No. 718,351. PATENTED JAN. 13, 1903.

H. L. HOPKINS.

CUTTING APPARATUS FOR MOWERS, &c.

APPLICATION FILED SEPT. 22, 1902.

NO MODEL.

Fig. 1.

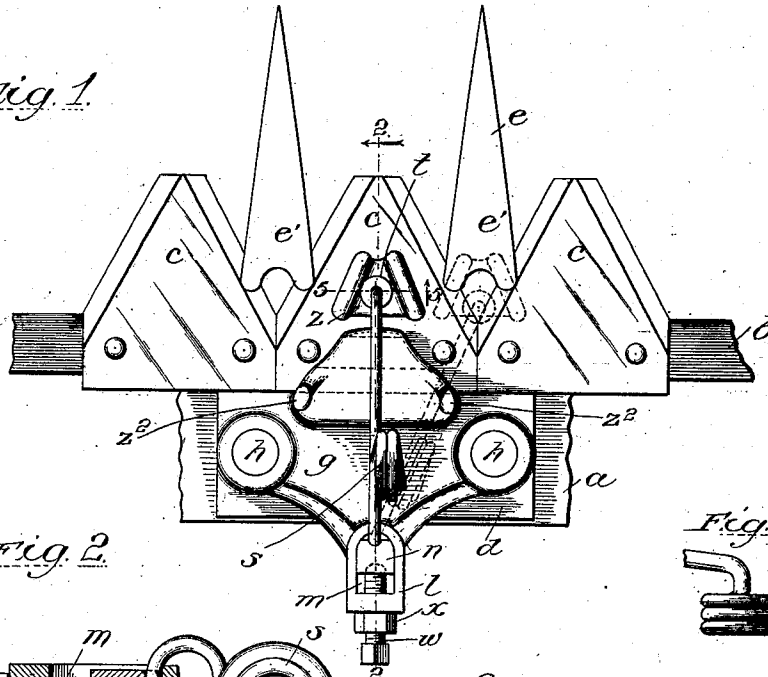


Fig. 2.

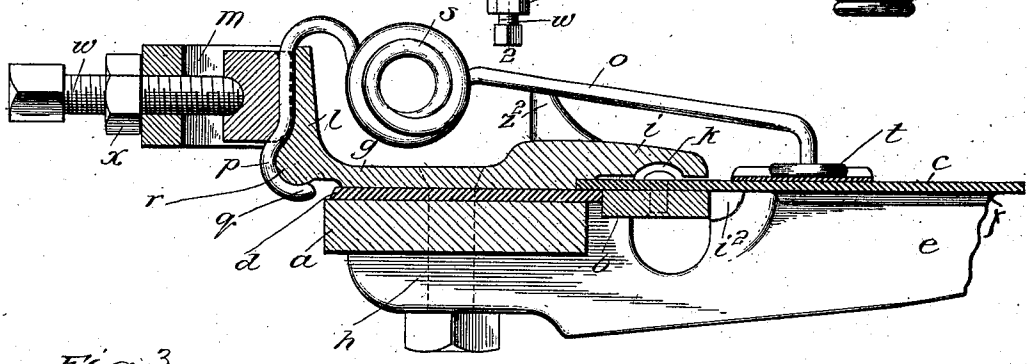


Fig. 7.

Fig. 3.

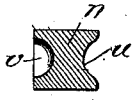


Fig. 4.

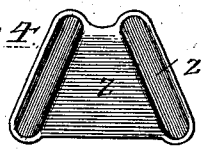


Fig. 5.

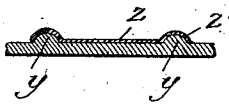
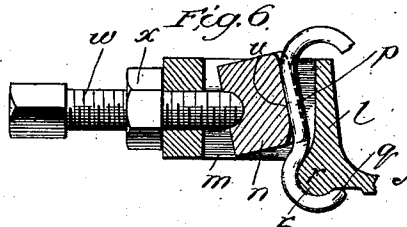


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CUTTING APPARATUS FOR MOWERS, &c.

SPECIFICATION forming part of Letters Patent No. 718,351, dated January 13, 1903.

Application filed September 22, 1902. Serial No. 124,261. (No model.)

To all whom it may concern:

Be it known that I, HARVEY L. HOPKINS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cutting Apparatus for Mowers, &c., of which the following is a specification.

The present invention relates to cutting apparatus for mowers, reapers, and like machines; and it relates particularly to various organizations, constructions, and arrangements of parts.

The primary object of my invention is, broadly, to provide keepers for the cutter-sections adapted to supplement the action of elastic or spring caps which have a yielding downward pressure on the cutters and follow the reciprocations of the cutters, and, specifically, to provide such keepers integral with the clips or holders upon which such caps are seated.

A further object is to provide an improved and novel organization of spring-cap for the cutting apparatus of mowers and like machines.

A further object is to provide chafe-plates or wear-irons for use in connection with spring-caps of the general type described, and other objects will appear from the disclosure.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a fragment of the cutter and finger-bars of a mowing-machine provided with my improvements. Fig. 2 is a cross-section on the line 2 2 of Fig. 1. Fig. 3 is a longitudinal central sectional view of the bearing-block employed in connection with the spring. Fig. 4 is a bottom plan view of a chafe-plate that may be employed. Fig. 5 is a sectional view on the line 5 5 of Fig. 1. Fig. 6 is a sectional view of the standard, showing the spring and clamping-block in adjusted or changed position; and Fig. 7 is a detail view of a modification.

Referring to the drawings, the reference-letter *a* indicates a finger-bar of ordinary construction, and *b* denotes a cutter-bar having knife-sections or cutters *c* riveted to it in the usual manner and with their alined rear edges overhanging the front edge of a chafe-plate or wear-iron *d*, which is secured to the finger-bar. The cutter-bar is the usual reciprocating or laterally-movable element employed in reapers, mowers, &c., having a rectilinear or straight movement, and I employ the word "reciprocating" in this case to designate and mean such right-line movement. The guard-fingers *e* are of the usual form, having guard-caps *e'*, and are provided with ledger-plates *f* in the ordinary manner. The wear-iron *d* preferably projects beyond the front edge of the finger-bar, and upon this wear-iron is secured a clip *g* by bolts *h h*, passing through the clip, wear-plate, and guard-fingers, with their heads countersunk in the upper surface of the clip. The space between the front edge of the plate *d* and the shoulders i^2 of the guards forms a channel or guideway in which the cutter-bar *b* reciprocates. The clip *g* is preferably provided on its front edge with a keeper *i*, which projects out over the cutters beyond their points of attachment to the cutter-bar. The keepers extend forwardly a sufficient distance to prevent the cutting edges of the cutters from being raised off the ledger-plates, so as to contact with the guard-caps when any obstruction, such as a stone or piece of wood, strikes the knife. The keepers may be fluted or channeled, as at *k*, to provide for the free passage of the heads of the rivets connecting the cutters and cutter-bar when the parts are reciprocated. The clip is provided at its rear edge with a central vertical standard *l*, which forms a bearing for the attachment of any suitable spring to exert a normally downward yielding pressure upon the cutters. The standard is somewhat elongated, being substantially rectangular in longitudinal section, and is provided with a socket or opening *m* to receive a spring and a clamping-block *n* therefor to adjust its tension, which socket may be of any suitable form and size.

The spring *o* shown in the drawings, and which is a convenient and practical form, is provided with a rear downwardly-extended leg *p*, which enters the socket of the standard to form a suitable pivot and has a forwardly-projecting rounded toe *q*, adapted to

the curve of a rounded bearing or abutment *r* on the inner wall of the socket and below the lower edge thereof. The spring is provided with suitable coils *s*, preferably as described in my Patent No. 697,407, dated April 8, 1902, and the front end is carried out from the coils at the central line of the convolutions, from which point it is carried forward and downward to bear upon one of the cutter-sections. The spring may be provided at its pressure end with any suitable means bearing on the sections that will serve as a suitable wear-surface to prolong the life of the spring and that will lessen the friction between the working parts of the spring and cutter. For this purpose I prefer to employ a disk or plate *t*, preferably of hard metal circular in form, which is pivoted upon the end of the spring, so as to freely reciprocate or turn about the spring as it moves with the reciprocations of the cutter-sections. This form of device is shown in the drawings and constitutes a suitable foot, as it provides a wearing-surface of great durability and one which by reason of its free movement about the end of the spring reduces the friction of the parts to a minimum. While I prefer to employ a disk, such as is just described, I may form the foot by terminating the spring in a plurality of superimposed coils or turns, as shown at t^2 in Fig. 7. By means of the plurality of horizontal coils lying one above the other the life of the spring is prolonged beyond all other forms, as the wear from frictional contact with the cutters is thus extended through a number of thicknesses or strands of wire. The spring is pivotally clamped in the standard by means of the clamping-block *n*, which is provided with a channel or groove *u* on its front face or edge, in which the leg lies. The block is provided on its opposite face with a central depression or well *v*, which receives the end of a suitable set-screw *w*, having a threaded engagement with the rear wall of the standard and provided with a suitable set-nut *x*. When the spring is clamped to exert its greatest tension, as when the knives are dull or the cutting is difficult, the parts assume the positions of Fig. 1; but when for any reason, as when the knives are sharp or the cutting is light, it is not necessary to have considerable tension of the spring the loosening of the set-screw allows the parts to assume other positions—as, for example, in Fig. 6—as the toe *q* turns about the abutment *r*, as shown.

The cutters are provided with rearwardly-diverging ribs *y* in the manner of my said patent, and I prefer to employ chafe-plates or wear-plates *z* constructed of suitable hard metal and secured in place to receive the feet of the springs by any suitable means. I prefer to attach these plates so that they may be readily removed and replaced, and as a convenient means of thus securing them I provide them with channels or grooves *z'*, corresponding in shape and contour with the ribs and adapted to take over the ribs, as shown in Fig. 5. The grooves are made by stamping up the metal from their lower faces, so that the plates are set in place, as shown, the grooves and ribs having sufficient frictional engagement to hold the plates in place.

I provide stops to prevent the springs from leaving their seats on the cutters, and these stops may be located at any suitable points where they will subserve this function. As the most simple and effective embodiment of this feature I provide these stops upon the clip, as at z^2, as they then are cast integral with the clip and are located in very effective positions. The left-hand stop also prevents the knife or cutters from falling down when the bar is folded for transportation, assuming, of course, that the machine is of the right-hand-cut type. These stops are preferably rounded and are inclined on their front faces to more readily shed the grass and stalks.

The forwardly-extending keepers for the cutters may be provided at any suitable points along the length of the cutter-bar. In practice I prefer to form them integral with the clips supporting the springs, as the expense of the production of the parts is reduced by making the keepers and clips integral, and in this position the springs passing back and forth in front of them in their movements with the reciprocations of the cutters prevent dirt and grass from packing under them. Furthermore, under normal conditions of work the springs preserve the knife-sections in operative position upon the ledger-plates and insure a perfect shear cut; but when a stone or other obstruction is encountered the force of the springs will be overcome, and if my forwardly-extending keepers or equivalent devices are not provided the sections or cutters will be thrown upward against the guard-caps. Therefore the function of these keepers is to supplement the action of the springs by preventing a rise of the knives from the ledger-plates so great as to strike the guard-caps.

While I have shown a spring for exerting downward elastic pressure on the cutters, it is to be understood that the spring may be arranged in any suitable manner for this purpose, as by bearing directly upon the cutters or by exerting its pressure through the means of any intermediate element or elements or by any organization of parts accomplishing the same function, or the elastic pressure on the cutters may be accomplished by any functionally equivalent means.

Having described my invention, I claim—

1. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, means movable with and exerting a yielding downward pressure on the cutters, and a keeper for the cutters to supplement said means.

2. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a spring movable with and tending to hold the cutters in operative position, and a keeper to positively limit upward movement of the cutters.

3. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a clip on the finger-bar, a spring mounted on said clip movable with and adapted to hold the cutters in operative position, and a keeper on the clip for limiting upward movement of the cutters.

4. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar having cutters riveted thereto, a spring-holder on the finger-bar, a spring on the holder movable with and exerting pressure upon the cutters, and a fluted keeper for the cutters.

5. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a spring on the finger-bar movable with the cutter and provided with a foot composed of a disk pivoted on the spring.

6. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a spring on the finger-bar exerting pressure on and following the movements of the cutters, and a removable wear-plate on the cutter to receive the spring.

7. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar provided with a cutter having ribs, a spring on the finger-bar exerting pressure on and movable with the cutter, and a wear-plate to receive the spring and having grooves adapted to the ribs.

8. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a clip on the finger-bar, a standard on the clip having a socket provided with a curved abutment, a spring having a rear leg journaled in the socket and provided with a toe adapted to the abutment, the front leg of the spring bearing upon the cutter, and a clamping-block in the socket having adjusting means whereby to vary the tension of the spring.

9. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a clip on the finger-bar having a keeper for the cutting edge of the cutters, a spring on the clip bearing upon and movable with a cutter, and stops for the spring.

10. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a clip on the finger-bar, a spring on the clip bearing on the cutter and movable therewith, and stops on the clip for the spring.

11. In a cutting apparatus for mowers, reapers and like machines, the combination of a finger-bar, a reciprocating cutter-bar, a clip on the finger-bar having a keeper for the cutter limiting the upward movement thereof, a pair of stops on the clip, and a spring on the clip bearing upon the cutter and movable therewith between the stops.

In testimony whereof I affix my signature in presence of two witnesses.

HARVEY L. HOPKINS.

Witnesses:
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J. MCROBERTS.