(No Model.)

3 Sheets—Sheet 1.

J. GARFIELD.

MOWING MACHINE.

No. 406,520. Patented July 9, 1889.

Fig. 1.

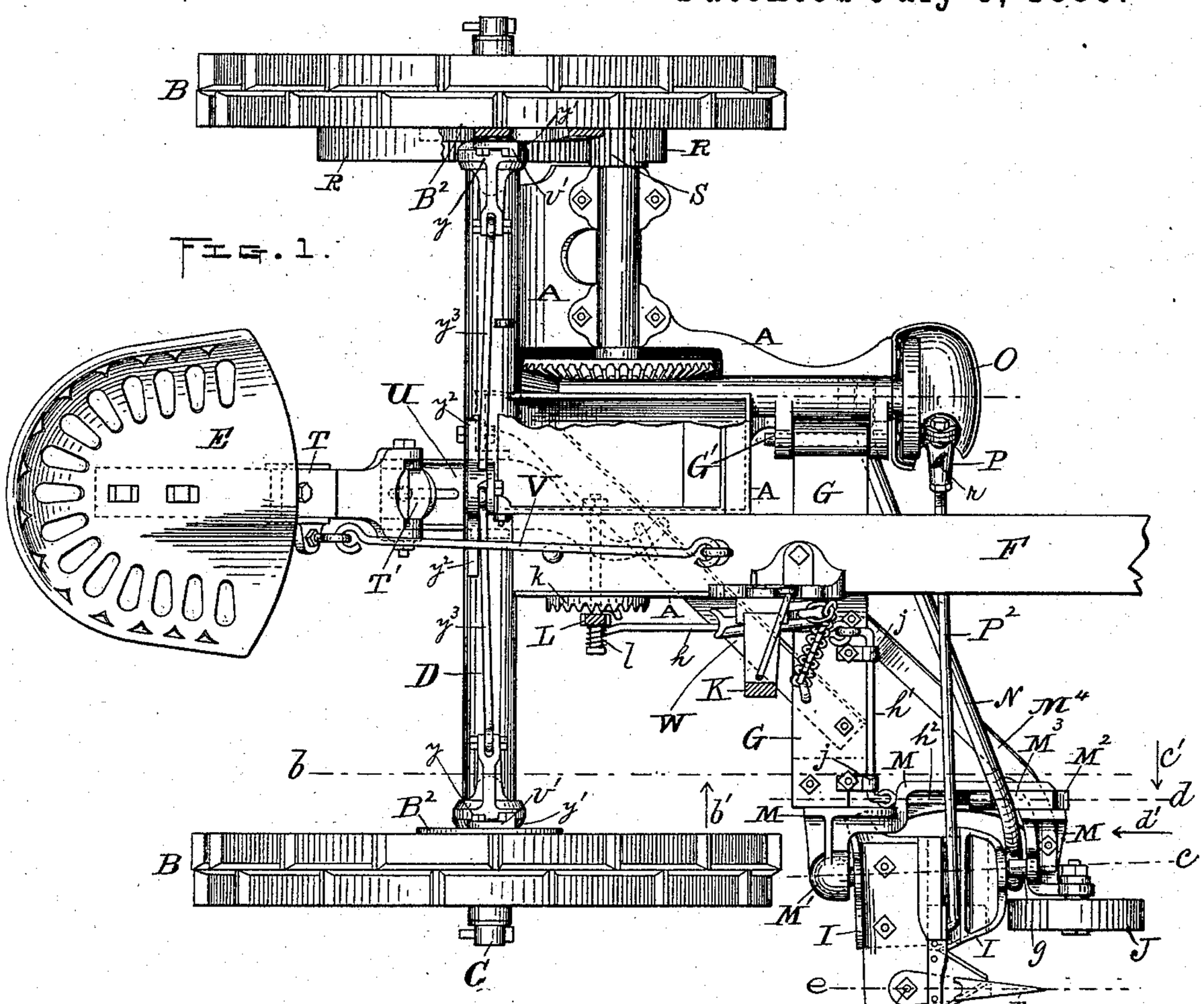


Fig. 3.

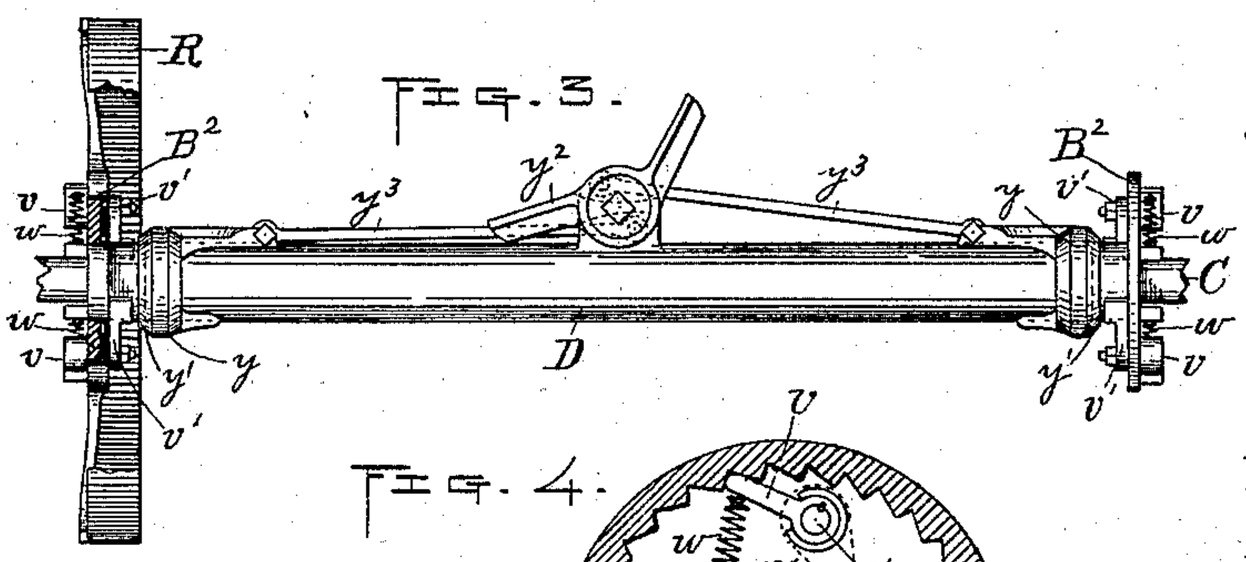
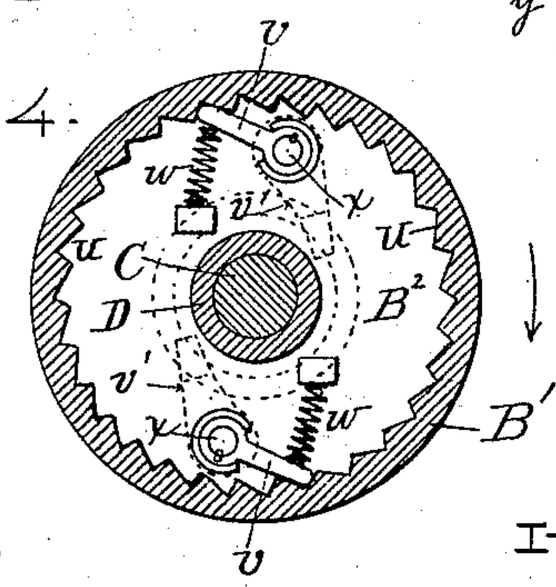


Fig. 4.



Witnesses;

Walter B. Nourse.

Lucius W. Briggs.

Inventor;

Joel Garfield.

By A. A. Baker Atty.

(No Model.) 3 Sheets—Sheet 2.

J. GARFIELD.

MOWING MACHINE.

No. 406,520. Patented July 9, 1889.

FIG. 2.

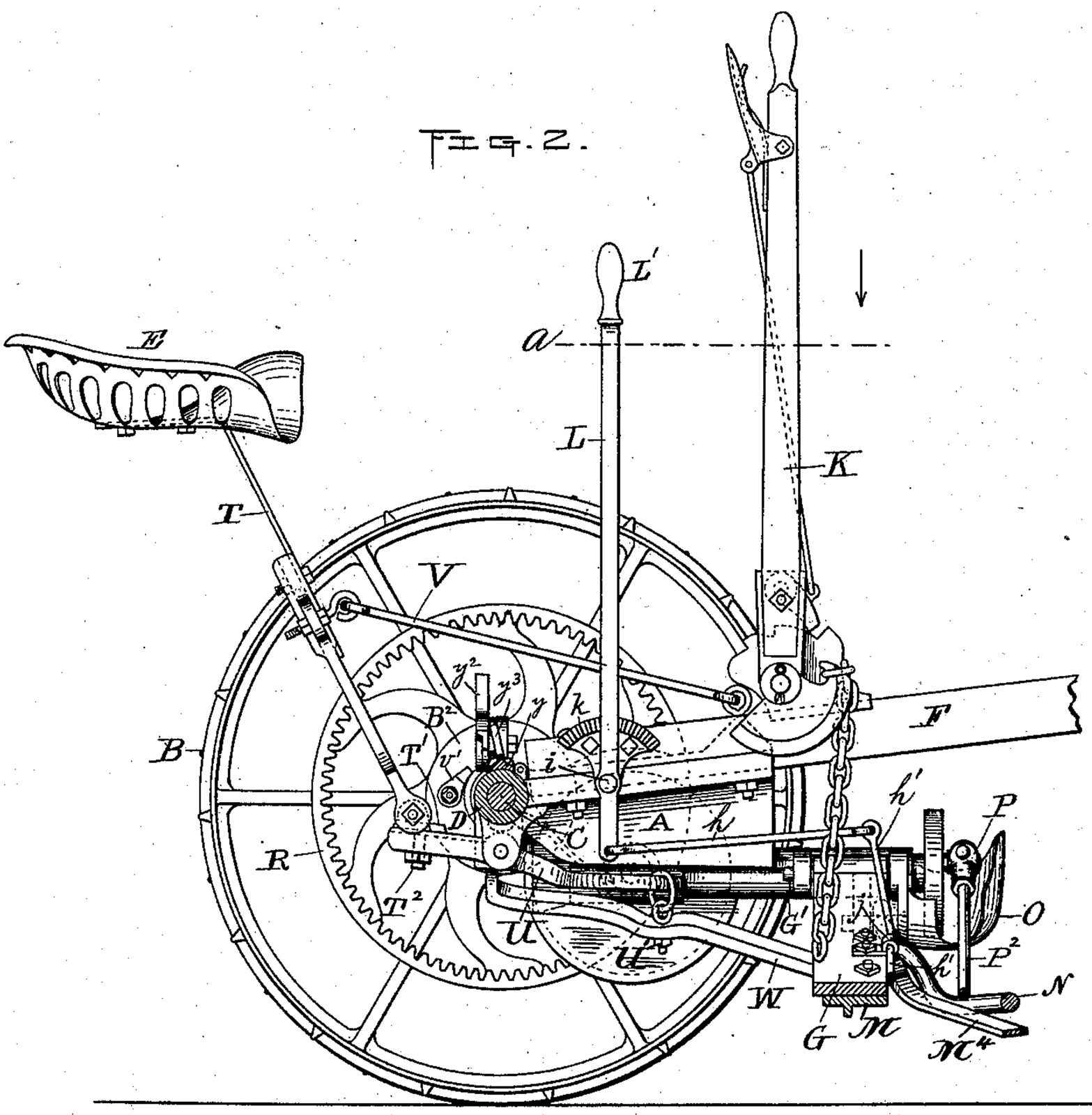


FIG. 5.

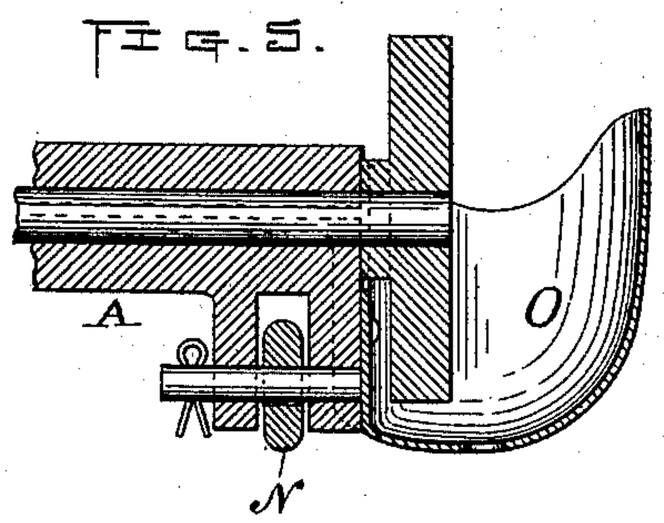
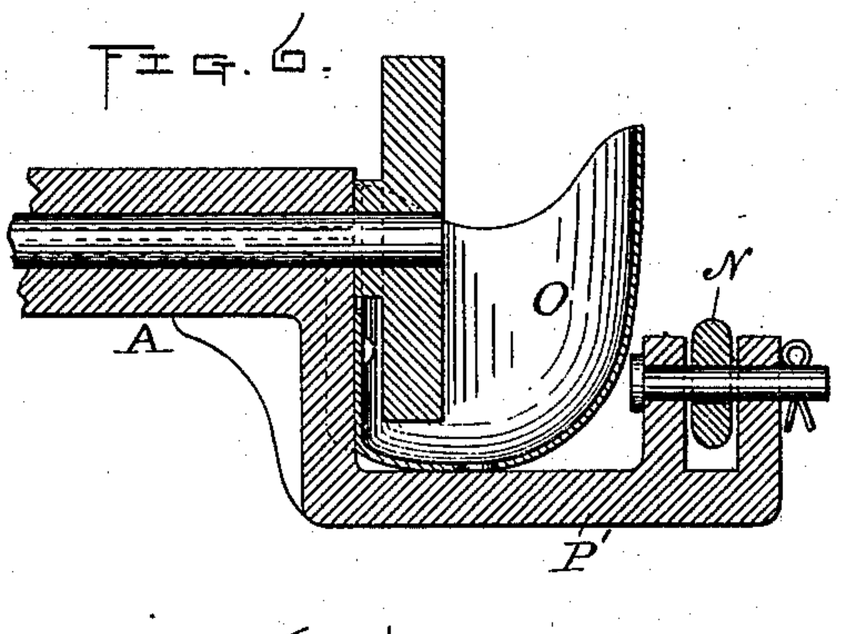


FIG. 6.



Witnesses;

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(No Model.) 3 Sheets—Sheet 3.

J. GARFIELD.

MOWING MACHINE.

No. 406,520. Patented July 9, 1889.

Fig. 7.

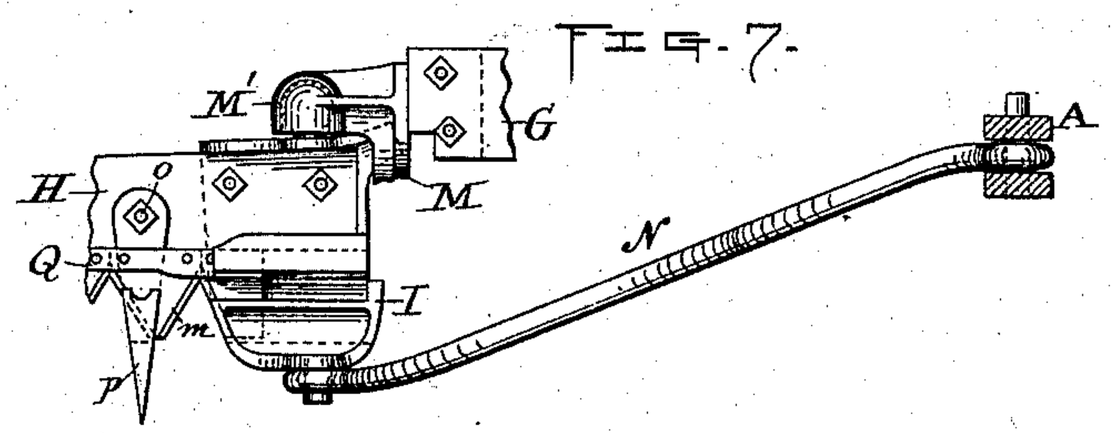


Fig. 8.

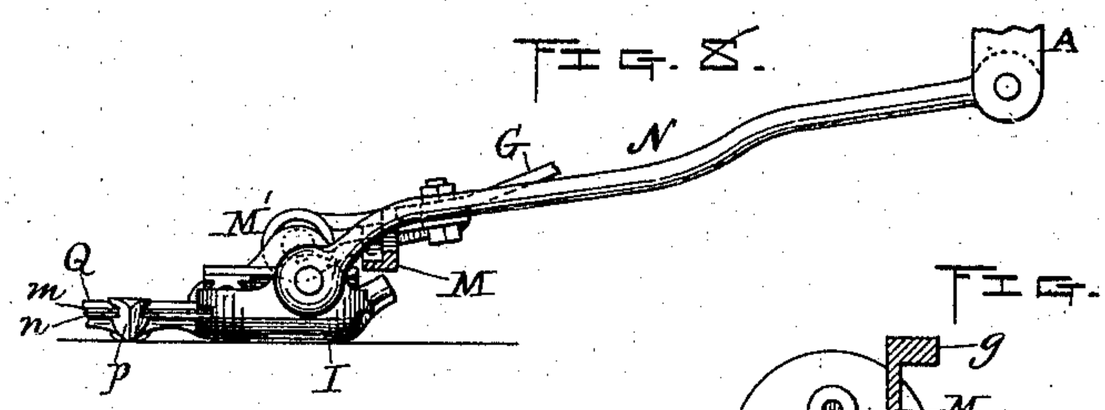


Fig. 9.

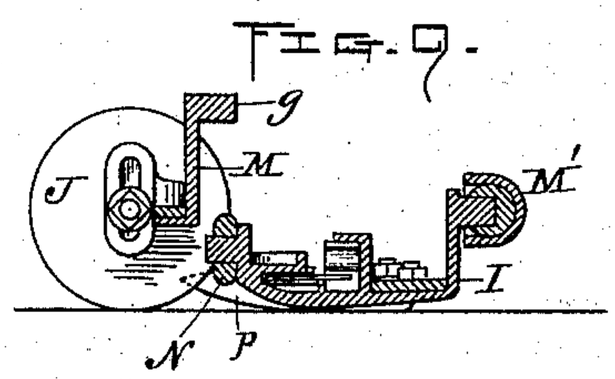


Fig. 10.

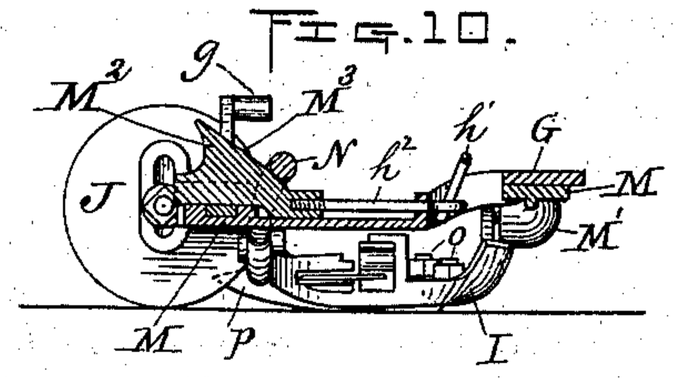


Fig. 11.

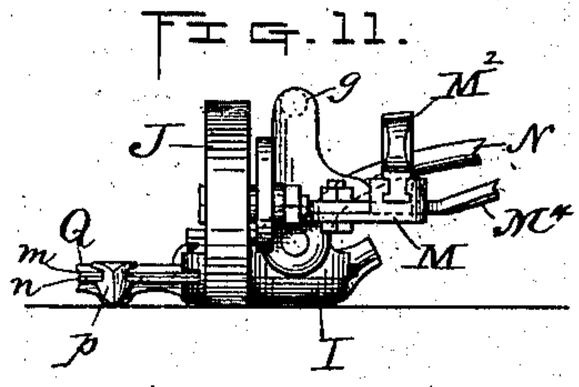


Fig. 12.

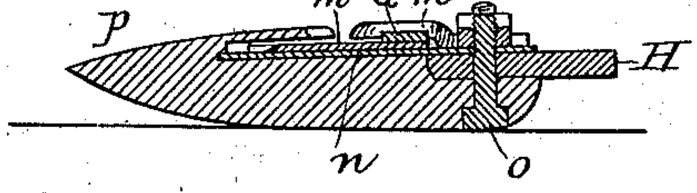


Fig. 13.

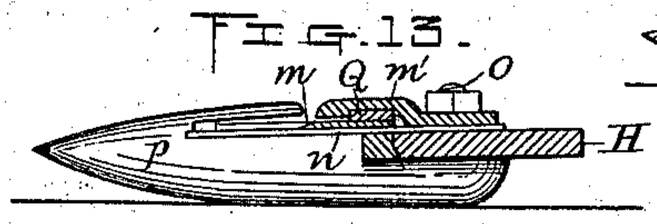


Fig. 14.

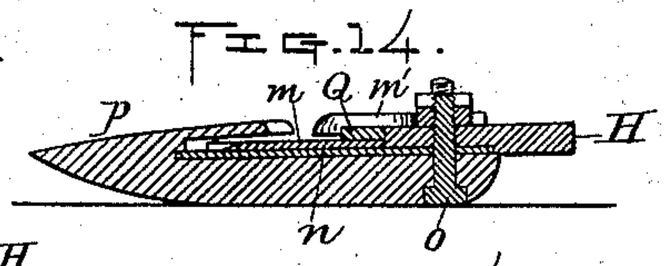


Fig. 15.

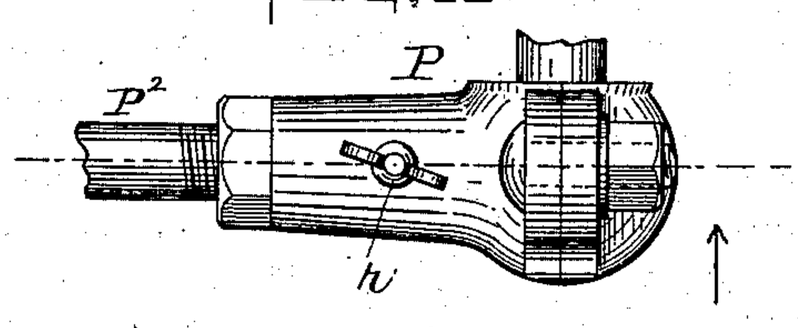
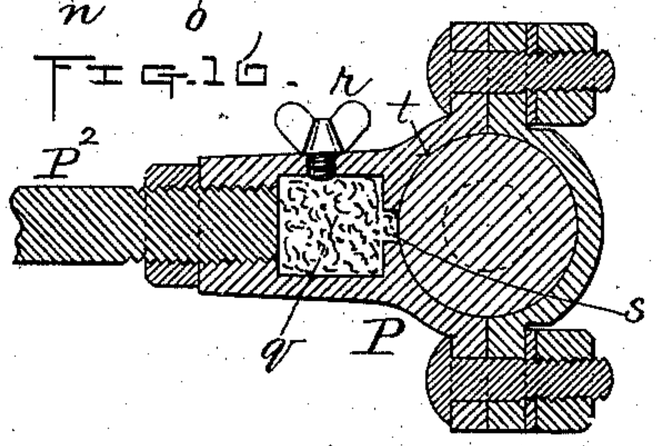


Fig. 16.



Witnesses;
Walter B. Nourse,
Lucius W. Briggs.

Inventor;
Joel Garfield.
By A. A. Baker Atty.

UNITED STATES PATENT OFFICE.

JOEL GARFIELD, OF WORCESTER, MASSACHUSETTS.

MOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 406,520, dated July 9, 1889.

Application filed January 19, 1889. Serial No. 296,800. (No model.)

To all whom it may concern:

Be it known that I, JOEL GARFIELD, of the city and county of Worcester, and State of Massachusetts, have invented certain new and useful Improvements in Mowing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a plan of so much of a mowing-machine as is necessary to illustrate my improvements, the hand-operating levers thereof being shown in cross-section at the points indicated by line *a* in Fig. 2, and a portion of the tool-box and frame broken away to show the operating parts underneath. Fig. 2 is a vertical longitudinal section of said machine, taken on line *b*, Fig. 1, looking in the direction indicated by the arrow *b'*, showing a side view of the parts coming beyond said section-line. Fig. 3 is a back view of the shipping device for shipping and unshipping the power of the driving-wheels to and from the machine. Figs. 4, 5, and 6 are enlarged sectional details of parts of the machine, hereinafter described. Figs. 7 and 8 are a plan and front view, respectively, of the inner end of the finger-bar and adjacent parts, showing the back supporting-pivot and the front rod for holding the parts laterally, as hereinafter more fully specified. Figs. 9 and 10 are transverse vertical sections taken on lines *c* and *d*, respectively, in Fig. 1, looking in the direction of arrow *c'*, same figure. Fig. 11 is a front view of the inner end of the finger-bar, its supports, and adjacent parts, looking in the direction of arrow *d'* in Fig. 1. Figs. 12 and 13 are transverse vertical sections taken on lines *e* and *f*, respectively, in Fig. 1. Fig. 14 is a similar section to Fig. 12, showing a modification in the construction, hereinafter described; and Figs. 15 and 16 are a plan and central longitudinal section, respectively, of the inner end or head of the pitman-rod.

My invention consists, first, in the construction of the inner end of the finger-bar and its supports and connections, whereby a free and independent rocking or oscillating motion of said finger-bar is obtained, so that it may automatically conform to any unevenness of the ground in passing over the same; second, in an improved construction whereby the finger-bar and its attachments may be not only automatically rocked, as aforesaid, but also folded over onto the pole of the machine for convenience in transportation; third, in an improved construction whereby the finger-bar and its attachments may be rocked by hand, independent of the aforesaid automatic rocking motion, by the operator without leaving his seat or stopping the machine, thus enabling him to incline the bar so that the cutters may pass under and cut "lodged" grass, or to elevate the same to pass over soft ground and obstructions; fourth, in an improved construction and arrangement of the cutting apparatus, whereby perfectly-adjusted cutting-edges are produced and the liability to clogging greatly reduced; fifth, in an improved shipping device for shipping and unshipping the power of the main driving-wheels to and from the machine, and, sixth, in an improved construction whereby the weight of the rider upon the seat of the machine may be utilized to counterbalance the weight of the cutting apparatus, and thus ease the draft upon said machine.

Having briefly stated of what my invention consists, I will now proceed to give a detailed description of the same, sufficiently clear and exact to enable others skilled in the art pertaining thereto to fully understand the nature and purpose thereof.

In the drawings, A represents the main frame or body of the machine, which supports the pole, the tool-box, the main shaft, and parts connected with and for operating the cutting apparatus; B B, the main driving-wheels; C, the main shaft; D, the sleeve in which said shaft turns; E, the operator's seat; F, part of the pole; G, the coupling-arm pivoted at G' to main frame A; H, part of the finger-bar; I, the shoe; J, the lead-wheel; K, the lifting-lever for elevating through the usual connections the whole cutting apparatus, and L the lever for rocking, through its connections, the finger-bar and its attachments by hand, independent of its automatic rocking motion previously referred to.

The mechanism for producing said automatic rocking motion, which constitutes one

of the most important features of my invention, is constructed and arranged in the following manner.

Upon the lower end of the pivoted coupling-arm G is rigidly secured an irregular-shaped frame M, which serves as a bearing to support the back end of the shoe I, and also extends around forward under the rods which connect with the front side of the cutting apparatus, and forms a bearing also for the lead-wheel J to turn upon. The frame M is braced at its front end from the coupling-arm G by means of a bar M^4, connected at its ends with said frame and coupling-arm. The shoe, as usual, is secured to the inner end of the finger-bar H. It is supported from the frame M at the back end, as aforesaid, by means of a ball-bearing connection M′, (see Figs. 1, 7, 8, and 9,) a socket being formed in said frame M to receive a ball-bearing on the shoe. The front end of said shoe is pivoted to the lower end of a rod N, whose upper end is pivoted to the main frame or some other rigid part of the machine. In this instance said upper connection is represented as being made to the main frame close to the pivot G′ of coupling-arm G. In Fig. 5 the rod is shown pivoted back of the shield O, arranged under the pitman-head P, and in Fig. 6 in front of said shield to an arm P′, extending under the shield. If desired, the connection may be made direct to said shield or to any other fixed point, as before stated, the main purpose being to suspend the front part of the finger-bar from some fixed point on the machine in such manner as to permit of a free vertical rocking motion thereof in its rear bearing M′. Although I prefer a ball-and-socket joint, as shown, for this purpose, I do not limit myself thereto, but reserve the right to use any equivalent device for effecting a like result.

In Figs. 7 and 8 I have shown only such parts as are necessary to illustrate said adjustable finger-bar, back support, and the front holding-rod. Said front holding-rod is in practice fitted comparatively loose at its end bearings and extends nearly horizontally from one connection to the other, as shown in Fig. 8. It is therefore obvious that nothing prevents the finger-bar from freely and automatically rocking or oscillating up and down in its rear bearing, as aforesaid. Consequently the cutters are always kept in the same relative position above the ground whether passing over smooth or over undulating surfaces, the advantage of which will at once be apparent. Owing to said provision no attention is required from the operator except when approaching unusual obstructions, such as rocks, sharp angles in the ground, &c.

The main purpose of the rod N is to hold the finger-bar and parts attached thereto at right angles to the machine, said bar and the cutter-bar and parts attached thereto being supported at their proper normal level by simply resting on a suitable support underneath. In this instance it rests either upon the top of the irregular-shaped frame M or on an inclined slide-block M^2, fitted to slide longitudinally in said frame and operated to rock the finger-bar by hand, as will be hereinafter described. In Fig. 10 it is shown as resting on said block at the bottom of its incline M^3.

By the construction adopted to obtain the aforesaid automatic oscillating motion of the finger-bar and parts attached thereto I am enabled also to fold the whole cutting apparatus over onto the pole F of the machine for convenience in transportation, the finger-bar rod N, as well as the pitman-rod P^2, for operating the cutter-bar Q, both coming above all the other parts, as indicated in Fig. 1, and thus admitting of said operation.

I am aware that it is not broadly new to thus fold said parts over for the above purpose, and therefore limit this part of my invention to substantially the construction specified for obtaining said result.

It is not intended, it will be understood, that the finger-bar shall be automatically operated to allow the cutters to pass over the more prominent obstructions in mowing, although when the fingers come in contact with slanting stones or similar obstructions, even of considerable size, the ends of the fingers do not impinge squarely against said bar, and other parts will be lifted or swung up thereby and readily pass over the same without the necessity of rocking the bar by hand. Said upward rocking motion is controlled within proper limits by means of a stop pin or stud *g*, which projects out horizontally from frame M over the front end of the shoe I, as shown in Figs. 1, 9, and 10. The finger-bar is rocked by hand when required by means of the lever L, previously referred to, through the connecting-rod *h*, angle-rod *h′*, connecting-rod h^2, and the inclined block M^2, previously referred to. The lever L is pivoted a short distance above its lower end to the main frame at *i*, and the angle-lever, whose ends project at right angles to its main part in opposite directions, rocks in suitable bearings *j* on the coupling-arm G. Therefore it is obvious that when said lever L is operated in one direction by its handle L′ the slide-block M^2 is moved toward the rod N, and thus causes said rod to be elevated by sliding up over the incline M^3 of said block, and in consequence lifting the front of the finger-bar and parts attached thereto, and vice versa, for lowering the same.

The operating-lever L may be held in any adjusted position by means of a tooth or stud formed on the inner side of said lever, which engages with the teeth of a rigid quadrant K. A constant pressure may be imparted to the lever to keep it in engagement with said quadrant by means of a suitable spring, as *l*—in this instance fitted over the pivot-bolt *i* of lever L outside of said lever. When it is desired to operate the lever, it is simply pressed outward against said spring until turned into the position required to move the finger-bar

into the desired position, and then released, in which position it is now held by the spring. When in its normal position, the rod N rests on the block at the bottom of its incline, as before stated, or on the shoe close to said incline. In practice, when coming toward an obstruction that the finger-bar is not likely to automatically pass over, the lifting-block is drawn forward by hand and said bar elevated so as to pass over said obstruction, and when past the same the block is pushed back again to allow all the parts to assume their normal positions, the operator during this operation ordinarily keeping hold of the lever L all the time, so as to drop the cutters immediately after passing the obstruction.

My improvement in the cutters and adjacent parts is as follows, (see Fig. 1 and Figs. 9 to 14, inclusive:) The top movable cutters or sickles *m* are fastened to the under side of the cutter-bar Q, and the bar is held in position and guided in its longitudinal reciprocating movements to operate said cutters past the rigid cutters or ledger-plates by means of the clasps *m'*, which are grooved upon the under side to receive and guide said cutter-bar, as is indicated in Figs. 12, 13, and 14. The finger-bar H and ledger-plates *n* are arranged between the fingers *p* and clasps *m'*, and are fastened together rigidly by means of one and the same set of screws or bolts *o*, passed vertically through all of said parts. It will therefore be seen that said bolts not only hold all of said parts, but also the cutter-bar Q and cutters *m* with the two sets of cutters in close contact.

The ledger-plates may be arranged over or under the finger-bar H. In Fig. 14 they are shown under, while in the other figures mentioned they are shown over, said bar.

By the foregoing construction and arrangement of the various parts of the cutting apparatus it is obvious that the cutting-edges of the two series of cutters are brought together perfectly, (see Figs. 12 and 13,) with no grooves for grass and dirt to become lodged in to impede their proper action, and said bottom rigid cutters or ledger-plates are held in a very secure and perfect manner. The outer ends of said cutters may be held in grooves in the fingers in the usual way.

The cutter-bar Q is connected with and operated, as usual, by the pitman-rod P^2 and its operating mechanism, which latter may be connected and disconnected to and from the driving-wheels B, as hereinafter described.

The pitman-rod head P may be automatically oiled (see Figs. 15 and 16) by forming a chamber *q* in said head beyond the upper end of the pitman-rod, adapted to receive cotton waste, asbestus, or other suitable material and oil poured in through a proper opening having a suitable plug *r* to retain said oil therein, a small opening *s* being formed to connect the oil-chamber with the ball-bearing socket *t*. By this construction I find in practice that just sufficient oil enters around the ball-and-socket-joint bearing to keep it in perfect working order.

My improved shipping device is constructed and arranged as follows, (see Figs. 1 to 4, inclusive:) The large driving-wheels B B are fitted to turn loosely on the main shaft C, and each of said wheels are provided upon the inside with a rigid hollow hub B', having internal ratchet-teeth *u*, (see Fig. 4,) for the pawls *v v* to engage with. Said pawls are kept in engagement with said ratchet-teeth (except when forcibly removed therefrom, as hereinafter described) by means of suitable springs *w w*, fastened to the rigid hubs B^2 B^2, and adapted to bear upon the outer sides of the pawls. The hubs B^2 are fastened to and turn with shaft C, and the pawls are secured to the ends of short pins or studs *x x*, passed transversely through said hubs and fitted to turn therein. To the other ends of said pins or studs, on the opposite side of the hubs from the pawls *v v*, are secured the pawls *v' v'*. (See full lines, Fig. 3, and dotted lines, Fig. 4.) Said pawls *v' v'* are adapted to engage with the beveled ends *y' y'* of the slide-rings *y y*, in turn adapted to slide longitudinally on the sleeve D, within which the main shaft turns. Said beveled rings *y y* may be operated toward or from the pawls by means of a double-arm foot-lever y^2 and the connecting-rods y^3 y^3, said lever being pivoted to the sleeve, preferably at or near its center, and the rods y^3 eccentrically connected to the hub thereof, as indicated by dotted lines in Fig. 3, so that when the lever is turned in one direction the beveled rings are pushed out and drawn in when the motion of said lever is reversed. By this construction it will be apparent that when the foot-lever is operated in one direction the driving-power is engaged with the main shaft by engaging the pawls *v v* with the ratchet-teeth on the hubs of the driving-wheels through the connections above described and disengaged by turning it in the opposite direction to disengage said pawls. Upon one of the rigid hubs B^2 is formed or secured the internal gear R, which engages with a pinion S, and operates through said pinion and the other usual connections the cutters of the machine in the ordinary way. A shipping device thus constructed and operated, it will at once be seen, renders the operation of shipping and unshipping the power to and from the cutting apparatus being performed in a very easy and expeditious manner.

My improvement upon the seat-support and connections is as follows, (see Figs. 1 and 2:) The seat is secured to the upper end of a jointed supporting-bar T, pivoted at its lower end to the rear end of a rocking lever U, and near the middle to a holding rod or bar V. The forward end of said holding rod or bar is pivoted to the pole F in this instance; but it may be connected with the frame A, if preferred. The rocking lever U is pivoted, preferably, a little back of its center to said frame

A, and engages at its forward end with the pivoted coupling-arm G, or some branch thereof, so that the weight of the rider on the seat may be utilized to counterbalance a part of the weight of the cutting apparatus, and thus produce less friction upon the ground in drawing the machine forward, consequently, in a large measure, reducing the draft required in propelling said machine. In this instance I have shown the front end of the rocking lever as connected by a ring and eye-bolt with a bar W, extending toward the rear and one side from the pivoted coupling-arm G.

If desired, the weight of the rider on the seat to counterbalance the weight of the cutting apparatus, as aforesaid, may be increased or decreased (more or less) by moving the lower pivoted end of the supporting-bar T nearer to or farther from the fulcrum of the rocking lever U. This I accomplish by pivoting the lower end of said supporting-bar T to an adjustable holding-block T′, adapted to be adjusted forward or back on the rocking lever, a suitable slot being formed in said rocking lever, and the block T′ provided with a bolt and set-nut T^2, for fastening the parts after adjustment. The height of the seat may also be adjusted, as required, in a similar manner, one part of the supporting-bar T being fitted in practice to slide in the end of the other and fastened after adjustment by means of a suitable bolt or bolts.

The pivoted finger-bar G is elevated and lowered by the lifting-lever K to raise and lower the cutting apparatus in a similar manner to that employed in other machines, and I therefore make no claim thereto.

It will be understood that I do not limit myself to the special construction of the various parts employed in carrying out my improvements, as many equivalents thereof might be employed to effect substantially the same results herein specified.

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

1. In a mowing-machine, the finger-bar and inner shoe, the latter pivoted at the back side to the frame rigid with the coupling-arm and resting upon an inclined supporting slide-block mounted in the front side of said frame to support the cutters at their proper normal level, but not impeding their upward movements, in combination with said frame, a suitable holding-rod pivoted to the shoe and the frame for holding the parts in position laterally, and a hand-lever connected with the slide-block for elevating and lowering the cutters by hand, substantially as and for the purpose set forth.

2. The inner finger-bar shoe pivoted at its back side to an angular frame secured to the pivoted coupling-arm, which is connected with the lifting-lever, in combination with said angular frame, a holding-rod connected with the main frame, pivoted to the front side of the shoe and adapted to rest on said angular frame, substantially as set forth.

3. The inner finger-bar shoe pivoted at its back side to an angular frame secured to the pivoted coupling-arm, which coupling-arm is connected with the lifting-lever, in combination with said angular frame, a holding-rod connected with the main frame, pivoted to the front side of the shoe and adapted to rest on an inclined block fitted to slide in the angular frame, and a hand-lever operatively connected with said slide-block, substantially as and for the purpose set forth.

4. The combination of the inner finger-bar, shoe I, the ball-and-socket-joint bearing M′, angular frame M, secured to the pivoted coupling-arm G, holding-lever N, pivoted to the main frame and to the front side of the shoe, inclined block M^2, fitted to slide in the angular frame, connecting-rod h^2, angle-rod h', fitted to rock in bearings on coupling-arm G, connecting-rod h, spring-lever L, and means for holding the same in an adjusted position, substantially as and for the purpose set forth.

5. The combination, with the pivoted finger-bar, the inner shoe I, and holding-rod N, of the hand-lifting mechanism consisting of the inclined block M^2, fitted to slide in frame M, connecting-rod h^2, angle-rod h', fitted to rock in bearings on pivoted coupling-arm G, connecting-rod h, pivoted spring-lever L, and the fixed quadrant for holding said lever in its adjusted position, substantially as shown and specified.

6. In a mowing-machine, the combination of the angular supporting-frame M, with the finger-bar pivoted at the back side of said frame only and the front side pivoted to a holding-rod N, in turn pivoted at its opposite end to the main frame, said holding-rod, and the pitman-rod P^2, both said holding and pitman rods being arranged above the frame M, brace-bar M^4, shoe I, slide-block M^2, and its rod h^2, coming in line therewith vertically, so as to admit of the cutting apparatus being folded over onto the pole of the machine, substantially as set forth.

7. In a mowing-machine, the combination of the fingers, the finger-bar, the rigid bottom cutters or ledger-plates, and the cutter-bar guide-clasps, arranged one over the other in contact with the finger-bar and ledger-plates between the fingers and said guide-clasps, and a series of bolts each passed vertically through said parts to clamp them all tight together, substantially as set forth.

8. In a mowing-machine, the fingers, the finger-bar, the rigid bottom cutters or ledger-plates, the cutter-bar guide-clasps arranged one over another in contact with the finger-bar and ledger-plates, between the fingers and said guide-clasps, and a series of bolts each passed vertically through said parts to clamp them all tight together, in combination with

the cutter-bar fitted in a slot in the under side of the aforesaid guide-clasps and the top movable cutters or sickles fastened to the under side of said cutter-bar, substantially as and for the purpose set forth.

9. In a mowing-machine, the main driving-wheels fitted to turn on the main shaft and having hubs, each provided with an internal ratchet-gear, in combination with spring-latches, one for each wheel, mounted on fixed hubs secured to the main shaft at each end thereof, (one of said hubs having a gear formed or secured thereon adapted to engage with the pinion for operating the cutting apparatus,) and a suitable foot-lever pivoted to the main-shaft sleeve and operatively connected with beveled rings adapted to engage with said spring-latches, substantially as and for the purpose set forth.

10. In a mowing-machine, the combination of the main driving-wheels fitted to turn on the main shaft and having hubs, each provided with an internal ratchet-gear, with suitable spring-pawls adapted to engage with said ratchet-gears, the pawls being fastened to short pins or studs fitted to turn in hubs secured to the main shaft, (one of said hubs having a gear formed or secured thereon adapted to engage with the pinion for operating the cutting apparatus,) said hubs and pins or studs, suitable pawls also secured to the pins or studs upon the opposite end from the spring-pawls, a beveled slide-ring fitted to slide on the main-shaft sleeve and to engage with the last-mentioned pawls, a double-arm foot-lever pivoted to said sleeve, and suitable connecting-rods for connecting the beveled rings with the hub of said foot-lever eccentric to its axis, substantially as and for the purpose set forth.

11. The combination of the seat-supporting bar having a front holding-rod pivoted thereto and to the pole or main frame of the machine, in combination with a rocking lever pivoted to the main frame, also pivoted at its rear end to the lower end of said seat-supporting bar and at its front end to a bar connected with said main frame, and the coupling-arm, whereby the weight of the rider on the seat may be utilized to counterbalance the weight of the cutting apparatus and thereby lighten the draft required in propelling the machine, substantially as set forth.

12. The combination of the jointed adjustable seat-supporting bar, with a front holding-rod pivoted thereto and to the pole or frame of the machine, a rocking lever arranged under the main shaft pivoted to the frame, preferably a little back of its center, also having an adjustable block at its rear end, to which the lower end of the seat-supporting bar is pivoted and its front end pivoted to the coupling-arm, to which the lifting-lever is connected to lift the cutting apparatus, whereby a portion of the weight of said cutting apparatus may be counterbalanced by the weight of the rider on the seat and thus produce an easier draft, substantially as set forth.

JOEL GARFIELD.

Witnesses:
A. A. BARKER,
W. B. NOURSE.