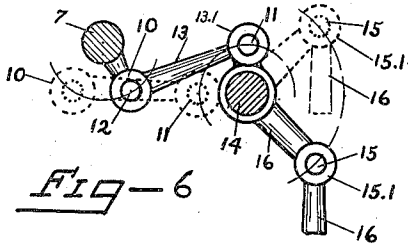
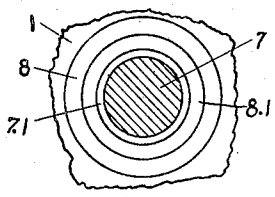
Aug. 23, 1949. H. J. CRINER 2,479,908

RECIPROCATING BREAD SLICING MACHINE

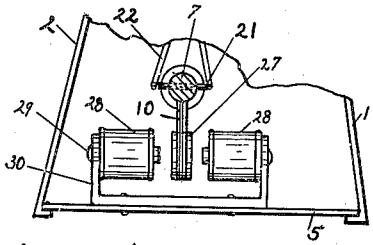
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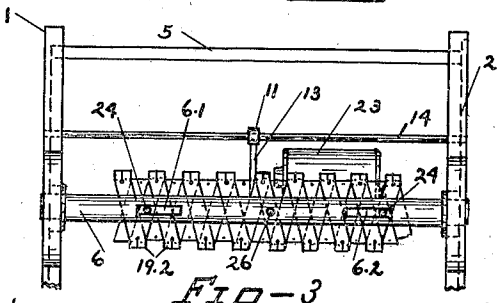
FIG—6



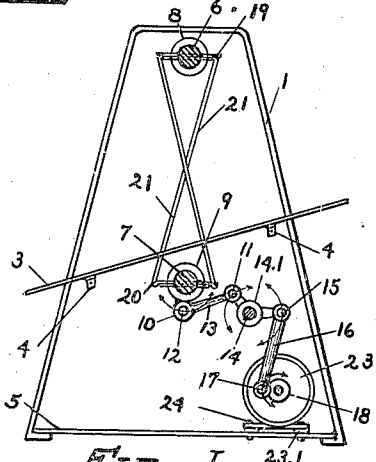
FIG—8



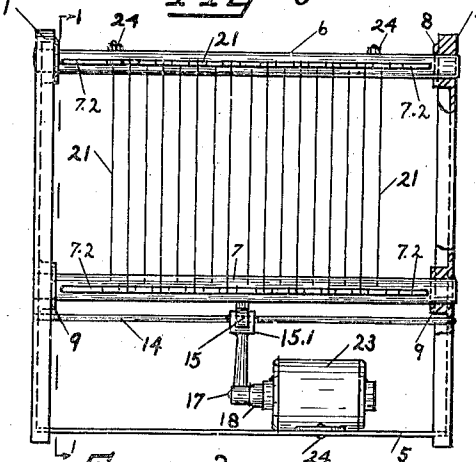
FIG—7



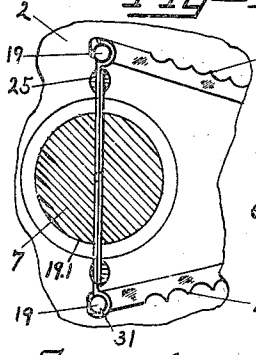
FIG—3



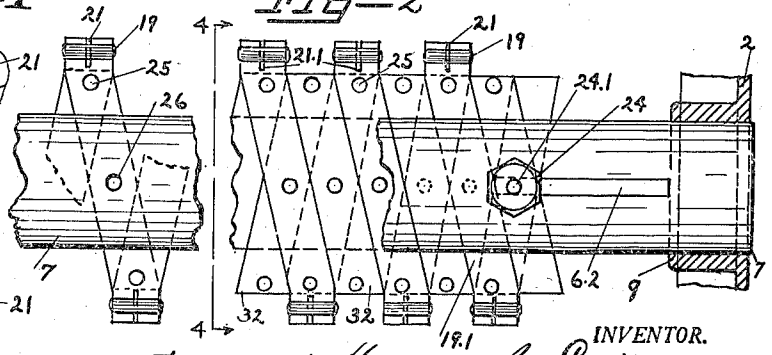
FIG—1



FIG—2



FIG—4



FIG—5

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RECIPROCATING BREAD SLICING MACHINE

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Application September 25, 1946, Serial No. 699,219

12 Claims. (Cl. 146—153)

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My invention relates to reciprocating, multiple-blade bread slicing machines. The objects of my invention are to provide means to speed up the travel of the cutting blades; to increase the distance traveled by the cutting blades in a given time; to balance the cutting blades and the blade carriers to reduce vibration; to simplify the construction and reduce the size of the machine necessary for a given capacity and to provide additional means to reduce vibration. Other objects will appear from the description.

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

Figure 1 is a sectional elevation of my machine on the line 1—1 of Figure 2;

Figure 2 is a rear elevation of my machine but with the feed chute 3 omitted for clearness;

Figure 3 is a detail showing the arrangement of the spacing mechanism and split shaft;

Figure 4 is an enlarged sectional detail looking downward upon the split shaft, but with part of the shaft broken away;

Figure 5 is an enlarged detail of a portion of the split or slotted shaft, with a portion of the shaft broken away to show the relative position of the lazy tongs members;

Figure 6 is an enlarged detail of the driving levers showing one position in full lines and their opposite position in dotted lines;

Figure 7 is a detail showing an alternate form in which a magnetic prime mover is shown in place of the electric motor;

Figure 8 is a detail showing a steel bearing for the main shaft mounted in a rubber bushing which in turn is mounted in the bearing hub.

Similar numerals refer to similar parts throughout the several views.

My machine comprises a housing with side frames 1 and 2 united at the bottom by a plate or bar 5. On the base 5 a motor 23 or other prime mover is mounted. The upper and lower blade-carrying shafts 6 and 7 are journaled in suitable bearings in the side frames 1 and 2 respectively. These shafts 6 and 7 have horizontal slots formed therein extending longitudinally of the shafts or the shafts may be formed in two pieces suitably united at the ends but spaced apart through the rest of their length.

In the slots of the lower shaft a lazy tongs comprised of flat metal bars is slidably mounted and the arms of the lazy tongs extend outward on opposite sides of the shaft. The arms of the lazy tongs are pivotally united by pivot pins near their ends, and by pivots at their middle crossing points. Alternate arms 19.1 of the lazy tongs

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are extended to a somewhat greater length then the intermediate arms 32 and the ends of the extended arms have slots 21.1 to receive the lower ends of the cutting blades 21 which are secured therein by pivot pins 19.

The middle arms of the lazy tongs may be pivotally secured to the shaft 7 by a pin 26 extended into the shaft and securing the middle arms from movement longitudinally of the shaft while leaving them free to turn upon said pivot, or one of the end arms of the lazy tongs may be pivotally united to the shaft and the remaining arms be left free for longitudinal movement along the shaft.

A similar slotted shaft 6 is journaled in the upper part of the frame and carries a similar lazy tongs slidable longitudinally thereof. The alternate arms 19.2 of the upper lazy tongs are extended and slotted to carry the upper ends of the blades 21, the lower ends of which are carried by the bars 19.1 of the lower lazy tongs. The bars of the lazy tongs are preferably formed of spring steel or other resilient metal and the extended bars 19.1 and 19.2 have sockets 31 formed therein to receive the pins 19 and hold the blades 21 in place.

The length of the blades 21 and the position of the bores therein through which the pins 19 pass, are so proportioned that the resilient bars or arms of the lazy tongs will exert a continuous tension thereon of sufficient force to hold the blades taut and at the required tension for the most effective work.

The lower shaft 7 is fitted with a downwardly extending arm 10 preferably at the middle thereof by which the shaft may be rocked in its bearings 9. The arm 10 has pivotally united thereto one end of a lever 13 by a pivot 12 the other end of which is united by a pivot 11 to a bell-crank lever 14.1 mounted upon a shaft 14 the ends of which are secured in the side frames 1 and 2 by pressfit or other suitable means.

The other end of the bell-crank lever is united by a pivot 15 to one end of a link 16 the opposite end of which is pivotally mounted upon the crank pin 17 carried by a crank 18 mounted upon the shaft of the motor 23 or other prime mover.

As thus arranged, each half revolution of the motor shaft and crank pin 17 will cause the arm 10 to travel through its complete traversable arc twice; and the other half revolution of the motor shaft will cause the arm 10 to travel through its allowable arc twice more. In this way there will be two complete reciprocating movements of the shaft 7 for each revolution of the motor shaft

and crank pin 17, thus giving four cutting movements of each blade for each revolution of the motor shaft. The reciprocatory movements of the shaft 7 will be transmitted to the shaft 6 by the blades 21.

Any desired form of prime mover may be utilized to drive the arm 10 and reciprocate the shafts 7 and 6, but in order to secure a high speed of reciprocation, I have shown in Figures 1 and 6 the driving mechanism just described.

In Figure 7 I have shown an alternate form of drive in which the arm 10 is actuated by an electromagnet 30 with pole pieces 29 surrounded by coils 28 which may be operated by electric current from an ordinary lighting system or from batteries as desired, and are so arranged that contact of the arm 10 with one pole will act to reverse the current and cause the arm to be drawn immediately to the other pole in the well known manner utilized for ringing door bells and various other applications.

The size and strength of the magnets may be proportioned to the load and the speed of action desired.

In order to reduce vibration to the least possible point, I prefer to mount the ends of the shafts 6 and 7 in steel bushings 7.1 as shown in Figure 8, with rubber bushings 8.1 surrounding the steel bushings in the bearing hub 8 which may be united to the side frame 1 surrounding the rubber bushing 8.1.

The motor 23 may be mounted upon resilient pads 23.1 and when the electromagnet 30 is used, the supporting plate 5 may be formed of a resilient insulating material.

A chute 3 mounted upon brackets 4 united to the housing, may be provided to carry the bread to the slicing blades and is preferably inclined downwardly toward the blades so that the action of gravitation will assist in carrying the bread through the blades, but additional feeding means may be used as desired and I make no claim in this application to any particular form of feeding or discharge apparatus.

In the operation of my apparatus, the blades 21 are secured under tension in the extended bars 19.1—19.2 of the lazy tongs by pins 19 in slots 21.1. The spacing of the blades is adjusted by extending or retracting the lazy tongs, and after the lazy tongs are located in any desired position, they can be locked in place by nuts 24 threaded upon the pins 24.1 which are united to the terminal arms of the lazy tongs and can be moved longitudinally of the shaft in the slots 6.2.

The prime mover is then started and the shafts 6 and 7 will rock simultaneously. The shafts 6 and 7, the lazy tongs therein, and the blades, are carefully balanced; and the downward momentum of one set of blades moving downwardly, will be counterbalanced by the upward momentum of the other set of blades moving upwards at the same time.

Thus the downward impulse given to each shaft by one set of blades and the arms holding them, will be offset by the upward impulse given to the same shaft by the upward movement of the other set of blades, etc.

Another advantage of my forms of machine is that it can be built in very compact form. The entire length of the blades need not be more than six or seven inches to allow sufficient cutting length for all ordinary sizes of bread loaves. At the same time, a high speed of operation may be maintained which will equal or exceed the cutting speed of the blades in the largest and heaviest forms of reciprocating machines now in use.

It is obvious that various modifications in the form, size, proportion and materials of my machine may be varied to a considerable extent without departing from the spirit of my invention and I do not limit my claims to the precise forms shown in the drawings.

I claim:

1. A bread slicing machine comprising side frames united at the top and bottom, spaced upper and lower shafts journaled in the side frames, longitudinally movable parallel lazy tongs assemblies slidably mounted upon said shafts respectively in alinement with the axes thereof and with their bar members extending laterally on opposite sides thereof, said successive bar members being pivoted at the ends and at the middle crossing points thereof, slotted extensions formed upon the ends of alternate pairs of bar members, cutting blades diagonally mounted in crossed position upon the extensions of said lazy tongs bars, and means as described to reciprocate the shafts simultaneously and in opposite directions.

2. A bread slicing machine as described in claim 1, said upper and lower shafts being formed with horizontal longitudinal slots therein and the lazy tongs assemblies being slidingly mounted in said slots respectively.

3. A bread slicing machine as described in claim 1, each of said shafts being formed in upper and lower halves spaced apart but united at the ends, and the lazy tongs being slidably mounted in the spaces between the two halves.

4. A bread slicing machine as described in claim 1, the middle members of said lazy tongs assemblies being pivoted to the middle of their respective shafts.

5. A bread slicing machine as described in claim 1, said upper and lower shafts being formed with horizontal longitudinal slots therein and the lazy tongs assemblies being slidingly mounted in said slots respectively, one member of each of said lazy tongs assemblies being pivotally united to its adjacent shaft.

6. A bread slicing machine as described in claim 1, said upper and lower shafts being formed with horizontal longitudinal slots therein and the lazy tongs assemblies being slidingly mounted in said slots respectively, one member of each of said lazy tongs assemblies being pivotally united to its adjacent shaft and the remainder of said assemblies being manually adjustable lengthwise of their shafts.

7. A bread slicing machine as described in claim 1, said upper and lower shafts being formed with horizontal longitudinal slots therein and the lazy tongs assemblies being slidingly mounted in said slots respectively, one member of each of said lazy tongs assemblies being pivotally united to its adjacent shaft and the remainder of said assemblies being manually adjustable lengthwise of their shafts, vertical longitudinal slots formed in the upper halves of said shafts, and set screws threaded into bars of said assemblies adjacent said slots and extending upwardly in said slots whereby the lazy tongs may be secured in adjusted position.

8. A bread slicing machine comprising side frames united at the top and bottom, spaced upper and lower shafts journaled in the side frames, parallel lazy tongs assemblies slidably mounted upon said shafts respectively in aline-

ment with the axes thereof and with their bar members extending laterally on opposite sides thereof, the successive bar members being pivoted at the ends and the middle crossing points thereof, slotted extensions formed upon the ends of alternate pairs of bar members, opposed series of cutting blades diagonally mounted in crossed position upon the extensions of said lazy tongs bars, a prime mover mounted in the frame, a system of levers arranged to be driven by the prime mover and arranged to rotate the lower shaft reciprocatingly whereby the opposed series of cutting blades will be driven simultaneously in opposite and alternate directions.

9. In a bread slicing machine as described in claim 1, said means comprising an arm rigidly united to the lower shaft, a lever pivotally mounted in the frame having one arm pivoted to the shaft arm and its opposite arm pivotally united to one end of a connecting rod the opposite end of which is pivoted to a crank mounted upon and driven by the shaft of an electric motor or other prime mover.

10. In a bread slicing machine, the combination with side frames united at the top and bottom, of spaced upper and lower shafts journaled in the side frames, parallel lazy tongs assemblies slidably mounted upon said shafts respectively in alinement with the axes thereof and with their bar members extending laterally on opposite sides thereof, the successive bar members being pivoted at the ends and the middle crossing points thereof, slotted extensions formed upon the ends of alternate pairs of bar members, opposed series of cutting blades diagonally mounted in crossed position upon the extensions of said lazy tongs bars, a prime mover mounted in the frame, a system of levers arranged to be driven by the prime mover and arranged to rotate the lower shaft reciprocatingly whereby the opposed series of cutting blades will be driven simultaneously in opposite and alternate direction.

11. In a bread slicing machine, the combination with side frames united at the top and bottom, of spaced upper and lower shafts journaled in the side frames, longitudinally movable parallel lazy tongs assemblies slidably mounted upon said shafts respectively in alinement with the axes thereof and with their bar members extending laterally on opposite sides thereof, said successive bar members being pivoted at the ends and at the middle crossing points thereof, slotted extensions formed upon the ends of alternate pairs of bar members, cutting blades diagonally mounted in cross position upon the extensions of said lazy tongs bars, and means as described to reciprocate the shafts simultaneously and in opposite direction, said means comprising an arm rigidly united to one of said shafts, and an electro-magnet arranged to reciprocate said arm.

12. In a bread slicing machine as described in claim 1, the bar members of the lazy tongs being formed of resilient metal.

HARRY J. CRINER.

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