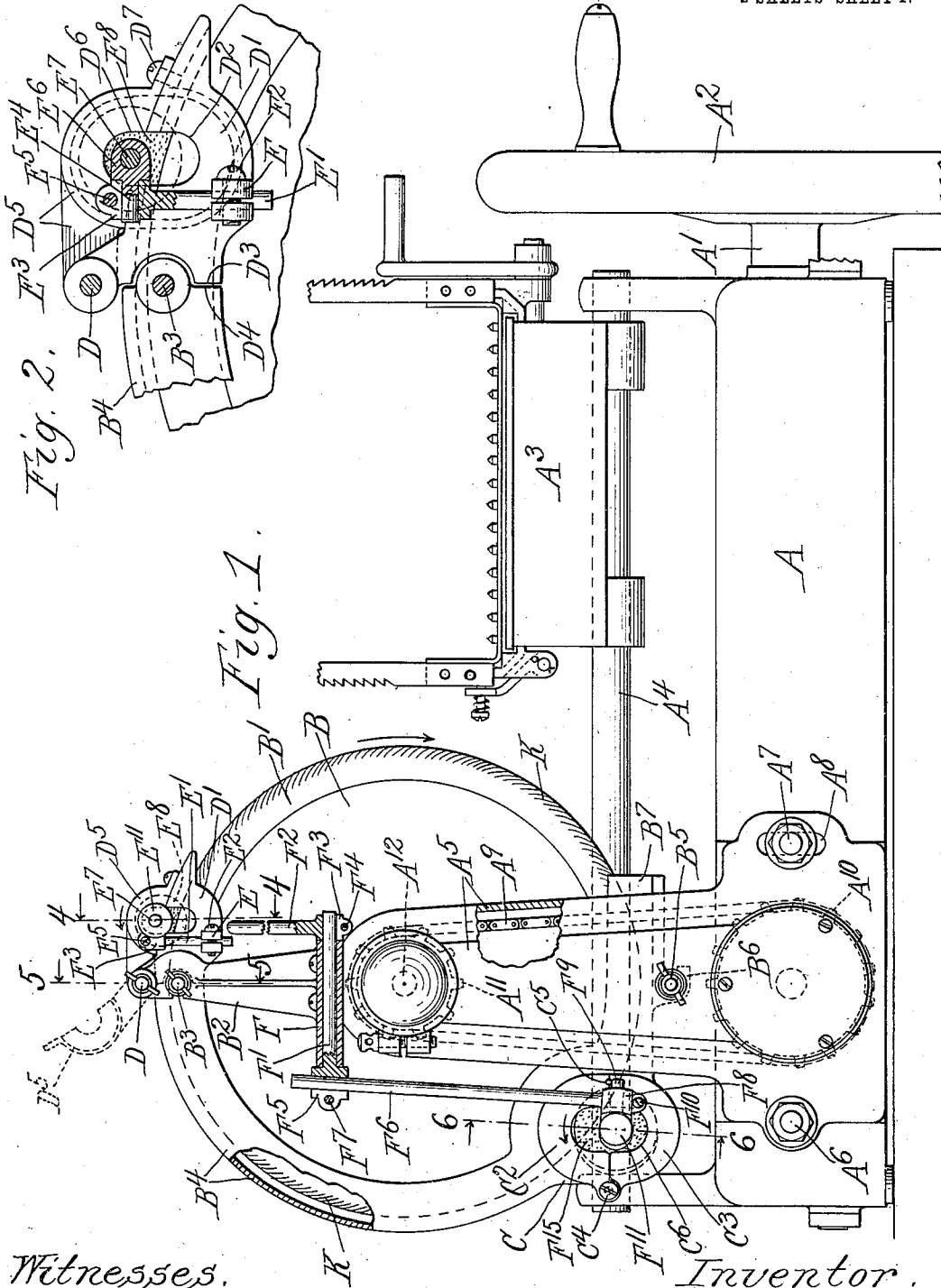


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SHARPENING DEVICE FOR ROTARY CUTTERS.
APPLICATION FILED APR. 15, 1912.

1,060,916.

Patented May 6, 1913.

2 SHEETS—SHEET 1.



Witnesses.
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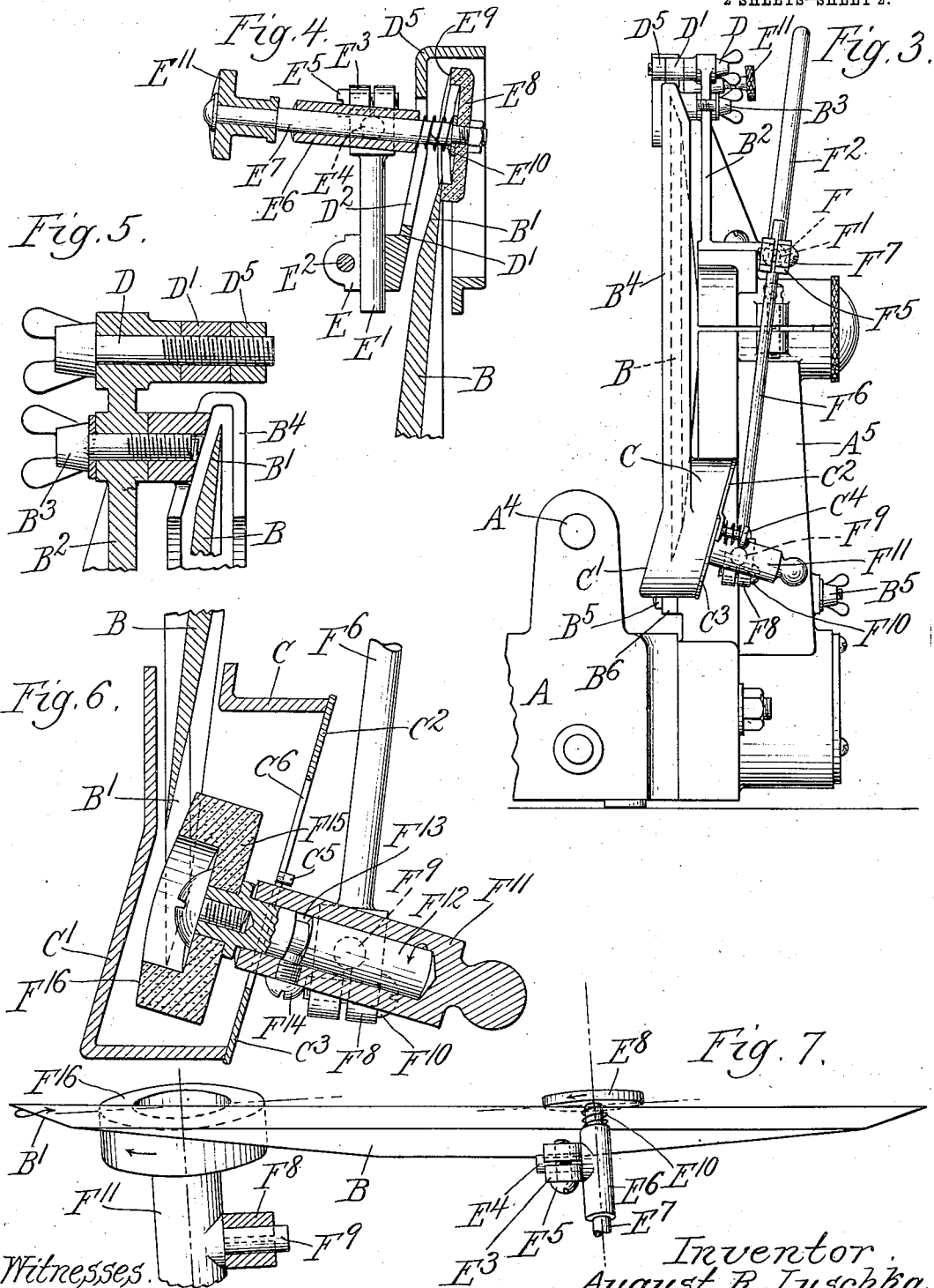
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UNITED STATES PATENT OFFICE.

AUGUST R. LUSCHKA, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN SLICING MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW YORK.

SHARPENING DEVICE FOR ROTARY CUTTERS.

1,060,916.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed April 15, 1912. Serial No. 690,696.

To all whom it may concern:

Be it known that I, AUGUST R. LUSCHKA, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Sharpening Devices for Rotary Cutters, of which the following is a specification.

My invention relates to improvements in sharpening devices for rotary cutters and is illustrated diagrammatically in one form in the accompanying drawings, wherein—

Figure 1 is a side elevation with parts in section; Fig. 2, a detail side elevation of one of the grinding means and housing therefor; Fig. 3, a detail end view looking toward the right on Fig. 1; Fig. 4, a section along the line 4—4 of Fig. 1; Fig. 5, a section along the line 5—5 of Fig. 1; Fig. 6, a section along the line 6—6 of Fig. 1; Fig. 7, a detail diagrammatic plan view of the cutter and grinding wheels.

Like parts are indicated by like letters throughout the several figures.

The usual slicing machine base A in which is mounted the drive shaft A¹ carrying the crank wheel A² supports the reciprocating table A³ on the guide rail A⁴. The vertical chain housing and knife support A⁵ is pivotally mounted on the cap-screw A⁶ on the frame A and is locked in position by the bolt or cap-screw A⁷ in slidable engagement with the curved slot A⁸. The drive chain A⁹ which is inclosed within the housing A⁵ rides upon a sprocket A¹⁰ driven from the drive shaft A¹ by any suitable means and drives the sprocket A¹¹ on the shaft A¹² which shaft is rotatably mounted in the upper end of the housing A⁵.

The concavo-convex rotary cutter or knife B is rigidly mounted on the shaft A¹² and has peripherally disposed the truncated conical knife surface B¹ terminating in a peripherally disposed cutting edge. The vertical arm or support B² projects upwardly from the top of the housing A⁵ and carries pivotally mounted thereon and held in position by the thumbscrew B³ the grooved knife guard B⁴ which conforms substantially in curvature to the knife and is held rigidly in position at its lower end against the housing A⁵ by the thumbscrew

B⁵ engaging the hook B⁶. The knife guard B⁴ is provided at its lower end with the horizontal projection B⁷ which extends forwardly from the knife toward the reciprocating carriage B⁸.

The knife guard B⁴ has on its lower side adjacent the housing A⁵ the downwardly and outwardly disposed and extended pocket C having an inclined flat wall C¹ projecting outwardly and away from the concave side of the knife. This pocket is open toward the convex side of the knife and the opening is closed by the two-part portion or door C² C³, the two-parts being pivoted at C⁴ on the wall C¹ and limited in their motion together by the pin C⁵ in the wall C¹. These parts C² C³ are slotted so as to form the oval opening C⁶ into the interior of the pocket when they are brought together.

The vertical arm or support B² which projects upwardly from the top of the housing A⁵ is provided at its uppermost extremity with the thumbscrew D upon which is pivoted a shield D¹ slotted at D² and having a flat side D³ in opposition to a flat end D⁴ on the knife guard B⁴. This shield forms in effect a continuation of the slotted knife guard but has an open side at the front of the knife. The cap D⁵ which is pivotally mounted on the thumbscrew D is slotted at D⁶ in continuation of the slot D² and closes the open upper portion of the guard or shield D¹. The set-screw D⁷ in the shield D¹ serves to hold the cap in fixed position in such manner that the shield and cap may be together swung back from the knife or the cap alone may be swung back leaving the shield in position.

The shield D¹ carries the outwardly projecting split lug E in which is slidably and rotatably mounted the rod E¹ adapted to be clamped by the screw E². The rod E¹ terminates in the square split head E³ in which is held the lug E⁴ clamped in position by the screw E⁵ and carrying the sleeve E⁶. The shaft E⁷ is rotatably and slidably mounted in the sleeve E⁶ and carries at one end rigidly mounted thereon the cupped grinding wheel E⁸ having the convex grinding surface E⁹ in opposition to the smooth front edge of the knife. The helical spring E¹⁰ surrounds a shaft E⁷ and is interposed be-

tween the grinding cup and the sleeve to yieldingly force the grinding cup or wheel away from the knife. The handle E¹¹ which is rotatably mounted on the other end of the shaft E⁷ may be used to manually force the cupped grinding wheel toward the knife against the pressure of the spring.

The grinding wheel E⁸ is inclosed within the shield D¹ and cap D⁵ and therefore is completely protected from the outside and it together with its point of contact with the cutter is guarded from any outside interference.

The slot in the shield and cap is provided in order to permit an adjustment of the holding and supporting means for the grinder and in order to permit the grinder to be positioned accurately with respect to the knife without in any way interfering or being interfered with by the housing, shield, cap, etc.

The housing A⁵ carries at its top the bearing sleeve F in which is rotatably mounted the shaft F¹. The lever F² is provided at its lower end with the square split head F³ adapted to be clamped on the shaft F¹ by means of the screw F⁴. This lever projects upwardly to a point adjacent the member E¹¹. The shaft F¹ has at its other end the square split head F⁵ in which is rotatably and slidably mounted the rod F⁶ adapted to be clamped in position by the screw F⁷. The rod F⁶ terminates at its lower end in the split head F⁸ in which is rotatably held the lug F⁹ clamped in position by the screw F¹⁰. The lug F⁹ carries the sleeve F¹¹ in which is rotatably mounted the shaft F¹². The shaft F¹² is provided with the annular groove F¹³ which is slidably engaged by the set-screw F¹⁴ in the wall of the sleeve F¹¹. The cupped grinding wheel F¹⁵ which is provided with the convex cutting surface F¹⁶ in opposition to the conical surface B¹ on the knife is rigidly mounted on the shaft F¹².

The grinding wheel F¹⁵ is located within the pocket C¹ and the supports for the grinding wheel enter the pocket through the oval opening C⁶. This grinding wheel and its supports are so disposed that it tends, when acted on freely by the force of gravity, to swing away from the knife and therefore this grinding wheel is normally completely out of contact with the knife but located within and inclosed and protected by the pocket which forms in effect a continuation of or annex to the knife housing.

I have shown the axis of rotation of each of the grinding wheels inclined outwardly from the knife and also inclined backwardly toward the direction of rotation of the knife in such manner that they are neither perpendicular to the surface to be ground nor parallel with the axis of rotation of the knife. The result of this is that but one side of the grinding cup contacts the knife

and the rotation of the knife or cutter when in engagement with the grinding cup tends to cause the cup to rotate. However, the rotation of these two parts causes such a lateral displacement with respect one to the other that the edges of the knife are ground and that the grinding surfaces assume a convex shape.

It will be understood that the larger grinding wheel in engagement with the conical portion of the knife is the wheel which does the grinding for sharpening purposes and the function of the smaller grinding wheel is merely to take off the bur or feathered edge which is, of course, formed by the grinding point of the conical portion of the knife. The two grinding wheels, of course, are absolutely independent in their operation although the operator might by gripping them both together bring them in unison into operative relation with the knife. Although the work may equally well be done by first grinding down the outer conical surface and then bringing the smaller wheel into opposition to the flat surface to take off the bur, it will be noted that the supports of both of the grinding wheels are such they have a universal annular adjustment so that the position of the axis of rotation of the grinding wheel may be set by the operator wherever desired and the setting which I have shown, while for a knife the contour of which is the same as the knife I have shown in my preferred setting, still for other knives or even for the same knife when different shaped cutting edges are desired, the setting might be materially altered without departing in any sense from the spirit of my invention. It will be obvious, therefore, that many changes might be made in the size, shape and arrangements of parts and in the setting and adjusting of the different features without departing materially from the spirit of my invention and I wish, therefore, that my drawings be regarded as in a sense diagrammatic.

In Fig. 1 the wheel B is shown with the curved spiral lines K curved spirally outward in a direction the same as the direction of rotation. These are meant merely as a diagrammatic showing of the way in which the knife is ground. An inspection of the knife when ground by my device shows these spiral markings on either side of it, the marking on each side pointing forward as indicated. This is the result of the grinding action and results in giving the knife what is in effect a microscopic saw tooth edge which adds very greatly to the efficiency of the cutting operation. This result is obtained because of the arrangement of the grinding wheels wherein they rotate in opposite directions from the cutting wheel and it is necessary in order to produce this result that each of them rotate in the opposite

site direction. If one rotate in the opposite direction and the other in the same direction, as in some of the prior art devices, or if they both rotate in the opposite direction, then this result is not obtained, but it is only when they rotate in such a direction as indicated, as to give these forwardly pointing grooves, which grooves terminate in microscopic saw teeth that the best cutting result is obtained. This result is obtained, it will be observed, by causing the cutting wheel to come in contact with the grinding wheel on the back side of the grinding wheel, but at a point inside of the axis of rotation thereof and it is this arrangement which produces the desired result. In other words, in order to produce a maximum cutting efficiency, it is necessary that the grinding action take place along lines inclined backwardly from the cutting edge, thus forming on both sides of the cutting edge these almost microscopic lines which terminate in forwardly overhanging saw teeth to facilitate the cutting. It will be noted that these lines do not extend very far in from the cutting edge, and this is because the grinders are not expected to grind off the entire bevel of the knife, but merely to keep sharp the cutting edge, since the truing up of the knife by means of grinding down the bevel, which must be done occasionally, as the knife wears out, must be done by special movement, since it is too heavy a disk for the relatively small grinding wheels indicated. I have shown a larger cupped grinding wheel as having a slightly convexed surface, but it is of course evident that this is by no means essential and depends entirely upon the setting of the wheel with respect to the cutting edge of the knife, and all that is required in either case is that the knife grind the wheel in the lines as indicated.

The use and operation of my invention are as follows:—When a rotary cutter is to be sharpened this must be done by first grinding down the truncated conical cutting edge or surface but this grinding down will have to be done by the rotation of the cutter and the pressure of the grinding wheel upon the unsupported cutting edge will cause a bur to form upon the other side, and this bur must be ground off before the cutter will have a sharp cutting edge. In sharpening a cutter, therefore, the operator first seizes the swinging lever in his hand and pulls it out. This presses the large grinding wheel against the conical cutting edge and causes it to be ground off by the wheel the setting of the wheel being such that the rotation of the cutter causes the wheel to rotate and slide across the cutting edge thus grinding it off. The operator then simultaneously or later presses forward the hand button on the shaft of the smaller grinding wheel thus

pressing that wheel against the opposed side of the cutter and smoothing off the bur and grinding the edge down upon the opposed side thus giving the sharp cutting edge desired. The position of the end of the lever and the hand button is such that the operator may seize them together in one hand and by a single movement cause them both to operate or he may operate them independently. Under ordinary circumstances he will probably operate them independently grinding first and afterward taking off the bur.

The movement of the two grinding wheels toward the cutter is limited only by their pressure upon the cutter and when once they reach the cutter they commence their work. The setting of the grinding wheels and their relation to the cutter is such that they are self-leveling and therefore the same grinder may be used to grind the cutter without any further adjustment once the proper adjustment has been made. This proper adjustment is made by rotating the two vertical supporting rods and clamping them into suitable position and by then rotating the two holding sleeves and clamping them into suitable position or vice versa. In any event, the two adjustments in planes at right angles one to the other enable the operator to fix the axis of rotation at any desired angle with respect to the knife, the knife surface, the axis of rotation of the knife or any other point so that the maximum effect may be had by the grinding wheels.

I claim:

1. A sharpening device for rotary cutters having grinding wheels in opposition to the cutting edge and a peripherally disposed combined guard and housing inclosing the cutting edge and the grinding wheels.

2. A sharpening device for rotary cutters and grinding wheels in opposition to the cutting edge and a peripherally disposed guard therefor and pockets continuous with said guard to inclose the grinding wheels.

3. A sharpening device for rotary cutters having grinding wheels in opposition to the cutting edge and a substantially semi-circular guard inclosing the cutting edge of the cutter for substantially half its length and pockets in said guard for the grinding wheels, said pockets being disposed one at either end of the guard.

4. A sharpening device for rotary cutters having grinding wheels in opposition to the cutting edge and a peripherally disposed guard, a pocket pivotally mounted on one end of said guard to inclose one of said grinding wheels.

5. A sharpening device for rotary cutters having grinding wheels in opposition to the cutting edge of a peripherally disposed guard, a pocket pivotally mounted on one end of said guard to inclose one of said

grinding wheels, said pocket having a removable cover said cover being pivotally mounted on the pocket.

5 6. A sharpening device for rotary cutters having grinding wheels in opposition to the cutting edge and a peripherally disposed guard, a pocket pivotally mounted on one end of said guard to inclose one of said grinding wheels and a support carried by
10 said pivotally mounted pocket for one of said grinding wheels.

7. A sharpening device for rotary cutters having grinding wheels in opposition to the cutting edge and a peripherally disposed
15 guard, a pocket pivotally mounted on one end of said guard to inclose one of said grinding wheels, said pocket having a removable cover said cover being pivotally

mounted on the pocket and a support carried by said pivotally mounted pocket for one of
20 said grinding wheels.

8. A sharpening device for rotary cutters having grinding wheels in opposition to the cutting edge with a peripherally disposed guard therefor, a pocket continuous with
25 said guard to inclose one of said grinders, said pocket being cut away on one side and provided with a pivotally mounted cover to inclose said cut-away portion.

Signed at Chicago, Illinois this 11th day 30
of April 1912.

AUGUST R. LUSCHKA.

Witnesses:

FRANCIS W. PARKER, Jr.,
LULU JORDAN.