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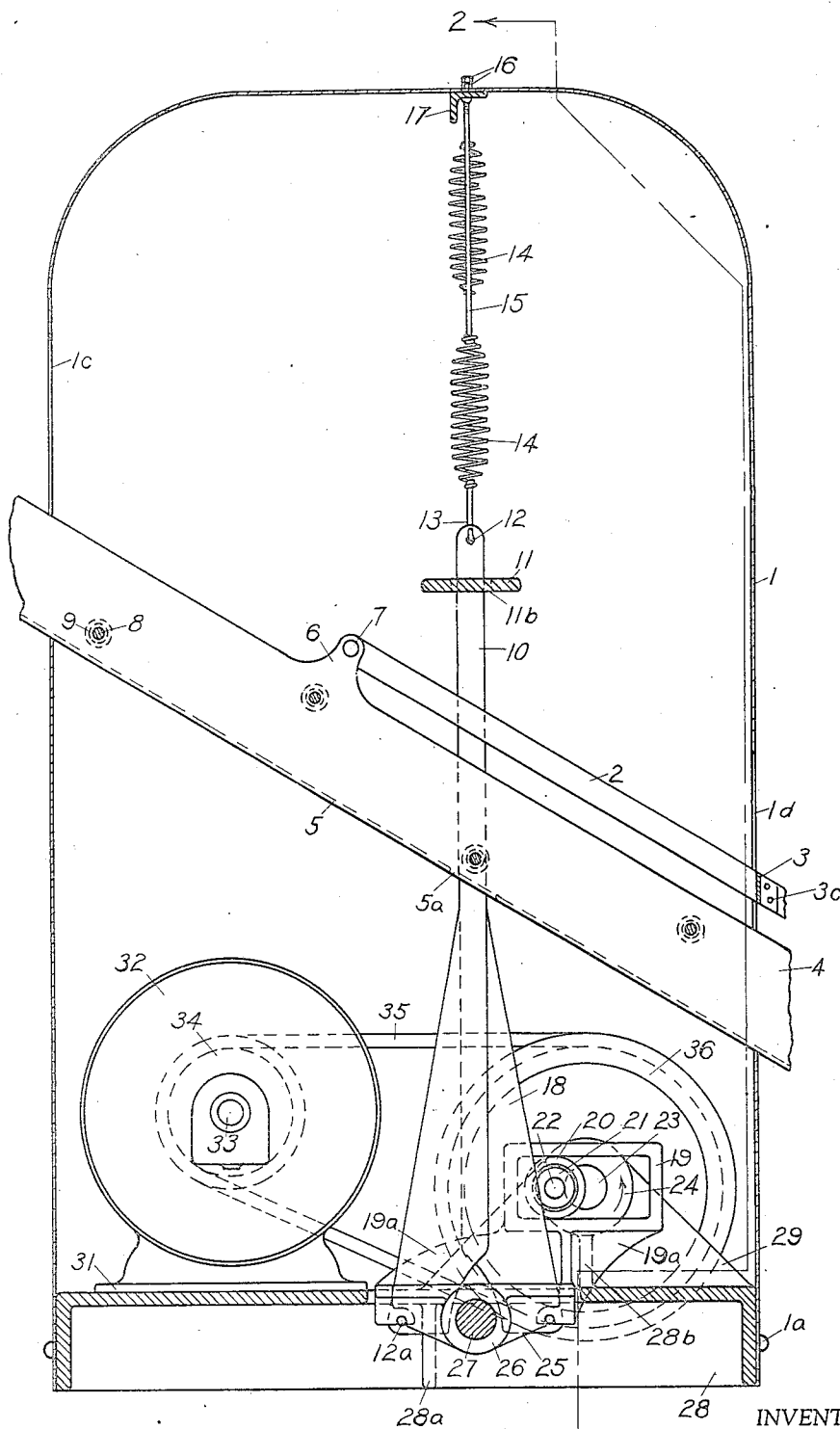
H. J. CRINER

1,976,331

BREAD SLICING MACHINE

Filed Oct. 6, 1932

3 Sheets-Sheet 1



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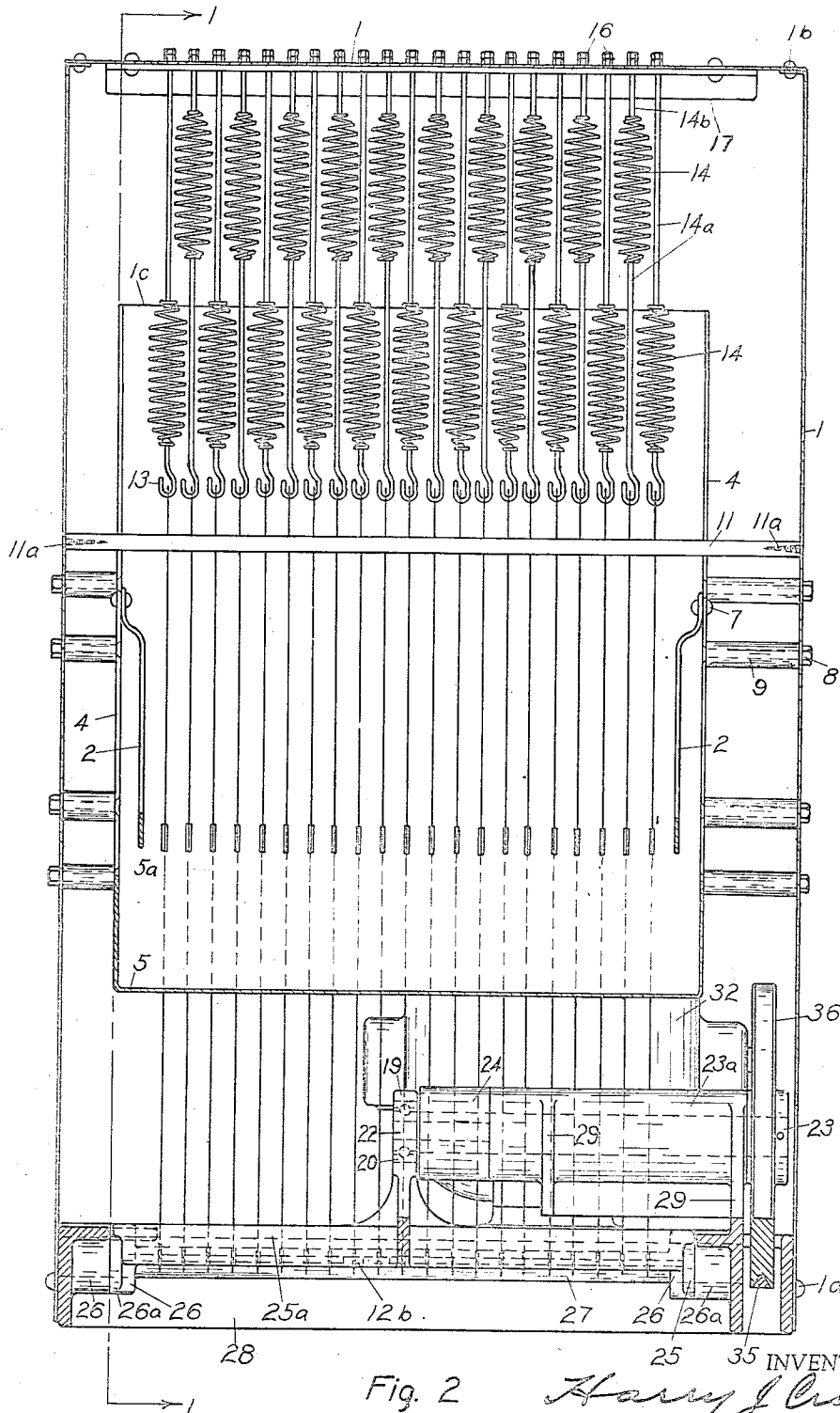
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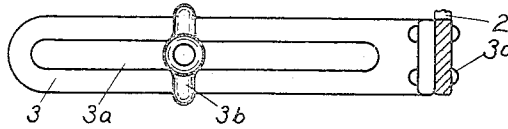


Fig. 3

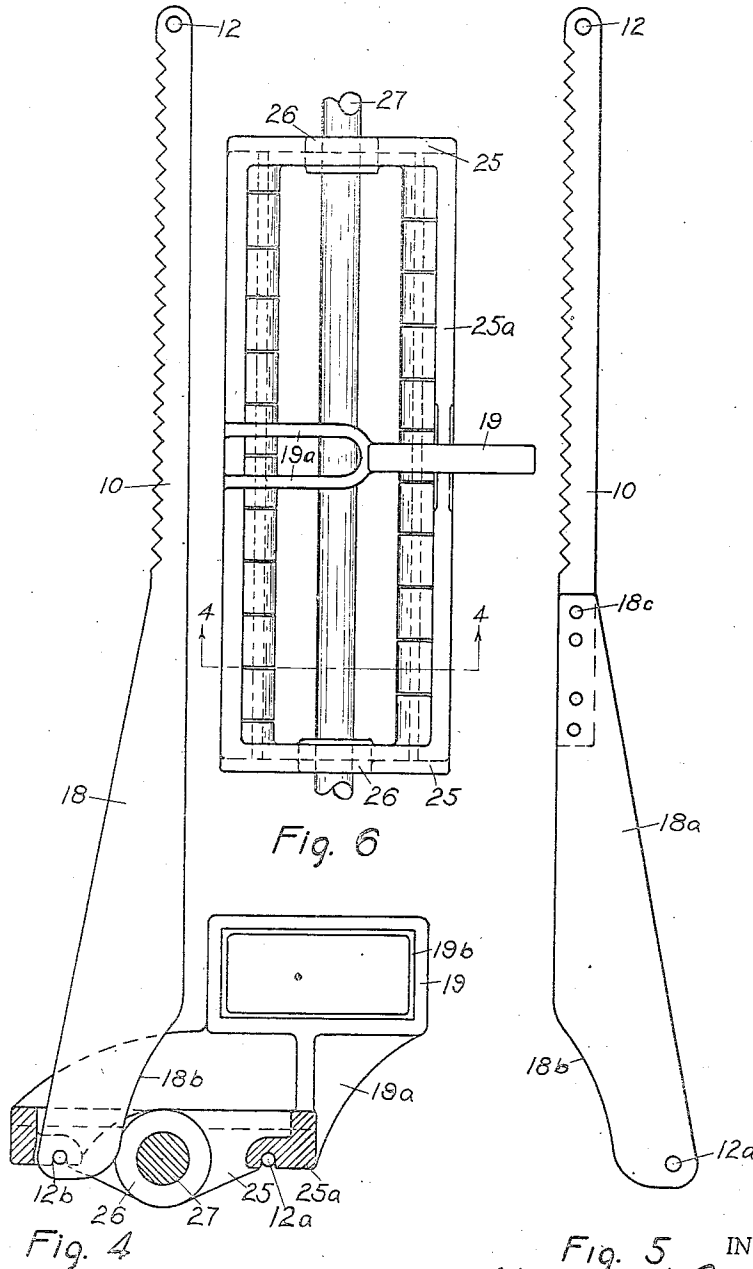


Fig. 6

Fig. 4

Fig. 5 INVENTOR.
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UNITED STATES PATENT OFFICE

1,976,331

BREAD SLICING MACHINE

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Application October 6, 1932, Serial No. 636,459

15 Claims. (Cl. 146—153)

My invention relates to improvements in slicing machines.

The objects of my invention are:

1. To provide a reciprocating slicing machine in which two series of blades alternate having their cutting edges maintained substantially in parallel lines and with a minimum of vibration;
2. To provide a reciprocating slicing machine having alternating series of blades driven by a rocker in which the cutting edges of the blades are arranged to travel with very little deviation from parallel lines;

3. To provide a reciprocating slicing machine in which two series of blades alternate having their cutting edges maintained substantially in parallel lines, with a minimum of vibration and which can be manufactured at very low cost.

I attain these objects by the means illustrated in the accompanying drawings, in which,—

- Figure 1 is a side elevation of my machine in section on the line 1—1 of Figure 2;

Figure 2 is a rear elevation of my machine in section on the line 2—2 of Figure 1;

- Figure 3 is an enlarged detail of the support for the lateral guides;

Figure 4 is an enlarged detail of one of the cutting blades and showing the rocker in section on the line 4—4 of Figure 6;

- Figure 5 is an enlarged detail of an alternate form of cutting blade;

Figure 6 is a detail plan view of the rocker with yoke attached thereto.

Similar numerals refer to similar parts throughout the several views.

- My machine comprises a housing, 1, having a rectangular base, 28, united thereto by rivets, 1a, and reinforcing ribs, 28a, united to the base, 28.

- The housing is preferably formed of sheet metal and has a feed opening, 1c, at the front of the machine and a discharge opening, 1d, at the rear thereof. The plates of the housing may be united by casing rivets, 1b, or other suitable means. Upon the base, 28, I mount a motor, 32, with its foot, 31, resting upon the base, 28, and united thereto by any suitable means.

- At the opposite sides of the base I form bearings, 26a, in which a rocker shaft, 27, is mounted. A rectangular rocker, 25, having bearings, 26, formed integral therewith, is pivotally mounted upon the rocker shaft, 27. The side bars, 25a, of the rocker have an extended rib, 19a, cast integral therewith which extends upwardly from the rocker and supports a yoke, 19, which is preferably cast integral with the rib, 19a. The

inner end of the rib, 19a, is bifurcated so as to straddle one of the cutting blades hereafter described.

A crank shaft, 23, is mounted in suitable bearings, 24, formed integral with ribs, 29, which extend upwardly from the base and has a crank head, 24, formed integral therewith carrying a crank pin, 22. Upon the crank pin, 22, is mounted the inner member, 21, of a ball bearing, the outer member, 20, of which contacts with the inner face of the yoke, 19, and drives the yoke as the crank shaft, 23, is revolved.

A plurality of cutting blades arranged in two opposite alternating series have their lower ends pivotally united to the opposite edges of the rocker by any suitable means.

I prefer to provide the lower ends of the cutting blades, 10, with pivot pins, 12a, which may seat in corresponding longitudinal grooves, 12b, formed in the under face of the rocker, the inner edges of the rocker side bars being slotted to permit the introduction of the pins, 12a, into the grooves, but any desired pivotal form of attachment may be substituted.

The upper ends of the blades have united thereto tension springs, 14, the opposite ends of which are adjustably secured to the top of the casing by nuts, 16, or other suitable means and an angle bar, 17, may be riveted to the top of the casing to afford the necessary stiffness thereto.

In order to utilize springs having the necessary size and weight, I prefer to utilize springs having one end extended a considerable length in a straight line or having a link, 14a, pivotally united thereto, and terminating either in a hook to which a cutting blade may be attached, or threaded into a nut adapted to be connected to the casing as described. In this way, by alternating springs having the extension, 14a, formed with the hook for attachment to the cutting blades, with those having the extension, 14a, connected to the casing, I can use a heavier and larger spring than there would be room for without this alternation.

The center of the rocker shaft is preferably mounted in line with the middle line of the cutting blades, 10, and parallel to the line of attachment of the springs to the top of the housing. The lower end, 18, of each blade, 10, is widened as shown in Figure 4 and the pivot, 12a, for attaching same to the rocker arm is preferably offset from the middle line of the cutting portion of the blade a distance equal to the distance between the center of the rocker

shaft, 27, and the center of the groove, 12b, in which the pin, 12a, seats.

It is obvious that this widened portion for attachment to the pivot may be either integral with the blade as shown in Figure 4, or a separate piece of metal, 18a, may be united to the blade by spot welding as at 18c.

In order to cause the lower ends of the cutting blades, 10, to clear the rocker shaft, 27, I shear away a portion of the blade or attaching plate as at 18b.

It is obvious that as far as the travel of the blades is concerned, the same results may be obtained by bending the blades transversely at the junction of the cutting portion of the blade with the lower extension thereof, but I prefer the widened form of blade shown in Figure 4 as this form will tend to prevent the bending and consequent danger of crystallization and breaking that would be present if the blades were made of the same width throughout their entire length and bent at the junction of the cutting portion with the lower extension thereof.

For ordinary purposes a one inch longitudinal travel of the cutting blades will be sufficient and a rocker arm having a radius of one and a half to two inches will be ample to provide a travel of one inch or a little more for the cutting blades. Using a rocker arm having a radius of only one inch traveling through an arc having a one inch chord would cause a transverse movement of the lower end of the attached cutting blade of only one-eighth of an inch. The cutting portion of the blade would have to be approximately two inches longer than the thickness of the loaf of bread to be sliced or approximately six inches long and I prefer to make the remainder of the blade approximately equal in length to the cutting portion. When the blades are so proportioned, and utilizing a rocker arm and movement as just described, it is obvious that a transverse movement of one-eighth of an inch at the bottom of the blade would cause a movement of only one-half that much at the lower end of the cutting portion of the blade—or one-sixteenth of an inch—and this movement would be so small that it would not appreciably impair the cutting effect of the blades and would give them substantially the same effect as if they moved in strictly vertical lines. As a matter of fact, the transverse movement of the lower part of the cutting portion of the blade would be even less than that because the threaded ends of the springs would pass through an opening in the anglebar, 17, and upper portion of the housing, 1, slightly larger than the diameter of the spring wire and permit the entire assembly of spring and cutting blade to pivot at its point of attachment to the upper portion of the casing, 1, and in addition to this, the springs are pivotally attached to the links or extensions, 14a. If desired, separate links, 14b, may be used to connect the upper ends of the springs, 14, to the casing, 1, and may be pivotally united to the upper ends of the springs. In like manner, the hooks, 13, may be pivotally attached to the lower ends of the springs, 14, instead of being formed integral with the springs.

A chute or feed table, 5, is mounted in the housing in the usual way and is provided with longitudinal slots, 5a, to permit the passage of the cutting blades through the feed table.

A guide bar, 11, is mounted above the bread chute having slots, 11b, formed therein through

which the cutting blades travel. The slots, 11b, are made very little wider than the thickness of the blades so as to hold the blades against lateral movement and the bar, 11, is preferably made of hard maple or some self-lubricating material so as to avoid the necessity of using oil.

The bar, 11, may be secured in place in the casing by screws, 11a, or other suitable means. Lateral guide bars, 2, have their upper ends riveted to shoulders, 6, projecting upwardly from the flanges, 4, of the bread chute, the flanges, 4, being formed integral with the bottom of the chute, 5. The lower ends of the lateral guides, 2, are adjustably secured to the rear plate of the housing by brackets, 3, and bolts having wing nuts, 3b, threaded thereon. Slots, 3a, are formed in the brackets, 3, to permit the brackets to be moved laterally so as to adjust the position of the lower ends of the lateral guides, 2, as desired to fit the different lengths of loaves.

In the operation of my machine, a loaf of bread or several loaves, are placed upon the feed table, 5. The motor is then started and drives the pulley, 36, which in turn drives the cam shaft, 23, and the crankhead, 24, carrying the crank pin, 22, which carries the roller bearing cam members, 21 and 20. The cam member, 20, contacts with the inner face of the yoke, 19, and transmits an up and down movement to the yoke which is communicated through the ribs, 19a, to the rockers, 25, causing a vertical reciprocating movement of the cutting blades. The springs, 14, being constantly in tension, not only hold the pivot pins, 12a, in contact with the rockers, but also act to draw the cutting blades upwardly to their uppermost point of travel. As one series of blades is carried downwardly by the rocker arm, the other series is drawn upwardly by the springs, 14, and this operation is alternated and repeated as long as the motor is in motion.

The bread chute is inclined downwardly sufficiently to permit gravity to carry the bread against the cutting blades and the weight of the bread will ordinarily be sufficient to prevent displacement of the bread from the chute by the blades, inasmuch as the series of blades which is moving downwardly will equalize any tendency of the upwardly moving series to displace the bread from the chute, although a retaining plate may be mounted above the bread chute to prevent accidental displacement of a loaf if desired, such retaining plates being in common use and well known.

As the bread leaves the cutting blades it passes on downwardly in the chute, 5, and may be removed from the machine mechanically, manually or by gravity as desired.

It is obvious that various changes may be made in the shape, size and proportions of various parts of this machine without departing from the spirit of my invention and I do not limit my claims to the precise form and proportions illustrated in the drawings.

It is also obvious that an upper rocker may be substituted for the springs and the upper ends of the blades may have extensions united thereto similar to the lower ends of the blades shown in Figures 4 and 5, and that when so arranged, the transverse movement of the blades will be so small as to be negligible.

In the construction of my machine, any desirable metal may be used for the rocker, yoke and attaching ribs, but I prefer to use one of

the light alloys so as to aid in reducing vibration to the minimum and when so constructed, the inner face of the yoke may be hardened by any suitable means or faced with a thin strip of hard steel or brass as at 19b, to provide against wear.

I claim:

1. In a reciprocating bread slicing machine, the combination with a housing, of a rocker pivotally mounted therein, a plurality of cutting blades having offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof and arranged in two alternating series, the offset being so proportioned as to cause the cutting edges of the blades to travel longitudinally approximately in the same plane, tension springs united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, and means to reciprocate the rocker.
2. In a reciprocating bread slicing machine, the combination with a housing, of a rocker pivotally mounted therein, a plurality of cutting blades having offset extensions at their lower ends pivotally united to the rocker, tension springs united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, the offset extensions being so proportioned as to cause the blades to travel longitudinally substantially in a plane passing through the center of the rocker and through the point of attachment of the blades to the springs and means to reciprocate the rocker.
3. In a reciprocating bread slicing machine, the combination with a housing, of a rocker pivotally mounted therein, a plurality of cutting blades having offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof and arranged in two alternating series, means united to the upper ends of the cutting blades adapted to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker and means to reciprocate the rocker the offset extensions being so proportioned as to cause the blades to travel substantially in a plane passing through the center of the rocker and the point of attachment of said means to the upper ends of the blades.
4. A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, tension springs respectively united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, the offset being so proportioned as to cause the cutting edges of the blades to travel longitudinally approximately in the same plane and means to reciprocate the rocker.
5. A reciprocating bread slicing machine, comprising a housing, a rocker pivotally

mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, the amount of offset in each blade approximately equaling the length of the radius from the center of the rocker shaft to the center of each blade pivot, tension springs respectively united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, and means to reciprocate the rocker.

6. A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, the amount of offset in each blade approximately equaling the length of the radius from the center of the rocker shaft to the center of each blade pivot and the cutting portions of the blades having their middle lines approximately conforming with a vertical plane extending lengthwise of the rocker shaft, tension springs respectively united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, and means to reciprocate the rocker.

7. A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, the amount of offset in each blade approximately equaling the length of the radius from the center of the rocker shaft to the center of each blade pivot and the cutting portions of the blades having their middle lines approximately conforming with a vertical plane extending lengthwise of the rocker shaft and through the points of attachment of the springs herein mentioned to the housing, tension springs respectively united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, and means to reciprocate the rocker.

8. A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, tension springs united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, a guide bar mounted within the housing near the upper end of the blades having transverse slots adapted to receive and guide the upper ends of the blades respectively, and means to reciprocate the rocker.

- 9 A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, tension springs united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, guides mounted within the housing near the upper end of the blades adapted to receive and guide the upper ends of the blades respectively, and means to reciprocate the rocker.
- 10 A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a yoke rigidly united to the rocker, a crank shaft revolvably mounted in the housing, a crank pin united to the crank shaft, a cam mounted upon the crank pin to travel within and actuate the yoke, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, tension springs respectively united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, and means to reciprocate the crank shaft.
- 11 A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, tension springs united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, a guide bar mounted within the housing near the upper end of the blades having transverse slots adapted to receive and guide the upper ends of the blades respectively, a feed chute mounted within the housing and means to reciprocate the rocker.
- 12 A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, tension springs united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, a guide bar mounted within the housing near the upper end of the blades having transverse slots adapted to receive and guide the upper ends of the blades respectively, a feed chute mounted within the housing sloping downwardly to the blades and means to reciprocate the rocker.
- 13 A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, tension springs respectively united to the upper ends of the cutting blades and to the housing adapted to maintain an upward tension constantly upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, the offset being so proportioned as to cause the cutting edges of the blades to travel longitudinally approximately in the same plane, a feed chute mounted within the housing sloping downwardly to the blades and means to reciprocate the rocker.
- 14 A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series, and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, means united to the upper ends of the cutting blades adapted to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, the offset extensions being so proportioned as to cause the blades to travel substantially in a plane passing through the center of the rocker and the point of attachment of said means to the upper ends of the blades and means to reciprocate the rocker.
- 15 A reciprocating bread slicing machine, comprising a housing, a rocker pivotally mounted therein, a plurality of cutting blades arranged in two alternating series, and having transversely offset extensions at their lower ends pivotally united to the rocker at opposite edges thereof, means united to the upper ends of the cutting blades adapted to maintain a constant tension upon the cutting blades and to draw them to their highest point of travel as their lower ends are permitted to move upwardly by the rocker, the offset extensions being so proportioned as to cause the blades to travel substantially in a plane passing through the center of the rocker and the point of attachment of said means to the upper ends of the blades and means to reciprocate the rocker.

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