2 Sheets—Sheet 1

J. S. & J. MATTHEWS.

Straw-Cutter.

No. 207,757. Patented Sept. 3, 1878.

Fig. 1

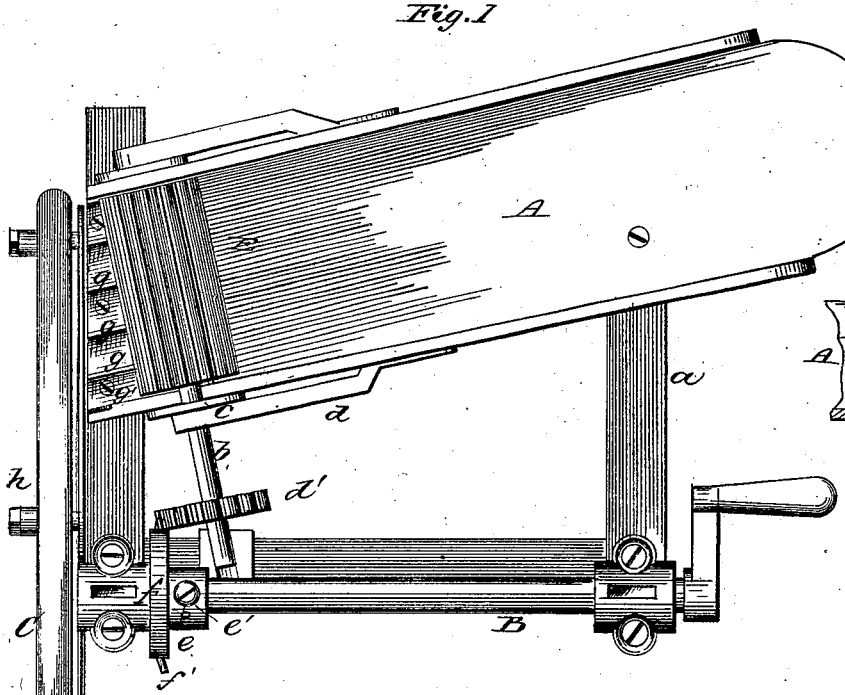


Fig. 7

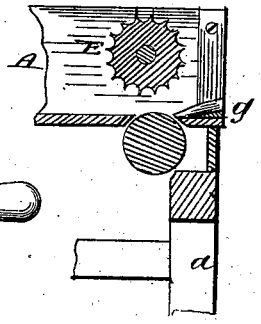


Fig. 4

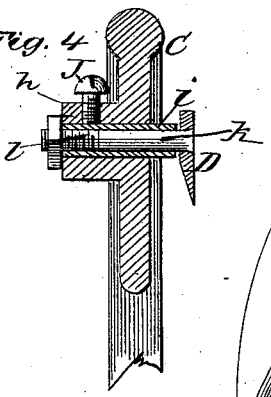
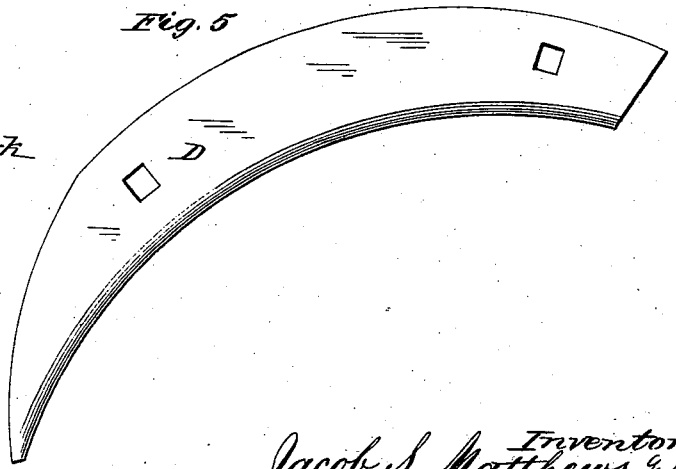


Fig. 5



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2 Sheets—Sheet 2.

J. S. & J. MATTHEWS.

Straw-Cutter.

No. 207,757. Patented Sept. 3, 1878.

Fig. 2

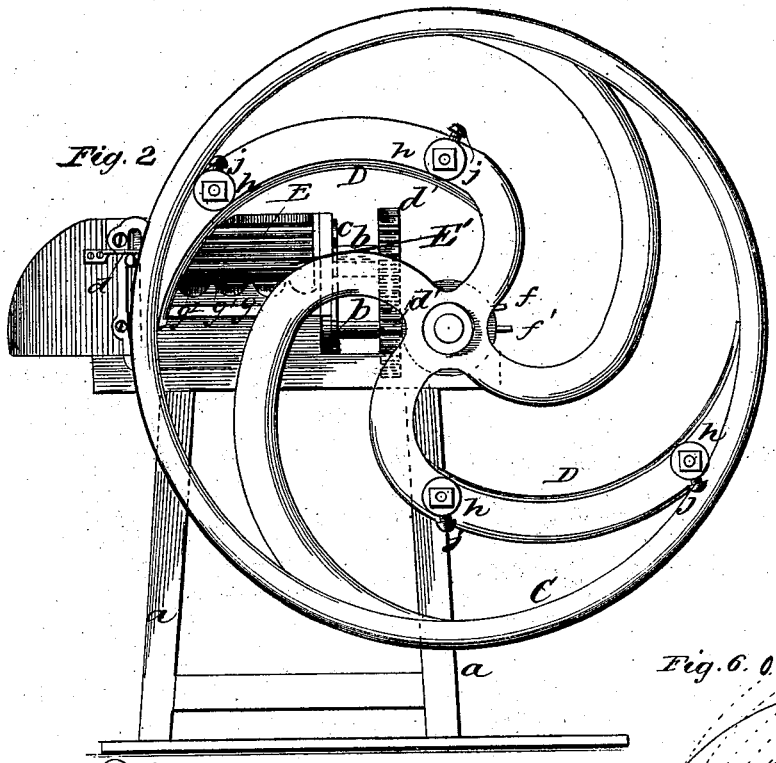


Fig. 6.

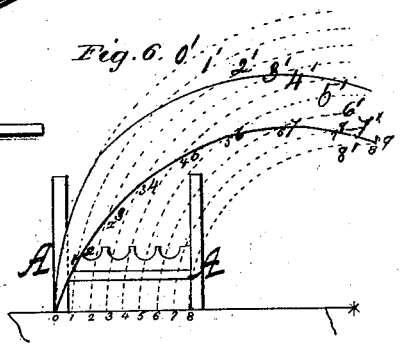
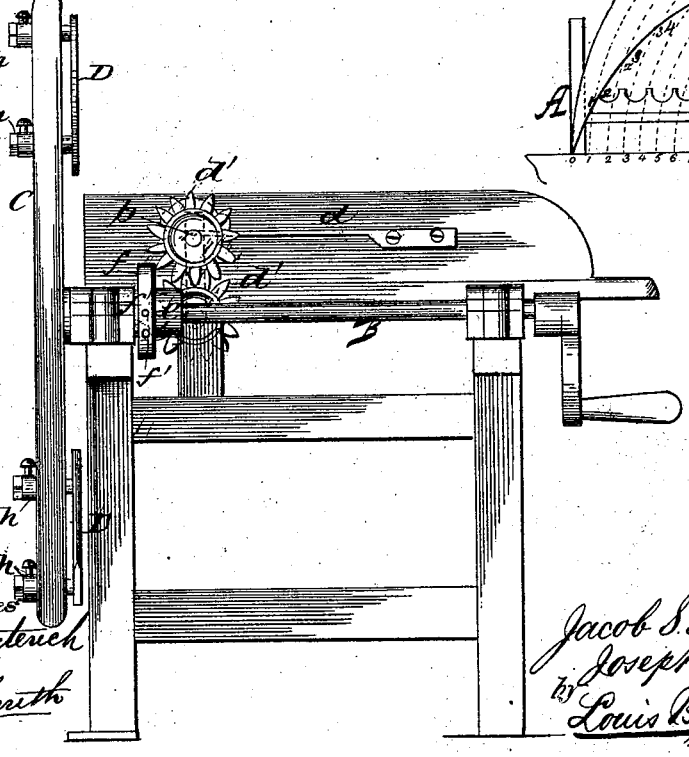


Fig. 3



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UNITED STATES PATENT OFFICE.

JACOB S. MATTHEWS AND JOSEPH MATTHEWS, OF ATHENS, TENNESSEE.

IMPROVEMENT IN STRAW-CUTTERS.

Specification forming part of Letters Patent No. **207,757**, dated September 3, 1878; application filed June 17, 1878.

To all whom it may concern:

Be it known that we, JACOB S. MATTHEWS and JOSEPH MATTHEWS, of Athens, in the county of McMinn and State of Tennessee, have invented certain new and useful Improvements in Straw-Cutters; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a plan view of our improved straw-cutter. Fig. 2 is a front elevation thereof. Fig. 3 is a side elevation of the same. Fig. 4 is a detailed sectional view through one of the knife-wheel spokes and the knife adjusting and detaching mechanism. Fig. 5 is a detached side view of one of the knives; and Fig. 6 is a diagram, showing the scale for laying off the curve of the cutting-edge of the knife.

Corresponding parts in the figures are denoted by like letters.

This invention relates to certain improvements in straw-cutters of that class in which the straw is cut by a number of knives arranged upon a revolving wheel, driven by hand or other power; and it consists, first, in the peculiar curving or constructing of the knives; secondly, in the employment, in the forward end of the straw-holding box, of a plate having a series of straw-holding and separating partitions; thirdly, in providing the shaft of the knife-wheel with a toothed disk, whose teeth engage at intervals with the cogs of the feed-roller gearing; fourthly, of mechanism for adjusting the knives with reference to the straw or its holding-box; fifthly, of mechanism for rendering the knives readily detachable, substantially as hereinafter more fully set forth.

In the drawing, A is the straw-holding box, suitably supported in position upon a framework or legs, *a a*. Upon the same frame is journaled the shaft B of the wheel C, carrying the straw-cutting knives D D, to be further referred to hereinafter.

It will be observed that while the wheel, with its knives, is adjusted by means of its shaft upon the frame or legs in the usual way, the box A is arranged obliquely to or slightly out of a right angle in the plane of an obtuse angle with the wheel and its knives. This arrangement enables the cutting of the straw to be performed more easily and to the greatest advantage.

In the forward end of the box A are arranged, one above the other, the feed-rollers E E′, between which the straw is fed to the knives D D, and whose shafts *b* are passed through slots in the sides of the box A and through metallic frames *c c*, fastened to the latter. Downward pressure is exerted upon the upper corrugated roller, E′, by springs *d d*, bearing upon the projecting portions of its shafts and fastened to the outer sides of the box A.

The projecting ends of the shafts *b b* of said rollers are provided with the gearing or pinions *d′ d′*, meshing with each other, and having their teeth or cogs somewhat elongated and beveled, as shown, to insure the striking of the same by the teeth of the disk for imparting an intermittent motion to the said gearing, as presently set forth.

Upon the shaft B of the knife-wheel is preferably attached by a collar and adjusting or set screw, *e e′*, a disk or wheel, *f*, provided with radial peripherical teeth or projections *f′ f′*, which are more or less inclined toward and strike the cogs or teeth of one of the feed-roller-rotating gearing as the knife-wheel shaft is rotated.

The projecting teeth *f′ f′* are so spaced or arranged upon their disk *f* as to strike and rotate the feed-roller gearing at intervals—*i. e.*, imparting a partial rotation or movement to said gearing, and through them to the feed-rollers E E′, just previous to the descent of a knife, to enable the rollers to feed the straw thereto. This movement of the feed-rollers is repeated for every knife, or previous to every descent or downward movement of a knife during the operation of cutting the straw.

The teeth *f′*, by being screw-threaded and fitted into corresponding sockets in their disk *f*, and providing additional similar sockets in said disk, they (the teeth *f′ f′*) can be moved closer together or placed farther apart, by which the feed may be varied—*i. e.*, a greater or lesser length of straw fed at each movement of the feed-rollers to the knives.

In the same or forward end of the box A, in

front of the feed-rollers, is fastened to the bottom of said box, in any suitable way, a plate, g', having on its upper surface a series of transverse parallel partitions, g g, dividing that end thereof into a number of compartments, the intermediate spaces between which are rounded out at the bottom to prevent the wedging of the straw fed between them to the knives. The partitions g g themselves serve to separate the straw and hold it from being drawn up into a mass against the side of the box by the cutting of the same—the straw.

To revert to the wheel C, its spokes are provided with hubs h h, which receive sleeves i, fastened therein by set-screws J. Through the sleeves i pass holding-screws k, whose inner ends are fastened to the knives D, their other ends being screw-threaded, and having nuts l, by which they may be manipulated in detaching the knives whenever it may be necessary to remove them for sharpening or renewal. The hub h and and their adjusting-screws enable the knives to be set nearer to or farther from the straw, or the forward end of its holding-box A, as may be desired.

By reference, again, to the knives D D, it will be seen that their cutting-edges are curved or graduated to a particular scale, to enable them, as they are revolved, to move in the direction of their lengths about three times faster than they move in a transverse direction across the knife-steel in performing the operation of cutting the straw.

The scale laid off for attaining this form of cutting-edge for the knives is as follows: A pair of dividers is used to space off the forward end of the straw-holding box, say, into eight equal parts, as represented in Fig. 6, or into any other number of equal parts. The next step is to place one foot or point of the dividers at the center of the wheel, or at the fulcrum of a knife in the form of a lever, where such is used, (indicated by the asterisks, same Fig. 6,) and extend the other foot thereof to the point o on the diagram, Fig. 6, the point of designating the proposed knife, whence a curve or arc is produced by penciling the arc described by moving one point or foot of the dividers, as at o'. The same course is pursued with reference to all the rest of the points, 1 2 3 4 5 6 7 8, on said diagram, producing a series of arcs, 1^1 2^1 3^1 4^1 5^1 6^1 7^1 8^1, thereon. The third step is to adjust the dividers so as that their feet will span any one of the spaces between the numerals 1 2 3, &c., then spreading their feet or points just about three times as far apart, placing one foot at o and the other foot at a point upon the arc 1^1, as at 1^2; thence swing the foot from o to a point upon the adjacent arc, 2^1, which will bring it at 2^3, and so on, the same course being observed till all the other arcs have been intercepted, forming the curve 1^2 2^3 3^4 4^5 5^6 6^7 7^8 8^9. This manner of curving or constructing the knife or knives produces a downward drawing cut, in contradistinction to the "chopping" cut, as heretofore obtained, by which the disadvantages are avoided attending the latter—*i. e.*, the increased amount of pressure or force required in cutting therewith, because of the greater resistance offered by the knife or knives striking the straw, particularly at its heel end, square across the straw, resulting from the absence of the movement peculiar to our knife or knives, cutting the straw continuously from point to heel with a vertically-drawing motion, which, in addition to avoiding the disadvantages common to the ordinary knife, as above set forth, also cuts the straw almost noiselessly.

This cutter is such, in its construction and arrangement of parts, as that the straw is cut to the greatest possible advantage and with ease, the feed-rollers for feeding the straw to the knives operated at the desired intervals, the holding of the straw while being cut effected, and the knives rendered susceptible of adjustment with reference to the straw or its holding-box, and readily detachable for sharpening or renewal.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a straw-cutter, the combination of an oblique cutter-box, A, a curved knife, D, and operating mechanism to secure an oblique uniform draw-cut from point to heel, substantially as and for the purpose set forth.

2. The combination of an oblique cutter-box, A, a tapering ribbed plate, g, a curved knife, D, and operating mechanism to secure an oblique uniform draw-cut from point to heel, substantially as and for the purpose set forth.

3. The combination, with the feed-roller gearing of a straw-cutter, of the disk f, having a number of isolated teeth, f', arranged to strike and operate the said gearing at intervals, substantially as and for the purpose described.

4. The wheel C, having hubs h, provided with set-screw J, in combination with bolt k and knife D, substantially as and for the purpose set forth.

5. The wheel C, having hubs h, provided with set-screw J, in combination with sleeve i, bolt or screw k, nut l, and knife D, substantially as and for the purpose indicated.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

JACOB S. MATTHEWS.
JOSEPH MATTHEWS.

Witnesses to Jacob S. Matthews's signature:
JNO. W. MADIGAN,
AUGUST PETERSOHN.

Witnesses to Joseph Matthews's signature:
T. J. BOYD,
H. A. MCAFFREY.