

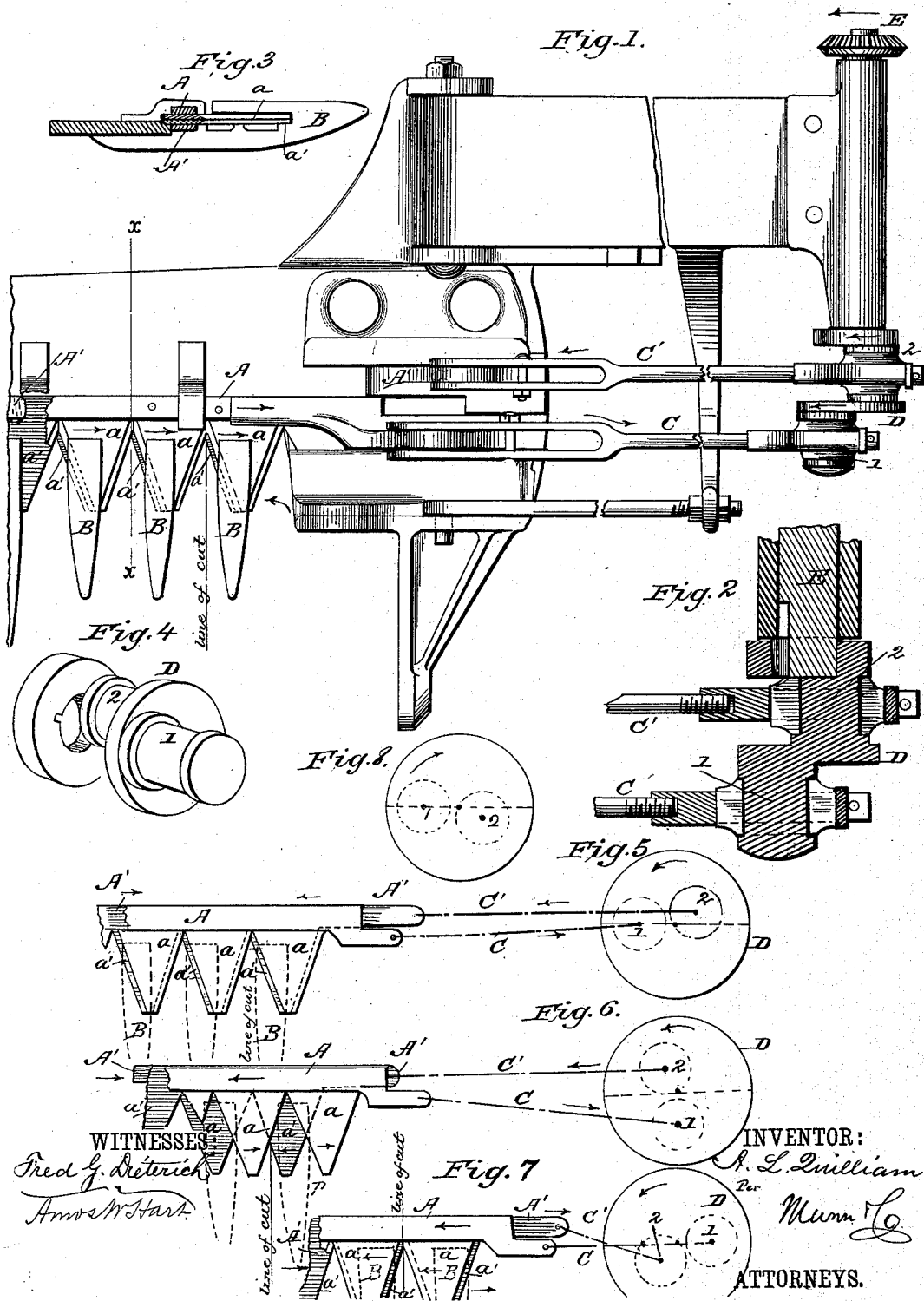
(No Model.)

A. L. QUILLIAM.

MOWER.

No. 384,712.

Patented June 19, 1888.



UNITED STATES PATENT OFFICE.

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MOWER.

SPECIFICATION forming part of Letters Patent No. 384,712, dated June 19, 1888.

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To all whom it may concern:

Be it known that I, ALBERT L. QUILLIAM, of Chateaugay, in the county of Franklin and State of New York, have invented a new and useful Improvement in Mowers, of which the following is a specification.

This invention is an improvement in the class of mowers having two cutter-bars which reciprocate in opposite directions simultaneously. So far as I am aware, success has not heretofore been attained with these mowers, and the failure has been due to one or all of the following faults in construction: First, the two cranks employed for driving the cutter-bars had an equal "throw;" second, the wrist-pins of the respective cranks were placed in line and diametrically opposite; third, the cutters were not properly proportioned in width to the width between the guard-fingers and to the throw of the cranks. In a machine having these features of construction the oppositely-moving cutters do not meet at such a point as enables them to be properly supported by the guard-fingers while making their cut, and hence they are "sprung" or bent downward under the weight and pressure of the grass, thus preventing their edges from working in close contact with the upper cutters, as required to enable them to cut in the best manner—*i. e.*, so as to avoid clogging.

By the construction hereinafter described and claimed I have overcome all difficulties and produced a machine which works perfectly in the field, and is also of very light draft. Figure 1 is a plan view of the parts of a mower embodying my invention. Fig. 2 is a horizontal section of the double crank and parts immediately connected therewith. Fig. 3 is a cross-section on line *xx*, Fig. 1. Fig. 4 is a perspective view of the double crank detached. Fig. 5 is a diagram showing the relation of the wrist-pins of the double crank to the axis thereof in a machine which runs to the right, and also the position of the cutters relative to each other, the guard-fingers and the double crank when ready to begin cutting in one direction. Fig. 6 is a diagram showing the same parts and their local relation when the cut is half completed in the same direction. Fig. 7 is a diagram showing the rela-

tive positions of the same parts when the cutters are ready to begin their return cut—*i. e.*, a cut in the direction opposite to that shown in Figs. 5 and 6. Fig. 8 is a diagram showing the positions of the wrist-pins relative to each other and the axis when arranged for a machine that runs to the left.

The upper and under cutter-bars, A and A', are respectively provided with beveled cutters *a a'*, whose flat sides work in contact. The said cutters reciprocate through the slotted guard-fingers B, being operated by connecting-rods C C', attached to wrist-pins 1 2 of the double crank D. The under cutters rest on and are supported by the under side of the guard-fingers.

I will now proceed to indicate the features of novelty constituting my invention.

Instead of placing the wrist-pins 1 2 in alignment with the axis of the shaft E, and also at equal distances from said axis, as usual heretofore, I adopt the arrangement which is shown—that is to say, the center of the wrist-pin 1 (to which the connecting-rod C of the upper cutter-bar, A, is attached) is placed five-eighths of an inch, and the wrist-pin 2 (of the under cutter-bar, A') is placed three-eighths of an inch from the axis. Of course the throws of the respective cranks are double these distances—to wit, one and one-fourth inch and three-fourths of an inch. The wrist-pins are also not in alignment with the axis, (see diagrams, Figs. 5 and 6,) but at points indicating an angle of about sixty degrees—that is to say, one of them is about thirty degrees from the diametrical line drawn through the other wrist-pin and the axis. The reason for these positions of the wrist-pins will be presently explained. About ninety per centum of the single-cutter-bar mowers have cutters which are three inches wide, and the remaining ten per centum are two and one-half inches wide. A cutter having a less angle than is afforded the latter width will not work with the narrow ledger-plates ordinarily used. I have found that I secure a good result with cutters only two inches wide; hence I employ twenty-four cutters on each cutter-bar in place of sixteen, as usual in single-cutter-bar machines. There are, therefore, forty-eight cutters in all, work-

ing against each other, and at a comparatively slight angle, instead of one-third that number working against dull-edged ledger-plates at a considerably greater angle. The result is that the grass is cut by my apparatus much more easily, so that the draft of the machine is proportionally less. Besides this great advantage in consequence of the cutters acting against each other, they are to a large degree self-sharpening, and may in many, if not most, cases be used an entire season without requiring to be removed for resharpening.

The guard-fingers B are about seven-eighths of an inch wide at base, and the distance between them is equal to the width of the cutters—to wit, two inches. The throw of the lower cutter-bar being three-fourths of an inch, the lower cutters, *a'*, are limited in their reciprocation so as to pass only about half their width beyond the sides of their respective guard-fingers in moving either way. This limitation of movement is necessary in order that the said cutters *a'* may be properly supported by the lower portions of the guard-fingers B while cutting, and thus be prevented from bending or "springing" downward under the weight of the grass and pressure due to forward draft of the machine. In other words, if the cutters, *a'*, should meet the upper cutters, *a*, at a point equidistant between the guard-fingers B they would be bent downward, and thus fail to work in close edge-contact with the upper ones, so that clogging would inevitably result, and the success of the machine would thereby be endangered, if not destroyed. By my arrangement and proportional relation of parts the line of cut of each pair of coacting knives *a a'* is as close to the side of the guard-fingers as practicable. (See Figs. 1 and 7, where the cutters *a a'* are shown at the limit of their movement in one direction and ready to begin the return movement indicated by the arrows.) The point where the cutters meet, which is the line of cut in such return movement, will be close to the guard-fingers at the right of each pair of coacting cutters. In diagram, Fig. 6, the cutters have completed about half of their movement, and yet the line of cut is shown to be the same as before. In diagram, Fig. 7, the cutters are cutting in the reverse direction to that indicated in Figs. 5 and 6, and hence the line of cut is close to the opposite guard-fingers—that is to say, the guard-fingers at the left of each pair of coacting cutters. Thus the lower cutters, *a'*, are supported by the guard-fingers B while making their cut, and therefore always work in so close contact with the upper ones, *a*, that clogging is an impossibility; but it will be seen that to enable the upper cutters, *a*, to meet the lower ones, *a'*, at the point indicated the former must travel a greater distance, and for this reason the upper cutter-bar, A, is given a throw of one-half inch more than the under one, A'.

The reason for placing the wrist-pins 1 2

out of alignment with the axis of crank D can now be understood. By reference to Figs. 1, 5, 6, it will be seen that the shaft E is driven to the right, (regarded from the rear of machine,) and the wrist-pin 1 of the upper bar, A, is on the same horizontal line with the crank-axis, while the other wrist-pin, 2, is thirty degrees above such line. As the shaft rotates the lower cutter bar, A', will obviously move first and faster than A, since its wrist-pin 2 is farther from the dead-center. Thus the cutters *a a'* are caused to work—i. e., slide on each other—with the required rapidity at the beginning of their stroke, which they would not do if both wrist-pins were on the dead-center—i. e., at diametrically-opposite points.

As above stated, the shaft E is driven to the right. This is the usual direction of motion in single-cutter-bar machines; but some machines run to the left, and of course in such a case the local relation of the wrist-pins to the axis must then be changed, otherwise the cutters will not meet properly and not cut at all. The necessary change is indicated in Fig. 8, the wrist-pin 2 being placed the same distance below or on the other side of the diametrical line as it is above said line in Fig. 5. In other words, when the wrist-pins are set for a machine running to the left, they are at an angle of about sixty degrees on the other side of the axis from the one they occupy when the machine runs to the right, as in Figs. 5, 6.

The double-crank piece D is adapted for attachment to the shaft E of a single-cutter-bar mower in the same manner as the single crank ordinarily employed thereon. Thus the disk formed on the inner end of the crank D is bored, as shown in Fig. 4, to receive the end of the shaft, and is rigidly keyed thereon.

It will be seen that a single-cutter-bar machine may be converted into a double-cut mower by attaching my double crank and cutter-bars and the requisite number of guard-fingers.

I have indicated the proportional relation of the double-crank cutters and guard-fingers, and the number of the latter which experience has demonstrated to be the best; but it is practicable to secure measurably good results by employing a less number of cutters and guard-fingers, and in such case the cutters would of course be made wider, and hence the length of throw of the cranks might require to be changed correspondingly.

In general I do not wish to be understood as limiting myself to the precise proportions stated, since some small variations may be practicable.

What I claim is—

1. In a cutting apparatus of the class herebefore indicated, the combination of the double crank whose wrist-pins are set out of alignment with each other and the axis, and at unequal distances from the latter, to wit, five-eighths of an inch and three-eighths of an inch,

respectively, a series of guard-fingers placed about two inches apart, and a series of upper cutters and a series of under cutters whose width is the same or nearly the same as the
5 guard-fingers, substantially as shown and described, for the purpose specified.

2. The detachable double crank D, having wrist-pins 1 and 2 set out of alignment with

each other and the axis, and at unequal distances from the latter, as shown and described.

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Witnesses:

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