

(Model.)

2 Sheets—Sheet 1.

J. T. WARREN.
STRAW CUTTER.

No. 267,472.

Patented Nov. 14, 1882.

Fig. 1.

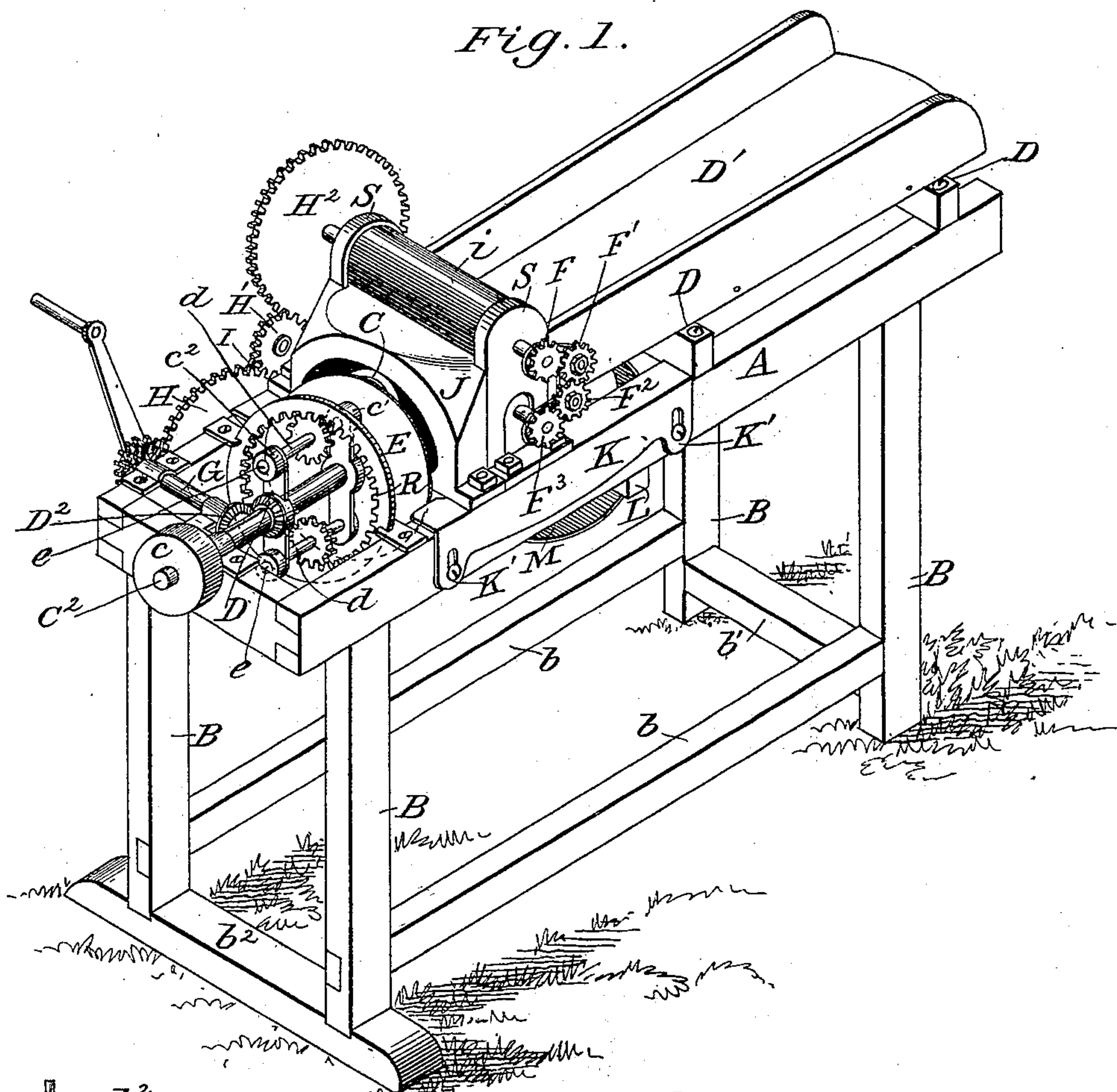
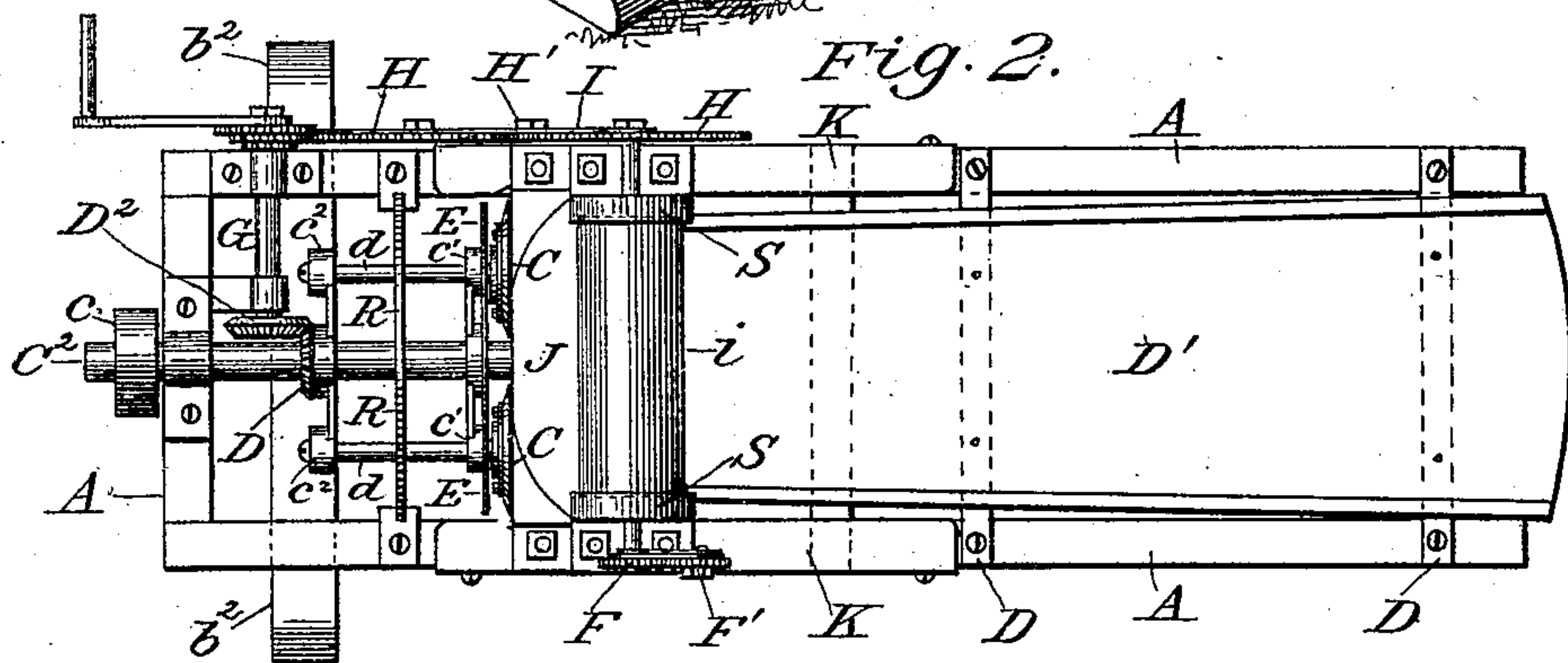


Fig. 2.



Witnesses:
W. H. King
C. H. Simmons

Inventor:
Jabez T. Warren
By G. W. Ford
Atty.

UNITED STATES PATENT OFFICE.

JABEZ T. WARREN, OF LE ROY, NEW YORK.

STRAW-CUTTER.

SPECIFICATION forming part of Letters Patent No. 267,472, dated November 14, 1882.

Application filed August 7, 1882. (Model.)

To all whom it may concern:

Be it known that I, JABEZ T. WARREN, a citizen of the United States, residing at Le Roy, in the county of Genesee and State of New York, have invented a new and useful Straw or Feed Cutting Machine, of which the following is a specification.

My invention relates to improvements in straw-cutters in which circular revolving knives are used in conjunction with an automatic feeding device; and the objects of the improvements are, first, to provide circular knives (one or more in number) secured to longitudinal shafts which turn in independent bearings, the whole revolving around one main or driving shaft with a motion reverse to the actuating one; second, to provide means for shielding the gear mechanism and preventing the cut feed from falling thereon; third, to provide means for compensating for the wear of the cutting parts as they become worn by use; and, fourth, in the general construction of the parts, which will be fully explained hereinafter. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view taken from the front corner, toward which the cutters revolve, and opposite the handle. Fig. 2 is a top or plan view. Fig. 3 is the side view upon which the intermediate gear-wheels are placed, which drive the upper feed-roller. Fig. 4 is a bottom view, showing the C-shaped spring and its connection with the cross-bar upon the under side of the box, also the adjusting-frame that carries the spurred or under feed-roller. Fig. 5 is a detailed view of the cutting-knives, and Fig. 6 is a detailed view of the semicircular throat across which the knives are made to pass in the line of their revolution.

Similar letters refer to similar parts throughout the several views.

A supporting-frame, A, has legs B mortised into the same, and is tied together by the longitudinal bars *b*. Cross-bars *b'* connect the rear legs. The front cross-bar, *b*², ties together the front legs, and provides a means for bolting the machine to the floor when desired. This combination of bars, legs, &c., forms the frame-work proper, upon which the

cutting mechanism is mounted. Upon this frame there is also placed the feed-box D', supported on cross-bars D. This feed-box contains the material to be operated upon by the rollers and cutters, which will be hereinafter explained.

C are circular-shaped cutters mounted upon shafts *d*, which revolve each upon its own axis. These shafts *d* have bearings in cross-head *c'*, and are of equal diameter the entire length, and are made to pass through the cross-head in such a manner that any required longitudinal movement may be given them. The ends of the shafts remote from the cutters, having bearings in cross-head *c*², do not pass entirely through the cross-head, but impinge against set-screws *e*, for a purpose hereinafter explained. Each of these shafts carries a spur-pinion, which meshes into a stationary internal circular rack, for a purpose which will be hereinafter explained. A driving-shaft, C², carries a pulley, *c*, upon which the driving-belt runs when the machinery is driven by other than hand-power. Upon this driving-shaft C² are mounted at the proper distance from each other two cross-heads, *c'* *c*², in the ends of which are made bearings for the cutter-journals. A miter-gear, D, is mounted upon the drive-shaft C², which meshes into a corresponding gear, D², for a purpose hereinafter explained. The cutters C are bolted to a suitable head, which is secured to the cutter-shaft, and in such a manner that the said cutters may be removed from the head when it is desired to sharpen the same. A circular shield, E, is also secured to shaft C², turning with the same, and interposed between the cutter and the inner cross-head, (designated *c'*.) This shield is to prevent the cut feed falling among the gear-wheels or other working parts of the machine.

e are set-screws screw-threaded into the journal-bearings in the ends of cross-head *c*², and abut against the ends of the shafts upon which the cutters are mounted, and by which the adjustments of the cutter-shafts are had, for a purpose hereinafter explained.

F F' F² F³ are spur-gears for connecting the feed-rollers, and for driving the under feed-roller by the movement of the upper one and

at the same rate of speed. F is the pinion secured to the upper roller-shaft. F' is an idler meshing into and is driven by gear F. F² is still another idler, which meshes into and is driven by idler F'. This idler F² meshes into the gear-wheel F³, which is secured to the shaft of the lower feed-roller, and by which the said roller is driven. By this arrangement of gear-wheels and idlers the feed-rollers can be brought in close proximity with each other; or they can be opened to their full capacity without changing the pitch of the gear-wheels, as it will be observed that the gear-wheels and idlers are secured together by pivotal connections, so as to form jointed elbows, which are straightened or doubled up so as to give the desired spread of the feed-rollers, as will be readily understood.

G is a horizontal shaft placed at right angles with drive-shaft C², having upon its inner end miter-gear D², which meshes into miter-gear D upon shaft C², and by which motion, through intermediate gears, is imparted to the feed-rollers.

Upon the outer end of shaft G is placed several gear-wheels of different diameters, but of the same mesh of teeth. These gear-wheels are run by a spline or feather made in the shaft and fitting into corresponding recesses in the gear-wheels, so that the said gear-wheels may be removed and changed at pleasure by unscrewing the securing-nut. These different-sized gear-wheels upon shaft G are made available for changing the speed of the rollers in the following manner: A gear-wheel, H, is secured to a bar, I, which is pivoted at its upper end to the shaft of the upper feed-roller. The lower end of the said bar I has an elongated slotted head, through which slot a bolt passes for firmly securing to the leg of the frame. This slot is upon the radius of a circle of which the upper roller-shaft is the center, and can be swung around upon its pivot, so that the wheel H will mesh into any sized gear-wheel upon the shaft G that is within the throw of the slot through which the securing-bolt passes.

H' is an idler, secured to the bar I by a bolt, and turning upon the same, which meshes into the gear-wheel H upon one side and into gear-wheel H² upon the other. The wheels H, H², as well as the idler H', have bolts which pass through them and upon which they turn, and by which they are secured to bar I, so as to form a driving-connection between the cross-shaft and feed-roller, as will be readily understood.

In order that the revolving cutters may always run in close proximity with the metallic throat J, set-screws *e* are screw-threaded in the bearings in the cross-head *c*², as before mentioned, so that as the face of the circular cutters or the face of the throat becomes worn an end-thrust may be given the cutter-shafts, with a consequent movement of the cutters, thus keeping them squarely against the metallic

throat, and by turning the set-screws, the ends of which rest against the ends of the shafts, the true cutting position can always be maintained. These cutters are set diagonally of the line of the driving-shaft C², so as to bring only the forward portion of the cutting-edge in close contact with the throat, so as to lessen the friction incident to the close contact of the whole cutting-surface with the throat, as well as to prevent clogging, for the straw is fed to the cutters in a continuous manner, and it would impinge against the rear face of the cutters while traveling across the throat were the said cutters to come squarely against the face of the throat-head.

To compensate for the diametrical wear of the revolving cutters, the metallic throat-piece J, as well as the feed mechanism, is mounted upon flanged plates K, having ears K', provided with vertical slots, through which securing-bolts pass, to allow of raising or lowering the metal portion of the throat and keeping the semicircular cutting-edge of the throat in position for the most efficient service.

L is a cross-bar underneath the feed-box, and to which the C-shaped spring M is secured at one of its ends, the other being secured to the sliding frame N, upon which the lower feed-roller, O, is mounted, and which moves vertically with the sliding frame. This sliding frame, which carries the lower roller, is made vertically adjustable, in order that a large or small quantity of material may be carried by the revolution of the feed-roller to the throat, to be operated upon by the revolving knives.

It will be observed that by using the C-shaped spring, which acts upon the lower roller through the intervention of the sliding frame, a uniform pressure is given to the roller, whether a large or small quantity of straw is made to pass through between the feed-rollers.

The face-iron has a semicircular-shaped throat, J, and upon the same radius of a circle as is described by the revolution of the revolving cutters, so that as the cutters in the forward motion pass the throat a backward shear cut is given, and at a much less expenditure of force than is had in the usual chopping motion of the cutters. To give this backward and shear cut, and also that a separate and reverse motion may be given the circular cutters, a circular rack, R, having cogs upon the internal surface, is secured to the frame of the cutting-box in such a manner that the pinions upon the cutter-shafts mesh into the cogs upon this stationary rack, and in the revolution of the drive-shaft which carries the cutters, with their journal-supports, in the forward movement, the cutter-pinions, by meshing into the gear of the stationary circular rack, are turned backward, or a reverse motion given, so that as the material to be operated upon passes through the throat it is brought directly between the peripheral edge of the circular cutters and the circular cutting-edge of the throat-iron, thus giving a circular shear

cut by the backward revolution of the cutters while the whole cutter-frame is revolving in the opposite or forward direction.

If desired, the metal throat may be of steel in place of cast-iron by either decarbonizing the iron or by having steel plates secured in any suitable manner to the said throat. A cover may be placed over the cutting mechanism, of form corresponding to and in close proximity with it, so as to prevent any upward throw of the cut feed. This cover I usually and by preference place upon my cutting-boxes. A spout may also be placed under the cutters, so as to convey the cut feed to the one side, or wherever desired.

It will be observed that the machine is adapted for use either by hand or other power, as may be desired. The feed-box D' is placed upon the frame in such a manner as not to interfere with the vertical adjustment of the feed-works by the flanged plates K. The upper feed-roller is mounted in brackets S, upon either end of the roller, and bolted to the flanged plates K, so as to raise or lower with the flanged plates in the adjustment of the cutting mechanism. A vertical slot is made in the brackets S for the movement of the sliding frame which carries the lower roller, this slot preventing any lateral displacement of the sliding frame. The upper ends of the brackets S are made circular in form to correspond with the peripheral surface of the upper roller, and are flanged upon their inner side to prevent any foreign matter getting between the ends of the roller and bracket to cause undue friction.

Having now described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of the circular cutters, mounted upon the ends of longitudinal shafts, turning in the cross-head bearings, the pinions for imparting motion to the cutters, meshing into the circular rack, and the circular revolving shield, all arranged and operating substantially as described.

2. The combination of the circular cutting-knives, the cross-head bearings, the shafts upon which the cutting-knives are mounted, and the set-screws resting against the rear ends of the cutter-shafts for taking up the wear upon the cutting apparatus, substantially as described.

3. The combination of the flanged plates K, having the vertically-slotted ears and adjusting-bolts, the metallic throat J, semicircular in form, and the revolving cutter-knives, all arranged and operating substantially as described.

4. The combination of the flanged plates K, having the vertically-slotted ears K', brackets S, feed-rollers i O, and iron throat J, all arranged and operating substantially as described.

5. In a feed-cutting machine, the metallic throat having a semicircular cutting-edge, in combination with the revolving cutter mechanism, consisting of vertical circular cutters mounted upon horizontal shafts, and made to revolve circularly across the face of the cutting-edge, with a revolution reverse from the actuating one, substantially as herein set forth.

JABEZ T. WARREN.

Witnesses:

RANDOLPH BALLARD,
G. W. FORD.