

Nov. 15, 1938.

J. FOLK

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SLICING MACHINE

Filed Feb. 15, 1936

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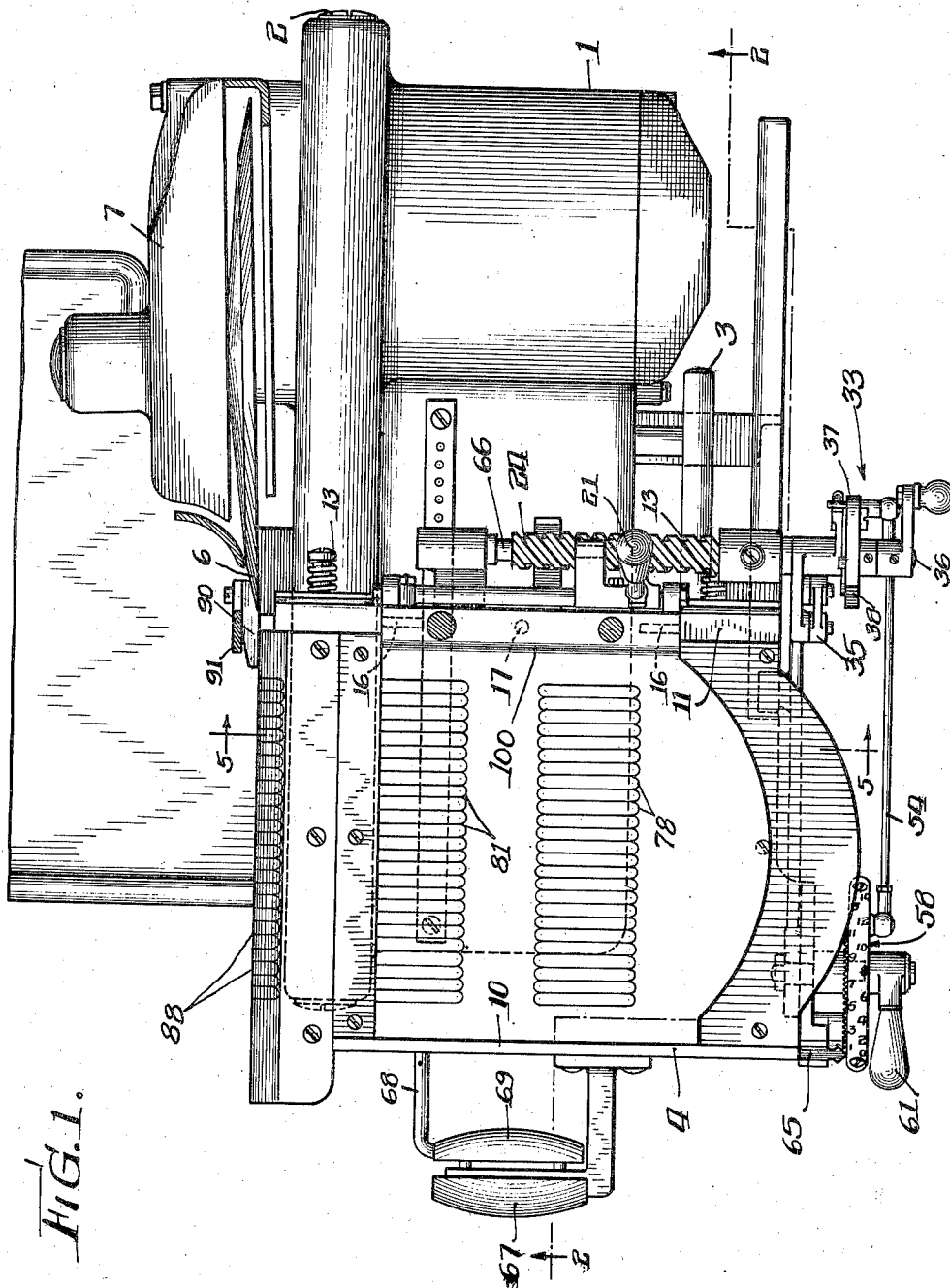


FIG. 1.

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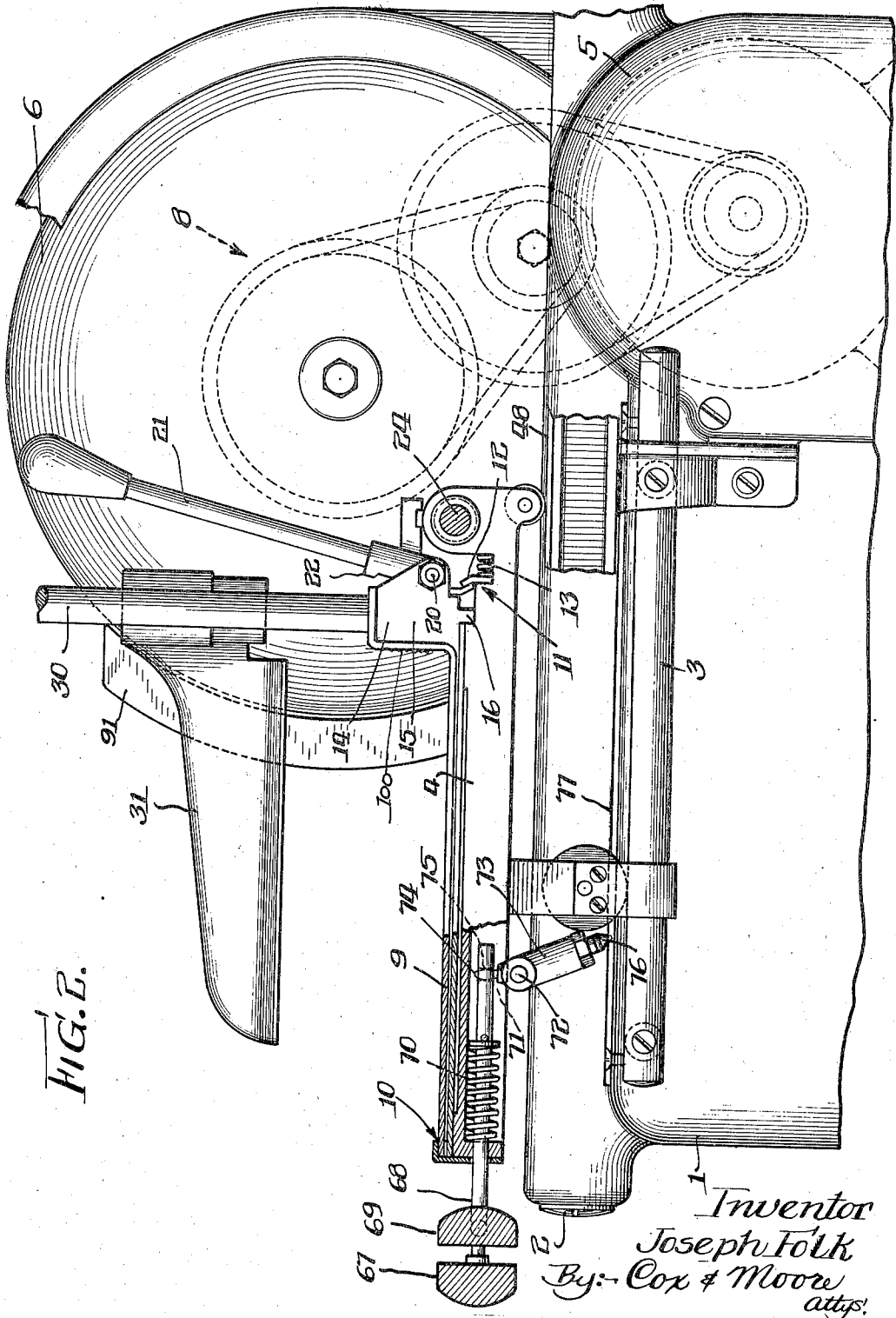
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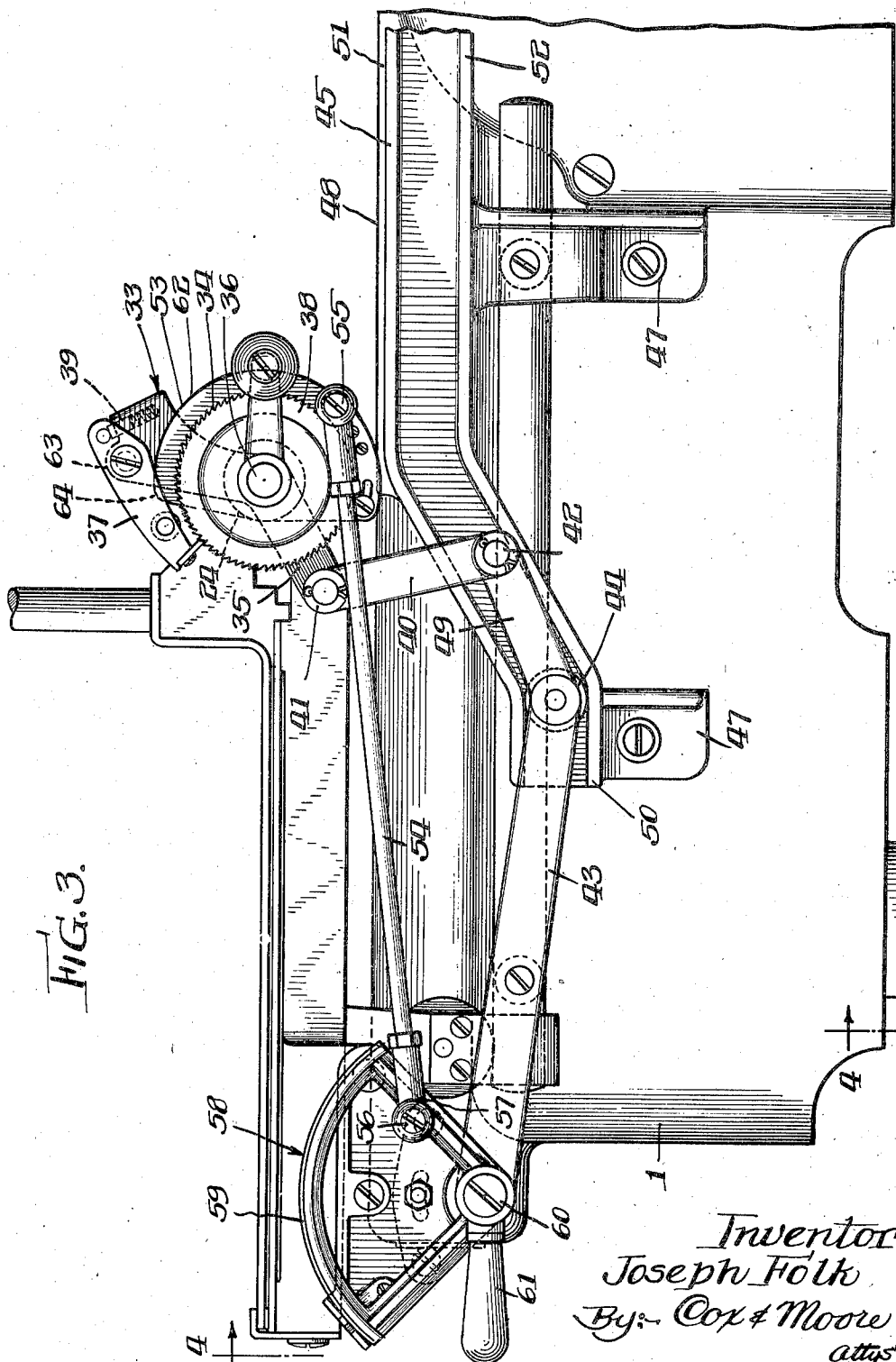
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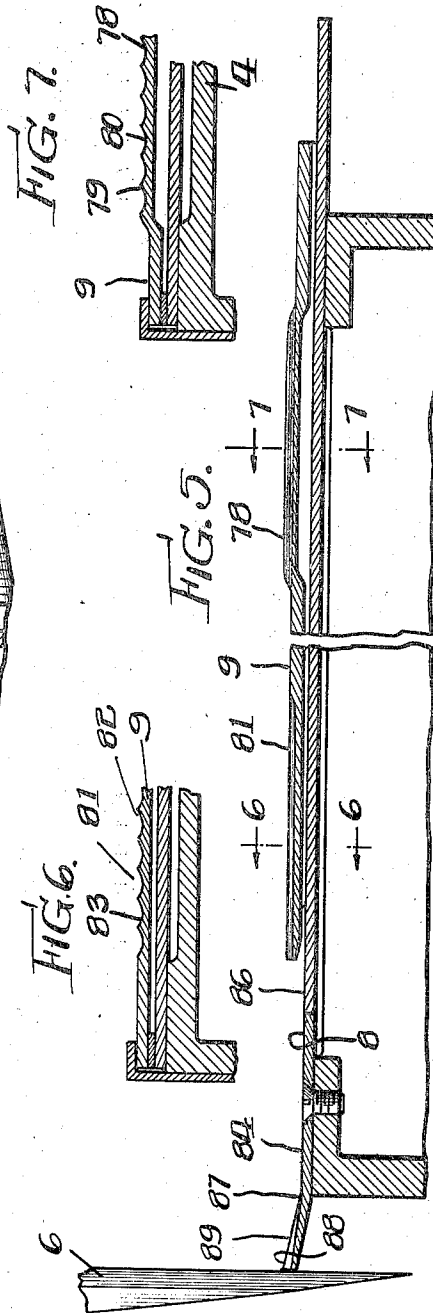
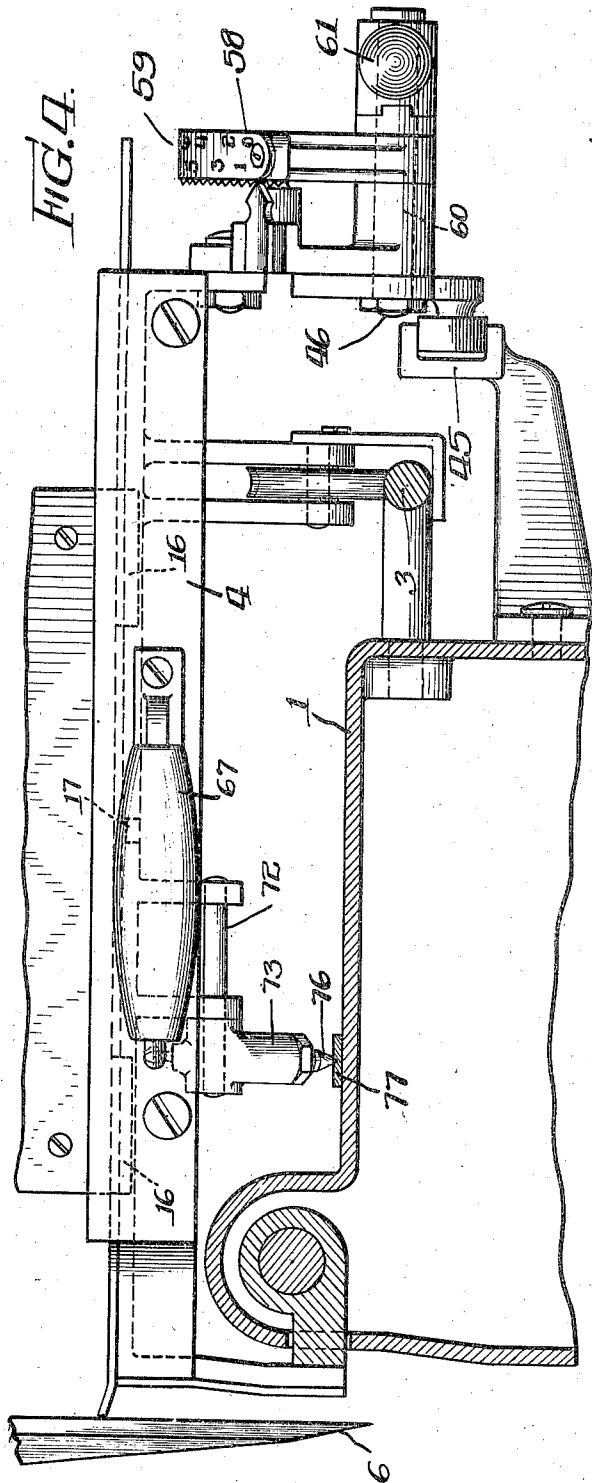
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5 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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SLICING MACHINE

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Application February 15, 1936, Serial No. 64,145

10 Claims. (Cl. 146—102)

This invention relates to slicing machines and particularly to feeding mechanism therefor. More specifically the invention relates to slicing machines whereby substance is positively fed by means of a feed screw.

The primary object of the invention is to provide a novel and efficient slicing machine having a fixed but revolvably mounted knife and a manually reciprocated carriage and feed screw substance feeding mechanism, which latter mechanism is operated and controlled by the movement of the carriage and particularly when the carriage reaches a certain predetermined position.

Another object of the invention is the provision of feeding mechanism controlled by the position of a slidably mounted, manually operated carriage, which feed mechanism is operated by a cam way which operates a feed lever for progressively turning a feed screw.

Another object of the invention consists in the provision of mechanism for controlling the feeding of a feed screw.

A further object of the invention is the provision of a feed plate which is progressively moved toward the cutting plane of the knife by a feed screw having a ratchet and pawl feeding mechanism, the ratchet being controlled or its feeding movement being regulated by means of a cam; means comprising a guide track or cam way operating a feed screw lever for controlling the operation of the feed pawl and consequently the ratchet.

A further object of the invention is the provision of means for regulating the ratchet feed mechanism to selectively operate the feed screw progressively so that slices of various thicknesses may be cut.

Still another object of the invention is the provision of a slicing machine which has a stationary but rotatably mounted knife, a manually operated reciprocal carriage which has means for locking the carriage positively against forward movement, which has means for releasing said locking mechanism to permit forward movement of the carriage, which has a food table operated by a feed screw, and which is provided with means for operating the feed screw when the carriage is moved at or near the end of its return travel, that is, movement toward the operator.

Still another object is the provision of new and improved means for permitting disengagement of the feed nut with the feed screw and permitting free and easy unhampered slidable movement of the food table with respect to the carriage in any

position of the food table but particularly for the returning thereof.

Still another object of the invention consists in the provision of corrugations on the food plate co-operating with raised corrugations at the edge of the carriage along the cutting plane to cause firm holding of the meat whereby uniform slices may be cut from the meat.

Numerous other objects and advantages will be apparent throughout the progress of the following specification.

The accompanying drawings illustrate a selected embodiment of the invention and the views therein are as follows:

Fig. 1 is a top plan view of the improved slicing machine and embodying the invention;

Fig. 2 is a detail longitudinal sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a detail side elevational view at the side of the machine remote from the knife;

Fig. 4 is a detail transverse sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a detail transverse sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a detail sectional view on the line 6—6 of Fig. 5;

Fig. 7 is a similar view on the line 7—7 of Fig. 5;

Fig. 8 is a detail plan section of some of the feeding mechanism taken on the line 8—8 of Fig. 9;

Fig. 9 is a vertical sectional view on the line 9—9 of Fig. 8.

The particular slicing machine herein shown for the purpose of illustration comprises a base 1 having longitudinal side bars or rails 2 and 3 upon which there is mounted for fore and aft reciprocation a carriage 4. A motor 5 is housed within the base supporting structure 1, as clearly shown in Fig. 2, and drives a stationary but rotatably mounted knife 6 which is operatively supported on a knife supporting bracket 7, Fig. 1. The knife 6 is driven by the motor 5 through a train of gears or pulleys and belts designated generally by the numeral 8, Fig. 2. The carriage 4 is adapted to be reciprocated forwardly and rearwardly in rectilinear path parallel to the cutting edge of the knife and a food table or substance support 9, mounted in suitable guide ways 10 and 11, Figs. 1 and 2, is adapted to feed the substance transversely of the cutting plane of the knife so that slices may be cut from the substance. The guide way 10 comprises a channel shaped opening, Fig. 2, into which the edge of the food support adjacent the operator is

adapted to be received. The guideway 11 comprises a rabbeted portion and an end plate 12 which is urged by springs 13 against the forward end of the carriage 4. The rearward edge of the food supporting table 9 is received in the guideway 10 while a guide 14 provided on the forward edge of the food table 9 operates in the guideway 11. The guide 14 comprises a casting or fitting 15 having lugs 16 formed on the bottom thereof, which lugs are adapted to abut an upstanding pin 17, Fig. 1, arranged in the guideway to limit the slidable movement of the substance supporting plate 9. A spring pressed plate 18, Fig. 9, is attached to the forward side of the fitting 15 being urged outwardly by springs 19, Fig. 9. The plate 18 is adapted to have frictional sliding engagement with the spring pressed plate 12, Fig. 9. A shaft 20 is mounted in suitable bearings provided on the fitting 15 and has fixed thereto an upstanding handle 21. A fitting 22 fixed to the transverse rod 20 and to the upstanding handle 21 carries a feed screw nut 23 which is adapted to become engaged with a feed screw 24. A face 25 of the fitting 22 is adapted to be brought into engagement with a face 26 of the plate 18 to depress the plate 18 against the tension of the springs 19 to free the plate 18 from the plate 12 to permit the food plate or support 9 to be removed out of the guideways. An upstanding lever 27, Fig. 9, is fixed to the plate 12 so that when this lever 27 is moved to the right, Fig. 9, the plate 12 will be moved a predetermined distance to the right, Fig. 9, to assist in freeing the guide 14 out of the guideway 11. A plunger 28 pressed by a spring 29 engages the fitting 22 and normally holds the lever 21 in the position shown in Fig. 9 as well as the feed nut 23 into screw engagement with the feed screw 24.

Upstanding vertical rods 30 may be fixed to the guide 14 to support and guide a food clamp 31, Fig. 2.

The feed screw 24 is mounted in suitable bearings 32, Fig. 8, and extends a predetermined distance away from its outermost bearing to receive mechanism to operate the feed screw. A bell crank 33, Fig. 3, comprising the arms 34 and 35, is revolvably mounted on the protruding end 36 of the feed screw 24. The arm 34 of the bell crank 33 has a pawl 37 pivoted thereto, Fig. 3, which pawl is adapted to be brought into engagement with the teeth on a ratchet wheel 38 fixed to the reduced end 36 of the feed screw 24. A spring pressed plunger 39 is provided to urge the pawl in a direction toward engagement with the ratchet wheel 38. A link 40 is pivotally connected to the arm 35 of the bell crank 33 as indicated at 41, Fig. 3. The other end of the link 40 is pivotally connected at 42 to a feed arm 43, Fig. 3. This feed arm 43 carries a roller 44 which is adapted to operate in a track or guideway 45. The forward end of the feed lever 43 is pivotally mounted to the carriage at the side opposite the knife as indicated at 46, Fig. 4. The track or guideway 45 is rigidly supported on rigid supports 47 fixed to the frame 1. The track comprises a straight portion 48, an inclined portion 49, and a relatively straight but short portion 50. During manual reciprocation of the carriage, when the carriage is moved to the end of its travel toward the operator in a rearward direction, the roller 44 on the arm 43 will cause the arm 43 to rock on the pivot 46, swinging the forward free end and rock the bell crank 33. The movement of the arm 43

is caused by the roller 44 engaging the space between the upper and lower rails 51 and 52 respectively of the track 45. Thus, when the carriage is moved to the end of the rearward travel the roller 44 following the track 45 will cause the lever 43 to swing on a pivot 46 and operate the bell crank 33 pulling downwardly on the bell crank arm 35 as shown in Fig. 3. As the bell crank arm 35 moves toward its downward position the arm 34 of the bell crank will raise and cause the pivoted pawl 37 to move the ratchet wheel in a counter-clockwise direction and consequently rotate the screw 24. The teeth of the ratchet are so arranged that upon forward movement of the carriage the pawl will be free to slide over the teeth of the ratchet.

Of course it is necessary and desirable that the feed screw 24 be capable of varying rotation so that slices of various thickness may be cut. Therefore a cam 53 is provided to determine the feeding action of the pawl 37. This cam 53 is located between the outside of the bell crank 33 and the inside of the ratchet 38. The cam 53 has one end of a rod 54 pivotally connected to a part thereof as indicated at 55, Fig. 3, and its other end 56 pivotally connected to a leg 57 of a spider element 58, Fig. 3. The legs of the spider 58 are connected by an arcuate surface 59 carrying indicia characteristic of different slice thicknesses. The spider is pivotally mounted on a stud 60 fixed to a part of the carriage. A handle 61 is rigidly connected to the spider to permit the spider to be moved on its pivot stud 60. When the spider 58 is operated on its pivot the rod 54 will move the cam member 53. This cam member 53 is provided with a cam surface 62 which is adapted to engage the underside of a roller 63 formed on the pawl 37. Therefore, during operation of the bell crank 33 the roller 63 will ride on the cam and prevent the pawl from engaging the ratchet until the roller 63 leaves the cam surface 62 and drops beyond the edge 64 of the cam surface 63, Fig. 3. Therefore, the pawl does not come into engagement with the ratchet wheel until after the roller 63 leaves the cam surface. Thus when the cam which is controlled by operating the handle 61 is in a position such as shown in Fig. 3 very thin slices are cut as the pawl is adapted to engage the teeth of the ratchet after a delayed interval of time, the pawl being kept from engaging the ratchet teeth by the cam surface 62. If, however, very thick slices of material are desired to be cut from the substance the handle 61 is pushed downwardly to an angle of approximately ninety degrees from the horizontal in which latter position it would be hanging straight down in Fig. 3. The spider, therefore, will be swung on its pivot and be to its extreme left position, Fig. 3, whereby the rod 54 due to the movement of the spider would have caused the cam 53 to be rotated in a clockwise direction thereby moving the edge 64 of the cam considerably to the right, Fig. 3, and allowing the pawl 37 to come into engagement with the teeth on the ratchet wheel at a much earlier period. The pawl would then come into engagement with the ratchet wheel much quicker and cause greater movement of the ratchet wheel 38 and consequently greater rotative movement of the feed screw 24. The spider is adapted to be set intermediate its two extreme points whereby slices of various thicknesses may be cut. An index or pointer 65 is arranged as shown in Fig. 1 and is adapted to cooperate with the indicia on the spider so that the operator may set the spider

in any desirable position with respect to the index to determine the thickness of the slice to be cut from the substance.

As the food table 9 is arranged in the guideways 10 and 11 with the feed nut 23 in engagement with the feed screw 24 the feed table will be fed progressively along the guideways toward the cutting plane of the knife. The feed table 9 of course is prevented from striking the knife because the movement thereof is limited by reason of a lug 16 engaging the pin 17, each lug 16 limits the movement of the food table in opposite directions because of their respective engagements with the upstanding pin 17. Also the feed screw 5 is left smooth at its end nearest the knife as indicated at 66, Fig. 1, so that the threads on the nut will not be in engagement with any threads on the feed screw. Therefore, as soon as the nut leaves the threads on the feed screw 24 no further movement of the food table will be caused.

A handle 67 is rigidly connected to the carriage to reciprocate the carriage forwardly and rearwardly in a rectilinear path parallel to the cutting plane of the knife. A longitudinal rod or bar 25, 68, Fig. 2, is slidably supported in a part of the carriage frame and is provided with a grip portion 69, Fig. 2. A spring 70 surrounds the rod 68 and urges the grip 69 away from the grip handle portion 67. A bracket 71 extends downwardly from a part of the carriage and pivotally supports a cross bar 72 upon which there is rigidly mounted a fitting 73. A pin 74 is rigidly carried by the fitting 73 and extends into a receiving opening 75 formed in the rod 68. A stop point or plug 76 is mounted in the lower end of the fitting 73 and is adapted to engage any one of the series of openings or recesses formed in a longitudinal bar or strip 77 which is fixed to the upper face of the base. The plug 76 is normally urged downwardly against the strip 77 and particularly in a recess thereof. Forward pressure of the handle 67 prevents movement of the carriage forwardly because the plug 76 would engage a recess in the strip 77. In order to permit the carriage to be moved in a forwardly direction the plug 76 must be disengaged from a recess in the strip 77. This latter operation is done by moving the rod 68 rearwardly (toward the operator). The grip portion 69 on the rod 68 is arranged in juxtaposition relatively to the handle grip portion 67 so that the two parts 67 and 69 may be conveniently gripped as a single unit. By gripping the two parts 67 and 69 as a single unit the part 69 will be moved toward the part 67 thereby imparting longitudinal movement to the rod 68 in a direction toward the operator and against the tension of the spring 70. When the rod 68 is moved rearwardly, that is toward the operator, the fitting 73 is caused to swing on its pivot 60, 72 and release the plug from a recess in the strip 77. The advantage of this stop mechanism for the carriage is to insure safe loading of the machine because the carriage is locked in such predetermined position, movement of the carriage 65 being prevented unless the grip 69 on the rod 68 is purposely operated.

It will be noticed however that the plug and its fitting 73 extend forwardly in an angular position so that forward movement of the carriage is positively prohibited unless the plug is retracted from a receiving notch in the strip 77. The carriage, even though being frictionally locked, is capable of being moved rearwardly, that is toward the operator, because the plug 75 will be relatively free to slide over the various

notches in the strip 77. However, in loading the thrust against the machine is generally, if not nearly always forwardly and forward movement of the carriage is prevented unless the grip 69 on the rod 68 is purposely manipulated by the 5 operator.

The knife 6 is of the rotary type and while being rigidly mounted is free to rotate in one direction during operation of the motor 5. It is desirable that the motor and consequently 10 the knife be not operated unless it is intentionally desired so to do. Therefore means are provided to prevent rotation of the knife except when the carriage is being operated. This means for causing or preventing rotation of the knife 15 is disclosed and claimed in applicant's co-pending application Serial No. 64,146, filed concurrently herewith.

In order to facilitate the cutting of proper 20 slices means are provided to engage the substance, these means being located on the top of the feed table and at the edge of the carriage adjacent the cutting plane. The upper surface of the food table 9 intermediate the ends thereof, and substantially entirely across the upper face 25 of the food table there are provided a plurality of corrugations 78, Fig. 7. The ridges 79 of these corrugations extend a predetermined distance above the upper face of the food table 9. If 30 desired the furrows 80 of these corrugations may be relatively flush with the top surface of the food table but it has been found desirable to make these furrows with their bottoms slightly above the normal face of the food table 9. The ridges come to a relatively sharp point as is 35 clearly shown in Fig. 7.

At the edge of the food table adjacent the cutting plane of the knife and extending substantially across the entire width of the food table 9 are other corrugations 81. These corru- 40 gations 81 have their ridges 82 substantially flush with the normal upper surface of the food table while the bottoms of the furrows 83 are sunk below the normal surface of the food table.

On the top of the carriage immediately adjacent the cutting plane there is attached to the carriage a plate 84. This plate 84 has its normal upper surface 85 substantially flush with the normal top surface 86 of the carriage. At a 45 point close to the cutting plane of the knife and indicated by the numeral 87, Fig. 5, the plate is bent and inclines upwardly as indicated at 88, Fig. 5. The portion 88 is provided with a plurality of corrugations 89. The ridges of the corrugations are flush with the upper normal inclined surface while the furrows of these corru- 50 gations are countersunk or extend below the normal upper face of the inclined portion 88.

Substance on the carriage is then held and 60 guided by the corrugations 78, 81, and 88 on the food table and carriage respectively. The substance on the food table 9 slants downward slightly toward the cutting plane of the knife and when the substance is further fed to engage 65 the corrugations 88, the substance is urged upwardly against the tension of the food clamp causing a good clean slice to be cut and preventing a ragged edge from being formed. If 70 desired the corrugations 78, 81, and 83 may have their furrows and ridges in alignment as shown.

A slice support 90 is fastened to the side of the frame adjacent the knife to support the slice as it is being cut and an arcuate guard 91 is rigidly connected to a part of the support 90 to 75

act as a guard for the exposed part of the knife which extends toward the operator's stance.

Also, to assist in holding and guiding the substance during the feeding operation toward the cutting plane other corrugations or ribs 100, Figs. 2 and 9, may be formed on the upwardly extending portion of the feed table which acts as the front abutment.

The invention provides an efficient, economical, safe slicing machine embodying a manually operated reciprocating carriage, a stationary but revolvably mounted knife, and a positively driven food table which is operated toward feeding position positively by means of a feed screw and feed nut upon reciprocation of the carriage when the carriage assumes a predetermined position. Means are also provided to prevent movement in a forward direction by a unique and novel locking device which can only be released by actual and proper manipulation of a grip device. This arrangement permits for safe loading and eliminates the hazards inherent in most conventional slicing machines. Accidental movement in a rearward direction, that is toward the operator, is prevented because of the frictional resistance of the plug 73 with the strip 77. The invention also provides for a free and easy sliding, positively operated food table, which can be quickly removed and displaced when desired as well as insuring quick and easy return of the food table. Due to the arrangement of the guide track 45 positive operation of the feeding mechanism is assured and because of the arrangement of the cam ratchet and pawl mechanism slices of various thicknesses may be cut as desired.

Changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

What I claim is new and desire to secure by Letters Patent of the United States is:

1. A slicing machine comprising a stationary but rotatably mounted knife, a manually reciprocal carriage, a food table above the carriage, means for feeding substance on the food table toward the cutting plane of the knife and comprising a feed screw, means controlled by the position of the carriage to cause rotation of the feed screw, locking means for locking the carriage against forward movement but permitting free movement in a reverse direction, releasing means carried by the carriage for releasing said locking means, a manually controlled handle carried by the carriage for operating the releasing means, and a motor operatively connected to drive the knife.
2. A slicing machine comprising a rotatably mounted knife, a reciprocal carriage, a food table above the carriage having a substantially horizontal surface, means for feeding substance on the food table toward the cutting plane of the knife, raised corrugations extending toward said cutting plane on the food table elevated above the said surface, and depressed corrugations on the food table formed below said surface and spaced from the raised corrugations, the surface of the carriage adjacent the cutting plane of the knife being inclined upwardly and corrugations on said inclined surface extending toward the plane of the knife, said depressed corrugations being situated between the raised corrugations and said last named corrugations.
3. A slicing machine comprising a rotatably

mounted knife, a reciprocal carriage, a food table having a generally horizontal supporting surface and arranged above the carriage, means for feeding substance on the food table toward the cutting plane of the knife, corrugations on the food table extending generally perpendicular to said cutting plane, the surface of the carriage adjacent the cutting plane of the knife being inclined upwardly toward the knife, and corrugations on said inclined surface substantially parallel with said first named corrugations in the plane of said supporting surface.

4. A slicing machine comprising a rotatably mounted knife, a reciprocal carriage mounted for movement in a plane parallel to that of the knife, a food table having a generally horizontal supporting surface and arranged above said carriage and supported for movement with respect to the plane of said knife, means for feeding substance on the food table toward the cutting plane of the knife, and corrugations on said food table extending generally perpendicular to said cutting plane, the surface of the carriage adjacent the cutting plane of the knife being inclined upwardly toward the knife and having corrugations on said inclined surface extending toward the plane of the knife and being arranged generally parallel to said first named corrugations in the plane of said supporting surface.

5. A slicing machine comprising a rotatably mounted knife, a reciprocal carriage mounted for movement in a plane parallel to that of the knife, a food table above said carriage having a substantially flat surface and supported for movement toward the plane of said knife, means for feeding substance on the food table toward the cutting plane of the knife, upstanding corrugations on said food table extending toward said cutting plane and being elevated above said surface, and depressed corrugations formed below said surface, spaced from said upstanding corrugations and in alignment therewith, the surface of the carriage adjacent the cutting plane of the knife being inclined vertically above the plane of said surface and having corrugations on said inclined surface extending toward the plane of the knife, said depressed corrugations being situated between the upstanding corrugations and said last named corrugations.

6. A slicing machine comprising a knife, electric drive means for said knife, a carriage mounted for rectilinear movement, a handle member for manually moving the carriage, a complementary handle member adjacent said first handle portion and slidably mounted for reciprocation toward and from each other, and locking means mounted under the carriage in a position remote from the handle portions, said locking means being controlled by said reciprocation to lock the carriage in a forward direction in any pre-selected position but permitting free slidable movement in a rearward direction.

7. In a slicing machine, a knife, a carriage mounted for rectilinear movement, manual means to move said carriage, means actuated by grasping of said manual means to lock the carriage in a pre-selected position, said locking means comprising a slidable bar mounted in the carriage and connected to said manual means for slidable movement therewith, a pivoted remotely positioned locking finger mounted beneath the carriage, and means on said bar to move said locking finger into locking position.

8. In a slicing machine, a knife, a carriage mounted for rectilinear movement, locking means

on said carriage to prevent rectilinear movement, said locking means comprising an apertured rack, a pivoted finger, a rack-engaging portion on said finger adapted to engage in said apertured rack for locking the carriage, means to adjust said end portion with relationship to the finger whereby to provide for adjustment of said lock-engaging finger to a preferred rack engaging position, and locking means for maintaining the finger in adjusted position.

9. In a slicing machine, a knife, a carriage mounted for rectilinear movement in a plane parallel to that of the knife, a food table mounted on said carriage for rectilinear movement perpendicular to the plane of the knife, a guide mounted on the carriage for engaging a portion of said table, a second generally parallel guide spaced from said first named guide resiliently mounted on said table and having an interengaging portion, a further guide resiliently mounted on said food table and having a portion adapted to engage with said first named interengaging portion for guiding the food table in a path toward and away from the plane of the knife, said resilient means being adapted to force both of said guides toward interengaging position, and control levers associated with each of said guides, said guides being completely disengageable to release the food table therefrom when the said

levers are both oppositely actuated to retract the guides against said resilient means.

10. In a slicing machine, a knife, a carriage mounted for rectilinear movement in a plane parallel to that of the knife, a food table mounted on said carriage for rectilinear movement perpendicular to the plane of the knife, feed screw means for advancing said food table toward the plane of the knife, a guide mounted on the carriage for engaging a portion of said table, a second generally parallel guide spaced from said first named guide resiliently mounted on said table and having an interengaging portion, a further guide resiliently mounted on said food table and having a portion adapted to engage with said first named interengaging portion for guiding the food table in a path toward and away from the plane of the knife, said resilient means being adapted to force both of said guides toward interengaging position, and control levers associated with each of said guides, said guides being completely disengageable to release the food table therefrom when the said levers are both oppositely actuated to retract the guides against said resilient means, one of said levers having means thereon to disengage the feed screw means from the carriage during said actuation thereof.

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