(No Model.) 3 Sheets—Sheet 1.

S. K. WHITE.

MACHINE FOR CUTTING GRAIN.

No. 286,980. Patented Oct. 16, 1883.

Fig. 1.

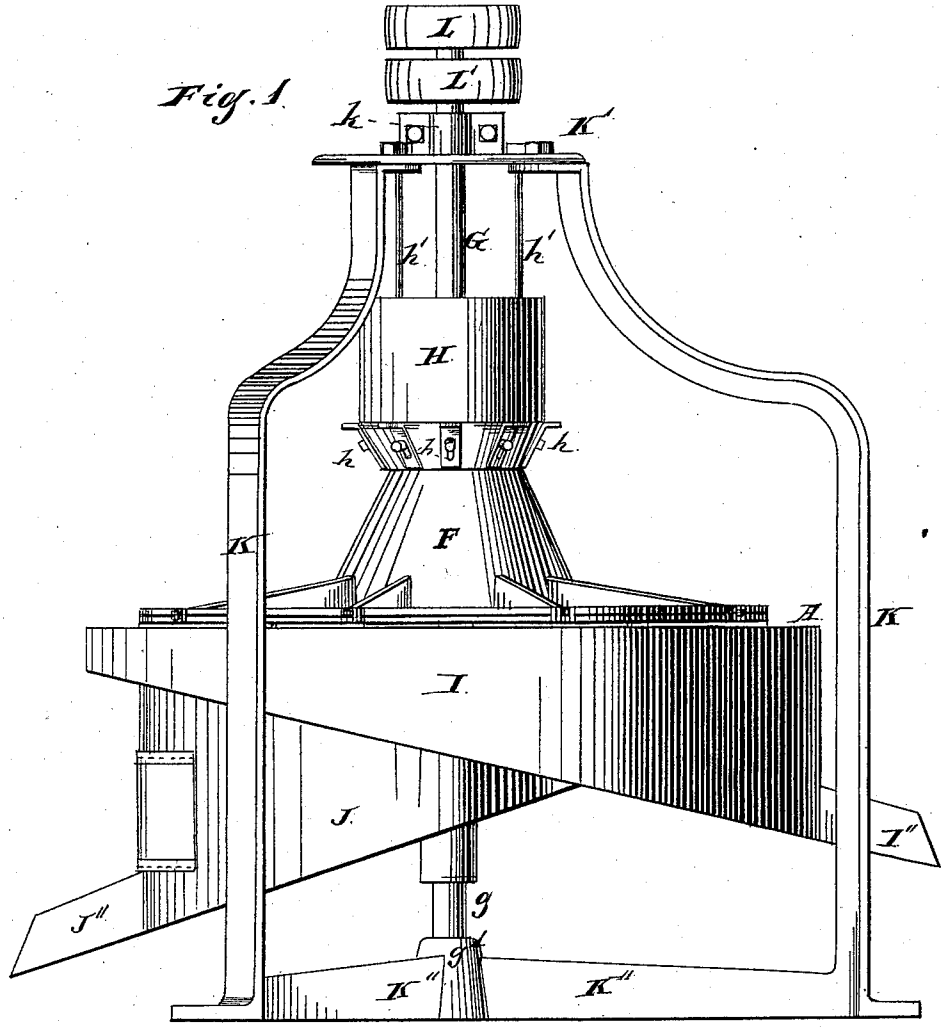


Fig. 1a

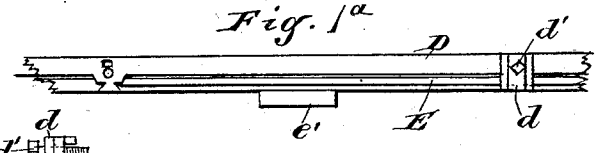


Fig. 1b

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Fig. 2.

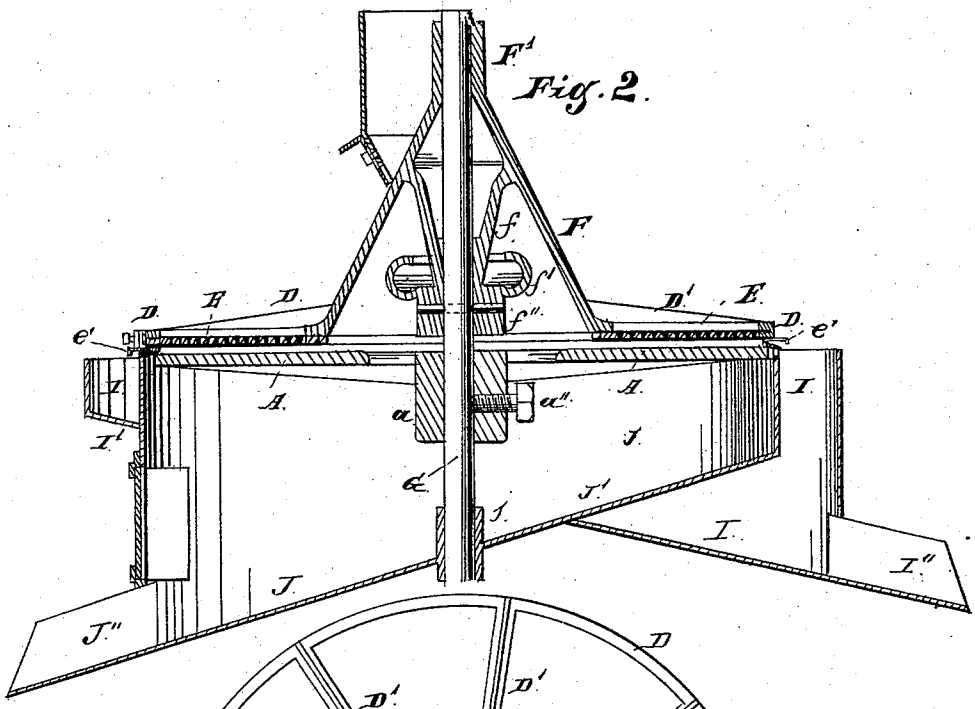
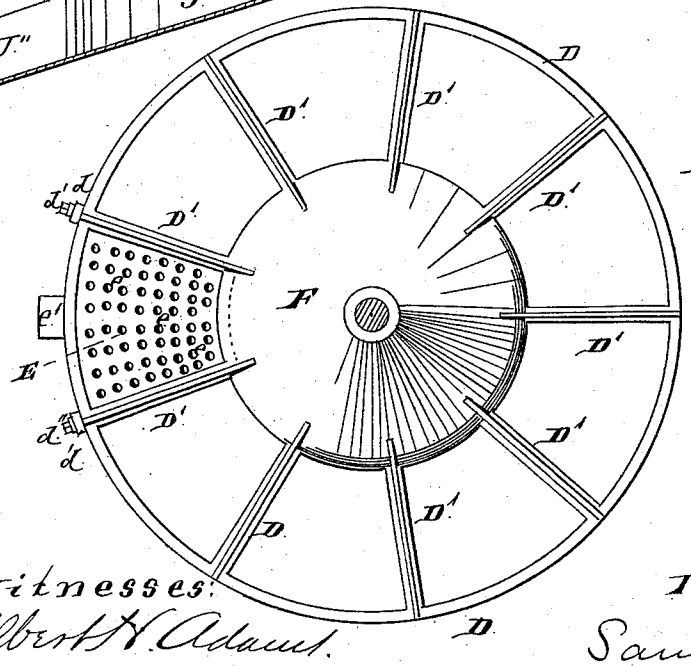


Fig. 3.



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Fig. 4.

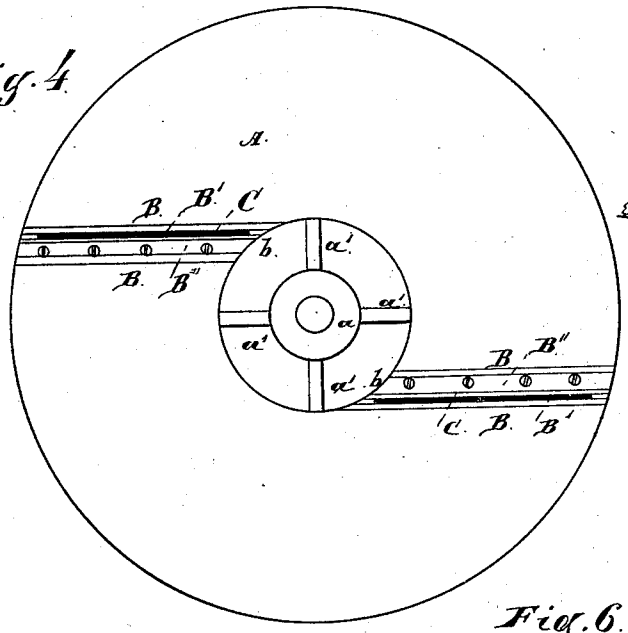


Fig. 5.

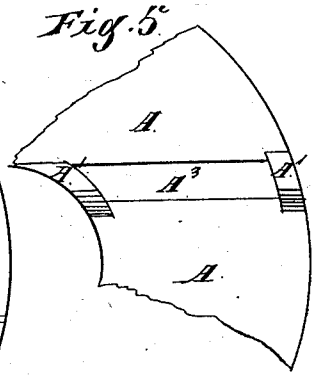


Fig. 6.

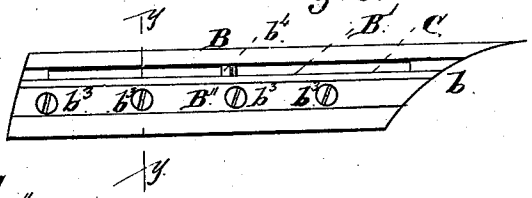


Fig. 8.

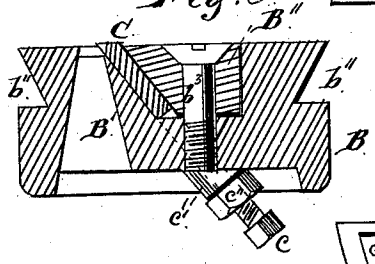


Fig. 7.

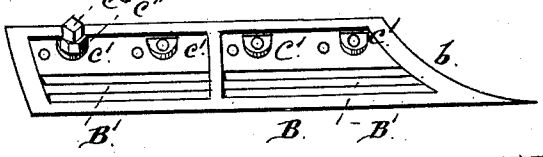
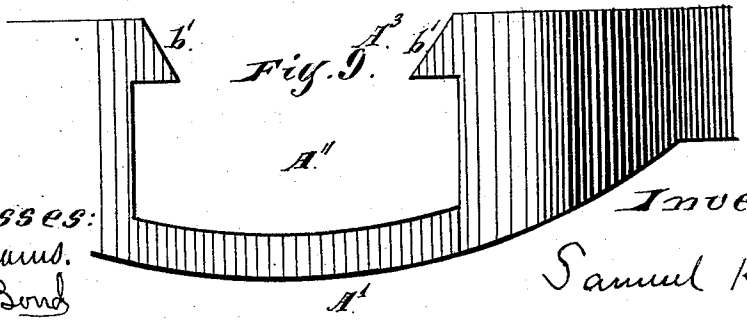


Fig. 9.



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UNITED STATES PATENT OFFICE.

SAMUEL K. WHITE, OF CHICAGO, ILLINOIS, ASSIGNOR TO EDWARD P. HATCH, OF SAME PLACE.

MACHINE FOR CUTTING GRAIN.

SPECIFICATION forming part of Letters Patent No. 286,980, dated October 16, 1883.

Application filed November 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL K. WHITE, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in a Machine for Cutting Grain, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation. Figs. 1ª and 1ᵇ are detail views of the devices for locking the sections of the feed-plate in position; Fig. 2, a detail in section, showing the feeding and cutting plates or disks and the receptacles; Fig. 3, a top or plan view of the feeding plate or disk; Fig. 4, a top or plan view of the cutting disk or plate; Fig. 5, a detail of the under side of the cutting disk or plate at the knife-opening; Figs. 6 and 7, a top and under view, respectively, of the knife-frame and knife; Fig. 8, a detail enlarged and in section on line *y y* of Fig. 6; Fig. 9, a section, being an edge view of the cutting disk or plate at the knife-opening.

This invention relates to certain improvements in a grain-cutting machine for which Letters Patent No. 251,012 were granted to Andrew Wemple, dated December 13, 1881, and has for its objects to improve the cutting plate or disk in reference to the manner of inserting, withdrawing, and adjusting the knife, and to improve the construction and operation of the delivery or feeding devices; and it consists in the several devices and combinations of devices hereinafter described, and pointed out in the claims.

In the drawings, A represents the cutting disk or plate, which may be made of steel or other suitable material that will withstand the strain and effects of use, which plate may be varied in diameter to suit machines of different sizes and the capacity which it is desired such machines shall have. This disk or plate is formed of an annular rim joined to a center or hub, *a*, by arms *a'*, and its upper face is left flat or in a level plane, and its under side may be strengthened by ribs or flanges, if so desired; or it may be formed thicker at the center than at the periphery, or formed in some other suitable manner, to produce the necessary strength. As shown, two knives are to be used with this disk or plate, and for that purpose two openings, A^3, are provided, as shown in Figs. 4 and 5. Each opening extends entirely across the plate, but the plate, at each end of the opening, has a downward flange or lip, A′, forming an opening, A″, as shown in Fig. 9. Although two knives are shown, one could be used and do the work of cutting, or more than two, if so desired. As shown, the openings are arranged in parallel lines on opposite sides of the plate, and also on opposite sides of the center opening, as shown in Fig. 4.

B is a block or head, of steel or other suitable material, of a length to correspond to the width of the rim or ring forming the body of the cutting plate or disk A, at the point where the openings A^3 are located, and one end, *b*, of this head or block is cut out or formed so as to correspond with the circle at the center of the disk or plate, while its opposite end is made to conform to the periphery or outer edge of the plate or disk when the block is inserted. This block, on one side, has an opening, B′, wider at the bottom than the top, as shown in Fig. 8, which opening extends nearly the entire length of the head or block, as shown in Fig. 7, and, as shown, a stiffening bar or rim, b^4, is provided transversely at the center of the head or block. The upper face of this head or block is provided with a groove or recess, to receive a clamping-strip, B″, one edge of which is inclined, so that when in position an inclined slot is formed between this inclined face and the adjacent inclined face of the head or block B. Each side of this head or block, at the upper end, is provided with an inclined slot or opening, *b″*, which receives a corresponding-shaped flange or rib, *b′*, formed by the edges of the opening A^3 in the plate or disk A, as shown in Fig. 9, so that when the block is slipped into position the openings *b″* and the ribs or flanges *b′* will interlock and hold the head or block against vertical movement, and the opening A″ in the flange A′ is for the purpose of permitting of the insertion of the head or block B.

C represents the cutting blade or knife, made of a piece of steel or other suitable material,

and of such length as to extend across or nearly across the head or block longitudinally. This knife C is inserted in the inclined opening between the inclined faces of the strip B″ and the head or block B, as shown in Fig. 8, and is held in position by forcing the strip B″ down by set-screws b^3 or other suitable means, and the projection of the cutting-edge of the knife above the surface of the block is adjusted by means of set-screws *c*, which pass through bosses *c′* on the under face of the head or block, to have their inner ends engage the lower edge of the knife C, as shown in Figs. 7 and 8; and these set-screws *c* are locked against further movement when the desired adjustment is reached by suitably-locking nuts *c″*, which are made to engage with the end of the respective bosses *c′*.

In putting the parts together the strip B″ is to be loosened sufficiently to allow of the insertion of the knife C, which drops into the opening between the inclined face of the strip B″ and the coinciding face of the block B, with its lower edge resting on the ends of the set-screws *c*, by means of which it is raised or lowered, to give the proper projection to the cutting-edge, and when adjusted the knife is locked firmly in position by setting down the strip B″ through the set-screws b^3, or otherwise. The head or block is slipped into the opening therefor in the plate A, bringing its upper face in line with the upper face of the plate and its ends in line with the periphery of the plate and the opening at the center thereof, and when in place it can be locked by passing a screw between its edge and the edge of the plate A, one half of the opening for such screw being in the edge of the plate and the other in the edge of the head; or it could be locked in place in some other suitable manner. This construction enables the knife to be readily and quickly adjusted, to give the proper projection above the surface of the plate, and it also allows of a ready withdrawal of the head and removal of the knife therefrom, for the purpose of sharpening or replacing the knife in case of breakage, or for other cause, and by using this head a free discharge of cut material is provided through the opening B′, which, being wider at the bottom, will not become filled or clogged up, but must remain open under all ordinary conditions. The ledge A′ furnishes a rest for the head B at each end, and also strengthens the plate at the point where the knife is inserted, preventing warping or springing of the plate in use.

D represents a ring or rim of metal having inwardly-projecting arms or spokes D′, connecting the ring or rim with a center, and these spokes or arms D′ are each provided on both sides with a V-shaped groove, and are somewhat wider than the thickness of the ring or rim, so as to bring the V-shaped grooves below the under face of the ring.

E represents a plate of metal, corresponding in size to the size of the opening between the arms D′ and the ring D and its center, and having its edges of a V shape, to fit the V-shaped grooves in the arms, and having its ends formed on a curve corresponding to the curve of he ring and its center. As many of these plates are to be used as there are openings formed by the arms D′, and when inserted in the spaces they form a feeding-disk in connection with the ring and its arms, by means of which the material to be cut is brought into position for the knives or cutters to operate thereon, the openings *e* being of sufficient dimensions to readily pass the material to be cut. These plates are each provided with a finger or hand piece, *e′*, by which they can be withdrawn for cleaning or repairs, and the plates are held in position by means of locking-pieces *d* and set-bolts *d′*, the set-bolts being screw-threaded and entering screw-threaded openings in the ring or rim. The locking-pieces *d* are located one in line with each arm D′, and they are so formed as to project, when in locking position, over the edge of the plate on each side of the arm, and to remove the plate the set-bolt *d′* is loosened and the upper end of the locking-piece, turned around sidewise, leaving a clear space for the withdrawal of the plate on one side, and by turning this end so that it comes on the opposite side of the arm the plate on that side can be removed, it being understood, of course, that the two locking-pieces for each plate are reversed to clear the plate. By providing the locking devices shown and described for holding the sections of the feeding-plate in position, each section can be independently removed and replaced, and by making a feeding-plate of removable sections the plates can be withdrawn readily and quickly, for the purpose of clearing the feed-openings, or for making other repairs or replacing a plate in case of breakage.

F represents the feeding-cone, down which the material runs to pass on the feeding-plate. As shown in Fig. 2, this cone has a tubular end or extension, F′, for the passage of a driving-shaft for the rotary cutter-plate A, and the cone, with the feeding-plate D D′ E, are supported by a downwardly-projecting bearing, *f*, which enters a ring, *f′*, on a collar, *f″*, which collar is secured to the driving-shaft by a suitable pin or otherwise, so that the shaft is free to revolve without affecting the cone.

G represents the driving-shaft for the rotary cutting-plate, stepped or supported at its lower end, *g*, in a suitable box or bearing, *g′*, and supported at its upper end in a bearing or box, *k*.

H represents the hopper, of a cylindrical form, and having its lower end provided with a number of slides, *h*, which can be raised or lowered, so as to produce a large or small opening between their ends and the face of the cone, as may be desired for the feed. This hopper H is supported from the upper end of the frame-work of the machine by suspending-rods *h′*, the lower ends of which are secured

to the hopper and their upper ends pass through the top plate or piece of the frame, and are provided with adjusting-nuts, by means of which the hopper can be raised or lowered to bring its lower end nearer to or farther away from the face of the cone, to decrease or increase the space at that end between the hopper and the cone to suit the material and the feed. The feed can be regulated by raising and lowering the hopper; but by providing the slides *h* an increase or decrease can to a certain extent be made in the feed without changing the position of the hopper in relation to the cone.

I represents a cylindrical receptacle having an inclined bottom, I′, and discharge-spout, I″, and located around the cutting devices, for the purpose of receiving any uncut material which may be thrown off by the movement of the feeding-plate.

J represents a cylindrical receptacle having an inclined bottom, J′, and a discharge-spout, J″, and located within the receptacle L and around the cutting devices, to receive the cut material. The bottom J′ of this receptacle has a center tube, *j*, which encircles the shaft G, and by means of which the receptacle is supported, the end of the tube resting on a suitable collar or pin on the shaft. This support is such as to allow a free vibratory movement of the receptacles, to facilitate the discharge of the uncut and cut material from each receptacle. As shown, the under face of the ring D has secured thereto a flap of rubber or other suitable material, *i*, which extends over and around the entire periphery of the cutting-plate, and forms a guard against the discharge of the cut material at the periphery of the plate.

K represents uprights or standards, united at their lower ends by cross-pieces K″, which cross-pieces support the bearing *g′* of the shaft G. The standards or uprights K may be formed as shown, or otherwise, and their upper ends, as shown, are joined to a ring, top plate, or piece, K′, by bolts or otherwise, on which top piece is supported the bearing or box *k*, and through which top piece the rods *h′* pass.

L L′ are fast and loose pulleys, for driving the shaft G from a suitable driving mechanism.

The cone F and the feeding-plate D D′ E are to be oscillated by devices similar in construction and arrangement to those shown in Patent No. 251,012, for oscillating the cone and feeding-plate of that machine; or this oscillation can be produced in some other suitable manner.

The receptacles I and J are similar in construction and arrangement to the receptacles shown in said Patent No. 251,012, and are for the same purpose, and the cone F is similar in construction and for the same purpose as the cone of the Patent No. 251,012. It will be understood that this cone, with the arms D′ and ring or rim, could be cast or formed from a single piece; or the cone could be separate and the arms or ring be secured thereto in any suitable manner.

The operation is as follows: The material to be operated upon is placed in the hopper H, the hopper being adjusted by the rods *h′* to suit the material and the feed being regulated by the slides *h*. The material passes down the surface of the cone or taper F onto the sections E of the feeding-plate, and by the oscillating movement of such plate is shaken through the openings *e*, projecting below the under surface of the plate in position for the plates or knives to act and cut or sever such projecting portions, which, with the portion from which it is severed, passes through the openings B′ and falls into the receptacle J, from which it is discharged into the spout J′.

As before stated, a single knife can be used in the cutting-plate, but for rapid cutting two are preferred. The feeding-plate should have sufficient oscillation given to it to stir the material sufficiently to cause the grains or particles to enter the perforation or holes, but such movement should not be so great as to throw off or discharge the material at the periphery.

The advantages of the present construction are: the knife or cutter is removably secured in place on the plate A, and can be readily and quickly removed for sharpening or other purposes, the feeding-plate, made up of sections, and the sections held by the locking-pieces *d*, can be readily and quickly cleaned, all that is necessary to be done being to unloosen the lock, slip the plate out, clean it and replace it; and this construction of feed-plate enables repairs to be made, or a section replaced in case of breakage and by providing an adjustable hopper with secondary feed-slides the feed can be changed to suit the material, oftentimes without changing the position of the hopper in relation to the feed-cone.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the block B, having one side provided with an inclined longitudinal slot, and a cutting-blade, C, secured in said inclined slot to stand in an oblique position relative to the edges of the block, with a plate or disk, A, constructed with a radial opening, A^3, in which the block is secured, the edges of the radial opening and the longitudinal edges of the block engaging each other, substantially as described.

2. The combination of the block B, provided with a longitudinal inclined slot, and a cutting-blade secured in said slot to stand in a fixed oblique position relative to the block, with a plate or disk, A, having a radial opening, A^3, within which the block is removably secured, substantially as described.

3. The combination of the head or block having a longitudinal discharge-opening, B′, and blade-receiving slot arranged adjacent thereto, and a clamping-plate, B″, with the

blade C, secured in said slot, and the disk or plate A, having a radial slot, A^3, in which the head or block is detachably secured.

4. The head or block B, having a discharge-opening, B′, in combination with the knife or blade C and clamping-strip B″, for securing the knife or blade firmly in position, substantially as and for the purposes specified.

5. A head or block, B, having a discharge-opening, B′, in combination with a blade or knife, C, adjusting-screws *c* and b^3, and locking-strip B″, substantially as and for the purposes specified.

6. A rotary cutting plate or disk, A, having an opening, A^3, with beveled edges, and a flange, A′, at each end of the opening, for supporting a head or block carrying a knife, substantially as specified.

7. The plate or disk A, having an opening, A^3, with beveled edges and flanges A′ at each end of the opening, in combination with a head or block, B, having a discharge-opening, B′, knife C, and clamping-strip B″, for securing the knife or cutter to the plate or disk, so as to be removable, substantially as specified.

8. The combination of the ring D, having arms or spokes D′, each provided in its opposite sides with a groove, the radially-sliding perforated plates E, having their edges adapted to the grooves in the plate, the set-screws *d*′, and rotating locking-plates *d*, substantially as described.

9. The combination, with the perforated feeding and cutting plates, of an oscillating cone, F, arranged above the feeding-plate, and a hopper suspended over the cone, and having an annular lower end, provided with a series of adjustable slides, *h*, substantially as described.

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