No. 676,230. Patented June 11, 1901.

C. W. HARRIS.

MOWER.

(No Model.) (Application filed June 8, 1899.)

3 Sheets—Sheet 1.

Fig-1.

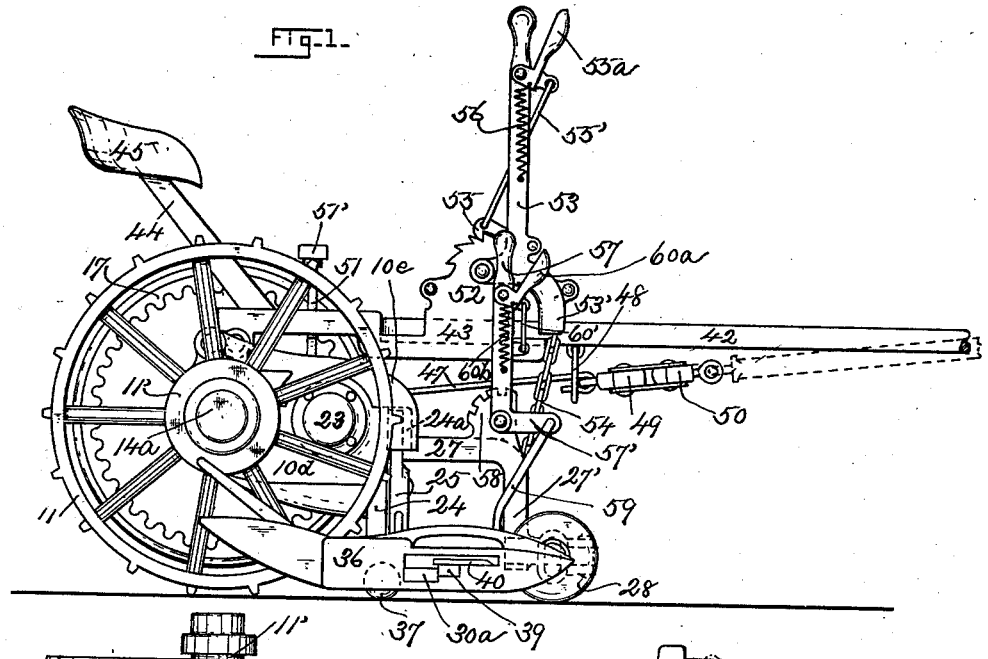
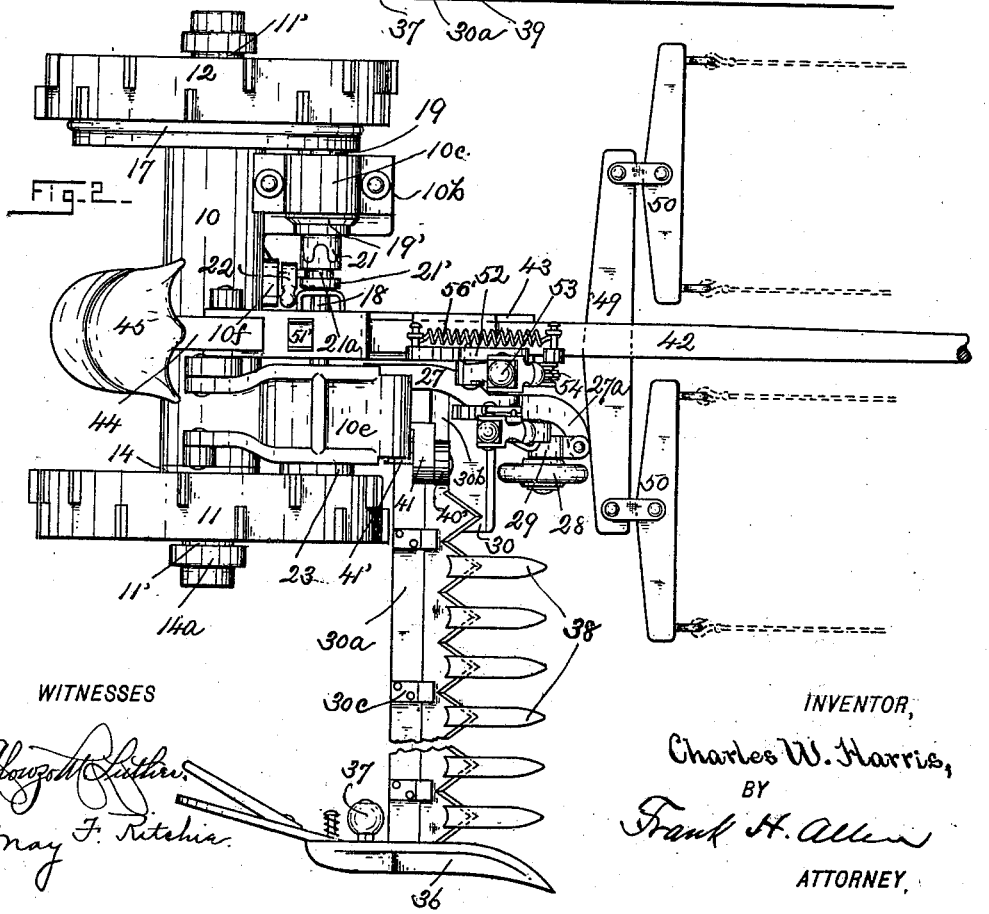


Fig-2.



WITNESSES

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No. 676,230. Patented June 11, 1901.

C. W. HARRIS.

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(Application filed June 8, 1899.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

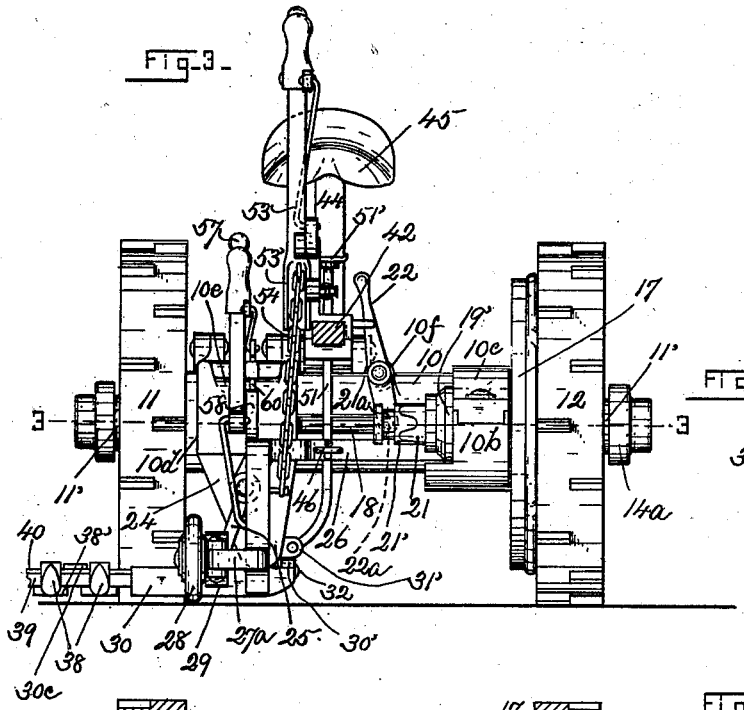


Fig. 13.

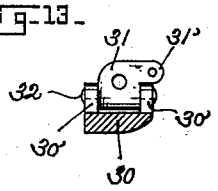


Fig. 4.

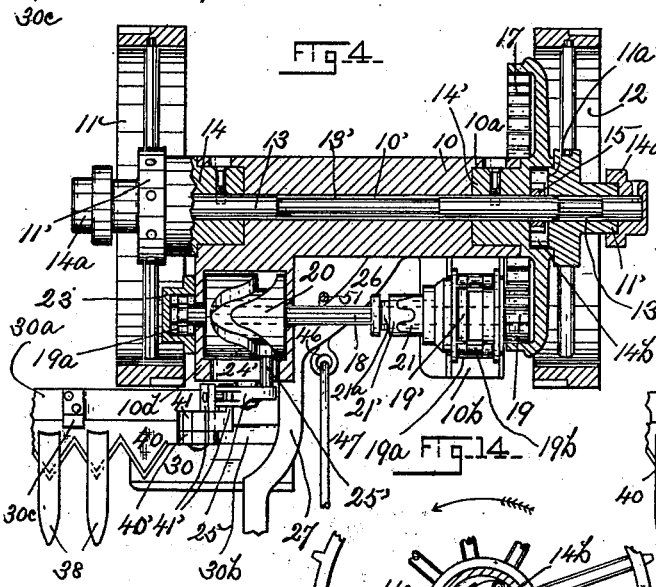


Fig. 14.

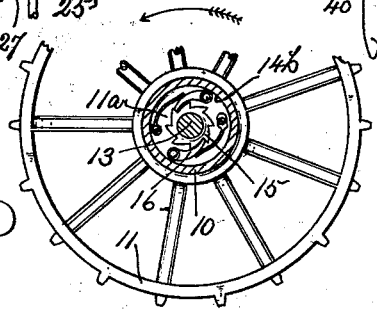


Fig. 12.

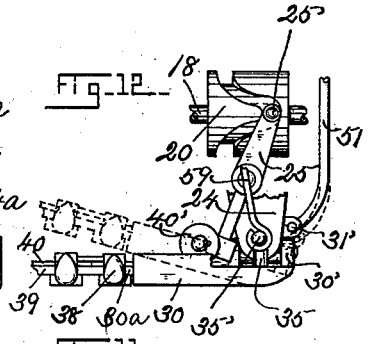
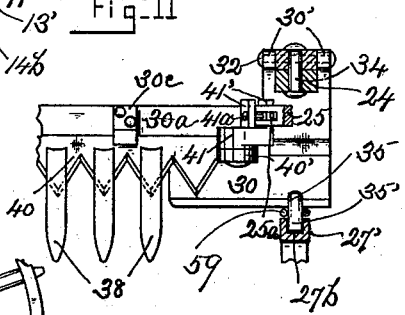


Fig. 11.



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No. 676,230. Patented June 11, 1901.

C. W. HARRIS.

MOWER.

(Application filed June 8, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

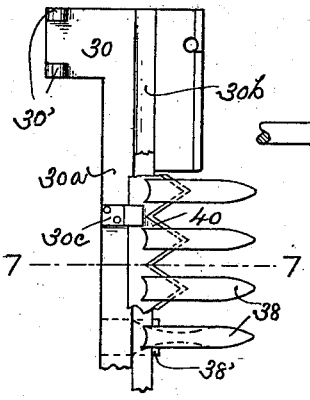


Fig. 5.

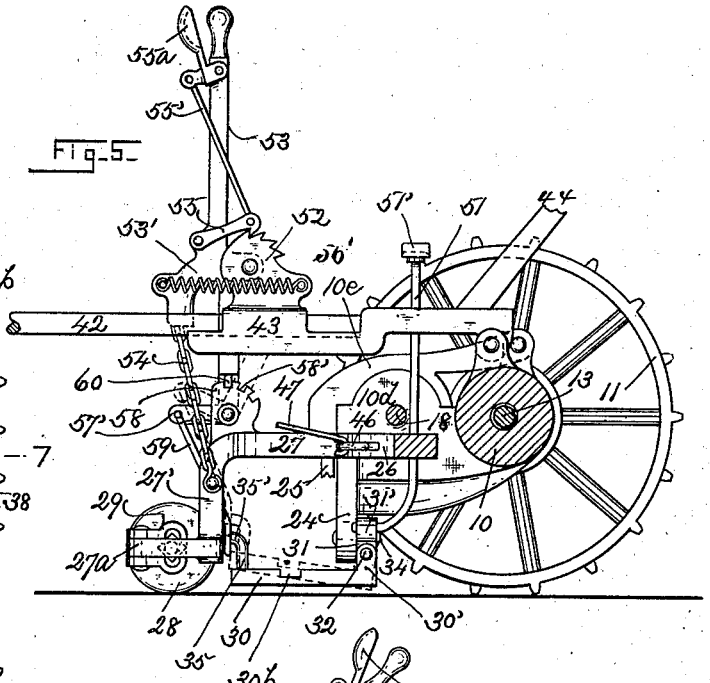


Fig. 8.

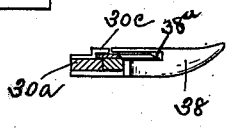


Fig. 6.

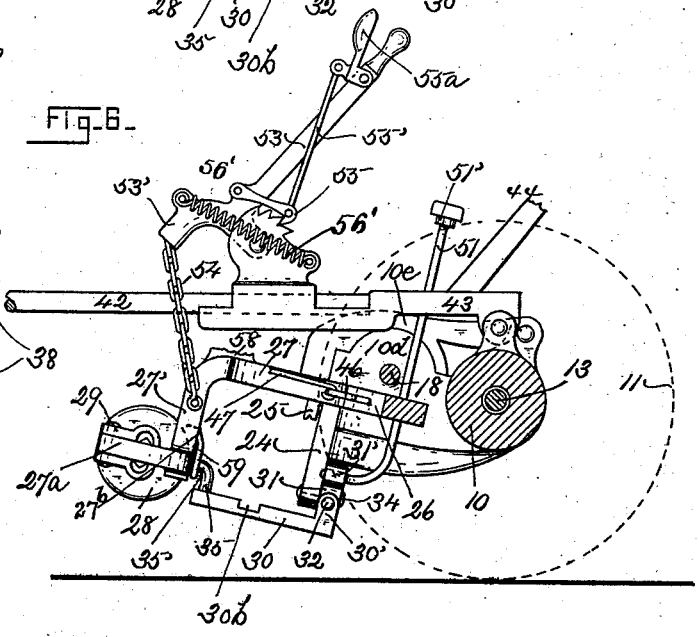


Fig. 9.

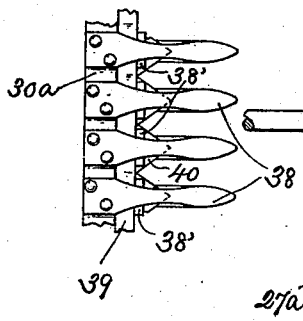
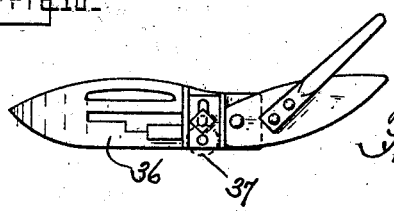


Fig. 10.



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UNITED STATES PATENT OFFICE.

CHARLES W. HARRIS, OF SALEM, CONNECTICUT.

MOWER.

SPECIFICATION forming part of Letters Patent No. 676,230, dated June 11, 1901.

Application filed June 8, 1899. Serial No. 719,747. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. HARRIS, a citizen of the United States, residing at Salem, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Mowers, of which the following is a full, clear, and exact description.

The object of this invention is to provide a mowing-machine embodying certain improvements in minor details of construction to the end that the machine shall be simplified as a whole and very readily operated.

To assist in the explanation of my invention, the accompanying drawings have been provided, which illustrate the same, as follows:

Figure 1 is a side elevation, Fig. 2 a plan view, and Fig. 3 a front elevation, of my newly-improved mower. Fig. 4 shows my mower principally in horizontal central section, the sectional portion of said view being taken on the line 3 3. Figs. 5 and 6 illustrate, partly in vertical section and partly in elevation, certain mechanism of the mower and the manner in which it operates. Fig. 7 is a plan view of a portion of the knife mechanism. Fig. 8 is a sectional view thereof, taken on the line 7 7; and Fig. 9 is a plan view of the under side of said mechanism. Fig. 10 is an elevation of the shoe that supports the outer end of the knife. Fig. 11 illustrates in plan the inner end of the knife mechanism. Fig. 12 shows in elevation the manner in which said knife mechanism operates, and Fig. 13 illustrates the manner of assembling certain elements of said mechanism. Fig. 14 illustrates, principally in elevation, the manner in which the wheels of the mower are mounted upon the axle.

Referring to the drawings, the number 10 denotes a casting of substantially cylindrical shape, which is supported horizontally between the mower-wheels 11 and 12 upon the axle 13. The casting 10 is bored centrally throughout its length, as at 10′, to receive the said axle and at each end is provided with a countersunk recess 10^a to receive collars 14 14′; which latter when in position are secured to the axle 13, thus preventing endwise movement thereof but interfering in no way with its revolution. The mower-wheels 11 and 12 are retained in position on the axle by means of caps 14^a, which are secured to the ends of the axle and receive within themselves the outer ends of the hubs 11′ of the wheels, thus serving not only to retain the wheels in position, but also to exclude all dust and dirt which might otherwise work in and clog the wheels. The wheels 11 and 12 are loosely mounted upon the axle 13; but means are provided whereby said wheels under certain conditions are locked to the axle and cause it to revolve with themselves.

To drive the knife-bar of the mower, mechanism is provided whereby motion is transmitted from the axle 13 to the said knife-bar, and as it is desirable that the knives shall operate only when the mower is traveling forward the connection between the mower-wheels 11 and 12 and the axle 13 is such that during any backward movement of the mower the wheels ride idly upon the axle.

Describing now the connection between the wheels 11 and 12 and the axle 13, the reference-number 14^b denotes a countersunk recess in the face of the collars 14 14′, adjacent the hubs 11′ of the wheels 11 and 12. In the bottom of each recess a ratchet-wheel 15 is secured concentric to the axle 13, which latter passes therethrough, as shown in Figs. 4 and 14. The otherwise open end of the recess 14^b is closed by the reception in such ends of a boss 11^a, formed on the hubs 11′ of the mower-wheels. Each boss 11^a has secured to its face one or more spring-pressed pawls 16, which engage the ratchets 15, and when the wheels 11 and 12 are revolved by the forward travel of the mower said pawls serve to revolve the ratchets 15 and the collars 14 14′, to which they are respectively secured, said collars in turn being secured to the axle 13, thereby effecting the revolution of the said axle. Upon the rearward movement of the mower, however, the pawls 16 ride idly over their ratchets 15 and no motion is imparted to the axle 13 or mechanism controlled thereby. The pawl-and-ratchet mechanisms just described being located in the countersunk recesses 14^b, whose outer

ends receive the bosses 11^a, are thus completely inclosed and protected from all dust and dirt that might otherwise collect and prevent the free working of such mechanisms.

The reference-number 17 denotes an internal gear of considerable size located adjacent to the mower-wheel 12, concentric with the axle 13, and having for its hub the collar 14′, this manner of mounting the internal gear 17 permitting it to revolve in unison with the wheel 12 when the mower is traveling forward or allowing it to remain stationary when the said wheel is traveling in the opposite direction. The internal gear 17 is provided to drive a shaft 18, located somewhat forward of the axle 13 and extending parallel therewith, which said shaft 18, might be termed the "cam-shaft" of my machine. To aid in driving the cam-shaft 18, the latter bears a pinion 19, that is mounted loosely thereon, upon its end adjacent the wheel 12, the said pinion 19 meshing with the internal gear 17. Near its opposite end the cam-shaft 18 bears a serpentine-groove cam 20, which forms an important element of the knife-driving mechanism of the mower. To support the cam-shaft 18, the cylindrical casting 10 is provided near its end adjacent the wheel 12 with a projection 10^b, preferably of journal-box form, in which the said shaft 18, or rather a sleeve 19′, secured to the pinion 19, lies, the said box being provided with an ordinary hinged cover 10^e.

At its end adjacent the wheel 11 the casting 10 has a box 10^d formed thereon, within which the cam 20 is inclosed by means of a cover 10^e, hinged to the casting 10, as shown in the drawings. The shaft 18 passes through the side walls of the box 10^d and is supported by bearings formed in the same, or the end of said shaft adjacent the cam 20 may be supported in the manner shown in the drawings and hereinafter described.

The pinion 19 is loosely mounted upon the cam-shaft 18 or upon the end of the sleeve 19′, the other end of which sleeve has secured thereto or formed therein the loose section 21 of a clutch whose splined section 21′ is adapted to revolve with the cam-shaft 18. The said splined clutch-section is controlled by a lever 22, hung midway its length to a projection 10^f on the cylindrical frame 10, the lower end of said lever bearing a pin 22^a, which engages a groove 21^a in the clutch-section 21′, the upper end of the lever being within easy reach of the driver, so that it may be operated to throw the splined clutch-section either into or out of engagement with the loose (driving) section, and thus cause the shaft 18 to be driven by the pinion 19 or allow said shaft to remain stationary while the said pinion and the loose clutch-section continue to revolve. In the accompanying drawings I have shown the cam-shaft 18 as provided with roller-bearings, and, if desired, the axle 13 and other running parts might be similarly fitted up; but such feature is not essential to the successful working of my machine and is shown in the case of the cam-shaft only.

When roller-bearings are provided for the cam-shaft 18, the sleeve 19′, having at one end the pinion 19 and at the opposite end the clutch-section 21, is preferably of somewhat increased diameter between the pinion and clutch-section, and the just-mentioned portion of the sleeve lies within the said box 10^b, being surrounded by a ring of rolls 19^a, seated in a suitable recess in the said box 10^b and its cover 10^e. The end of the shaft 18, bearing the cam 20, projects through the box 10^d and into a chamber provided by securing a cap 23 to the outer side wall of the said box 10^d, adjacent to the wheel 11. The said chamber is concentric with the shaft 18, and surrounding the end of the latter is a ring of rolls 19^a, engaging the circumferential face of the end of the shaft and the inner wall of the chamber, this feature of providing a roller-bearing for the cam-shaft 18 being best shown in Fig. 4 of the drawings. In order to reduce friction still more than would be accomplished by the rollers 19^a themselves, said rolls midway their length are of reduced diameter, as at 19^b, and the coinciding points of the shaft 18 and sleeve 19′ may, if desired, be correspondingly reduced in diameter, thus making the points of contact between the shaft and sleeve and their rolls so small as to do away almost entirely with any friction that might otherwise be present. This feature of reducing the diameter of the shaft 18 and the sleeve 19′ I have also carried into effect in the case of the axle 13, whose diameter is reduced at the points 13′ and at other points, if desired, to reduce the frictional contact of said axle with the wall of the hole 10′.

Depending from the cam-box 10^d is a fixed arm 24, that reaches nearly to the ground and upon the front face of which a lever 25 is pivoted approximately centrally of its length. The upper end of the lever 25 bears a pin 25′, that passes through a slot or other opening 24′ in the box 10^d and so that on the inner end of said pin a roll 25^a, carried thereon, may lie in the groove of the cam 20. The cover 10^e, which closes the box 10^d, preferably overlaps said box somewhat and receives within a chamber 24^a, provided in said cover, the upper end of the lever 25, as shown in dotted lines in Fig. 1, thus protecting the said upper end of the lever from dirt and injury. The lower end of the lever 25 is secured by suitable connection to the knife-bar of the mower, as hereinafter described, and it will now be readily understood from the drawings that when the cam 20 is in revolution the lever 25 will be caused to rock upon its pivotal support, and the lower end thereof, connected with the knife-bar, will move the latter with the desired reciprocating motion.

To assist in supporting the knife mechanism of the mower, a framework 26 is secured to the casting 10, from which a beam 27 extends forward, bearing in advance of the arm 24 a right-angular downwardly-extending portion 27′. To support the forward end of the beam 27 and the inner end of the knife mechanism, I have provided a small wheel 28, whose axle is adjustably secured in a frame 29, which latter in turn is pivotally secured in advance of its axle to the forward end of an arm 27^a, leading from a point near the lower end of the downwardly-extending portion 27′ of the beam 27, such manner of securing the wheel 28 allowing the same to follow freely the direction of travel of the mower and to adjust itself readily to any change in the direction of such travel. The arm 27^a extends horizontally grassward a sufficient distance from the downwardly-extending portion 27′ to bring the small wheel 28 nearly on a line with the inner edge of the inner driving-wheel 11. This wheel 28 is thus brought directly in front of the plate 30 and opposite the front end of the cutter-bar, where it runs along the ground on the edge of the uncut grain when the machine is passing over the ground which has already been cut. This wheel serves as a guide for the driver, and at the same time it helps to support the inner end of the cutting apparatus.

The reference-number 30 denotes a plate that is pivotally secured to the lower ends of the arm 24 and the beam portion 27′. To thus support the plate 30, it is provided on its upper side adjacent the lower end of the arm 24 with lugs 30′, between which a block 31 is pivotally secured by means of a pin 32, lying in a plane parallel with the axle of the mower. Somewhat above the pin 32 the block 31 is in turn pivotally secured to the lower end of the arm 24 by means of a pin 34. Located in the plate 30, adjacent to the lower end of the beam portion 27′, is a pin 35, having a right-angular extension 35′ at its upper end, which extension is approximately in line with the axial center of the pin 34, and the end of said pin portion 35′ is adapted to rest in the bottom of a groove 27^b, formed in the face of the beam portion 27′ confronting the arm 24. The pins 34 and 35 serve to support the plate 30 at a slight elevation from the ground, and under conditions hereinafter recited the said plate 30 may be rocked upon its points of support. Extending from the plate 30 is an arm 30^a, whose length is determined by the width of cut of the mower, the outer end of which arm is supported by a shoe 36, which latter is retained at preferably a slight elevation above the ground by means of a wheel or ball 37, adjustably secured thereto. The bar 30^a provides a support for the knife-guard, which is made up of the required number of fingers 38. The said guard-fingers 38 have portions 38′ formed thereon, extending at right angles to the length of the fingers, which said portions 38′ are in alinement with each other and form one wall of a raceway whose opposite wall is composed of the confronting face of the bar 30^a, the bottom of the raceway being provided by the guard-finger portions adjacent the bar 30^a. The raceway just described is continued across the plate 30 by a groove 30^b and receives within itself a bar 39, which is adapted to travel reciprocally to impart like motion to the knife 40, which latter is secured to the upper side of the said bar and is adapted to travel through slots 38^a in the guard-fingers 38. To retain the bar 39 in its seat in the raceway, a number of plates 30^c are secured to the bar 30^a in such manner as to overlap somewhat the knife 40, and thus prevent displacement of the latter and of the bar 39.

The inner end of the knife 40 bears a lug 40′, (or such lug could be as well secured to any suitable element moving with the knife,) and to the said lug 40′ there is pivotally secured a disk 41, having two projections 41′ extending therefrom, that receive between them the lower end of the lever 25, the latter being secured by means of a pin 41^a, located therein and passing through a slot 25^a in the lever 25. It will now be readily seen that when the lever 25 is set in motion by the cam 20, as already described, said lever by reason of its connection with the knife-bar 40 will cause the latter to travel with a reciprocating motion, the said knife acting in the usual manner to cut the grass between the guard-fingers 38.

The pole 42 of my mower forms a continuation of a tongue 43, to which tongue it is suitably secured, the tongue being hinged to the top side of the cylindrical casting 10 about midway the length of said casting. Near the hinged end of the tongue a post 44 is located, bearing on its upper end the mower-seat 45. The frame 26 has secured thereto beneath the pole 42 an eye 46, to which the inner end of a rod 47 is hooked, the outer end of which rod rests in a link 48, secured to the pole 42, and said outer end has secured thereto the draft-equalizer 49, which bears at each end the whiffletrees 50, such construction having a tendency to slightly lift the knife mechanism when the machine is being drawn along, a feature which in practice is found desirable.

In connection with mowing-machines of this class it is desirable that mechanism be provided whereby the outer or inner ends of the knife may be independently raised when it is desired to pass over stones or other obstructions and also means whereby the knife may be adjusted to cut at desired distances from the ground, and the manner in which I accomplish these results in my newly-improved machine I will now explain.

To enable the raising of the outer end of the knife mechanism, I have provided on the block 31 a projection 31′, which latter has pivotally secured thereto the lower end of a

rod 51, which passes upward through the tongue 43 and bears upon its upper end, within easy reach of the foot of the driver, a plate 51′. Upon the downward pressure of the foot-plate just mentioned the rod 51 is caused to correspondingly travel downward, thus rocking the block 31 and the plate 30, to which it is secured by the pin 32, the said plate 30, rocking upon the pin 34 and the pin portion 35′, which support it, carrying upward the outer free end of the knife mechanism, as shown in dotted lines in Fig. 12. Upon the release of the foot-plate 51′ the weight of the knife mechanism returns said knife and connected parts to their normal horizontal positions.

When the cutting mechanism is not desired for use, but the machine is in motion, as in traveling along the road, the knife 40 and connected elements may be rocked upward into an approximately vertical position, in which position they may be secured in any suitable manner.

To accomplish the raising of the inner end of the mower-knife, I have provided the following-described means: Pivotally secured to a flange 52, located on the tongue 42, is a lever 53, the upper end of which is within easy reach of the driver and whose lower end has secured thereto a curved grooved arm 53′, extending forward and downward and having secured in said groove one end of a chain 54, whose opposite end is secured to the beam portion 27′. Connected to this grooved arm 53′ and to the flange 52 is a spring 56′ for the purpose of assisting to throw the lever back into position after having been thrown to the position shown in Fig. 6. As the lever 53 is moved forward from the driver for the purpose of lowering the cutter-bar and the parts connected thereto the spring 56′ expands, and when drawn back the contraction of the spring assists in drawing the lever back into position. When it is desired to raise the inner end of the knife, the lever 53 is drawn rearward, such action resulting in rocking the arm 53′ to draw upward the chain 54, which in turn rocks upward the forward end of the beam 27, said beam rocking upon the axle 13 and lifting the wheel 28 clear of the ground, (see Fig. 6,) as well also as the plate 30, it being understood, of course, that the knife mechanism located on said plate will be correspondingly raised, while the outer end of the knife will remain in contact with the ground through the ball 37. Upon the release of the lever 53 the various parts are returned by gravity to their normal positions. Any suitable locking mechanism may be provided for retaining the lever 53 in its rearward position, the drawings showing mechanism for this purpose consisting of a pawl 55, hung upon the lever 52 and connected by a link 55′ with an angle-lever 55ª, located near the upper end of the lever 53. The said pawl 55 is adapted to engage the teeth of a segmental ratchet formed on the flange 52 and is held normally in engagement with said teeth by means of a spring, (not shown;) but upon the proper manipulation of the angle-lever 55ª the pawl 55 is withdrawn from engagement with the ratchet-teeth to permit the lever 53 to rock forward. The mechanism provided for regulating the height of the cutting portion of the knife is also controlled by means of a lever, the same being denoted by the reference number 57 and being hung upon a flange 58, located on the beam 27. The lever 57 has secured to its lower end a right-angular arm 57′, to the end of which the upper end of a link 59 is secured, whose lower end is hooked beneath the portion 35′ of the pin 35, which forms one of the pivotal supports of the plate 30.. When the lever 57 is rocked rearward, such action results in drawing the link 59 upward, the latter carrying the pin portion 35′ upward in the slot 27ᵇ, in which it is located. To permit the upward travel of the pin 35, the plate 30 rocks upward upon its supporting-pin 32, as shown in dotted lines in Fig. 5, and it will be readily understood that when thus rocked upward the cutting portion of the knife will be correspondingly raised, the outer end of the knife mechanism during such operation rocking upon the ball-support 37 of the shoe 36. As in the mechanism for raising the outer and inner ends of the cutting knife, the cutting mechanism is returned by gravity to its normal position upon the release of the lever 57.

Suitable locking mechanism is provided for retaining the lever 57 in any position to which it may have been rocked, the mechanism of the drawings showing the flange 58 provided with notches 58′, to interlock with which the lever 57 carries a spring-actuated bolt 60, connected by a link 60′ with an angle-lever 60ª, located near the upper end of the lever 57, said angle-lever being rocked to withdraw the bolt 60′ from engagement with the notches 58′ when it is desired to swing the lever 57, and said bolt being allowed to enter the proper notch to hold the lever in the position to which it may have been rocked, a spring 60ᵇ being provided to retain the bolt 60 from accidental displacement.

Having thus described my invention, I claim—

1. In a mower, the beam 27, 27′ extending forwardly and downwardly from the framework, the arm 27ª extending horizontally outwardly and forwardly from the part 27′ of the beam, combined with the wheel 28, and the pivoted frame in which the wheel is journaled, and which is connected to the front end of the arm 27ª, whereby the wheel is left free to follow the movements of the machine, said wheel being placed about on a line with the inner edge of the driving-wheel 11, substantially as shown.

2. The beam 27, 27′ extending forwardly and downwardly from the framework, the arm 27^a extending horizontally grassward and forwardly from the part 27′ of the beam, the pivoted frame connected to the front end of the arm 27^a, and a supporting-wheel adjustably journaled in this pivoted frame, combined with a mechanism for raising and lowering the inner end of the cutter-bar, and which mechanism is mounted upon the tongue 42, substantially as described.

Signed at Norwich, Connecticut, this 29th day of May, 1899.

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Witnesses:
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