(No Model.)

W. A. KNOWLTON.

MOWING MACHINE.

No. 523,286. Patented July 17, 1894.

FIG. 1.

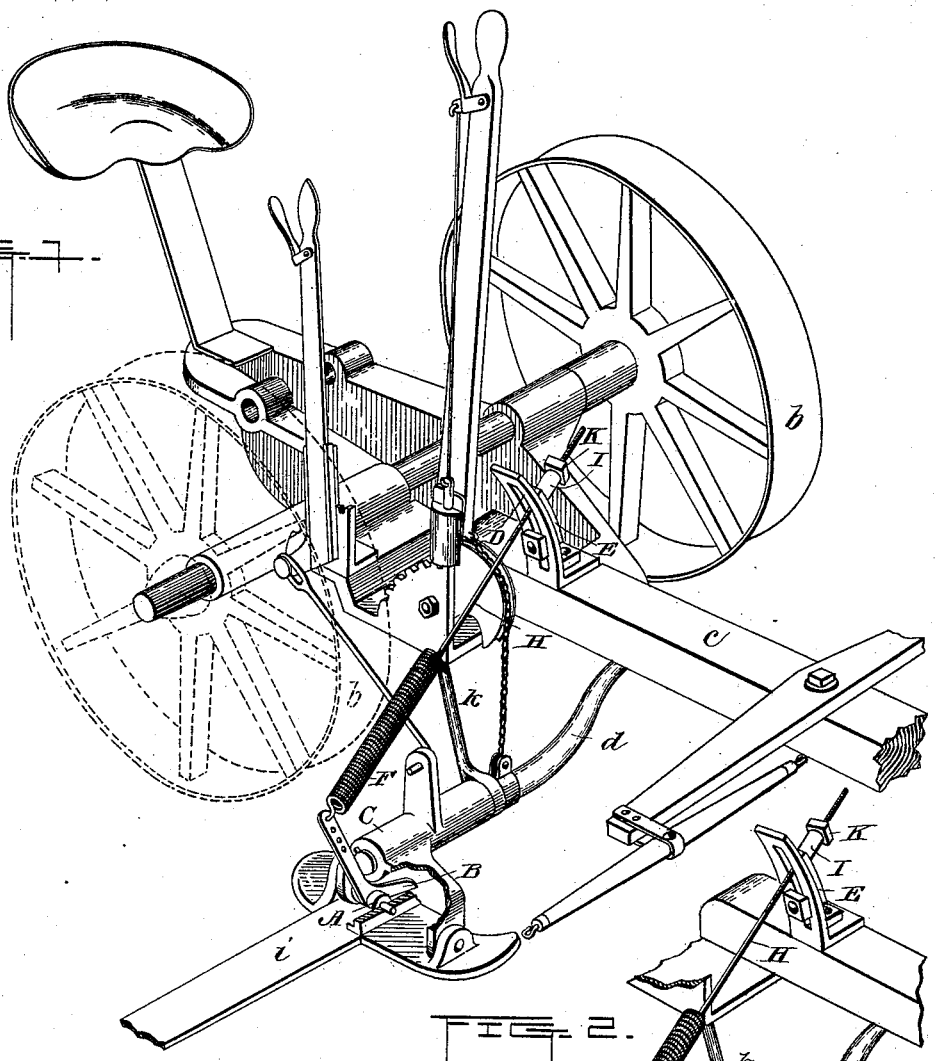


FIG. 2.

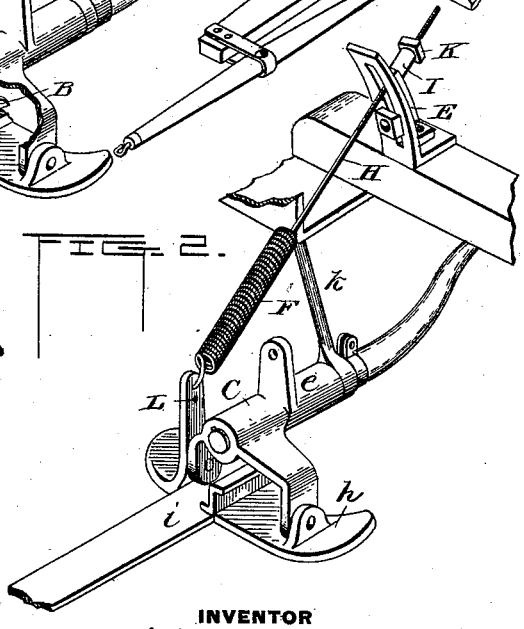
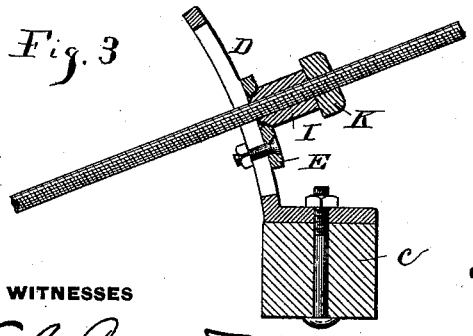


Fig. 3



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM A. KNOWLTON, OF ROCKFORD, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO MATILDA T. KNOWLTON, OF SAME PLACE.

MOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 523,286, dated July 17, 1894.

Application filed November 21, 1885. Serial No. 183,544. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. KNOWLTON, a citizen of the United States, residing in the city of Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Improvement in Mowing-Machines, of which the following is a specification.

This invention relates to mowing machines of a class known as the "hinged bar two wheeled machines." Its object is to reduce the ground friction of the cutting apparatus; lessen the direct draft and also the side draft of the machine, and increase its cutting power without materially increasing its weight.

It consists essentially in a counter balance spring for the cutting apparatus made adjustable in its connections to regulate its ground friction and transfer a portion of its weight to the wheeled carrying frame to lessen the direct and side draft of the machine, and increase its cutting power, all of which in connection with the accompanying drawings will be hereinafter more fully described.

The expression "cutting apparatus" will be employed in the specification and claims as referring to the coupling bar, shoe and finger bar and the operative parts belonging particularly thereto, when considered as a whole and when any particular part of the cutting apparatus is referred to it will be distinguished by a more specific term.

In the accompanying drawings, Figure 1 is an isometrical representation of portions of a mowing machine embodying my invention. Fig. 2 is an isometrical representation of portions of a mowing machine showing a modified application of my counter balance spring, and Fig. 3 is a vertical section in the plane of the screw threaded arm of the counter balance spring.

The several parts in the figures consisting of a supporting frame *a* mounted on carrying wheels *b*, a tongue *c* fixed to the frame, a coupling bar *d* hinge jointed at one end to the frame, a yoke *e* swivel jointed on the free end of the coupling bar, a shoe *h* hinge-jointed to the yoke arms, a finger bar *i* fixed to the shoe, and a push bar *k* having a hinged connection with the coupling bar and with the supporting frame are parts common to like machines, and may be any of the known varieties capable of use in connection with my improvements.

The heel or inner end of the finger bar in its connection with the shoe extends over its inner edge for a purpose to hereinafter appear.

An angle lever A is pivotally supported at its angle on the axial center of the shoe in its connection with the yoke, and its short arm B extends inward from its pivotal support to engage the inner or heel end of the finger bar, and its long arm C rises from its pivotal support vertically.

A bracket D is fixed to the tongue, and from its foot support connected therewith, rises in a curving form inclining toward the cutter side of the machine. The uprising curved arm of the bracket D is slotted centrally lengthwise in a transverse direction relatively with the machine.

The convex face of the slotted arm of the bracket is provided with a slide E made vertically adjustable in its connection therewith, and is fixed in place thereon when adjusted by means of a holding screw passed through the slide and through the vertical slot in the curved arm of the bracket.

The slide E is perforated to coincide with the slot in the curved arm, and is counter sunk on its convex surface.

A coiled spring F is connected at one end to the vertical arm of the angle lever A, above its pivotal support and is made adjustable in its connection therewith, in this instance by means of a series of holes formed in vertical line therein, to increase or lessen the leverage, to vary the lifting and holding action of the spring on the cutting apparatus. The inner arm H of the spring is of rod form screw threaded, and extends through the slot in the curved bracket arm, and through the counter sunk hole in the adjustable slide fixed to its convex side. A washer I of proper conformation to enter the counter sink in the slide, and screw nut K are placed on the projecting end of the screw arm, to adjust the force of the spring. In this application of the spring, the upward adjustment of its end connected with the lever arm, and the downward adjustment of its end connected with the slotted bracket either jointly or separately will transfer a por-

tion of the lifting force of the spring from the shoe end to the divider end of the finger bar. This transfer of the spring power will vary with the extent of the adjustments either separately or jointly to any extent within the limits of the device. The reverse adjustment of the spring to that above described, or the downward adjustment of its end connected with the lever, and the upward adjustment of its end connected with the slotted bracket either jointly or separately, will by reason of its increased angles relatively with the vertical arm of the angle lever, and with the coupling bar exert a less lifting force on the divider end of the finger bar and a greater lifting force on the shoe end thereof and upon the coupling mechanism.

From the foregoing it will be seen that it is within the capabilities of the adjustments to balance the cutting apparatus, to equalize the ground contact and consequently the ground friction of the ends of the finger bar; and by reason of the lifting force of the spring made adjustable in its connection with the curved bracket, the ground friction of the cutting apparatus as a whole can be reduced to its lowest practical point; and the weight thus sustained by the spring will be transferred to the carrying wheels of the machine to reduce its direct and side drafts, and increase its cutting power. By these connections of spring F, it will be seen that they are nearly parallel with the connections of the coupling mechanism to the carriage and finger bar, acting in harmony therewith, that there is no friction at either end or intermediate of its end connections to impede its flexible action upon the finger bar and that the finger bar is not hindered by it in the rising and falling undulation to keep close to the ground farther than to have carried upon the wheeled frame so much weight therefrom as the operator may elect, leaving to rest upon the ground so much as the operator may elect to cause the finger bar to keep on the ground for close cutting.

It will be seen that a spring pulling from the main supporting frame at a point in the horizontal plane with the connection with arm C will counterbalance weight from the free end of the finger bar, and sufficient force so applied will raise the free end of the finger bar from the ground, the weight so raised being thereby transferred to the jointed end; but no part of the weight of either end will be thereby transferred to the supporting frame to be borne upon the bearing wheels and other means must be employed therefor. That pulling from the main supporting frame from a point vertically above the connection of the spring with arm C will take the weight from the jointed end of the finger bar, and thereby transfer to the main supporting frame the extra weight so raised, but no part of the weight of the free end of the finger bar would be thereby raised and no weight would be thereby transferred therefrom, and other means must be employed therefor. There is however a point on the main frame in the arc between the horizontal and the vertical lines, being one side from the vertical and above the horizontal plane of the point of the connection of the spring with arm C wherefrom the exertion of lifting and pulling force will transfer weight from each end of the finger bar directly to the main frame to be borne upon the bearing wheels thereof to increase their traction and power and to relieve the finger bar from unnecessary weight upon, and friction with the ground. Such point is represented to be near the center of the slot in bracket arm D. From such point adjustment downward would apply more of the force to the outward end of the finger bar, and adjustment upward would apply more of the force to the inner end of the finger bar. Means for such adjustment are provided in the long slot in bracket D permitting the connection with main frame to be raised or lowered for the purpose of varying the lifting force as well as means to increase or decrease the tension of the spring and its lifting power by the screw thread and nut before described for the purpose; and for holding the spring to bracket D. These adjustments enable the operator to obtain the advantage of carrying the greatest possible weight of the cutting apparatus upon the wheeled frame and leave still sufficient to cause the finger bar to keep to the ground for close cutting through adjustment either of the action, or tension of the spring or both to the speed of the team employed, or smoothness of the ground upon which the machine is to be worked.

The adjustment of the connection of the spring to arm C, may be also used as a means of adjusting the spring's action, by connecting the spring to it at different distances from the ground but in a different, and less degree of adjustment than that which may be applied from the main frame.

It is manifest that the more of the weight of the cutting apparatus that can be transferred to the wheeled frame of the machine, and still have the cutters keep close to the ground so as to sever and save the standing grass, and leave the least amount of stubble, the greater will be the advantage derived from the use of the bar sustaining spring; that indirect action will give less perfect result, and that intermediate parts between the spring and the finger bar will impair its benefits by so much as they increase cost and cause indirect action, create friction and dissipate the spring's influence in overcoming friction and action of such intermediate parts.

I have herein shown a spring acting directly, to transfer weight from the cutting apparatus to the wheeled frame, so placed as to require no intermediate parts between the frame, and the finger bar, except the spring's connection with the gag lever having no fric-

tion to overcome in its action, and the force therefrom being directly applied, to float the finger bar, by going directly to, and lifting directly upon the inner end thereof.

It is evident that by experiments in the manufacture of machines and care in construction, the required balance of the cutting apparatus may be obtained with perhaps sufficient accuracy to dispense with some or perhaps all of the adjustments, and still be within the scope of my invention. In this instance I have employed a pivoted angle lever A, which I prefer, but instead thereof a rigid arm L as shown in Fig. 2, may be employed and instead of connecting the spring with the curved bracket D rising from the tongue, it may be connected with any convenient portion of the supporting frame.

In the drawings I have only represented such parts of a mowing machine as are believed necessary to a complete understanding of my improvements, and the several parts necessary to a complete machine, not herein shown and described may be any of the varities known, capable of use in connection with my improvements.

In my pending case, Serial No. 183,223, filed November 18, 1885, the counterbalance spring is represented as connected with the finger bar at a point above the connection between the finger and coupling bars, while its opposite end may be connected with the main frame at a point either above, below, or on a line with, the connection of the coupling bar with the main frame while in the present case the said spring is shown as preferably connected with the cutting apparatus and main frame at points above the connections of the coupling bar with the main frame and finger bar, respectively.

I do not claim broadly, a counterbalancing spring connection between the main frame and the cutting apparatus whereby the force exerted to float or counterbalance the cutting apparatus as a whole is applied first to lift the outer end of the finger-bar, but,

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

1. The combination of a main frame, a coupling bar connected thereto, a finger bar hinged jointed to the coupling bar a spring connected directly with the main frame, and connected with the finger bar at a point above the connection between the finger bar and coupling bar, the end of the spring connected with the main frame made adjustable in a vertical plane.

2. The combination of a main frame, a coupling bar connected thereto, a finger bar hinged jointed to the coupling bar a spring connected with the main frame and with the finger bar and located in line with the finger bar.

3. The combination of a main frame, a coupling bar connected thereto, a finger bar hinged jointed to the coupling bar, a spring between the finger bar and main frame, and connected with the finger bar above the plane of connection between the finger bar and coupling bar, and connected with the main frame substantially in line with the finger bar above the plane of the spring's connection with the finger bar.

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Witnesses:
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