

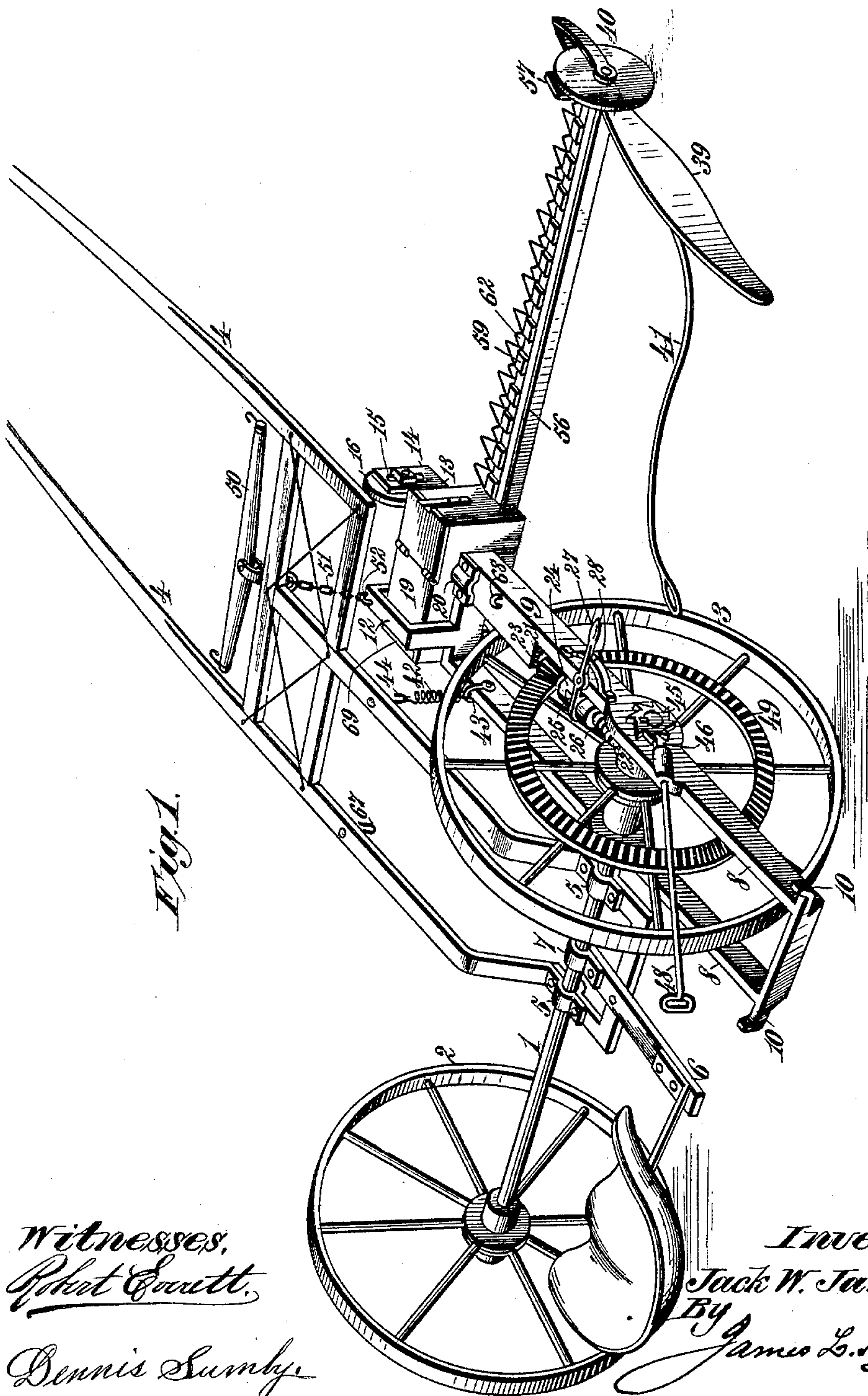
(No Model.)

4 Sheets—Sheet 1.

J. W. JAMES.
MOWING MACHINE.

No. 462,558.

Patented Nov. 3, 1891.



Witnesses,
Robert G. Pratt,

Dennis Sumby.

Inventor:
Jack W. James.
By *James L. Norris,*
Atty.

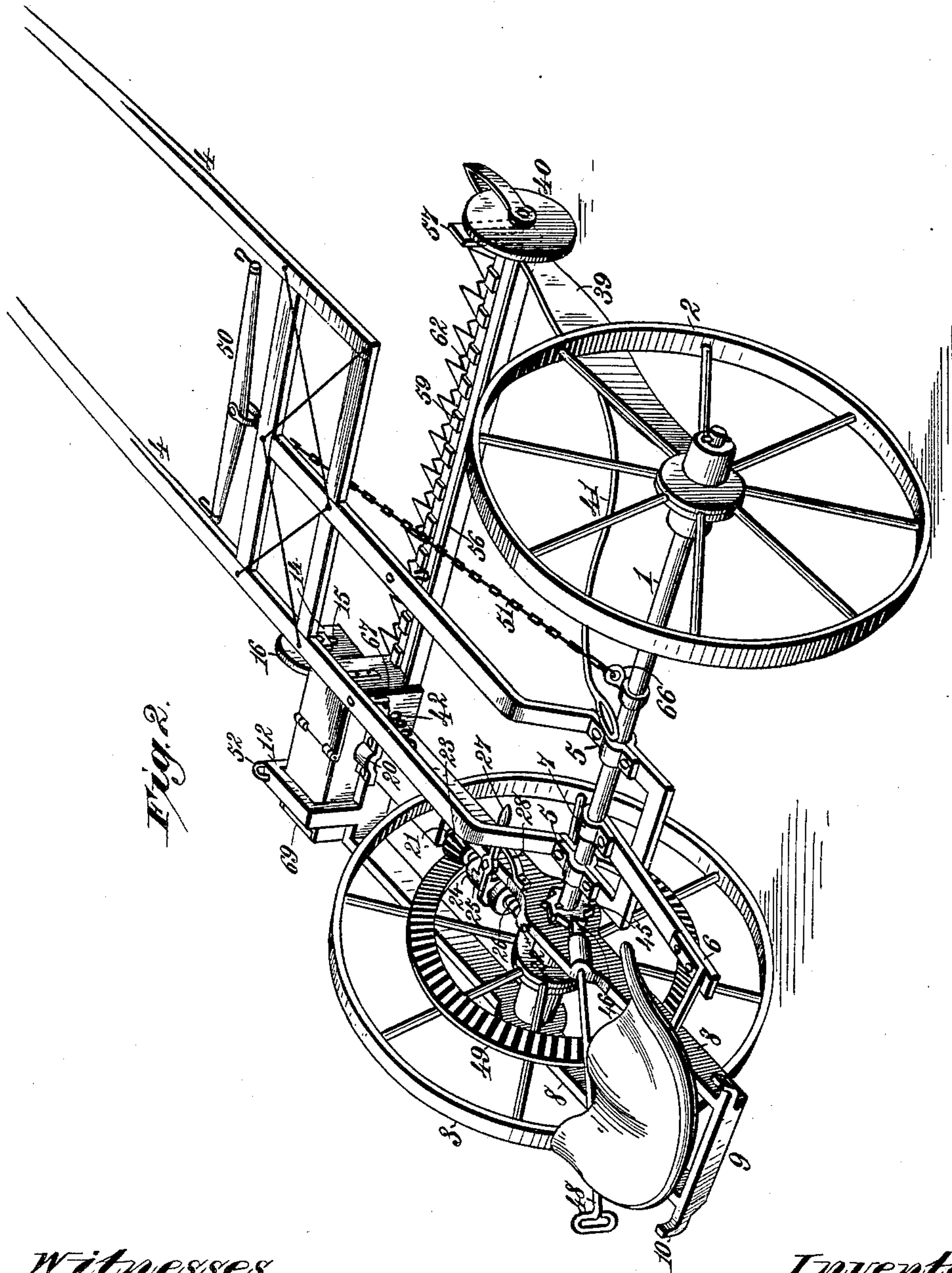
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4 Sheets—Sheet 2.

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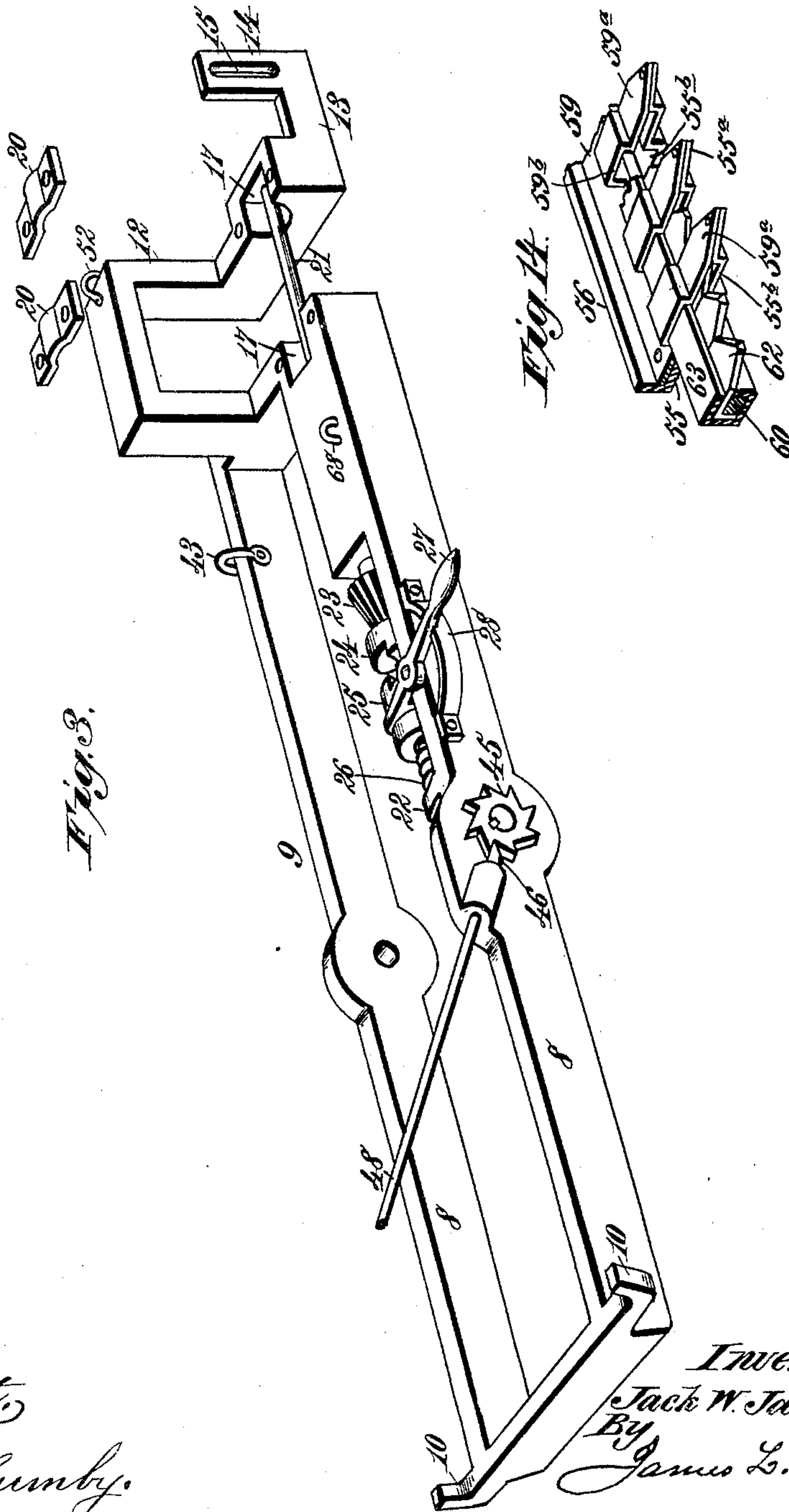
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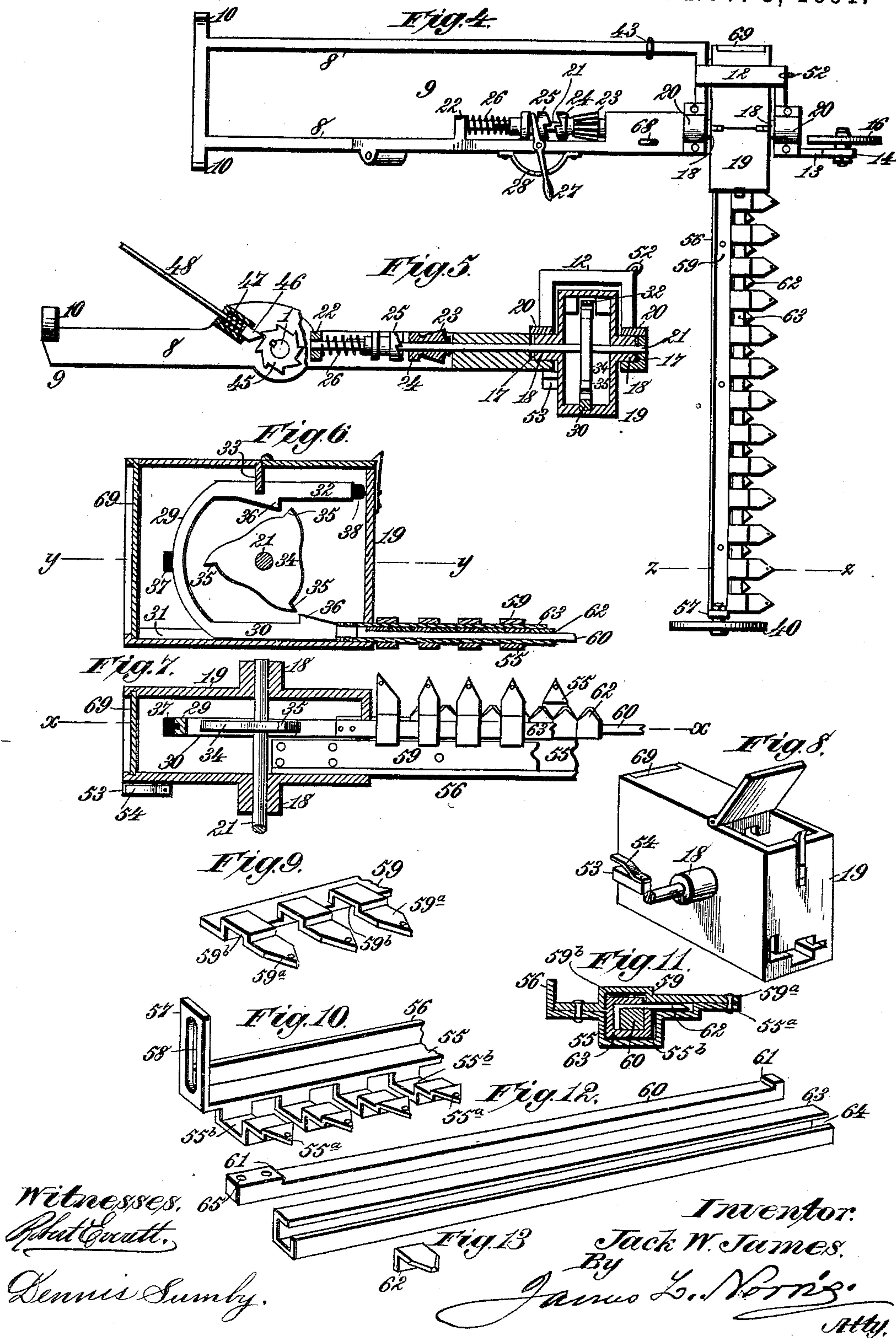
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J. W. JAMES.
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UNITED STATES PATENT OFFICE.

JACK WM. JAMES, OF CUBA, TENNESSEE.

MOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,558, dated November 3, 1891.

Application filed January 9, 1891. Serial No. 377,243. (No model.)

To all whom it may concern:

Be it known that I, JACK WM. JAMES, a citizen of the United States, residing at Cuba, in the county of Shelby and State of Tennessee, have invented new and useful Improvements in Mowing-Machines, of which the following is a specification.

This invention has for its objects to simplify and improve the mowing-machine described and shown in my Letters Patent No. 445,894, dated February 3, 1891; to provide a novel cutter-bar and finger-bar which are economical in construction and very durable and efficient in operation; to provide novel means for relieving the cutter-box from shock when it is swung to place the cutter-bar and finger-bar in a horizontal position in proximity to the surface traversed, and to provide novel means whereby the swing-frame is automatically locked when it is swung on the axle to elevate the cutting mechanism. To accomplish all these objects my invention involves the features of construction, the combination or arrangement of devices, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective view of a mowing-machine constructed in accordance with my invention. Fig. 2 is a similar view showing the parts adjusted to produce a thrust-cut mowing-machine. Fig. 3 is a detail perspective view of the swing-frame. Fig. 4 is a detail top plan view of the swing-frame and the cutting mechanism. Fig. 5 is a sectional side elevation of the swing-frame with the cutter-box in position. Fig. 6 is a vertical sectional view taken on the line $x x$, Fig. 7. Fig. 7 is a horizontal sectional view taken on the line $y y$, Fig. 6. Fig. 8 is a detail perspective view of the cutter-box. Fig. 9 is a detail perspective showing a portion of the upper section of the finger-bar. Fig. 10 is a similar view of a portion of the lower section of the finger-bar. Fig. 11 is a detail sectional view of the finger-bar and cutter-bar, taken on the line $z z$, Fig. 4. Fig. 12 is a detail perspective view showing parts of the cutter-bar. Fig. 13 is a detail perspective view of one of the cutters. Fig. 14 is a detail broken perspective view of portions of the finger-bar and cutter-bar.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 indicates the non-rotary axle of the mowing-machine, provided with loosely-mounted traction or ground wheels 2 and 3, of which the latter is the main drive-wheel for transmitting motion to the cutter-bar. The shafts 4 are rigidly secured to the axle by suitable clips 5 or any other devices which will prevent rotary movement of the axle. The shafts extend in rear of the axle to aid in supporting the seat-carrying bar 6, which is secured to the axle by a clip 7. The main drive-wheel is mounted on the axle between the parallel side bars 8 of a swing-frame 9, which is journaled on the axle at or near the middle of its length and is adapted to swing thereupon in a vertical plane. The swing-frame extends rearwardly from the axle to a point behind the main drive-wheel, where it is provided with foot-pieces 10, that constitute what may be termed a "pedal." The front end of the swing-frame is formed or otherwise provided with a vertically-extending arch 12, having a horizontal extension 13 provided with an arm 14, which is vertically slotted, as at 15, to receive the journal of a supporting-wheel 16, adapted to travel on the surface traversed, thereby aiding in supporting the front end of the swing-frame during the operation of the mowing-machine. The journal of the wheel 16 can be adjusted in the vertical slot 15 for the purpose of adjusting the front end of the swing-frame relatively to the surface traversed, if such should be desired. The swing-frame is provided with semicircular socket-bearings 17 to receive the laterally-extending stud journals or trunnions 18, provided at the opposite sides of the cutter-box 19, such journals or trunnions being confined in proper position by cap-plates 20, bolted or otherwise detachably secured to the swing-frame in such manner that the cutter-box is retained in proper position and can oscillate or swing in a vertical plane. A driving-shaft 21, journaled in suitable bearings on one side of the swing-frame, passes loosely through the cutter-box and its stud journals or trunnions, such shaft, however,

having no supporting-contact with the stud-journals, whereby the cutter-box is solely supported by said stud-journals, while the drive-shaft is free to rotate therein. The rear end of the drive-shaft is supported in a bracket or bearings 22 and carries a loose pinion 23, provided with a clutch-section 24, adapted to be engaged by a clutch-section 25, which is keyed to the drive-shaft 21 to rotate therewith, the construction being such that when the clutch-section 25 is disengaged from the clutch-section 24 the drive-shaft 21 will remain inactive, or, in other words, will not be rotated. The clutch-section 25 is acted on by a spring 26, which tends to press it toward the clutch-section 24; but a lever 27 and locking-catch 28 are provided for the purpose of locking the clutch-section 25 out of engagement with the clutch-section 24, as shown in Fig. 3.

In the cutter-box 19 is arranged a yoke 29, which at its bottom portion 30 moves in guide-ways 31 on the bottom wall of the cutter-box and at its top portion 32 moves in a guide 33, provided on the top wall of the cutter-box. The lower or horizontal arm or portion 30 of the yoke 29 is rigidly attached to a cutter-bar, hereinafter described, and the yoke is reciprocated rectilinearly through the medium of a triple cam 34, rigidly attached to the drive-shaft 21 within the cutter-box, and having its three cam projections 35 adapted to operate upon tappets 36, formed with or otherwise provided on the lower and upper portions or arms 30 and 32 of the yoke 29. The triple cam is preferably composed of cast-steel with the cam projections chilled, and as the cam is rotated by the drive-shaft the alternate contact of the cam projections with the tappets will reciprocate the yoke substantially in a manner described in my patent hereinbefore alluded to. If, however, the clutch-section 25 is held from the engagement with the clutch-section 24, by adjusting the lever 27 and locking it in the position shown in Fig. 3 the machine can be moved forward or backward without imparting motion to the yoke and cutter-bar, and consequently the cutting mechanism remains inactive until the clutch-sections are again engaged with each other.

The rear portion of the yoke is provided with a spring or elastic cushion 37 and the forward end of the arm or portion 32 is provided with a similar spring or cushion 38, which springs or cushions are adapted to strike the end walls of the cutter-box to avoid the noise which might arise if the metal yoke struck the ends of the cutter-box.

The finger-bar hereinafter described is rigidly attached to the cutter-box, and since the latter can oscillate or swing in a vertical plane, it will be obvious that the cutter-box can be turned on its bearings to place the cutter-bar and finger-bar in an approximately perpendicular position. The outer end of the

finger-bar is provided with a divider 39 and supporting-wheel 40, and, if desired, a handle-rod 41 may be employed for the purpose of swinging the finger-bar and cutter-bar in a vertical plane with the cutter-box. If this handle-bar 41 is properly arranged, the driver can reach over and operate it for the purpose of lifting the finger-bar and cutter-bar should occasion demand.

The swing-frame 9 is connected near its front end with the shafts through the medium of a coiled or other spring 42, which detachably connects with a hook 43 on the swing-frame and a hook 44 on the shafts. The object of this spring is to yieldingly sustain or balance the swing-frame and aid in supporting the weight of the cutter-box and of the cutter-bar and finger-bar, while the weight of the driver in the seat behind the axle serves to counterbalance the weight which is thrown on the shafts by the spring connection of the swing-frame with the shafts.

The cutter-box, and consequently the cutter-bar and finger-bar, can be raised relatively to the surface traversed by the driver placing one foot on the rear pedal-extension of the swing-frame to depress such pedal-extension, and thereby lift the front end of the swing-frame to the height desired. To automatically lock the swing-frame when adjusted to the desired position, I provide a ratchet-wheel 45, which is rigidly secured to the axle by a key or otherwise, and on the swing-frame is arranged a pawl 46, which is pressed into engagement with the ratchet-wheel through the medium of a spring 47, Fig. 5. The spring-pawl is provided with a rod-handle 48, arranged within convenient reach of the driver, so that the pawl can be disengaged from the ratchet-wheel for the purpose of permitting the descent of the front end of swing-frame. When the rear pedal-extension of the swing-frame is depressed by the driver pressing thereupon with his foot, the spring-pawl rides past the teeth of the ratchet-wheel until the swing-frame has been adjusted to the desired position, when the pawl will automatically spring into engagement with a tooth of the ratchet-wheel, and thereby lock the swing-frame in the position to which adjusted.

The swing-frame is preferably of cast-steel in order to give it requisite strength to sustain the various working parts thereupon. The main drive-wheel is provided with an annular gear 49, which is constantly in engagement with the loose pinion 23 on the drive-shaft 21 in such manner that whenever the clutch-sections 24 and 25 are in engagement the drive-shaft will be rotated and a reciprocating movement imparted to the cutter-bar through the medium of the triple cam, as before explained.

The shafts are preferably of the shape illustrated, in order to permit the draft-animal to

travel approximately in line with the main drive-wheel when the machine is used as a front-cut mower, Fig. 1.

The whiffletree 50, to which the draft-animal is hitched, connects by a draft-chain 51 with a hook or eye 52 on the arched part 12 of the swing-frame, so that the draft strain is on the latter if the machine is adjusted as exhibited in Fig. 1. By providing the cutter-box with independent supporting stud journals or trunnions 18, and arranging the drive-shaft 21 to pass loosely through the stud journals or trunnions without, in fact, having any supporting contact therewith, I entirely avoid bending of the cutter-box on the drive-shaft when the cutter-box is swung in a vertical plane, and also avoid binding of the cutter-box on the drive-shaft, which binding is objectionable where the cutter-box is journaled upon and solely supported by the drive-shaft.

To relieve the cutter-box and swing-frame from shock when the cutting mechanism is swung downward into a horizontal position, I provide the cutter-box with a cushion composed of a lateral projection 53, Fig. 8, having a leaf or other spring 54 riveted or otherwise attached thereto in such manner that when the cutting mechanism is swung downward the leaf-spring will come in contact with the under side of the swing-frame and thereby avoid sudden shocks. This projection, with its spring attachment, also serves as a stop to the cutter-box for the purpose of holding the finger-bar in a horizontal position.

In Figs. 9 to 13, inclusive, I exhibit my improved construction of finger-bar and cutter-bar. The lower section 55 of the finger-bar is composed of a plate of cold-rolled steel pressed and cut by a die into the shape represented, or it may be made of cast-steel. This section is strengthened at the rear edge by a vertical flange 56, and the outer end of the section is turned vertically to form an arm 57, having a slot 58 for the vertical adjustment of the supporting-wheel 40. The right-angular construction of the section 55, formed by the flange 56, serves to hold the finger-bar rigid and straight. The upper section 59 of the finger-bar is also composed of a piece of cold-rolled steel pressed and cut into shape, or it may be cast, and this upper section is riveted or bolted or otherwise secured to the lower section 55, as in Fig. 11. The lower finger-bar section 55 is struck or stamped up integral with the gang of lower finger-sections 55^a, each of which is formed with a transverse channel 55^b. The upper finger-bar section 59 is also struck or stamped up integral with the gang of upper finger-sections 59^a, each formed with a transverse channel 59^b. When the two finger-bar sections 55 and 59 are rigidly united, the gangs of finger-sections 55^a and 59^a rest upon each other, and the channels 55^b and 59^b provide the required space for the travel of the cutter-bar and the cutters, which I will now describe.

A steel rod or bar 60 is provided at each end with a shoulder 61. To this rod or bar are secured the cutters 62, one of which is exhibited in Fig. 13. The cutters are arranged on the steel rod 60 so that they abut against each other and exactly fill the space between the shoulders 61. The steel rod or bar 60 is fitted and rigidly attached within a hollow boxing 63, formed of a plate of steel bent or crimped into shape with open ends and a longitudinal slot 64, and the steel rod or bar carrying the cutters 62 may be secured in the hollow boxing 63 in any suitable manner; but I prefer to rivet it therein at one end. The rod, with its cutters, exactly fills the hollow space in the boxing 63, while the points of the cutters project through the longitudinal slot 64 and operate in the fingers of the finger-bar. The inner end of the cutter-bar, constructed as described, is accurately fitted and riveted to the lower arm or portion 30 of the yoke 29.

By the construction described I am enabled to properly retain the cutters 62 in position without riveting or bolting them to the steel rod 60. As exhibited by Fig. 13, the cutters are each composed of a right-angled piece, so that the rear extremity of the cutter is formed with a pendent heel-piece, which projects downwardly between the steel rod 60 and the adjacent side of the hollow boxing 63, whereby the cutters are firmly and rigidly secured in place.

The steel rod or bar 60 may be provided at one end with an orifice, as at 65, to receive a pointed instrument for the purpose of withdrawing such rod or bar when it is to be replaced by a new one. This construction of finger-bar and cutter-bar is advantageous in many ways, in that the parts are strong, durable, and economically manufactured, and the cutter-bar and cutters can be easily renewed when occasion demands.

By constructing the swing-frame with a pedal-extension in rear of the axle to be operated by the foot of the driver I provide for a nice adjustment of the cutting mechanism relatively to the surface traversed and dispense entirely with the hand-lever and connections heretofore employed, whereby the machine is not only rendered more desirable and efficient, but it can be manufactured more economically and enables the cutting mechanism to be raised and lowered at the will of the operator without the necessity of using his hand or hands for accomplishing that object.

In the machine illustrated in Fig. 1 the parts are adjusted for what I term a "front-cut" mower; but I have so constructed and organized the elements of the machine that I am enabled to convert it from a front-cut into a thrust-cut mowing-machine, as seen in Fig. 2, where the finger-bar and cutter-bar travel in a path directly in rear of the draft-animal. To effect the change from the front cut to the thrust cut the shafts are detached,

the traction-wheel 2 and the ratchet-wheel 45 are removed from the axle, and the latter is slipped through the main drive-wheel 3, and the traction-wheel 2 is then applied to the axles as in Fig. 2. The ratchet-wheel 45 is rigidly fastened to the axle in any suitable manner, as by a key, and the shafts and seat-carrying bar are applied to the axle and secured by the clips 5 and 7. By this arrangement the main drive-wheel and the swing-frame are placed at the left-hand end of the axle and the traction-wheel 2 is arranged at the right-hand end of the same, which is the reverse of the arrangement exhibited in Fig. 1. The draft-chain 51 is engaged with the axle, as at 66, and the spring connection 42 is connected with a hook 67 on the shafts and with the hook or eye 68 on the swing-frame. The operation of the parts remains substantially the same, except, of course, that the finger-bar cannot be swung to a perpendicular position, but still it can swing with the cutter-box to a limited extent in a vertical plane.

By the vertical adjustment of the wheels 16 and 40 the position of the cutting mechanism relatively to the surface traversed can be varied.

The cutter-box is provided at one end with a sliding plate 69 for the purpose of introducing the yoke 29 and its attachments.

Having thus described my invention, what I claim is—

1. In a mowing-machine, the combination, with an axle having rigidly-attached shafts and a ratchet-wheel, of a swing-frame journaled on the axle and having a pedal-extension in rear thereof, a spring-actuated dog carried by the swing-frame and engaging the ratchet-wheel, a handle for operating the pawl to disengage it from the ratchet-wheel, a cutter-box carried by the front portion of the swing-frame, a finger-bar connected with the cutter-box, a cutter-bar, and means for operating the latter, substantially as described.

2. In a mowing-machine, the combination, with an axle having rigidly-attached shafts and a loose main drive-wheel provided with an annular gear, of a swing-frame journaled on the axle and extending in rear thereof as a pedal for the foot of the driver, cutting mechanism connected with the front end portion of the swing-frame, a ratchet-wheel rigidly connected with the axle, and a spring-actuated pawl carried by the swing-frame, engaging the ratchet-wheel and having a handle for disengaging it therefrom, substantially as described.

3. In a mowing-machine, the combination, with a non-rotating axle having a rotary driving-wheel, of shafts rigidly attached to the axle, a swing-frame journaled to and swinging in a vertical plane upon the axle and extended in rear thereof as a pedal for the foot of the driver, cutting mechanism carried by the front end portion of the swing-frame, a spring connected at its upper end

with the shafts and at its lower end to the front end portion of the swing-frame, and a driver's seat located in rear of the axle and rigidly attached to the latter, substantially as described.

4. In a mowing-machine, the combination, with an axle, of a swing-frame journaled thereupon, a cutter-box journaled on the front end portion of the swing-frame and provided with a lateral projection having a spring adapted to strike the under side of the swing-frame when the cutter-box is swung in one direction, a finger-bar carried by the cutter-box, a cutter-bar, and means for reciprocating the cutter-bar, substantially as described.

5. In a mowing-machine, the combination of a finger-bar composed of upper and lower sections, each struck or stamped up integral with a gang of finger-sections, with a cutter-bar consisting of a hollow boxing having a longitudinal slot and a rod or bar inclosed within and rigidly secured to the hollow boxing, and cutters secured in place between the rod or bar and the top wall of the boxing and extending through the longitudinal slot in the latter, substantially as described.

6. In a mowing-machine, the combination of a finger-bar composed of upper and lower sections, each struck or stamped up integral with a gang of finger-sections provided with transverse channels, with a cutter-bar consisting of a hollow boxing having a longitudinal slot and moving in the channels of the finger-sections and a rod or bar inclosed within and rigidly secured to the hollow boxing, and cutters held in place between the rod or bar and the boxing and projecting through the longitudinal slot of the latter, substantially as described.

7. In a mowing-machine, the combination of a finger-bar composed of upper and lower sections, each struck or stamped up integral with a gang of finger-sections having transverse channels, with a cutter-bar moving in the transverse channels and consisting of a hollow boxing having a longitudinal slot and a rod or bar inclosed within and rigidly secured to the hollow boxing, and right-angled cutters having the pendent heel-pieces at their rear ends confined between the rod or bar and the rear side of the hollow boxing, substantially as described.

8. In a mowing-machine, the combination of the upper and lower finger-bar sections respectively formed integral with gangs of finger-sections and one finger-bar section having its rear edge formed integral with an upwardly-projecting longitudinal stiffening-flange, against which rests the rear edge of the other finger-bar section, with a reciprocating cutter-bar moving back and forth between the upper and lower finger-bar sections and having cutters which operate between the upper and lower finger-sections, substantially as described.

9. In a mowing-machine, the combination, with a wheeled axle, of a shiftable frame

mounted on the axle and carrying drive mechanism and cutting devices, said frame, with its drive mechanism and cutting devices, being adjustable on the axle to move the cutting devices from a position outside to a position between the ground-wheels for converting the machine from a front-cut into a thrust-cut mower, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in the presence of two subscribing witnesses.

JACK WM. JAMES. [L. S.]

Witnesses:

C. W. HERBERT,

J. P. YOUNG.