Sept. 4, 1928.

1,683,445

E. C. BROCK

BREAD SLICING MACHINE

Filed June 5, 1926

2 Sheets-Sheet 1

Fig. 3.

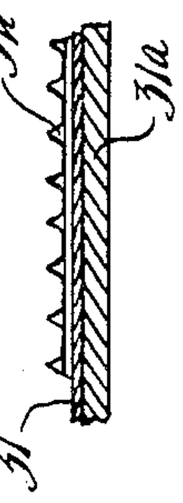


Fig. 1.




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Fig. 4.

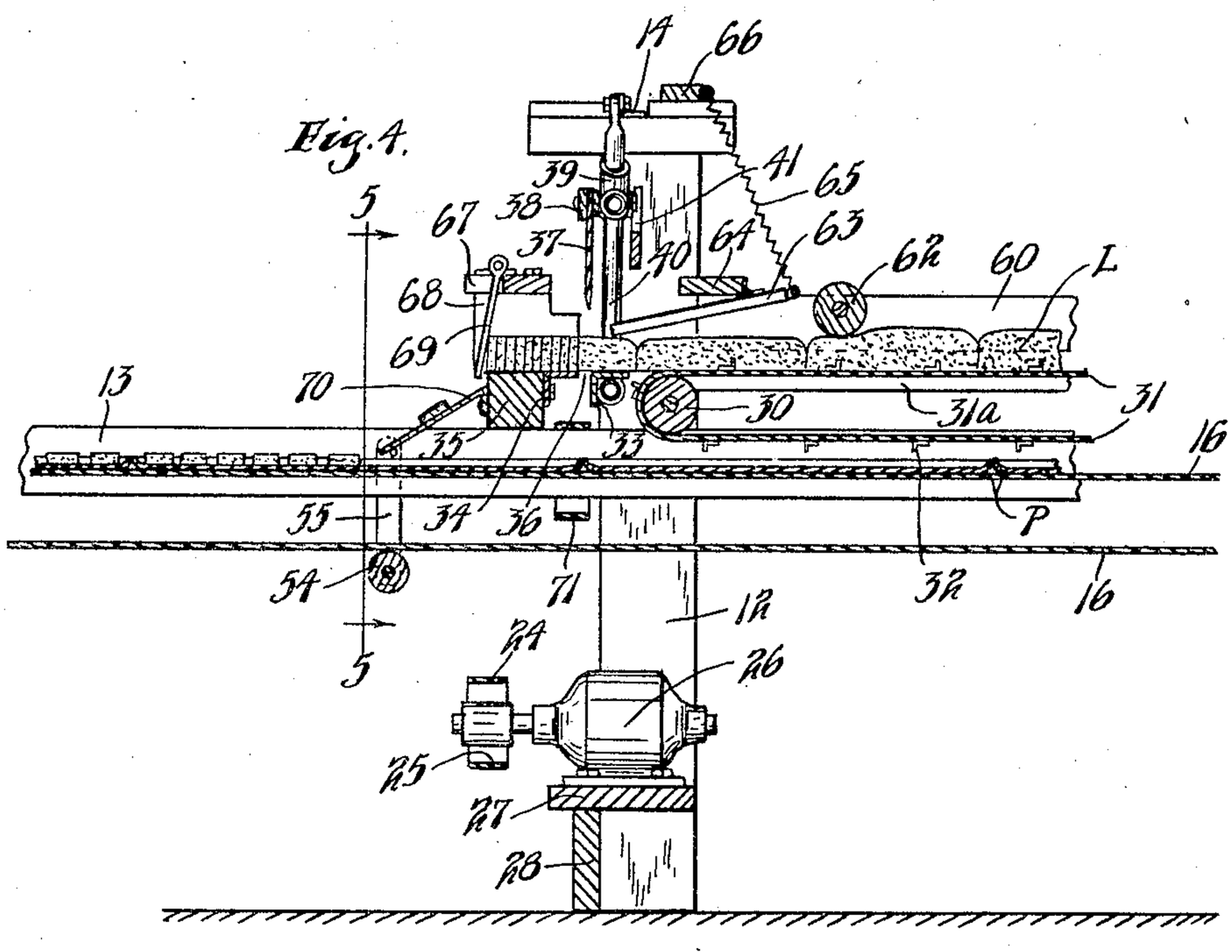



Fig. 5.

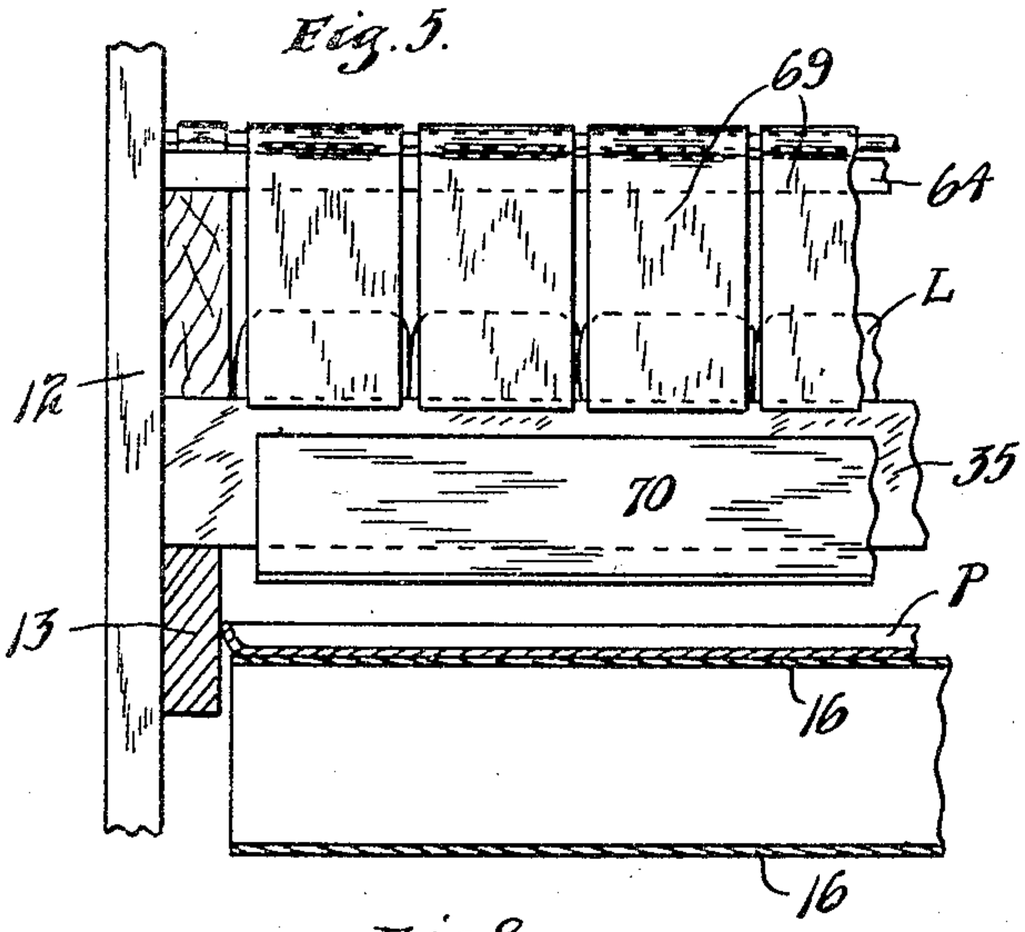



Fig. 6.

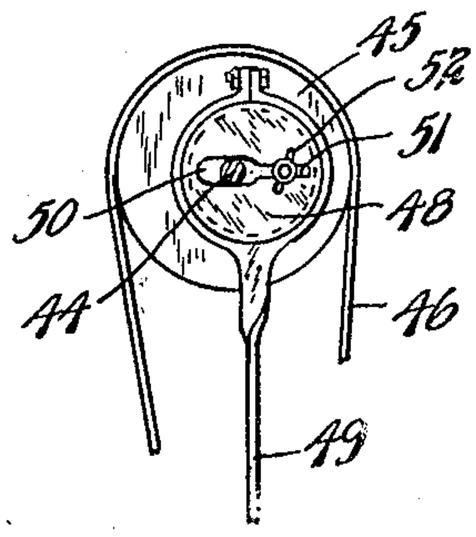



Fig. 7.

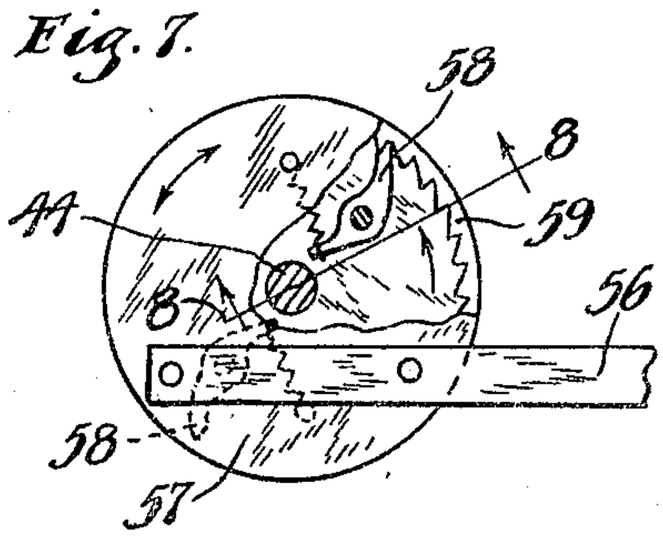
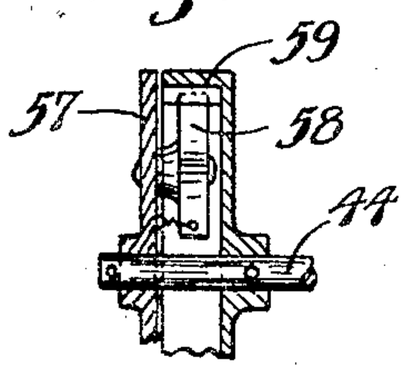



Fig. 8.

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Patented Sept. 4, 1928. 1,683,445

# UNITED STATES PATENT OFFICE.

EDWIN C. BROCK, OF MINNEAPOLIS, MINNESOTA.

## BREAD-SLICING MACHINE.

Application filed June 5, 1926. Serial No. 113,927.

My invention has for its object to provide an improved bread slicing and panning machine; and to this end the invention consists of the novel devices and combinations of devices hereinafter described and pointed out in the claims.

The preferred form of my invention is illustrated in the accompanying drawings, wherein like notations refer to like parts throughout the several views.

In said drawings, Fig. 1 is a side elevation of the machine, with some parts broken away;

Fig. 2 is a view partly in section and partly in elevation on the line 2—2 of Fig. 1;

Fig. 3 is a detail in section on the line 3—3 of Fig. 1;

Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 2;

Fig. 5 is a view partly in section and partly in elevation on the line 5—5 of Fig. 4;

Fig. 6 is a detail in side elevation or face view showing a driving pulley and an adjustable eccentric detached;

Fig. 7 is a view in side elevation or face view, with some parts broken away, showing a driving ratchet detached; and

Fig. 8 is a detail in section on the radial line 8—8 of Fig. 7.

In this machine a skeleton frame of considerable length is employed; and as shown, this frame includes a pair of suitably spaced front end supporting standards or uprights 10, a pair of suitably spaced rear end supporting standards or legs 11, and an intermediate set of two standards 12, to all of which standards 10, 11 and 12, are rigidly secured suitably spaced side rails 13, which may, if so desired, be connected by suitable cross-ties, (not shown). The pair of central standards 12, rise to a height some considerable distance above the side rails 13 and are cross connected by a top plate 14 rigidly connected to the upper ends of said standards 12 and extending outward therefrom at the right side of the machine as best shown in Fig. 2. The front standards 10 are also extended upward beyond the side rails 13 fixed thereto, for purposes which will presently appear. On suitable rollers 15, journaled in the main frame, is mounted an endless belt 16 adapted to carry shallow pans P thereon, and which for this reason may be called the pan carrier. The said rollers 15 are located near the opposite ends of the main frame and hence this belt 16 or pan carrier traverses a distance nearly equal to the entire length of the frame as can readily be seen on reference to Fig. 1. The rear member of said rollers 15 is provided on its left end with a small gear 17 which engages the worm of a worm shaft 18 mounted in a vertical position in bearings 19 fixed to the adjacent member of the rear legs 11 of the main frame, as shown in Fig. 1. The lower end of this worm shaft 18 is provided with a beveled gear 20 which engages a corresponding beveled gear 21 on the rear end of the main driving shaft 22. This shaft 22 is journaled in suitable bearings fixed respectively to the left side members of the standards 11 and 12 and which has fixed thereto a pulley 23 connected by belt 24 to the pulley 25 of an electric motor 26 shown as mounted on a shelf 27 fixed to the standards 12 and braced by an upright piece 28 as clearly shown in Fig. 4. From the foregoing it follows that when the motor 26 is in action, the pan carrier 16 will be moved continuously, under a slow motion, with its overrunning fold moving from the front toward the rear of the machine. In the front standards 10 above the side rails 13 is mounted a roller 29 and in the central standards 12 above the rails 13 is mounted another co-operating roller 30 (see Fig. 4) and on these two rollers, 29 and 30, is mounted an endless carrier 31 having sharp teeth-like brads 32 on its face, which travels over a fixed deck 31ª and adapted to carry the loaves of bread L as best shown in Fig. 4, and which on account of this function may be called the loaf carrier. This loaf carrier 31 receives an intermittent or step-by-step motion through means which include a pawl and ratchet device that will presently be detailed. Directly rearward of the roller 30 is located an angle bar 33, best shown in Fig. 4, which has its ends rigidly secured to the standards 12, and spaced apart therefrom, a little further to the rear, is another corresponding angle bar 34 fixed to the forward face of a bed block 35 extending crosswise of the main frame and rigidly secured thereto. The said angle bars 33 and 34 are spaced apart far enough to afford a slot 36 through which the edge of the slicing knife 37 works and acts on the loaves of bread L to sever therefrom the slices S as best shown in Fig. 4. In other words, the parts 33, 34 and 35 constitute a bed over which the loaves of bread L are moved intermittently by the loaf carrier 31 and, when stationary, the said knife 37 acts to sever

the slices S, from the loaves resting directly below the same on the said bed. The knife 37 has fixed to its supporting head 38 at the outer ends thereof, sleeves 39 which are mounted to slide on parallel inclined guides 40 which are fixed at their lower ends to the central standards 12 of the main frame and are fixed at their upper ends to the top plate 14 which connects the said standards at their upper ends and at the right side of the machine extends outward therefrom as above noted and as clearly shown in Fig. 2. A pitman 41 connects the head 38 of the knife 37 to a crank pin 42 projecting from the profile face of a crank disk 43 fixed to the rear end of a counter shaft 44, as best shown in Figs. 1 and 2. This shaft 44 is kept in continuous motion, by means which will presently be noted, and, under the rotation of the crank disk 43, the pitman 41 will force the slicing knife 37 upward and downward on its guides 40 and these guides being inclined, the knife will also move crosswise of the frame and act on the loaves with drawing or shearing cut, at a time when the said loaves are standing stationary on their supporting bed beneath the knife. The counter shaft 44 is suitably journaled in the upward extensions of the left side standards 10 and 12 as clearly shown in Fig. 1 and fixed thereto just forward of the standards 12, is a pulley 45 connected by belt 46 to a smaller pulley 47 fixed to the forward end of the main driving shaft 22. It follows that the counter shaft 44 will be kept in constant motion, at a considerably lower speed than the main driving shaft 22. The pulley 45 fixed to said counter shaft 44, has adjustably secured to its rear profile face, an eccentric 48 on which is mounted an eccentric strap 49 as shown in Figs. 1 and 6. To secure the adjustment of said eccentric 48, it is shown as provided with a diametric slot 50 through which extends the counter shaft 44 carrying the pulley 45, and, at one side of the center of the eccentric the slot is reduced in width and, in the reduced part of the slot, works a screw stud 51 projecting from the profile face of the pulley 45 on which screw stud is mounted a jam nut 52. It is obvious that by this means the throw of the eccentric can be varied at will.

The lower end of the eccentric strap 49 is pivotally connected to the forward end of a pawl actuating lever 56. The rear end of this lever 56 is fixed to the profile face of a pawl carrying disk 57 as shown in Figs. 1 and 7; and this disk 57 is pivoted or loosely mounted on the projecting end of the left hand journal of the roller 30 over which travels the loaf carrier 31. This disk 57 carries a pair of spring-held driving pawls 58 pivoted to its inner profile face, which pawls 58 engage with the internal teeth of a cup shaped ratchet disk 59 having the ratchet teeth on the inside of its outwardly projecting flange and which cup shaped disk 59 is fixed to the projecting journal of said roller 30 directly inward of and adjacent to the pawl carrying disk 57, as best shown in Fig. 7. It follows that, when the pawl actuating lever 56 is moved upward by the eccentric 48 and its strap 49, the pawls 58 carried by said disk 57, being in engagement with the teeth of the cup shaped ratchet disk 59, will move the cup shaped ratchet and the roller to which it is fixed a single step equal to the throw of the eccentric 48, thereby imparting a corresponding step of movement to the loaf carrying belt 31 and the loaves L thereon. The friction on the loaf carrier 31 from its load taken together with the resistance offered by the loaves then on the slicing bed under pressure from the clamps 63 is sufficient to hold the loaf carrier in the position to which it has been moved, by the ratchet and pawl device, while the pawl lever 56, disk 57 and pawls 58 make their return or idle stroke. In practice, a retaining dog might also be provided, if desired.

To the frame standards 10 and 12 on each side of the machine directly above the loaf carrying belt 31 are secured shallow sideboards 60, best shown in Figs. 1 and 4, which sideboards are provided with open slots 61 in which are journaled a pressure roller 62 which yieldingly rides on the faces of the loaves of bread when the machine is in operation.

As illustrated, the machine is of such dimensions that six rows or series of loaves L may lie abreast crosswise of the machine on the loaf carrier 31 and the slicing bed to which said loaves are delivered from said carrier 31. Means are provided for yieldingly clamping the loaves of bread to the slicing bed at the time the slicing knife acts thereon. The means illustrated consist of a series of short boards 63 pivoted to a cross bar 64 fixed to the standards 12 at a short distance above the top level of the loaves when on the carrier 31 or on the slicing bed. The outer ends of these boards 63 are connected by coil springs 65 to an anchor board or plate 66 fixed to the top of the cap plate 14, as clearly shown in Fig. 4. The lower ends of the said boards 63 are in position to bear upon the faces of the loaves resting on the slicing bed. It follows that these spring-held boards 64 will yieldingly clamp the loaves to the slicing bed at the time that the slicing knife is acting to cut the slices from the loaves, and at all times while on said bed.

Slightly rearward of the slicing knife 37 and the slicing slot 36 of the bed, is located a crossbar or plate 67 secured to brackets 68 fixed to the opposite ends of the bed block 35. To this cross plate or bar 67 are pivoted a series of slice retaining and delivering devices 69 of paddle-like form, as best shown

in Figs. 4 and 5, with their lower ends yieldingly bearing against the rear faces of the bread slices S standing nearest to the rear or delivery edge of the bed block 35. Under the action of gravity the said paddle-like devices 69 will hold all the slices of bread that rest on the slicing bed in their vertical position, as shown in Fig. 4, until the next step of feed movement imparted to the loaf carrier 31, whereupon the rearmost slice will be pushed rearward off from the bed block 35 and fall onto a guide plate 70 standing in a downwardly inclined position by which the slice will be directed to the face of one of the underlying pans P, as shown in Fig. 4. In the passage of the delivered slice S from the rear edge of the bed block 35, the action of the paddle 69 with its free end bearing against the rear face of that slice makes the slice slip down bottom first onto the inclined guide 70, thus getting flatwise onto said guide and into the underlying pan and permitting the paddle 68 to come up against the face of the next adjacent slice on the bed block 35. There are as many of these retaining and delivering devices 68 as there are series of loaves or spaces for series of loaves.

Whatever waste crumbs of bread may be produced under the action of the slicing knife 37 upon the loaves L, will fall down onto the upper fold of a cross belt 71, best shown in Fig. 2 which runs over idle guide rollers 72 and 73 and engages with a small pulley 74 fixed to the main shaft 22 near the main driving pulley 23, as best shown in Figs. 1 and 2. The left or delivery end of the crumb belt 72 runs within the upper end of a delivery chute 75 fixed to the left hand member of the central standards 12 for directing off the crumbs and waste material away from the machine.

As illustrated, the belt 46 for transmitting motion from the main shaft 22 to the pulley 45 of the counter shaft 44, is subject to an idler 53 for keeping the same under proper tension.

To keep the underrunning fold of the pan carrying belt 16 from dropping too far down, it is made subject to an idle roller 54 journaled in the lower ends of hangers 55 and underlying the said underrunning fold of said belt 16, as best shown in Fig. 1.

All the parts of the machine have now been identified and the actions of the respective parts have been stated. The general operation of the machine as an entirety, may be summarized as follows:—

The loaf carrying belt 31 is loaded with six series of loaves L of bread abreast of each other; and the pan carrying belt 16 is loaded with a series of pans P abutting each other. The electric motor is then started, thereby bringing all of the moving parts of the machine, driven thereby, into action. The pan carrying belt 16 will move continuously at a slow speed. The counter shaft 44 also runs continuously, thus causing the slicing knife 37 to be reciprocated on its guides 40 upward and downward under the action of the crank disk 43 and pitman 41. At the proper time in the rotation of the shaft 44 the eccentric 48 on the pulley 45 through its strap 49 will move upward the pawl lever 56 and thereby cause one step of rotation to the roller 30 and the loaf carrying belt 31, and this step of movement is sufficient to move the belt 31 and the loaves thereon a distance equal to the width of one slice. This step of feed movement occurs at the time when the slicing knife 37 is moving upward or at least before it gets far enough down to strike the underlying loaf. As soon as one loaf has been projected onto the slicing bed, it will be pushed rearward step after step by the succeeding loaves and when the knife comes down with its edge working through the slot 34 of the bed, the slices will be cut therefrom one at a time and accumulate on the bed members 34 and 35 until under the successive feed movements the rearmost slice reaches the rear edge of the bed block 35 while being held vertical by one of the paddles or retaining devices 69 and then under the next feed movement that rearmost slice from each of the series of loaves will be shoved off from the bed block 35 with its lower edge foremost and be turned flatwise onto the guides 70 by the action of said paddle-like device 69 and sliding down the guide 70 by gravity, will drop flatwise onto the face of one of the underlying pans P carried by the pan carrying belt 16. This pan carrying belt 16 will move the pans rearward to the back end of the machine whence they are removed by hand and taken wherever desired. Of course, it will be understood that the slicing knife 37 acts simultaneously on all of the underlying series of loaves thereby severing six slices S from the six series of loaves L. The resilient clamping devices 63 with their lower ends resting on the faces of the loaves resting in turn on the slicing bed, serve to yieldingly hold the loaves in proper slicing position and prevent the same from getting out of place under the feed movements imparted by the loaf carrying belt 31. The purpose of the brads or teeth 32 on the face of the belt 31 is to slightly engage the under surfaces of the loaves and hold the same properly alined in their desired positions without angular movement thereof when travelling with the belt. The purpose of the yielding idle roller 62 is to put the loaves under sufficient pressure to keep the same from jumping under their travel with the belt.

The practicability and the efficiency of this machine for the purpose intended has been demonstrated by extensive usage thereof. It has been found in actual practice that this machine, when in action, will automati-

cally cut and pan 420 slices of bread per minute, and that these will all be of exactly the same uniform thickness. This is an important point as it insures even toasting of the bread and it is for toasting purposes that most of the bread is sliced on this machine. The adjustability of the throw of the eccentric 48 on the pulley 45 enables the extent of the step of feed movement to be varied and consequently the thickness of the slices S to be varied at will. This is a feature of importance in the successful usage of the machine.

The machine is entirely sanitary. All the parts of the machine with which the loaves or slices of bread come in contact are exposed where they are readily accessible for cleaning and are so arranged that there is little chance for any accumulation of dirt.

The machine is simple in construction and can be made at low cost. It is also easy to drive. For the size of the machine illustrated, a horsepower electric motor is employed, and found to be amply sufficient.

What is claimed is:—

1. In a bread slicing and panning machine, the combination with a slow moving pan carrier, of an intermittently moving loaf carrier, a slotted bed and a slicing knife with its edge working through the slot of said bed, an inclined guide reaching from near the rear edge of said bed to a point overlying the pans of said pan carrier, and a series of slice retaining and delivering devices operative to yieldingly hold the cut slices in their normal vertical position abutting the cut loaf on the bed and then to deliver the foremost slices intermittently from said bed, with the bottom edges foremost and with the sides of the slices substantially parallel to the guide, on to said guide and therefrom to said pans, under the successive feed movements of said loaf carrier, substantially as described.

2. The combination in a bread slicing and panning machine of an intermittently fed loaf carrier, adapted to support a successive line of bread loaves, a slow moving pan carrier, a slotted bed, a slicing knife with its edge working through the slot of said bed, an inclined guide reaching from said bed to a point overlying the pans of said pan carrier and a paddle pivotally mounted above said bed to normally hang down above the juncture between said bed and said inclined guide, said paddle being adapted to hold the cut slices of bread on said bed in vertical position until successive feed movements of said loaf carrier force the lower end of a slice off the bed, whereupon the lower end of said paddle will swing upwardly to permit delivery of but the single slice with its lower edge, foremost and its sides inclined substantially parallel to the guide, on to the guide.

3. In a bread slicing machine, the combination of an intermittently fed loaf carrier, a slotted bed on to which the bread is forced by said carrier, a slicing knife with its edge intermittently working through the slot of said bed and a slice retaining and delivering means operative to yieldingly hold the cut slices in their normal vertical position abutting the cut loaf on the bed, and to deliver the same from said bed, one at a time, with the lower edges of the slices foremost and substantially parallel to the rear edge of said bed under the successive feed movements of said loaf carrier.

4. In a bread slicing machine, the combination of an intermittently fed loaf carrier adapted to support a plurality of series of rows of loaves, a slotted bed, a slicing knife with its edge intermittently working through the slot of said bed, and a corresponding series of independent retaining and delivering devices operative to yieldingly hold the slices cut from the several loaves in their normal vertical positions abutting the cut loaves, while moving over the bed, and then to successively deliver all the outermost slices from each loaf simultaneously from said bed with the lower edges of the outermost slices foremost and substantially parallel to the rear edge of said bed, under successive feed movements of said carrier.

In testimony whereof I affix my signature.

EDWIN C. BROCK.