June 8, 1937. J. HANSEN 2,082,832

MACHINE FOR PRODUCING AND RESHARPENING CUTTER BLADES

Original Filed Aug. 27, 1934 2 Sheets-Sheet 1

Fig. 1.

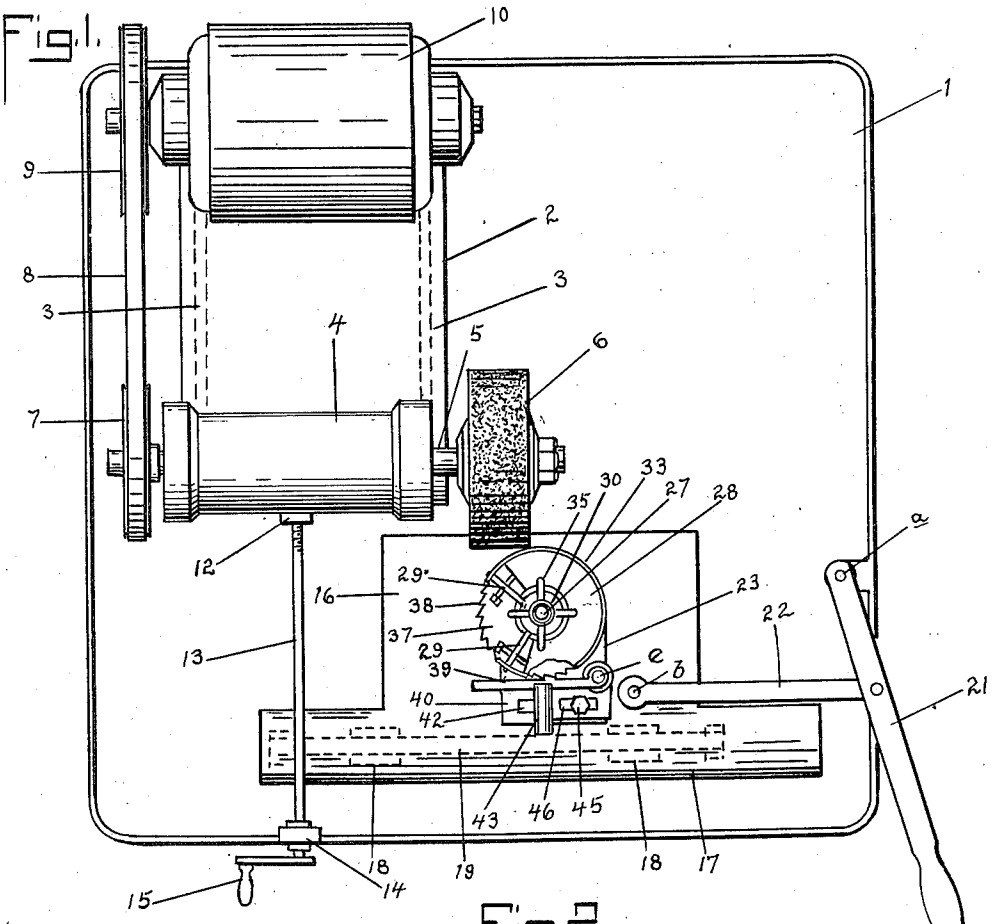


Fig. 2.

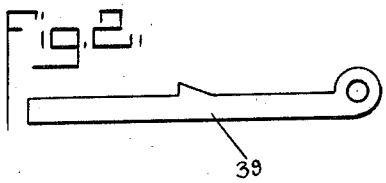


Fig. 3.

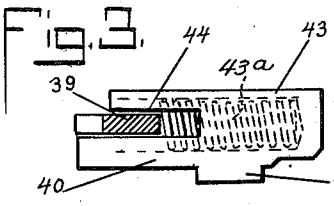


Fig. 4.

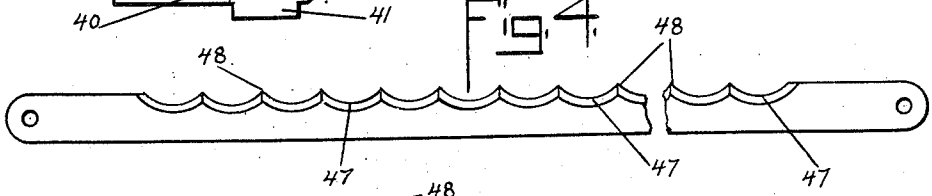
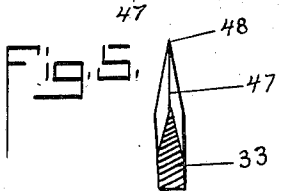


Fig. 5.



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Fig. 6.

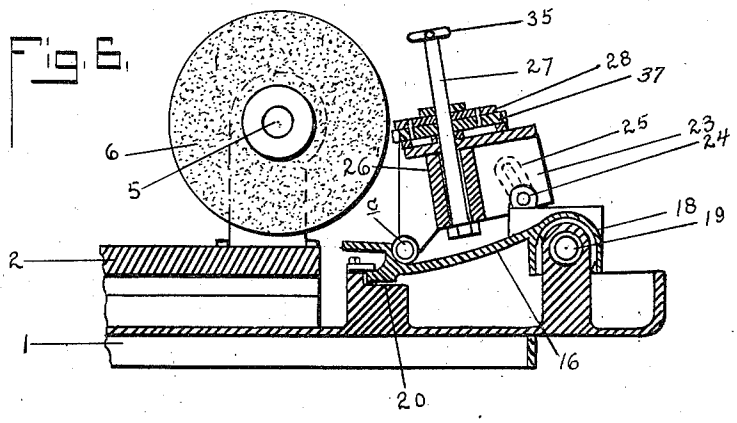


Fig. 7.

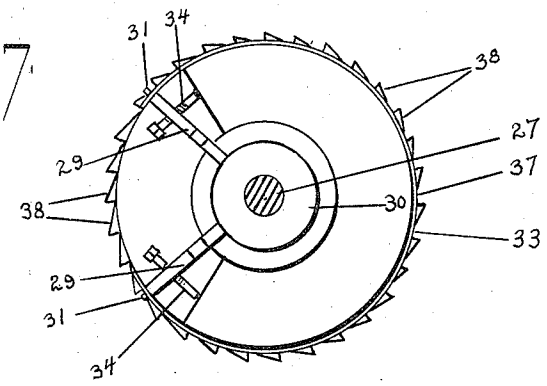
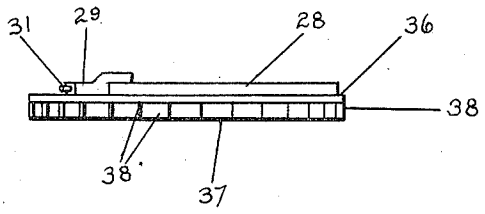


Fig. 8.



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UNITED STATES PATENT OFFICE

2,082,832

MACHINE FOR PRODUCING AND RE-SHARPENING CUTTER BLADES

John Hansen, Bettendorf, Iowa

Application August 27, 1934, Serial No. 741,575
Renewed March 15, 1937

13 Claims. (Cl. 51—92)

My invention has reference to a machine for producing and re-sharpening cutter blades, of that type which are employed in bread slicing machines. It has more special reference to the production of blades provided on one of their edges with a series of indentations or scallops, such as are set forth in my former application for Letters Patent of the United States for a Method for producing cutter blades for slicing machines, filed July 1, 1933, Serial No. 678,631. The method referred to consists in bending a blade into a curved shape and presenting a bent portion thereof to an abrasive element in a plane to remove a portion of the metal of the blade, and form an indentation therein of desired conformation. The present invention is designed for the support of a blade while the several steps of the method are being carried out, including certain features having to do with the adjustment of some of the parts to insure the proper relative positioning of the blade and grinding element. Means are also provided for effecting the movement of a blade after the forming of one indentation therein to a position for forming another one thereof, which means includes a metering control, by means of which a proper movement of the blade supporting drum is determined.

The above-named, and other features and advantages of the invention will be more readily understood from the following specification, taken in connection with the accompanying drawings, in which;—

Fig. 1 is a plan view of a machine which embodies the invention.

Fig. 2 is a detail of the ratchet-bar 39.

Fig. 3 is a detail of the ratchet-bar control mechanism.

Fig. 4 is a plan view of one of the cutter blades produced by the machine.

Fig. 5 is a cross-section on the line 5—5 of Fig. 4.

Fig. 6 shows the blade supporting mechanism, in medial vertical section.

Fig. 7 is a plan view of the blade supporting unit, detached.

Fig. 8 is an edge view thereof.

The reference number 1 indicates a table or bed of the machine, which may be supported in any well known manner, and upon which is slidably mounted a plate 2, by means of guides on the lower face of said plate in engagement with tracks 3 on the table. Fixed on the plate 2 is a bearing 4, in which is rotatably mounted a shaft 5, on one end of which is fixed a wheel 6, of abrasive material. On the other end of said shaft is a pulley 7, connected by a belt 8 with a pulley 9 on the drive shaft of an electric motor 10, also mounted on the plate 2. At the forward edge of said plate is an ear 12, perforated and threaded to receive the threaded end of a rod 13, the outer end of which is held rotatably in a bearing 11 on the forward edge of the table 1. On the end of the rod is a crank 15, by means of which the rod may be rotated, and by which movement the plate 2 can be given an adjustment forwardly or rearwardly for the purpose hereinafter set forth.

Another plate or carriage 16 is also mounted on the table 1, for movement transversely of the front of the machine, the forward edge of said plate having a mounting 17 slidable on bearings 18 on a shaft 19 supported on the table 1, and the rear part of said plate 16 being slidable on a track 20, also supported on the table 1. (Figs. 1 and 6.) Fulcrumed at one end of the table, as at *a* is a hand-lever 21, connected by a link 22 with a post on one end of the plate 16, as at *b*. By means thereof the carriage can be given a reciprocating movement on the table.

Rockingly mounted on the plate 16, as by pivotal connections at *c* is a frame 23, held normally from such movement by a bolt 24, supported in the frame and in engagement with a slot in an arcuate rack 25 supported on the plate 16. By loosening said bolt the frame can be tipped upwardly or downwardly, as desired. Mounted within said frame is a bearing 26, in which is rotatable a vertically disposed shaft 27, on which is keyed a drum 28, both shaft and drum being in a slightly inclined position with relation to the bed-plate of the machine. Said drum is partly cut away, and within the space between the ends thereof is a pair of arms 29, carried by collars 30 rotatable on the shaft 27, only one of which is shown. In the ends of said arms are pins 31 for engagement with openings in the ends of the cutter blades, for holding the same in position on the drum, as shown at 33 in Fig. 1. Said arms are provided with screws 34, rotatable in threaded openings in said arms, and bearing against the ends of the drum. By adjustment of said arms the blade can be held rigidly in position on the drum while being operated on, and adjustments of said arms can also be made to conform the same to blades of different lengths. The upper end of the shaft 27 is fitted with a hand-hold 35 by means of which the drum can be rotated, and by means of which it can be held from rotation while the grinding operation is in process. The upper portion of the drum is of reduced diameter, leaving a shoulder 38, which supports the lower edge of the blade, and aids in keeping the same in true position while the process of grinding the blade is being carried on.

In Fig. 1 the drum 28 is shown at one side, with the blade out of contact with the wheel 6, and inclined in position so that as the blade is passed across the face of the wheel a portion of

the upper edge of the blade will be removed. On account of the bent position of the blade this results in the formation of an arcuate scallop as shown at 47 in Fig. 4, with a flat portion or facet along the edge of such scallop. To accomplish this the blade supporting drum and carriage supporting the same are given a reciprocating movement toward the left in Fig. 1 and back to the starting point. During this movement the drum is non-rotatable, as the rotation thereof during the grinding operation would produce a continuous sharp edge on the blade, like a razor edge, which would not be desired. The drum 28 can be held in stationary position with relation to wheel during the grinding operation, but a channel would soon be worn in the wheel if this were done.

After the drum has been returned to its non-operative position the shaft 27 is given a partial rotation by means of the handle 35, bringing a blank space on the blade into position for the grinding operation. The degree of movement of the drum and blade is controlled by means of the following devices:—Rotatable on the shaft 27 beneath the drum 28 is a ratchet disk 37, connected with the drum so as to be movable therewith, and provided on its periphery with a plurality of teeth 38, engageable by a similar tooth on a bar 39, pivoted at *e* on a plate 40. The movement of the drum to the extent of one of the teeth on the disk 37 will impart the desired amount of movement to the blade, and these movements will be repeated until the desired number of scallops are formed, whereupon the position of the blade will be reversed, and a similar operation had on the opposite side thereof. The plate 40 is movable on the frame 23, and is held from turning by means of a guide 41 on the lower side of the plate, slidable in a slot 42 in the frame. Fixed on said plate is a cylinder 43, open at one end and provided thereat with slots 44 in which the bar 39 has lateral play. The engagement of the tooth on the bar 39 with those on the ratchet disk is enforced by means of a coiled spring 43*a* in the cylinder 43. The plate 40 is held from movement by a bolt 45 passing through a slot 46 in the plate and into the frame 23. By loosening said bolt an adjustment of the position of the plate 40 can be made to properly position the bar 39 with reference to the teeth on the ratchet-disk.

The disk 37 is provided with a maximum number of teeth, in accordance with the possible requirements called for by the forming of the indentations in a blade, but as a general thing the number of such indentations is less than the number of such teeth. As a result the point at which the drum stops for the last cutting is more or less remote from that at which the first cutting of the blade was had. As a result, when a blade is removed, and a new one placed in position, the ratchet bar is released and the drum rotated in one direction or the other until the blade is brought into position for the first grinding, whereupon the ratchet bar is again engaged with the ratchet-wheel. This also has to be done when the grinding is finished on one side of the blade and such blade is reversed in position for grinding on the opposite side. The production of two or more of the indentations on the edge of the blade results in the forming of points 48 between such indentations, and in order that said points may be perfectly formed and positioned the grinding in the second operation must correspond very closely with that of the first, so that the scallops and points shall exactly coincide. After the reversal of the position of the blade, in case there is such fault in the grinding it can be corrected by turning the drum 28 to bring the blade into an accurate position, and adjusting the position of the ratchet-bar to conform therewith. This will insure a proper cutting of the scallops in the blade in which the corrections are being made, and also in other blades of the same lot.

Drums of different diameters can be operated in the machine, with ratchet disks corresponding therewith. A continuous grinding on the wheel 6 will result in a general wear thereof, so that from time to time an adjustment of the wheel with reference to the movement of the drum must be made. This is accomplished by movement of the plate 2 forwardly, and when a worn wheel is replaced by a larger one the plate is moved rearwardly again. As the diameter of the wheel 6 is reduced by wear the angle of the plane of the drum 28 with reference thereto will vary somewhat, and this variation can be compensated for and corrected by adjustment of the frame 23, as before described, to vary the degree of inclination of the drum, and present the blade to the wheel at a little different angle.

If desired, the indentations can be punched or otherwise formed in the blades, following which the grinding operation would be carried on as above described, to sharpen the blades and form the intercepting facets thereon, but in practice it has been found to be more satisfactory to produce the indentations and complete the operation in the one grinding process.

The effect will be the same, whether the blade supporting drum is reciprocated with relation to the grinding wheel or the drum mounting held in stationary position and the wheel moved with reference thereto, and in the case of the movement of the carriage 16 it will be obvious that the same can be operated by mechanical power, as is done with the reciprocating carriages of standard grinding machines. When operated by hand the blades can be produced at a considerable amount of speed, and by a single operator, the right hand being used for actuating the lever 21, and the other hand in turning the shaft 27 at the end of each movement of the carriage.

What I claim, and desire to secure by Letters Patent, is:

1. In a machine for producing a series of adjacent scallops in one edge of a cutter blade, the combination of an abrasive wheel and means for rotation thereof, a cutter blade support mounted in proximity to said wheel, means carried by said support for mounting a cutter blade in a predetermined bent position with one of its edges presented to said wheel in suitable position for the grinding thereof, means for movement of said support to present new spaces on a blade for grinding operations, and means for gauging the length and positions of said spaces.

2. In a machine for producing a series of scallops of predetermined length and depth in the edge of a cutter blade, the combination of an abrasive element and means for rotation thereof, a drum rotatably mounted in proximity to said abrasive element, means carried by said drum for the support of a cutter blade in bent position and in a plane for the grinding of scallops in one edge thereof, means for giving to said drum and abrasive element a relative re-

ciprocating movement, means for giving intermittent movements to said drum consecutively with said reciprocating movements, to present new spaces on a blade for grinding operations, and means for adjustment of the last named means to correct faults in the positioning of said spaces.

3. In a machine for producing a scalloped edge on a cutter blade, a support, a grinding wheel on said support, a disk rotatably mounted on said support, adapted to receive and bend a cutter-blade into a predetermined curvature, and provided with a segmental space in one of its sides, arms supported in said space capable of movement to or from each other, and blade engaging means at the ends of said arms.

4. In a machine for producing a scalloped edge on a cutter-blade, means for mounting such cutter-blade in a machine, comprising a support, a grinding wheel mounted on said support, a disk rotatably mounted on said support, and provided in one of its sides with a segmental space, a pair of members supported in said space and provided at their outer ends with means for engagement with openings in the ends of cutter-blades, and means for holding said members in adjusted positions, with a blade engaged thereby held rigidly on said disk.

5. In a machine for producing a scalloped edge on a cutter blade, means for mounting said cutter blade in a machine, and controlling the action thereof in said machine, comprising a support, a grinding wheel mounted on said support, a disk mounted thereon and provided with means for the support of a cutter blade having perforations in its ends, a ratchet wheel connected with said disk, and provided with a series of teeth corresponding with the movements desired to be given to the disk for successive grindings, and means for engagement with said ratchet wheel to control the length of such movements.

6. In a machine for producing a scalloped edge on a cutter blade, means for mounting such cutter blade in a machine, and controlling the action thereof in the machine, comprising a support, a grinding wheel mounted on said support, a disk mounted thereon rotatably, and provided with means for the support of a cutter blade in a bent initial position or reverse position, means for determining the length of the successive movements of said disk, and means for causing the grindings on one side of a blade to register correctly with those on the other side.

7. In a machine for producing a series of scallops in one edge of a strip of metal, a frame, a grinding element mounted thereon, a support mounted in proximity to said element for reciprocation transversely thereof, a fixture carried by said support adapted to receive and bend such strip of metal into a definitely curved position, means for presenting said fixture to the grinding element in an inclined position to cause a grinding action on the edge of said strip, means for varying the inclination of said fixture with reference to the grinding element, and means for adjustment of the position of said grinding element with relation to said fixture.

8. In a machine for producing a series of scallops in one edge of a strip of metal, a frame, a grinding element mounted thereon, a support mounted in proximity to said element for reciprocation on a line transversely thereof, a fixture carried by said support adapted to receive and bend a strip of metal into a definitely curved position, means for presenting said fixture to the grinding element to produce a grinding action on the edge of a strip of metal carried thereby, means for reciprocating said support, to produce a scallop in the edge of said strip of metal, means for varying the position of said fixture with relation to said grinding element, means for adjustment of the position of said grinding element with relation to the line of movement of said fixture, and means for effecting a change in the position of the cutter blade to present successive blank spaces thereon to said grinding element.

9. In a machine of the class described, a cutter blade holding mechanism comprising a disk rotatably mounted and provided with a fragmentary blade bending segment and a segmental blank space, blade engaging elements in said blank space, a metering mechanism operatively connected with said mechanism for determining the degree of movement thereof in presenting successive blank spaces on a cutter blade to an abrasive action and an abrasive means supported adjacent to said disk.

10. In a machine for forming scallops in the edge of a cutter blade, a blade holding mechanism comprising a circular member provided with a fragmentary blade bending portion, and a segmental blank space at the ends thereof, blade engaging elements in said blank space, means for adjustment of said elements for use with blades of different lengths and an abrasive tool in proximity to said circular member.

11. In a machine for forming scallops in the edge of a cutter blade, a blade holding mechanism comprising a disk having an abutment for the support of a blade in arcuate position, establishing the position of such blade for grinding said scallops, means carried by said disk for holding such blade in fixed position thereon and an abrasive element operatively supported in proximity to said disk.

12. In a machine for producing and resharpening a series of scallops in an edge of a strip of metal, a grinding element, a support mounted in proximity to said grinding element, a fixture carried by said support, adapted to receive and bend said strip of metal, means for bringing said fixture and the grinding element into grinding relation with said strip in an inclined position to the grinding element to cause a grinding action on the edge of the bent strip of metal, means for intermittently moving the strip with respect to the grinding element, whereby successive scallops may be ground on the edge of the strip, and means for actuating the grinding element.

13. A machine for grinding a series of scallops in a flexible blade, comprising a grinding wheel, a support adjacent the wheel upon which a blade may be mounted, means carried by the support for holding the portion adjacent the wheel bowed toward the grinding surface of the wheel and in an inclined position, and means for engaging and disengaging the blade and grinding wheel and for imparting a predetermined lateral movement to the blade while the same is out of engagement with the wheel, whereby successive bowed portions may be engaged by the grinding wheel to grind the scallops.

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