Sept. 24, 1957 F. STEINMETZ 2,807,299

SLICING MACHINE

Filed Feb. 28, 1957 3 Sheets-Sheet 1

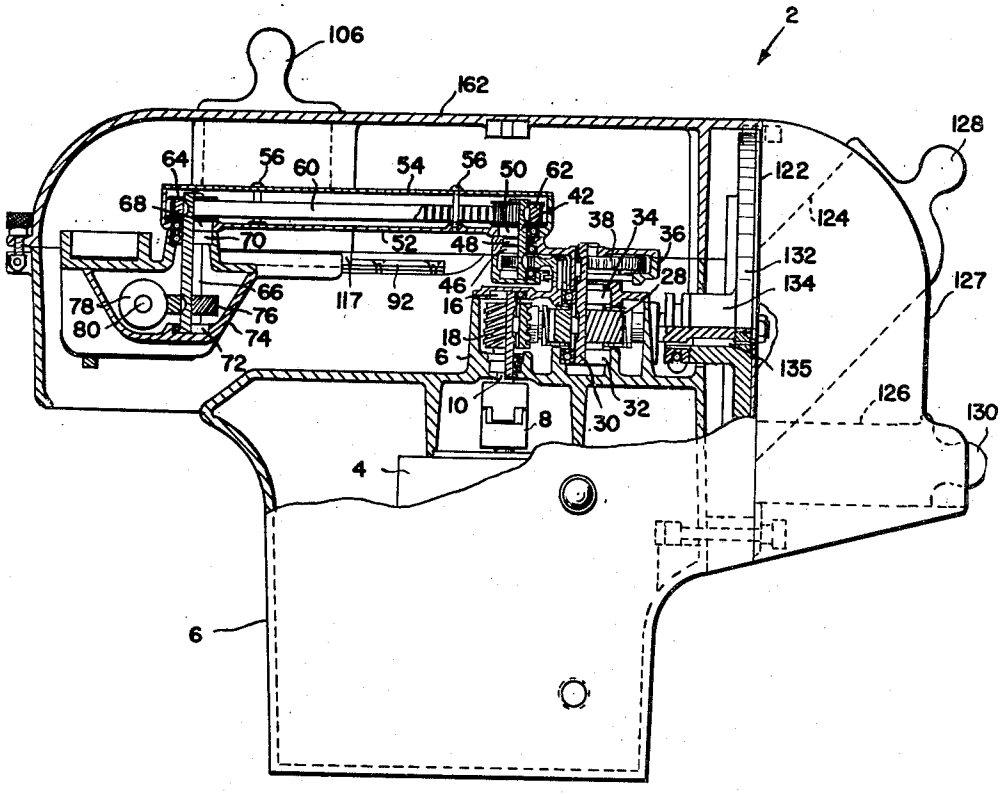


FIG. 1.

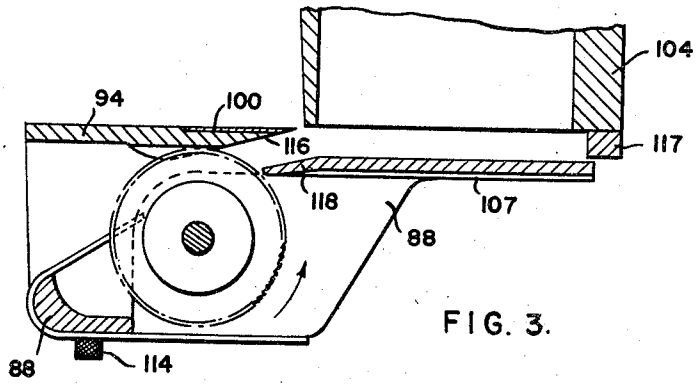


FIG. 3.

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SLICING MACHINE

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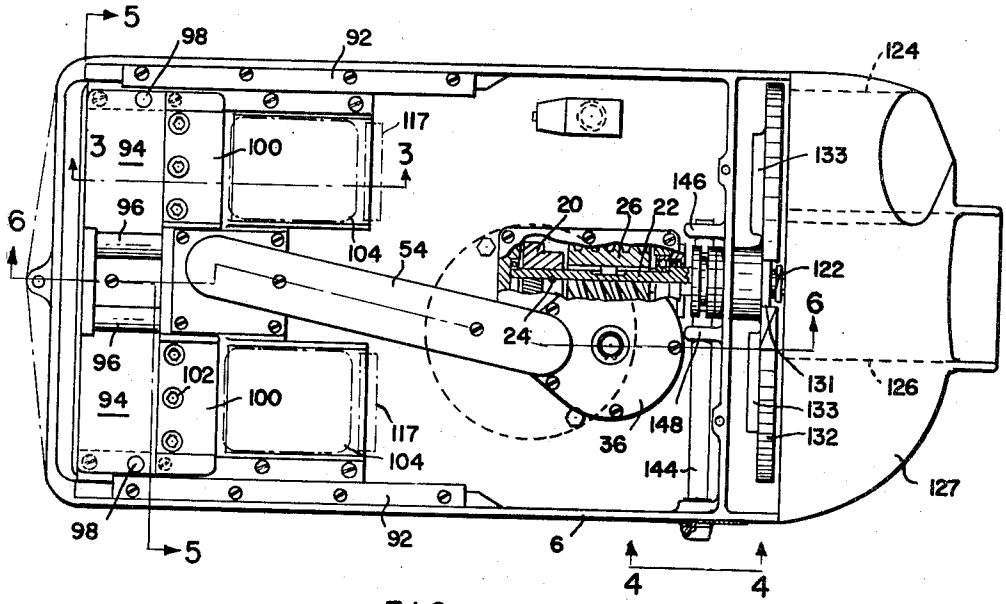


FIG. 2.

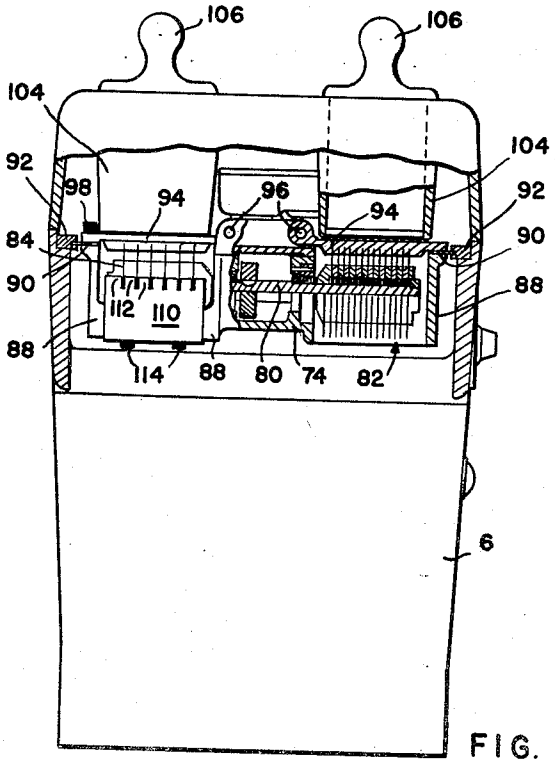


FIG. 5.

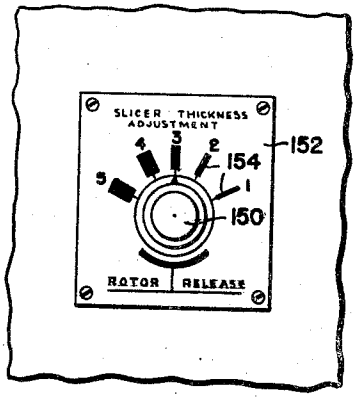


FIG. 4.

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SLICING MACHINE

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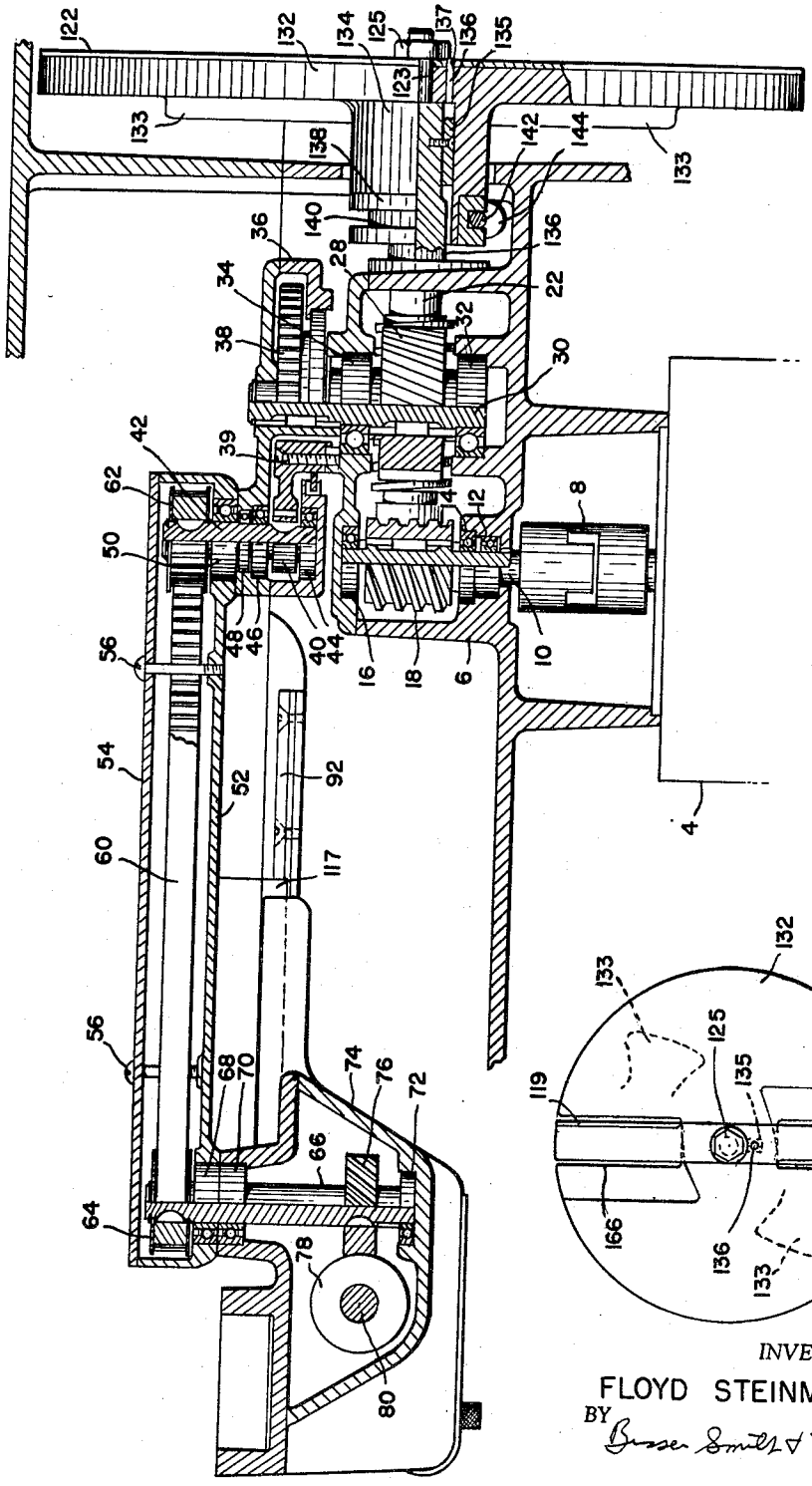


FIG. 6.

FIG. 7.

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2,807,299

SLICING MACHINE

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Application February 28, 1957, Serial No. 643,087

7 Claims. (Cl. 146—78)

This invention relates to a slicing machine. More particularly, it relates to a machine which is adapted to perform a single slicing operation as well as a multiple slicing operation. The machine in accordance with this invention is particularly useful in connection with food products, being capable on the one hand of cutting large slices from, for example, a potato and also slicing, for example, a potato and then cutting the slices to reduce them in size.

The machine in accordance with this invention is particularly advantageous in that it provides a very simple and effective mechanism for performing the above described operations.

It is therefore the broad object of this invention to provide a slicing machine which can produce both large slices and slices which are reduced in size by being cut.

It is a further object of this invention to provide a slicing machine which is simple in construction and efficient in operation.

These and other objects of this invention will become apparent on reading the following description in conjunction with the drawings in which:

Figure 1 is a side elevation of a slicing machine in accordance with this invention broken away to show the driving mechanism;

Figure 2 is a plan view of the slicing machine in Figure 1 with the top cover removed and partially broken away to show a portion of the driving mechanism;

Figure 3 is an enlarged vertical section taken on the plane indicated by the line 3—3 in Figure 2;

Figure 4 is a side elevation taken at the position shown by the line 4—4 in Figure 2 and showing the control for adjusting the thickness of the single slices;

Figure 5 is a vertical section of the slicing machine in Figure 1 taken on the plane indicated by the line 5—5 in Figure 1;

Figure 6 is an enlarged view of the driving mechanism shown in Figure 1;

Figure 7 is an end elevation on a reduced scale of the single slice knife assembly shown in Figure 6.

As shown in Figure 1, a slicing apparatus 2 in accordance with this invention, is driven by an electric motor 4 mounted in a housing indicated at 6. As best seen in Figure 6, motor 4 is connected by releasable coupling 8 to a shaft 10 which passes through seal 12 and is carried by bearings 14 and 16. A worm gear 18 keyed to shaft 10 engages a gear 20 which is secured to shaft 22 by pin 24 (Figure 2). A worm gear 26 keyed to shaft 22 is engaged with a gear 28 which is keyed to shaft 30 carried by bearings 32 and 34.

Shaft 30 is keyed to a planetary gear housing 36 which contains a planetary gear system comprising gear 38 which is fixedly secured to housing 6 by screws 39 and gear 40 which is keyed to shaft 42. Shaft 42 passes through seal 48 and is carried by bearings indicated at 44 and 46 in planetary gear housing 36 and by the bearing indicated by 50 in arm 52. It will be noted that housing 36 functions as an arm in the planetary gear system which includes gears 38 and 40.

Arm 52 is in the form of a hollow shell and has a cover 54 removably held by screws 56. Within arm 52 is a belt 60 which engages a pulley 62 keyed to shaft 42 and a pulley 64 keyed to a shaft 66.

Shaft 66 is mounted in a bearing 68 in arm 52 and in bearings 70 and 72 mounted in housing 74. A helical gear 76 is keyed to shaft 66 and engages helical gear 78 which is secured to shaft 80. As best seen in Figure 5, shaft 80 carries a gang cutter 82 of closely spaced rotary cutting knives and a gang cutter 84 of more widely spaced cutting knives. Housing 74 is integral with carriage 88 to which are secured slide members 90 which ride in oppositely disposed rail members 92, 92. Clean-out plates 94 which are mounted over each of the gang cutters 82 and 84 are pivotally secured to carriage 88 at 96. Clean-out plates 94 are secured to frame 88 by knurled screws 98.

Knives 100 are secured in recessed portions in cover plates 94 (Figure 2) by recessed screws 102. The knives 100 are adapted to slice the article fed downwardly through hoppers 104 by, for example, weights 106. Below each hopper 104 is a platform 107 secured to carriage 88 and which is adapted to support the item to be sliced.

As shown best in Figure 5, gang cutters 84 are provided with a guard 110 which has fingers 112 extending upwardly between the cutting blades. Guard 110 is removable, being secured to carriage 88 by knurled screws 114. A similar guard, not shown, is provided for gang cutter 82.

It will be noted (see Figure 3) that the leading edges of covers 94 are bevelled at 116 and that the supports 107 are bevelled at 118 in order to guide the material sliced by the knives 100 to the gang cutters respectively. A pad 117 secured to the bottom of each hopper acts to prevent the slice cut by knife 100 from being moved rearwardly.

For cutting large slices there is provided a knife 122 having leading cutting edges 119 and 120 (Figure 7) which is adapted to slice material fed into hopper 124 or 126 in end block 127 by members 128 and 130, respectively (Figure 1). Knife 122 is held against shoulder 123 on shaft 22 by a nut 125 (Figure 6). Knife 122 is mounted in slot 131 of backing wheel 132. Webs 133, integral with the inner face of wheel 132, act to dislodge any cut slices wedging behind wheel 132. Wheel 132 has a hub 134 and is slidably mounted on shaft 22 by a key 135 which abuts against knife 122 and has a pin 136 which engages opening 137 in knife 122. Adjacent hub 134 is a ring 138 having a circumferential groove 140. A pin 142 engages groove 140 and is eccentrically mounted on shaft 144. Shaft 144 is supported by brackets 146 and 148 and passes through housing 6. A control knob 150 is mounted exterior of housing 6 on shaft 144 and has associated with it a plate 152 with indicator markers marked thereon to indicate the relative position of the cutting knife.

As best seen in Figure 1, housing 6 is provided with a removable top cover 162.

Operation

Motor 4 rotates planetary gear housing 36 through shaft 10, gears 18 and 20, shaft 22, gears 26 and 28 and shaft 30. This results in carrying shaft 42 and gear 40 about fixed gear 38 and causes the rotation of shaft 42. Through pulley 62, belt 60, pulley 64, shaft 66, gears 76 and 78 and shaft 80, gang cutters 82 and 84 are rotated. At the same time carriage 88 and hence knives 100 are reciprocated by arm 52 as it is moved by shaft 42. Thus an article fed through a hopper 104 is sliced by a knife 100 and the slice cut into small pieces by one of the gang cutters 82 or 84.

Knife 122 and wheel 132 are rotated by motor 4

through shaft **10**, gears **18** and **20** and shaft **22**, wheel **132** being rotated by key **135** and knife **122** being rotated by pin **136** projecting from key **135** into opening **137**. The thickness of the slice cut is controlled by advancing or retracting wheel **132** on shaft **22** through control knob **150**, shaft **144**, pin **142** and groove **140** in ring **138**, the position of the knife **122** remaining fixed. The cut slices pass through openings **166**, **166** in wheel **132** and pass downwardly behind wheel **132**.

It is not desired to be limited except as set forth in the following claims.

What is claimed is:

1. A slicing machine comprising a feed hopper, a reciprocating carriage, a knife secured to the carriage and adapted to slice an article fed through the hopper, a rotary knife mounted on said carriage, lying in a plane substantially perpendicular to said first mentioned knife and adapted to cut a slice made by the first mentioned knife into a plurality of pieces, and means to drive said rotary knife including a shaft mounted for rotation on the carriage, an arm, said shaft being rotatably mounted in said arm, a second shaft rotatably mounted in the opposite end of said arm, means to rotate said second shaft on its axis and about a point spaced from said axis and a driving connection between said shafts

2. A slicing machine comprising a feed hopper, a reciprocating carriage, a knife secured to the carriage and adapted to slice an article fed through the hopper, a rotary knife mounted on said carriage, lying in a plane substantially perpendicular to said first mentioned knife and adapted to cut a slice made by the first mentioned knife into a plurality of pieces, and means to drive said rotary knife including a shaft mounted for rotation on the carriage, an arm, said shaft being rotatably mounted in said arm, a second shaft rotatably mounted in the opposite end of said arm, means to rotate said second shaft on its axis and about a point spaced from said axis, a wheel secured to each of said shafts and a belt connecting said wheels.

3. A slicing machine comprising a feed hopper, a reciprocating carriage, a knife secured to the carriage and adapted to slice an article fed through the hopper, a rotary knife mounted on said carriage, lying in a plane substantially perpendicular to said first mentioned knife and adapted to cut a slice made by the first mentioned knife into a plurality of pieces, and means to drive said rotary knife including a shaft mounted for rotation on the carriage, an arm, said shaft being rotatably mounted in said arm, a second shaft rotatably mounted in the opposite end of said arm, means to rotate said second shaft on its axis and about a point spaced from said axis, a pulley secured to each of said shafts and a belt connecting said pulleys.

4. A slicing machine comprising a feed hopper, a reciprocating carriage, a knife secured to the carriage and adapted to slice an article fed through the hopper, a rotary knife mounted on said carriage, lying in a plane substantially perpendicular to said first mentioned knife and adapted to cut a slice made by the first mentioned knife into a plurality of pieces, means to drive said rotary knife including an upstanding shaft mounted for rotation on the carriage, an arm, said shaft being rotatably mounted in said arm, a second shaft rotatably mounted in the opposite end of said arm and a driving connection between said upstanding shaft and said second shaft, and means to rotate said second shaft on its axis and about a point spaced from said axis, said rotating means comprising a planetary gear fixedly secured to said second shaft, a stationary gear engaging said planetary gear, an arm pivotally mounted on the axis of the stationary gear and pivotally connected to the second shaft, means to rotate said second mentioned arm on the axis of the stationary gear.

5. A slicing machine comprising a feed hopper, a reciprocating carriage, a knife secured to the carriage and adapted to slice an article fed through the hopper, a rotary knife mounted on said carriage, lying in a plane substantially perpendicular to said first mentioned knife and adapted to cut a slice made by the first mentioned knife into a plurality of pieces, means to drive said rotary knife including an upstanding shaft mounted for rotation on the carriage, an arm, said shaft being rotatably mounted in said arm, a second shaft rotatably mounted in the opposite end of said arm, and a pulley secured to each of said shafts and a belt connecting said pulleys, and means to rotate said second shaft on its axis and about a point spaced from said axis, said rotating means comprising a planetary gear fixedly secured to said second shaft, a stationary gear engaging said planetary gear, an arm pivotally mounted on the axis of the stationary gear and pivotally connected to the second shaft, and means to rotate said second mentioned arm on the axis of the stationary gear.

6. A slicing machine comprising a feed hopper, a reciprocating carriage, a knife secured to the carriage and adapted to slice an article fed through the hopper, a rotary knife mounted on said carriage, lying in a plane substantially perpendicular to said first mentioned knife and adapted to cut a slice made by the first mentioned knife into a plurality of pieces, means to drive said rotary knife including an upstanding shaft mounted for rotation on the carriage, an arm, said shaft being rotatably mounted in said arm, a second shaft rotatably mounted in the opposite end of said arm, and a driving connection between said upstanding shaft and said second shaft, and means to rotate said second shaft on its axis and about a point spaced from said axis, said rotating means comprising a planetary gear fixedly secured to said second shaft, a stationary gear engaging said planetary gear, an arm pivotally mounted on the axis of the stationary gear and pivotally connected to the second shaft, a shaft secured to said second mentioned arm on the axis of the stationary gear, a counter shaft connected by worm gears to said third mentioned shaft, means to drive said counter shaft and a rotary knife secured to the counter shaft.

7. A slicing machine comprising a feed hopper, a reciprocating carriage, a knife secured to the carriage and adapted to slice an article fed through the hopper, a rotary knife mounted on said carriage, lying in a plane substantially perpendicular to said first mentioned knife and adapted to cut a slice made by the first mentioned knife into a plurality of pieces, means to drive said rotary knife including an upstanding shaft mounted for rotation on the carriage, an arm, said shaft being rotatably mounted in said arm, a second shaft rotatably mounted in the opposite end of said arm, and a driving connection between said upstanding shaft and said second shaft, and means to rotate said second shaft on its axis and about a point spaced from said axis, said rotating means comprising a planetary gear fixedly secured to said second shaft, a stationary gear engaging said planetary gear, an arm pivotally mounted on the axis of the stationary gear and pivotally connected to the second shaft, a shaft secured to said second mentioned arm on the axis of the stationary gear, a counter shaft connected by worm gears to said third mentioned shaft, means to drive said counter shaft, a rotary knife secured to the counter shaft, said second mentioned rotary knife comprising a backing wheel slidably mounted on the counter shaft, means to adjust the position of the backing plate on the counter shaft, and a cutting blade mounted for rotation with said backing plate.

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