E. J. WORCESTER.

Machine for Grinding Lawn-Mower Cutters.

No. 197,711. Patented Nov. 27, 1877.

Fig. 3

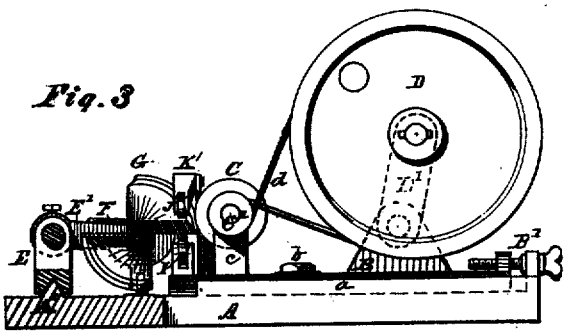


Fig. 2

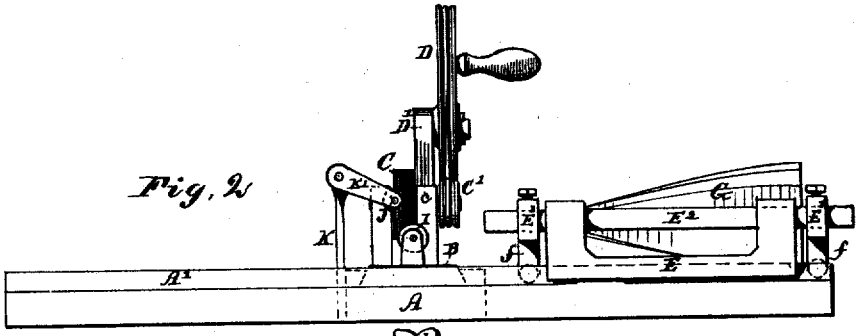


Fig. 1

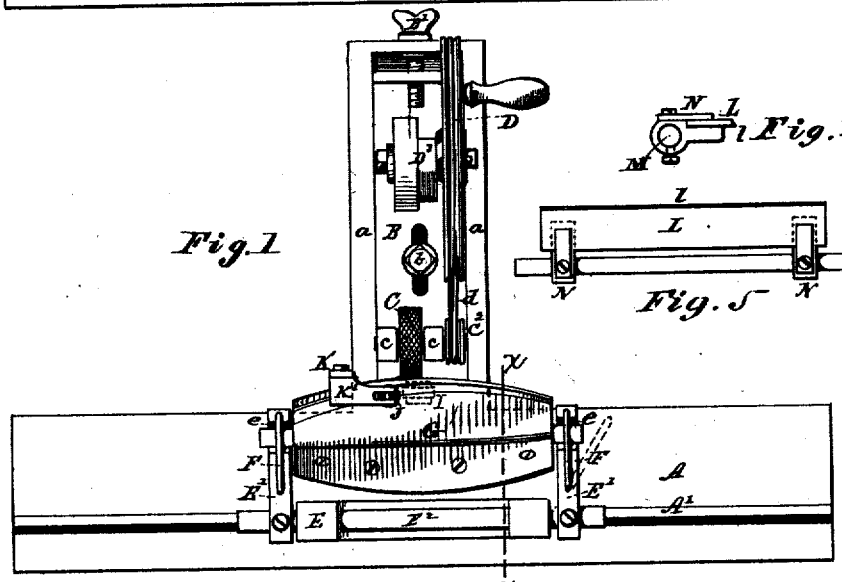
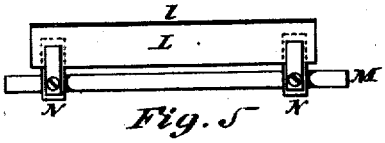


Fig. 4

Fig. 5



Witnesses

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IMPROVEMENT IN MACHINES FOR GRINDING LAWN-MOWER CUTTERS.

Specification forming part of Letters Patent No. **197,711**, dated November 27, 1877; application filed October 30, 1877.

To all whom it may concern:

Be it known that I, EDWARD J. WORCESTER, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machines for Grinding Lawn-Mower Cutters; and I declare the following to be a description of my said invention sufficiently full, clear, and exact to 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 represents a plan view of a machine for grinding lawn-mower cutters constructed in accordance with my invention. Fig. 2 represents a front view of the same. Fig. 3 represents a vertical sectional view at the line *x x* on Fig. 1. Fig. 4 represents an end view of the auxiliary bar to be used when grinding the straight bottom plate or cutter against which the spiral cutters work, and Fig. 5 represents a plan view of said auxiliary bar.

The object of my present invention is to provide a cheap, simple, and convenient apparatus for accurately grinding and sharpening the spiral cutters of lawn-mowers, and also the straight cutter or plate against which the spiral cutters act, said mechanism being adapted to be operated by hand, and being in readily portable form, so that the apparatus can be used by any person having a lawn-mower, thus avoiding the necessity of sending the cutters to a machine-shop or manufactory when they require sharpening.

With this view my invention consists in a grinding apparatus the parts of which are constructed and organized for operation substantially as set forth in the following detailed description and claims.

In the drawings, A denotes the bed-frame, having a guideway, A′, along its front part, and guides *a a* on its rear extension, at right angles to the guideway A′. B indicates an adjustable auxiliary bed or slide-plate, upon which the grinding-wheel C and its operating devices are supported. Said plate B is arranged between the ways *a a*, and is provided with an adjusting-screw, B′, and a clamp-bolt, *b*, for retaining it at any desired position.

The grinding-wheel C, of emery or other suitable material, has its shaft journaled in stationary bearings *c c* on the auxiliary bed B, and is operated by a band, *d*, from the large crank-pulley D to the small pulley *c′* on the grinding-wheel shaft.

Spur-wheels may be employed in lieu of pulleys and band; but I prefer the latter.

The pulley D may have a heavy rim to serve as a balance-wheel. Said pulley is supported by an adjustable standard, D′, which can be set back for tightening the band *d*.

E indicates the cutter-supporting carriage, arranged to move on the guideway A′, and provided with arms E¹, having V-shaped depressions *e*, to receive the journals of the cutter-head G, which is supported in position, and caused to move with the carriage in a direction parallel with the axis or working face of the grinding-wheel C. The arms E¹ are adjustable on the bar E², to accommodate different lengths of cutters, and are provided with spring-fingers F, for retaining the journals of the cutter-head G within the depressions *e*. Said fingers F may be swung outward, as indicated by dotted lines, Fig. 1, to release the journals. The arms E¹ are provided with standards *f*, (with or without caster-wheels,) which rest or travel on the bed A, and form supports directly beneath the depressions *e*, as indicated.

I indicates a guiding and supporting roll, arranged in front of the grinding-wheel C, and serving to support and direct the cutter while grinding. J indicates a guide-roll, supported on an overhanging adjustable arm, K′, and spring-standard K, for pressing down upon the upper side of the cutter in opposition to the roll I.

The operation is as follows: The cutter-head G being placed on the carriage, as shown, the bed-plate B is set forward, by means of screw B′, to a position where the grinding-wheel C can act on the edge of the cutter. The wheel C then being set in motion by turning the crank-wheel D, and the carriage moved across the frame on its guide A′, the edge of the cutter is passed in contact with the grinding-surface; and as the cutter is carried forward and back, the guide-wheel I supports the cutter-edge, and revolves the cutter-head G in accordance with its spiral curvature, keeping the point of grinding contact up to a given position on the face of the wheel, or in a plane

parallel with, and at a uniform radial distance from, the axis of the cutter-head, thus imparting to the edge a true and regular bevel, having the requisite spirality throughout its length. The upper roll J presses down the spiral surface as the carriage is moved toward the right-hand side of the frame A. The motion of the grinding-wheel surface being downward at the point of contact tends to force the edge of the cutter firmly down onto the roll I. Therefore, if desired, the roll J might be omitted; but said roll J is required if the wheel is run in the opposite direction, or with the point of grinding contact above the level of the axis of the grinder. Said roll is therefore fitted with a swing-arm, so that it can be used or not, as desired. The roll I and grinder-wheel C could be made adjustable, if desired.

For grinding the straight cutter or bottom plate L, over and against which the spiral cutters work in the mower, I employ an auxiliary bar, M, having adjustable clamping-jaws N N, for holding said plate L, as illustrated in Figs. 4 and 5. The ends of the bar M are supported in the depressions *e* of the carriage-arms E^1, while the edge *l* of the plate L is moved forward in contact with the grinding-wheel C, in like manner as described for the cutter-head G, the roll J and its support K K′ being turned back out of the way.

A separate spiral blade may also be supported and ground by aid of this auxiliary bar M, by adjusting the clamping-jaws N N at different radial positions with each other, thus adapting the mechanism for the grinding of hay-cutter knives, if desired, or for similar uses.

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

1. In a machine for grinding spiral lawn-mower cutters, the combination of a stationary supported revolving grinding-wheel, a cutter-head-supporting carriage, moving in a direction parallel with the axis or surface of said wheel, and a bearing roll or guide arranged in front of the grinding-surface for supporting and revolving the cutter-blade in accordance with its spiral surface, substantially as hereinbefore described, for the purposes set forth.

2. In combination, substantially as hereinbefore set forth, the carriage E, provided with adjustable arms E^1, V-shaped depressions *e*, and holding devices F, the grinding-wheel C, and guide-roll I, for the purposes stated.

3. In combination, substantially as hereinbefore set forth, the cutter-head-supporting carriage E E^1, the grinding-wheel C, the supporting and directing roll I, the top guide-roll J, and the adjustable spring-standard K, for the purposes stated.

4. In combination, substantially as hereinbefore described, the bed-frame A, with guideways A′ *a*, the cutter-head-support carriage E E^1, the adjustable auxiliary bed B, the grinding-wheel C, the guiding and supporting roll I, pulley C′, and crank-pulley D, for the purposes set forth.

5. In combination with the carriage E E^1, grinding-wheel C, and supporting-roll I, the auxiliary bar M, provided with clamping-jaws N, substantially as and for the purpose hereinbefore set forth.

Witness my hand this 6th day of September, A. D. 1877.

EDWARD J. WORCESTER.

Witnesses:

CHAS. H. BURLEIGH,

J. EDWIN LEWIS.