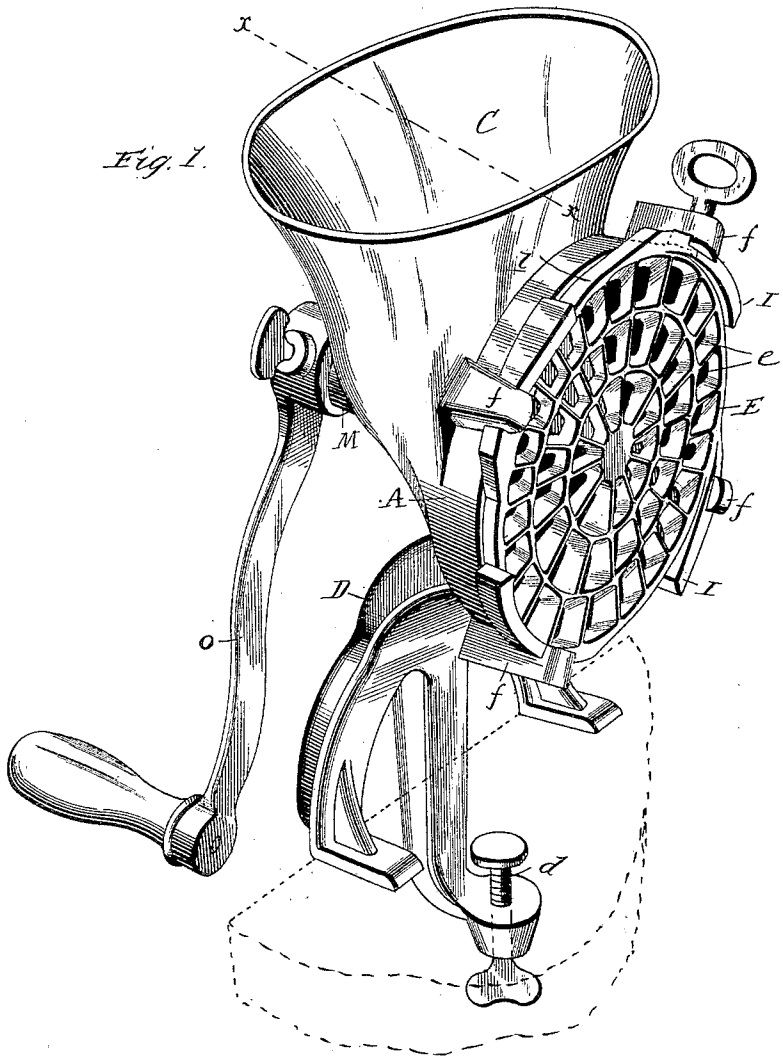
(Model.) 4 Sheets—Sheet 1.

E. BALTZLEY.

CULINARY GRATER AND CHOPPER.

No. 419,103. Patented Jan. 7, 1890.

Fig. 1.



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(Model.) 4 Sheets—Sheet 2.

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CULINARY GRATER AND CHOPPER.

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Fig. 3.

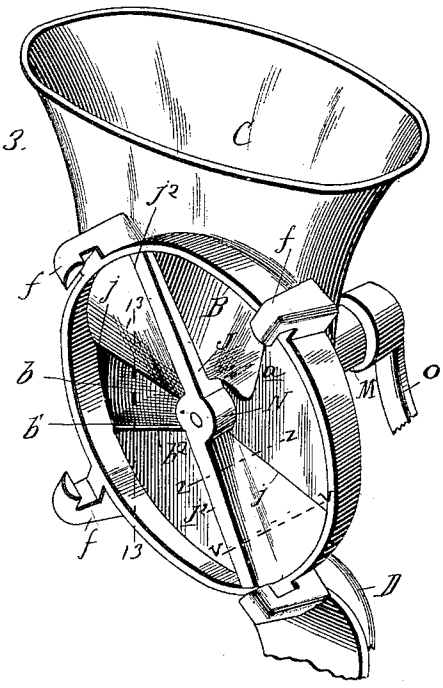
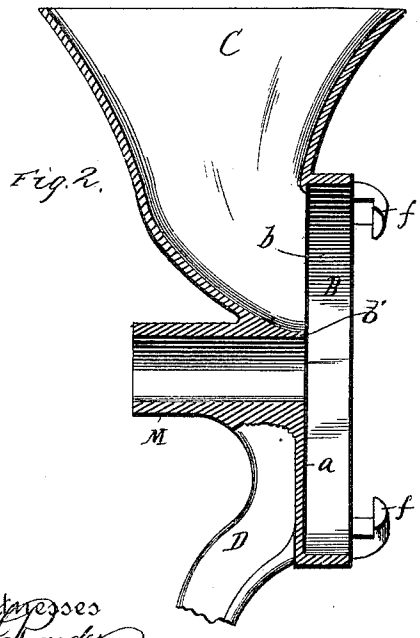


Fig. 2.



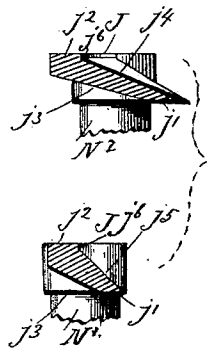


Fig. 6.

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CULINARY GRATER AND CHOPPER.

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Fig. 4.

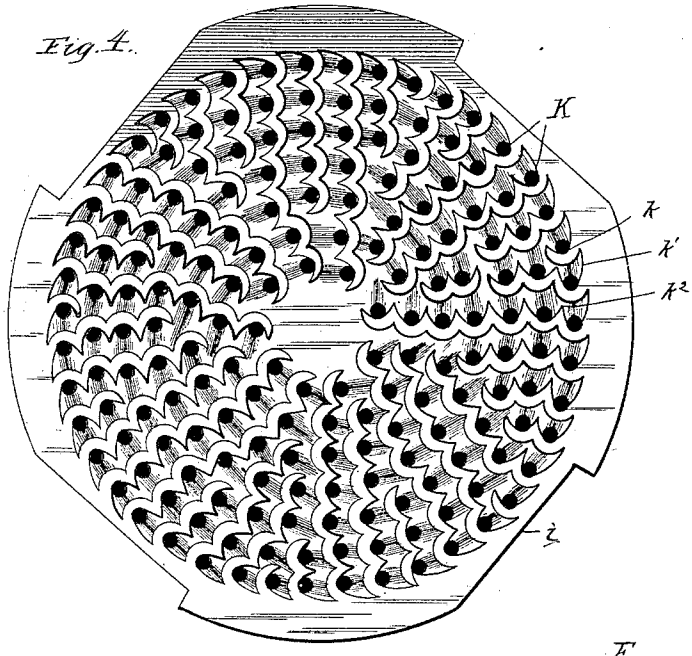


Fig. 5.

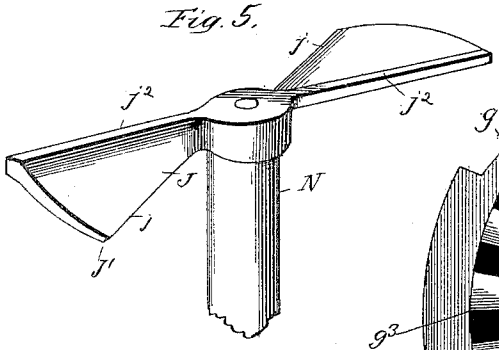


Fig. 7.

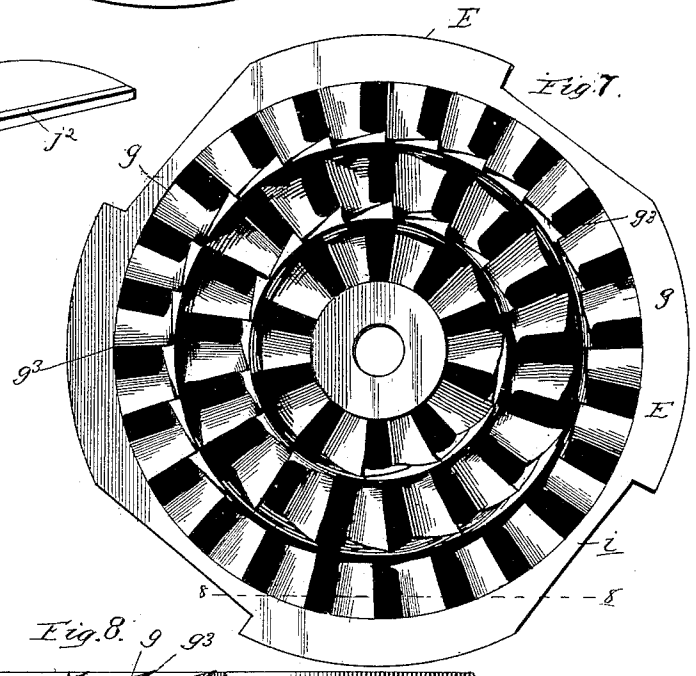
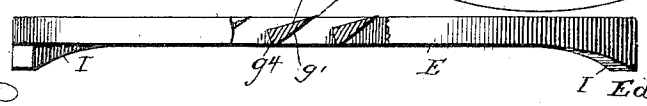


Fig. 8.



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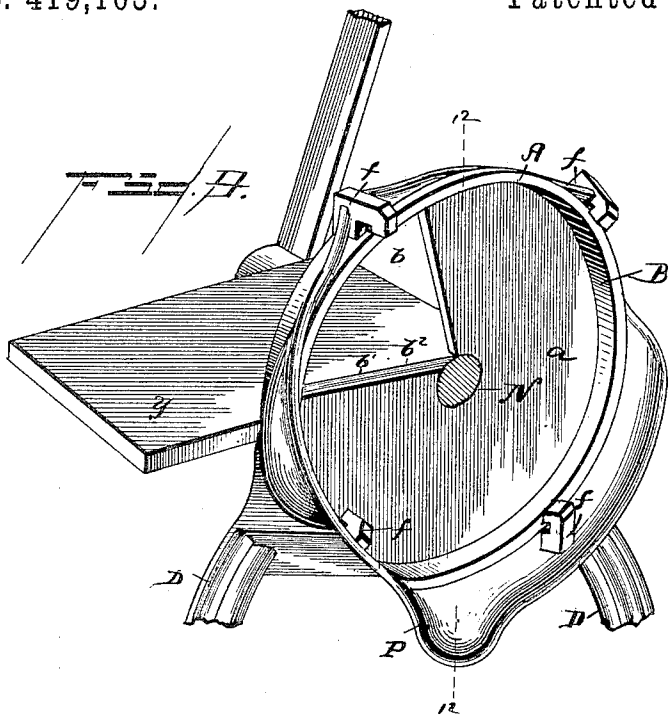


Fig. 11.

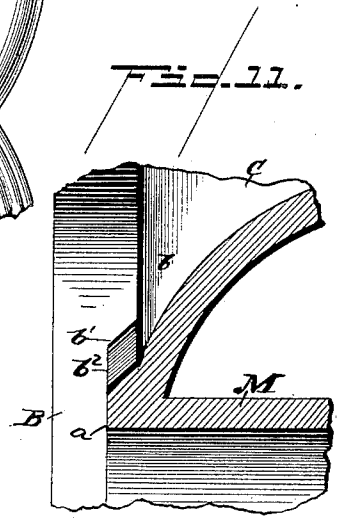


Fig. 10.

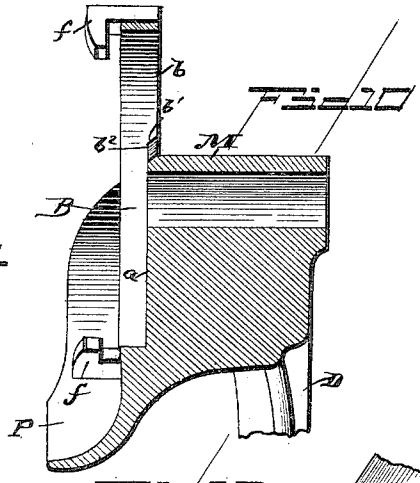


Fig. 12.

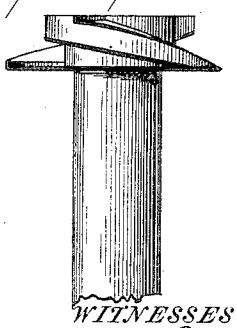
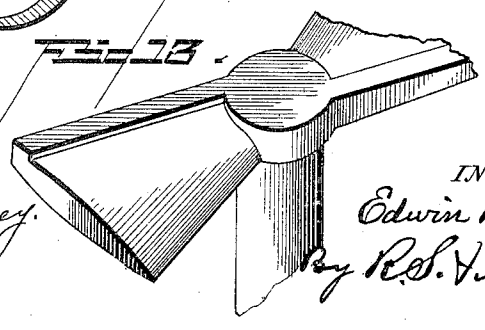


Fig. 13.



WITNESSES

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UNITED STATES PATENT OFFICE.

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CULINARY GRATER AND CHOPPER.

SPECIFICATION forming part of Letters Patent No. 419,103, dated January 7, 1890.

Application filed August 2, 1888. Serial No. 281,742. (Model.)

To all whom it may concern:

Be it known that I, EDWIN BALTZLEY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Culinary Graters and Choppers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to graters, cutters, choppers, and grinders, and has for its object the production of a machine that will grate nearly all substances, cut meats, press the juices and oils from berries, fruits, &c., and perform other useful culinary and industrial functions, and in which the cutter-plate will have egress or discharge openings and flaring cutting-edges or gathering-arms, which will be hereinafter more particularly described and claimed.

A further object of the invention is the provision of a simple, cheap, and efficient machine that will be compact and perform its work in a rapid and satisfactory manner and which can be readily cleaned, the parts being readily accessible and detached and interchanged for the various cutting, grating, and grinding purposes. The compartment for receiving the substance to be treated is extremely shallow, being deep enough only to contain a feed-blade of proper dimensions and a sufficient quantity of the substance to be acted on. By having the said compartment shallow simplifies and improves the method of conveying the substance from the hopper to the cutter-plate, and at the same time all its parts can be reached for a thorough cleansing, and very little substance is needed to begin or end an operation. The compartment receives the substance through a feed-opening formed through the rear wall of the said compartment, and preferably by way of a hopper, which I provide to hold a quantity of substance to be acted on and to guide it to the said opening, thereby forming a vertical gravity-feedway. The substance is forced by a feed-blade through a cutting-plate which closes the outer end of the compartment. This feed-blade crowds the substance onto the cutting-edges of the cutter-plate, producing a disintegration or separation of the substance into small particles. The lower side of the opening to the compartment terminates in a cutter-bar having a cutting-edge, and the feed-blade has a corresponding cutting-edge on its rear side. These two cutting-edges operate to cut or divide the meat at the instant it is taken up by the feed-blade from that which remains in the hopper, and permits it to be carried forward to the cutting-plate without restraint, which would not be the case if the pieces were not thus severed and were too large to be taken into the compartment at once.

The improvement further consists of the novel features and the peculiar construction and combination of the parts, which hereinafter will be more fully described and claimed, and shown in the annexed drawings, in which—

Figure 1 is a front perspective of a machine embodying my invention; Fig. 2, a vertical section on the line X X of Fig. 1, the cutting-plate, the feeder, and the crank being removed; Fig. 3, a perspective view of the upper portion of the machine, showing the feeder in position; Fig. 4, a plan view of the cutting-plate; Fig. 5, a perspective view of the feeder. Fig. 6 are detail sectional views of the feeder on the lines Z Z and V V of Fig. 3; Fig. 7, a plan view of a cutting-plate; Fig. 8, a cross-section on the line 8 8 of Fig. 7; Fig. 9, a perspective view of a modification; Fig. 10, a vertical section on the line 12 12 of Fig. 9; Fig. 11, a detail section on the line 13 13 of Fig. 3, on an enlarged scale. Figs. 12 and 13 show the feeder having a shoulder along the rear edge of the blade or blades.

The frame A, having the shallow compartment B in its face, is provided with suitable means for securing it to a support—such as a table, shelf, &c. The rear wall *a* of the compartment B is provided with the feed-opening *b*, through which the substance to be reduced has ingress to the compartment. The lower

edge of the opening b is provided with a cutter-bar b', which forms a cutting-edge b^2 in the plane of the bottom of the chamber. This cutter-bar may be made as a separate piece and set in, or it may be cast integral with the frame or casing, as shown. In cross-section the cutter-bar may have its upper surface at right angles to the plane of the rear wall a, or at an acute or obtuse angle to said wall; but as a matter of preference it is desired to have it incline to the plane of the wall a. The cutting-edge b^2 is preferably arranged tangentially to the center of the compartment to obtain a draw or shear cut, and may incline to or from the said center of the compartment to cut toward or away from the said center, as desired. The hopper C inclines to the cutter-bar b' to feed the substance vertically to the compartment B, which is constructed as shallow as possible consistent with the necessary strength to the feed-blade that works in it. A hopper, however, is not essential to my invention, as by providing a feed-board or ledge Y, as shown in Fig. 9, at the outside edge of the opening b the substance may be fed to the feed-blade by hand; but I prefer to provide a hopper to hold the substance to be operated upon in supply quantity and to direct it by force of gravity into the compartment B. The object of a shallow compartment is to get the substance to be operated upon directly from the hopper C to the cutting-plate E, and also to keep as little substance in the machine at once as possible. If the compartment were deep and extended into a long tube, some mechanism would be necessary to convey the substance from the hopper to the cutting-plate—such as a shallow screw operating in conjunction with conveying or friction sides of the tubular chamber; but with my shallow compartment it is only necessary to incline a narrow feed-blade from front to rear to take the substance directly from the hopper and force or wedge it forward to and onto the cutting-edges of the cutting-plate. The compartment B is provided with as small a feed-opening b as possible consistent with a sufficient aperture to admit large pieces of meat or other substance at once. The object of this is to provide as continuous a back wall as possible to the compartment, so that the least possible substance remaining in it may be acted on until it is all passed through the cutting-plate.

Any suitable means may be employed to fasten the cutting-plate to the frame, but I prefer the ordinary locking-studs f shown in the drawings.

In Fig. 7, also in Fig. 1, is shown a cutter-plate constructed on the principle of my former invention in graters, Patent No. 378,127—that is, with their cutting-edges flush with the body of the cutter and beveled from front to rear. The upper bevel g of the portion of the cutting-plate between the openings depresses the body of the grater in front of the cutting-edges g^3, and the under bevel g' helps to give sharpness to the cutting-edge, while it, together with the bevel g^4, gives more ready clearance for the substance after it has been cut or grated. The greater these nether or under bevels the better, for they not only make the clearance more ready and thorough, but render the cutting-plate easy to clean. The discharge-openings are arranged radial, so as secure the greatest number of cutting-edges and the largest discharge capacity possible within the given space. The plate shown in Figs. 1 and 7 has large discharge-openings, especially designed for meats and herbs. The large openings, together with the nether or under bevels, render the plate easy to clean.

In Fig. 4 is shown another cutter-plate—an improvement on the one shown in Figs. 1 and 7—in which the openings K are circular in form. It will be observed that the cutting-edges k in the rear of the egress or discharge openings K partially surround the said openings and flare outwardly to form, so to speak, gathering edges, arms, or shoulders k' on each side thereof. The cutting-edges intersect and form the points k^2, which divide the substance before the same is crowded in between the said flaring shoulders k'. As the substance is forced in between the said edges, arms, or shoulders k' it is gradually compacted and cut. This form of plate is especially designed for grating soft and yielding substances, such as corn. For harder substances—such as almonds—the cutting-edges k will not extend forward to such a degree.

While I have shown the form of egress or discharge openings round, I do not limit myself to this form, as it is evident that it may be varied as required, the essential features being the depressed portions opposite or in the rear of the cutting-edges and the flaring cutting-edges or gathering-arms on each side of the said openings.

Cams I are arranged on the front or discharge side of the peripheral ring of the cutter-plate. The outside of said ring is notched at four equal intervals, so as to permit the cutting-plate to slip onto the locking-lugs f, and one corner of each notch is cut away to form another series of peripheral cams i, by means of which the cutter-plate, when turned on the lugs f, automatically adjusts itself in place.

The feed-blade J receives the substance from the hopper, and, conveying it to the cutting-plate, forces it upon the cutting-edges thereof, from whence it is discharged through the egress or discharge openings. Each wing of the feed-blade J is set at an angle to the line of its movement, by means of which the substance is conveyed from the hopper to the cutting plate. The object of so placing it is to gain the compression bevel or angle on its front side for the purpose named and a free clearance-way on its rear or feed side, so that the instant its inner cutting-edge passes the feed-opening b the substance therein may drop into the compartment B in front of the

next descending blade and be carried forward thereby. If the wings of the feed-blade were solid on their inner side, having a bearing dimension against the rear wall of the compartment B equal to the width of the blades, then the substance in the hopper would be prevented from entering the compartment B until their entire width had passed the feed-opening *b*, and thereby limit the feed capacity of the device. The wings of the feed-blade are therefore made as thin as is consistent with the required strength. Each wing of the feed-blade has two cutting-edges, which I shall designate as the "front" and "rear" cutting-edges. The front cutting-edge is the one on the compression side of the feed-blade and works in opposition to the cutting-edges of the cutter-plate. The rear cutting-edge is on the feed side of the feed-blade and cuts in opposition to the cutting-shoulder in the feed-opening. Both cutting-edges are on a tangent, the front one to effect a shear cut with the radial cutting-edges of the cutter-plate, and the rear one to effect a shear cut with the cutting-shoulder in the feed-opening. Each wing of the feed-blade also has bearing-faces $j' j^2$ extending rearwardly from each of its cutting-edges, and they will be designated as the "front" and "rear" bearing-face, respectively.

The object of the bearing-face j^2 is to provide a sufficient body to that part of the feed-blade that forces the meat or other substance onto the cutting-edges of the cutting-plate, so that if any of the said substance from any cause should squeeze between the said face and cutters it (the said bearing-face) would tend to grind the said substance and force it onto the next succeeding cutting-edge. Moreover, if the said bearing-face were a narrow or knife edge it would soon wear, so as to leave a space between it and the cutting-plate.

The compression-face j^4 j^5, Fig. 6, of the wings of the feed-blade I bevel on a decreasing angle of inclination from center to circumference—that is, from shaft to outer ends, as shown in Fig. 5, and also in the two sections N′ N², Fig. 6. The blade is in section near the shaft in N′ and out toward the end in N². The end or widest part of the blade is shown in Fig. 5, where the angle of inclination is least. The purpose of this is to direct the substance to be grated or cut from the center to the circumference, where the greater number of cutting-edges are, whereby the speed of cutting is greatly accelerated, and for the additional purpose of crowding the substance against the peripheral wall of the casing, whereby it will be retarded in its forward movement by frictional contact, and the feed-blade advancing on the substance will force it onto the cutting-edges, cut, and force it through the discharge-openings.

I preferably increase the width of the feed-blade gradually from center to circumference, as shown in Figs. 3 and 5, for the purpose of increasing its compression-surfaces, so that its compression capacity will equal the cutting capacity of the cutting-plate throughout the diameter of the latter.

While my invention contemplates using one or more wings to the feed-blade, I prefer two. One decreases cutting-speed too much, and more than two occupy too much room in the compartment B, as they are made sufficiently strong, while two admit of powerful construction and at the same time permit ample feed-room between them for the admission of the substance to be cut from the hopper. In addition to this, two wings adjust themselves to the cutting-plate more perfectly and effect a more rapid and satisfactory cut. They are also more simple and convenient in operation. The two-winged form also admits of varying their width to suit the substance to be acted on. Some substances require very wide compression-surfaces, such as fruits and jellies.

In Figs. 12 and 13 I show the feed-blade with feed-shoulders j^6 raised or formed in its front bearing-face j^2, its front and rear edges preferably coincident with the edges of the bearing-face. This shoulder is provided so as to give greater efficiency to the operation of the feed-blade when oily or fibrous substances are being acted upon. When the compression-face of the feed-blade ends at the bearing-face without this shoulder, there is a tendency of tough fibers to wedge between the blade and cutter-plate. The shoulder obviates this by presenting a right-angled or approximately right-angled resistance to the wedging process of the fibers, and in place thereof collects them against it and crowds them with firm abrupt pressure onto the cutting-edges of the cutter-plate.

The frame is provided with a bearing M, which supports the shaft N, that has the feed-blade on its inner end and the crank O on its outer end.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the frame having a shallow compartment and the apertured discharge-plate, of the herein-described revolving feed-blade made thin and wide and arranged at an angle to its line of motion, the pitch of the blade varying, substantially as and for the purpose described.

2. The combination, with the frame having a shallow compartment and a hopper with its rear wall inclined and terminating in a shoulder or ledge b' and the cutting-edge b^2 and the perforated discharge-plate, of the feeder having a cutting-edge that is adapted to act in opposition to the cutting-edge b^2, a compression-face, and a second cutting-edge to act in opposition to the cutting-edges on the discharge-plate, substantially as described.

3. The combination, with the frame having a shallow compartment and a discharge-plate, of the herein-described feeder having a compression-face j^6, and having a shoulder which

forms a cutting-edge at the front rear edge of the said feeder, substantially as set forth.

4. The combination, with the frame having a compartment and the cutting-plate, of the feed-blade having its front side or compression-face inclined, the inclination being at different angles, substantially as described.

5. The combination, with the frame having a compartment and the cutting-plate, of the feed-blade having its front side or compression-face inclined from its bottom edge, the rapidity of the incline decreasing from the inner to the outer end of the blade, substantially as described.

6. The combination, with the frame having a compartment and the cutting-plate, of the feed-blade having a bearing-face at its rear front edge and having its front side inclined from the said bearing-face at different angles, substantially as described.

7. The combination, with the frame having locking-studs, of the cutting-plate having notches in its edges to correspond with the studs, and having one corner formed by the notches sheared off to form the cams *i*, and having cams I on the rear side of the plate, substantially as and for the purpose described,

8. In a culinary grater and chopper, the herein-described rotary feeder having a blade set at an angle to the plane of its revolution and provided with a shoulder projected from the advance edge and at an angle to the inclined feed-face thereof, substantially as and for the purpose set forth.

9. The herein-described cutting-plate having discharge-openings and having the cutting-edges in the rear of the said openings extended forward and flaring, substantially as and for the purpose described.

10. The herein-described cutting-plate having discharge-openings and having the cutting-edges in the rear of the discharge-openings flaring and intersecting with one another, substantially as and for the purpose described.

11. The combination, with the frame having a shallow compartment and the discharge-plate, of the revolving feed-blade gradually increasing in width from its inner to its outer end and having its front side inclined to the line of motion of the said blade, the inclination gradually decreasing from the inner to the outer end of the blade, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN BALTZLEY.

Witnesses:

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N. DUMONT.