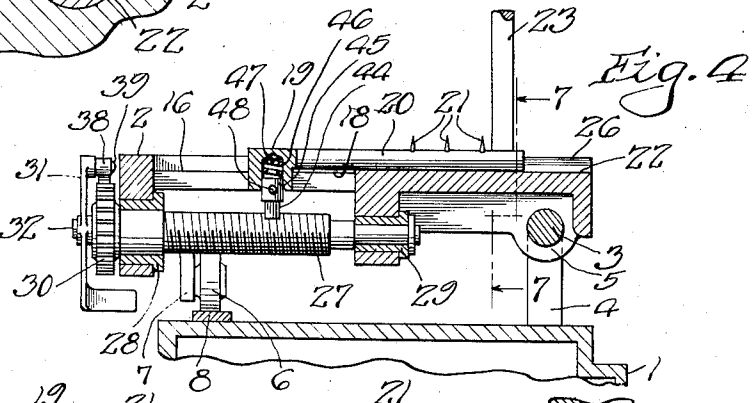


Fig. 4

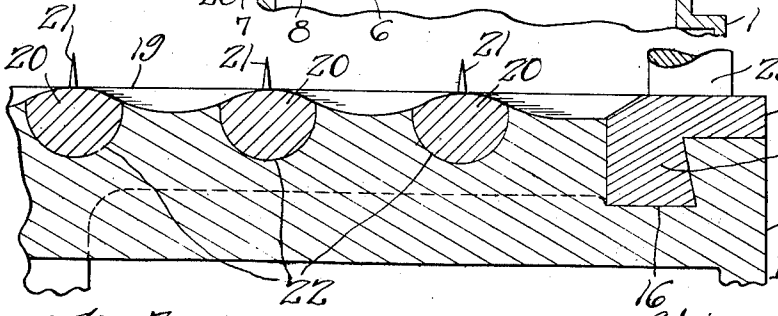


Fig. 7

Inventor:
Adrianus van Duyn,
By Chas. M. Nissen,
Atty.

Patented Oct. 16, 1934 1,977,463

UNITED STATES PATENT OFFICE

1,977,463

FEEDING MECHANISM FOR SLICING MACHINES

Adrianus van Duyn, Hillegersberg, Netherlands, assignor to U. S. Slicing Machine Company, La Porte, Ind., a corporation of Indiana

Application August 21, 1930, Serial No. 476,814
In Great Britain September 10, 1929

16 Claims. (Cl. 146—102)

The present invention relates to slicing machines and particularly that type of slicing machine in which the substance is fed with a step by step movement towards the cutting plane of the knife. In the drawings I have illustrated my invention as applied to a reciprocating slicing machine table, but it will be understood that the table may be stationary if desired and the knife reciprocated past the table instead of the table being reciprocated past the knife.

Generally in machines of this nature the substance is supported either directly on top of the carriage and slid relatively thereto in a direction towards the cutting plane of the knife, or the feed plate is superimposed on the substance support and the substance is clamped directly to the feed plate and moved towards the cutting plane of the knife by said feed plate.

An object of the present invention is to obviate certain disadvantages of prior known slicing machines and in order to accomplish this object I prefer to provide a plurality of substance supporting slides which are mounted on a base plate, these slides being combined with suitable feeding mechanism adapted to positively feed the substance towards the cutting plane of the knife. Preferably the substance supporting slides are provided with clamping means by which the substance can be securely clamped thereto.

Another object of this invention is to make the supporting surfaces of the slides above the level of the base plate for a purpose which will be hereinafter fully described.

Other objects of this invention will appear hereinafter as the description thereof proceeds, the novel features and combinations being pointed out in the appended claims.

In the drawings—

Fig. 1 represents a side elevational view of a slicing machine embodying my invention;

Fig. 2 is an elevational view of the slicing machine shown in Fig. 1 and looking from the right in that figure;

Fig. 3 is a plan view of the substance supporting carriage and associated mechanism, the clamping means being removed for the sake of clearness;

Fig. 4 is a section taken substantially along the line 4—4 of Fig. 3;

Fig. 5 is an enlarged detailed view of part of the mechanism shown in Fig. 4;

Fig. 6 is a cross-section taken on the line 6—6 of Fig. 5;

Fig. 7 is a section taken substantially along the line 7—7 of Fig. 4; and

Fig. 8 is a view similar to Fig. 7 showing a modified construction.

The slicing machine comprises a base 1 and a carriage 2 which reciprocates on the base 1. The mounting for the carriage 2 is as follows:

A guide rod 3 supported on the brackets 4 which in turn are carried by the base 1 engages a bearing 5 on one side of the carriage 2 to guide the carriage in its longitudinal movement relatively to the base. The other side of the carriage is provided with a plurality of rollers 6 mounted on suitable brackets 7 carried by the carriage. The rollers 6 run along a track 8 mounted on the upper side of the base.

The carriage is reciprocated by a crank and pitman connection in a manner which is common to machines of this nature. The crank is indicated at 9 and the pitman is indicated at 10, these two elements being pivotally connected at 11 and the pitman 10 being also pivotally connected at 12 to the carriage. The crank 9 is secured to a shaft which extends into the base of the machine, and this shaft carries a suitable gear meshing with another gear on a shaft which extends longitudinally of the base and to which is secured the fly-wheel 13 having a handle 14 for rotating the same. Therefore, when the fly-wheel 13 is rotated by the handle 14, the crank and pitman connection will cause the table to reciprocate longitudinally of the base member. A slicing knife 15 rotatably mounted adjacent one edge of the carriage is adapted to cut slices from the substance supported on the carriage as the carriage moves past the slicing knife. The knife may be rotated in any suitable manner.

The mechanism so far described is common to slicing machines of this nature, and therefore it is believed that no further description of these parts need be made except insofar as they may be modified by the present invention.

As stated before the invention resides chiefly in the construction of the slicing machine carriages and the means for feeding the substance towards the cutting plane of the knife. As is seen most clearly in Figs. 3 and 4, the carriage 2 has dove-tailed recesses 16 on opposite sides thereof and extending in a direction towards the cutting plane of the knife, and a feed plate 17 supported on the carriage 2 has suitable dove-tailed portions 18 on opposite sides thereof co-

operating with the dove-tailed guides in the base 2 so that the feed plate is positively guided in a direction towards the cutting plane of the knife.

The feed plate comprises a cross-member 19 and substance supporting slides 20 which carry the upright prongs 21. The slides 20 slide in suitable grooves 22 formed in the base 2, the grooves being preferably of the same contour as the adjacent surfaces of the slide members. It will be noted from an inspection of Fig. 7 that the upper surfaces of the slide members and the adjacent surfaces on the base member form a substantially continuous unbroken supporting surface which is substantially undulating although not necessarily so. The undulations are for a purpose which will appear hereinafter.

The feed plate carries a plurality of uprights 23 which in turn are adapted to slidably support the bearing members 24 and the clamping bar 25 pivoted at opposite ends to the bearing members 24.

The substance to be sliced is placed on the slides and the prongs 21 engage the lower surface thereof. The clamping bar is brought down into engagement with the substance S to cause the substance to be forced against the slides with sufficient gripping of the substance to prevent any substantial relative movement between the slides 20 and the substance so that as the feed plate 17 is adavnced towards the cutting plane of the knife by a means which will presently be described, uniform slices will be cut therefrom.

The raised upper surfaces of the slides prevent the clamping bar 25 from clamping the substance too firmly against the portions 26 of the base 2 which lie between the slides 20. In other words, if the supporting surfaces 26 and the supporting surfaces of the slides 20 were in the same plane the clamping pressure on the surfaces 26 would be substantially equal to the clamping pressure on the slides 20. Accordingly such an arrangement would cause the substance to create a considerable retarding effect on the movement of the feed plate towards and from the cutting plane of the knife and this is not desirable. With the slides and surfaces 20 and 26 respectively constructed in the manner illustrated in Fig. 4, the clamping pressure on the surfaces 26 is not as great as it otherwise might be. At the same time those portions of the surfaces 26 which lie between the cutting plane of the knife and the forward edge of the slicing machine table are high enough to properly support the substance being sliced as the substance is being moved towards the cutting plane. With this arrangement also it will be noted that the level of the substance supporting surface remains substantially unchanged throughout the movement of the substance towards the cutting plane of the knife and therefore the substance is never presented to the knife at an inclination thereto. When the slices are cut with the ordinary slicing machine with one end of the substance supported on a feed plate, the first slices which are formed may have the sides thereof substantially parallel, but as the substance gets shorter, the inclination of the substance downwardly and toward the cutting plane of the knife increases and wedge-shaped slices are formed. This disadvantage increases at a rapid rate as the feed plate nears the cutting plane of the knife, and as a result, the last slices which are cut become more wedge-shaped. The supporting surface of the substance support is not composed of the members 20 but rather of the intervening depressed portions such as 58. When the substance is clamped on the members 20, a portion thereof moves downwardly into engagement with the surfaces 58 on the substance support so that the substance is in reality supported by the main substance support at substantially the same height during the entire feeding movement. Since the portion of the substance, which lies between the clamp and the cutting plane of the knife is not clamped, this portion rests upon the intervening supporting surface 58 so that the bottom side of the supported substance is substantially in the same plane as the bottom portion which is clamped.

The difference in height between the top of the bars 20 and the intervening spaces is such that the meat rests on the surface 58 along its entire length up to the cutting edge of the knife and even between the bars 20 and due to the clamping pressure, the under side of the meat is substantially undulated along its bottom surface. The sharp longitudinal edges of the grooves 22 offer an obstruction to the displacement of the meat in the direction of reciprocation of the table, and since the grooves extend all the way to the cutting plane of the knife, the effectiveness of the edges of the grooves to prevent displacement of the meat is not lost near the cutting plane of the knife where it is most effective. Also the sloping sides of the bars 20 serve substantially the same purpose and prevent lateral displacement of the substance beneath the clamp during the cutting operation.

I will now describe the mechanism for feeding the feed plate towards the cutting plane of the knife. This comprises a feed screw 27 journaled in suitable bearings 28 and 29 in the carriage 2 and one end of the feed screw carries the ratchet wheel 30. An arm 31 is pivoted at 32 to the end of the feed screw 27. A spring 33 secured at 34 to the carriage 2 and at 35 to the arm 31 is adapted to rotate the arm in a clockwise direction and into engagement with a suitable stop 36 on the carriage 2. A pawl 37 is adapted to prevent clockwise movement of the ratchet wheel as viewed in Fig. 1. The pawl 37 is rotatably mounted on the carriage and may be spring pressed in a counter-clockwise direction if desired. A pawl 38 pivoted at 39 to the arm 31 is adapted to engage the teeth on the ratchet to rotate the feed screw in a counter-clockwise direction. The end of the arm 31 opposite to that on which the pawl 38 is mounted is adapted to be struck by means of the adjustable stop 40 secured in the bracket 41 and adjustable by means of a gear on the shaft 42 and a rack 43 formed integral with or secured to the stop 40. Any form of adjustable stop may be used as this is not a part of applicant's invention.

The stop 40 is adapted to strike the lower end of the arm 31 when the carriage moves to the left as viewed in Fig. 1, thereby imparting a counter-clockwise movement to the feed screw 27. A spring pressed nut 44 carried by the feed plate is adapted to engage the threads on the feed srcew 27 to cause the feed plate to move towards the cutting plane of the knife as the feed screw is rotated.

The feed nut 44 has a bearing portion 45 slidable within a suitable recess 46 in the feed plate and is yieldingly urged in a downward direction by means of a spring 47 arranged within the recess 46. A pin 48 extends through the bearing portion 45 and co-operates with the slots 49 pro-

vided in the walls of the recess 46 to prevent rotation of the feed nut in the recess.

In order to withdraw the feed nut from its engagement with the feed screw 27, I provide a bracket 50 extending downwardly from the feed plate and arranged adjacent the feed nut. To this bracket I pivot a cam member 51 having a handle or thumb piece 52 integral therewith. This cam member 51 is pivoted at 53 to the bracket. The cam surface 54 engages an extending end of the pin 48 and when the cam is rotated in a counter-clockwise direction, the cam surface 54 will raise the pin 48 and thereby raise the feed nut 44 out of engagement with the feed screw, a reverse movement of the cam permitting the feed nut to again engage the feed screw under the influence of the spring 47. Any other desired mechanism may be used for the purpose of retracting the feed nut or for yieldingly urging the feed nut into engagement with the feed screw but I find that the arrangement disclosed proves to be very satisfactory. If desired however the operating means for the cam may be extended to a more convenient position than that shown.

In Fig. 8 I have shown a modified construction of my apparatus in which the supporting slides 55 are provided with the pins 56 and beveled surfaces 57 instead of rounded surfaces as illustrated in Fig. 7. I also provide flat supporting surfaces 58 on the carriage 2' between adjacent slide members 55. This arrangement provides a substantially undulating supporting surface such as that illustrated in Fig. 7, but may be constructed more readily than that shown in Fig. 7. Either form of the invention shown in the drawings may be used with substantially equal advantages and it is apparent that the slides and carriage may have their supporting surfaces arranged in other manners without departing from the spirit of the invention or scope of the appended claims.

Obviously those skilled in the art to which this invention pertains may make various changes and modifications other than those which I have suggested without departing from the spirit of this invention, and therefore I do not wish to limit myself except as pointed out in the claims.

Having thus fully described two embodiments of my invention what I desire to secure by Letters Patent of the United States is:—

1. In a slicing machine, the combination with a substance supporting carriage having a plurality of slides movably supported in grooves formed in said supporting carriage and having the uppermost portions above the surface of said carriage, of a slicing knife, and means for moving said slides in said grooves in a direction towards the cutting plane of said knife, the supporting surfaces of said slides and carriage forming a substantially continuous undulating supporting surface in a direction transversely to the length of said slides.

2. In a slicing machine, the combination with a substance supporting carriage having a plurality of slides movably supported in grooves formed in said supporting carriage, of a slicing knife, and mean for moving said slides in said grooves in a direction towards the cutting plane of said knife, said slides having their upper surfaces above the supporting surfaces of said carriage and beveled downwardly towards said supporting surfaces of said carriage.

3. A substance support for slicing machines comprising alternately raised and depressed portions extending substantially parallel with each other and being of substantial length in a direction away from the cutting plane of the slicing knife of said machine, means for moving said raised portions relatively to said depressed portions and in the direction of their length, a substance clamp for clamping the substance against said raised portions with portions of the substance forced into the spaces between said raised portions resting on said depressed portions to thereby bring the lower side of the substance substantially entirely within a plane parallel with the direction of feeding movement of said raised portions, whereby said raised portions sustain a substantially greater supporting pressure than is supported by the depressed portions.

4. In a slicing machine, the combination with a substance supporting carriage having a plurality of slides movably supported in grooves formed in said carriage, of a slicing knife and means for moving said slides in said grooves in a direction toward the cutting plane of said knife, said slides having their upper sides above said supporting surfaces of said carriage and extending outwardly and downwardly on opposite sides thereof towards said supporting surfaces of said carriage, said slides being spaced sufficiently to permit the substance to be forced downwardly therebetween into engagement with the supporting surface of said substance supporting carriage when pressure is exerted on the substance in a direction toward the substance supporting carriage.

5. In a slicing machine, the combination with a main substance supporting carriage, grooves in said carriage, members guided by each of said grooves, an integrally formed tie bar for connecting said members to cause the same to move in unison with each other along said grooves and means for feeding said members in unison along said grooves toward the cutting plane of said knife, the ends of said members, extending in a direction toward the cutting plane of said knife being unconnected with each other, said grooves extending all the way to the edge of said substance carriage which lies adjacent the cutting plane of the knife and being open at the ends adjacent said plane to permit the free ends of said members to travel along said grooves substantially into the plane of the edge of said carriage which lies adjacent the cutting plane.

6. In a slicing machine, the combination of a substance supporting carriage having grooves in the upper surface thereof, a plurality of slides movably supported in said grooves, a slicing knife, means for connecting said slides so that said slides move in unison with each other in a direction toward and away from the cutting plane of said knife, the supporting surfaces of said slides being above the substance supporting surface of said carriage and forming with the portions of said substance supporting carriage which lie between said slides a substantially continuous undulating supporting surface for the substance to be moved in a direction transversely of the direction of movement of said slides, and means for clamping a substance against said slides.

7. In a slicing machine, the combination of a substance supporting carriage having grooves in the upper surface thereof, a plurality of slides movably supported in said grooves, a slicing knife, and means for connecting said slides so that said slides move in unison with each other in a direction toward and away from the cutting plane of said knife, the supporting surfaces of said slides being above the substance supporting surface of said carriage and forming with the portions of said substance supporting carriage

which lie between said slides a substantially continuous undulating supporting surface for the substance to be moved in a direction transversely of the direction of movement of said slides.

8. In a slicing machine, the combination with a substance supporting carriage, of a feed plate comprising a series of separated elements extending in the direction of feeding movement and having spaces of substantial width therebetween, a common means for connecting said elements to cause them to act as a unitary feed plate and guiding means for said feed plate, said elements having their upper substance supporting surfaces extending above the supporting surface of said carriage and sloping toward the adjacent portions of the surface of the said carriage which lies between said elements.

9. A substance support for slicing machines comprising a member having a substance supporting surface composed of a series of raised and depressed substance engaging portions of substantial length, each extending in the general direction of feeding movement and being arranged side by side in a direction transversely to the feeding movement, the spaces between adjacent raised portions being of appreciable width to expose appreciable portions of the depressed portions therebetween, whereby the substance may have portions of the under sides thereof forced into contact with depressed portions when a clamping force is applied to the substance, while the raised portions bear the major portion of the clamping force, and means for moving said raised portions relatively to said depressed portions in the general direction of feeding movement.

10. In a slicing machine, the combination with a main substance support, grooves in the supporting surface of said support, members of substantial length guided by each of said grooves and arranged therein, said members being adapted to support the substance to be sliced and being spaced from each other sufficiently to permit the substance being sliced to be moved downwardly therebetween into engagement with the intervening portions of said main substance support, and means for moving said members toward the edge of said support at which the slices are cut, said grooves extending to the end of said support at which the slices are cut, and the ends of said members which lie adjacent the edge of said support at which the slices are cut being unconnected with each other whereby the movement of the substance along said support progresses smoothly and uninterruptedly while said members are fed there along.

11. A substance support for slicing machines having a knife, comprising a member having a plurality of slides upon which the substance is held as it is fed toward the knife, said member having grooves therein, slides slidably mounted in said grooves, said slides being spaced from each other sufficiently to expose portions of said member there-between and having their supporting surfaces higher than the intervening surfaces on said member and being spaced from each other a sufficient distance to permit the substance to be partially supported on the portions of said member which lie between said slides and below the upper surfaces of said slides, whereby the upper surfaces of said slides bear the major portion of a clamping pressure exerted on the substance when a clamping pressure is applied to a substance to hold the substance as it is advanced toward the cutting plane of the knife.

12. In a slicing machine, the combination with a knife, of a main substance supporting carriage, grooves in said carriage, members guided by each of said grooves, an integrally formed tie bar for connecting said members to cause the same to move in unison with each other along said grooves, and means for feeding said members in unison along said grooves toward the cutting plane of said knife, the ends of said members extending in a direction toward the cutting plane of said knife being unconnected with each other, said grooves extending all the way to the edge of said substance carriage which lies adjacent the cutting plane of the knife and being open at their ends adjacent said plane to permit the free ends of said members to travel along said grooves substantially into the plane of the edge of said carriage which lies adjacent the edge of the cutting plane, the upper surfaces of said member being raised appreciably above the surfaces of said carriage which lie between said grooves, whereby the upper surfaces of said member bear the major portion of the clamping pressure when a clamping pressure is applied to the substance.

13. In a substance support for slicing machines, the combination with a main substance supporting table having spaced substance supporting surfaces thereon extending parallel to each other and substantially perpendicular to the cutting plane of the knife for a considerable distance, movable supporting members arranged between said substance supporting surfaces and extending parallel thereto and being raised slightly above said supporting surfaces whereby when a clamping pressure is applied to a substance on said support, the supporting members sustain the major portion of the clamping pressure, whereby the portions of the substance contacting with said first mentioned surfaces will not materially impede the forward movement of the substance in a direction parallel to said members, a clamp movable with said members for clamping a substance against said members and to force a portion thereof into engagement with said supporting surfaces, whereby the under side of the substance at the clamping position is brought into substantially the same plane as the said supporting surfaces and the supporting portion of the substance support between said slides and the cutting plane of said knife.

14. In a slicing machine, the combination with a slicing knife, of a main substance supporting carriage adjacent the cutting edge of said knife having an imperforate bottom on the portion thereof which lies adjacent the cutting plane of said knife, guiding mechanism for said carriage beneath the imperforate bottom of said carriage and protected thereby, said upper surface having grooves therein extending in a direction toward the cutting plane of said knife from a point remote from the cutting plane of said knife, members guided by each of said grooves, an integrally formed tie bar for connecting said members to cause the same to move in unison with each other along said grooves, and means for feeding said members in unison along said grooves toward the cutting plane of said knife, the ends of said members, extending in a direction toward the cutting plane of said knife, being unconnected with each other, said grooves extending all the way to the edge of said substance carriage which lies adjacent the cutting plane of the knife, and being open at the ends adjacent said plane to permit the free ends of said members to travel along said grooves substantially into the plane of the edge

of said carriage which lies adjacent the cutting plane.

15. In a slicing machine, the combination with a slicing knife, of a main substance supporting carriage adjacent the cutting edge of said knife having an imperforate bottom on the portion thereof which lies adjacent the cutting plane of said knife, guiding mechanism for said carriage beneath the imperforate bottom of said carriage and protected thereby, said upper surface having grooves therein extending in a direction toward the cutting plane of said knife from a point remote from the cutting plane of said knife, members guided by each of said grooves and arranged therein, said members being adapted to support the substance to be sliced and being spaced from each other sufficiently to permit the substance being sliced to be moved downwardly therebetween into engagement with the intervening portions of said main substance support, and means for moving said members toward the edge of said support at which the slices are cut, said grooves extending to the end of said support at which the slices are cut, and the ends of said members which lie adjacent the edge of said support at which the slices are cut being unconnected with each other whereby the movement of the substance along said support progresses smoothly and uninterruptedly while said members are fed there-along.

16. In a slicing machine, the combination with a substance supporting carriage having a substance supporting surface, of a feed plate comprising a series of separated elements extending in the direction of feeding movement and having spaces of substantial width therebetween, a common means for connecting said elements to cause them to act as a unitary feed plate and guiding means for said feed plate, said elements having their upper substance supporting surfaces extending a substantial distance above the supporting surface of said carriage, whereby the friction of the substance as regards the substance supporting surface of the carriage is materially reduced.

ADRIANUS VAN DUYN.