No. 637,932. Patented Nov. 28, 1899.

M. E. HAYES.

MOWING MACHINE.

(Application filed May 12, 1899.)

(No Model.) 2 Sheets—Sheet 1.

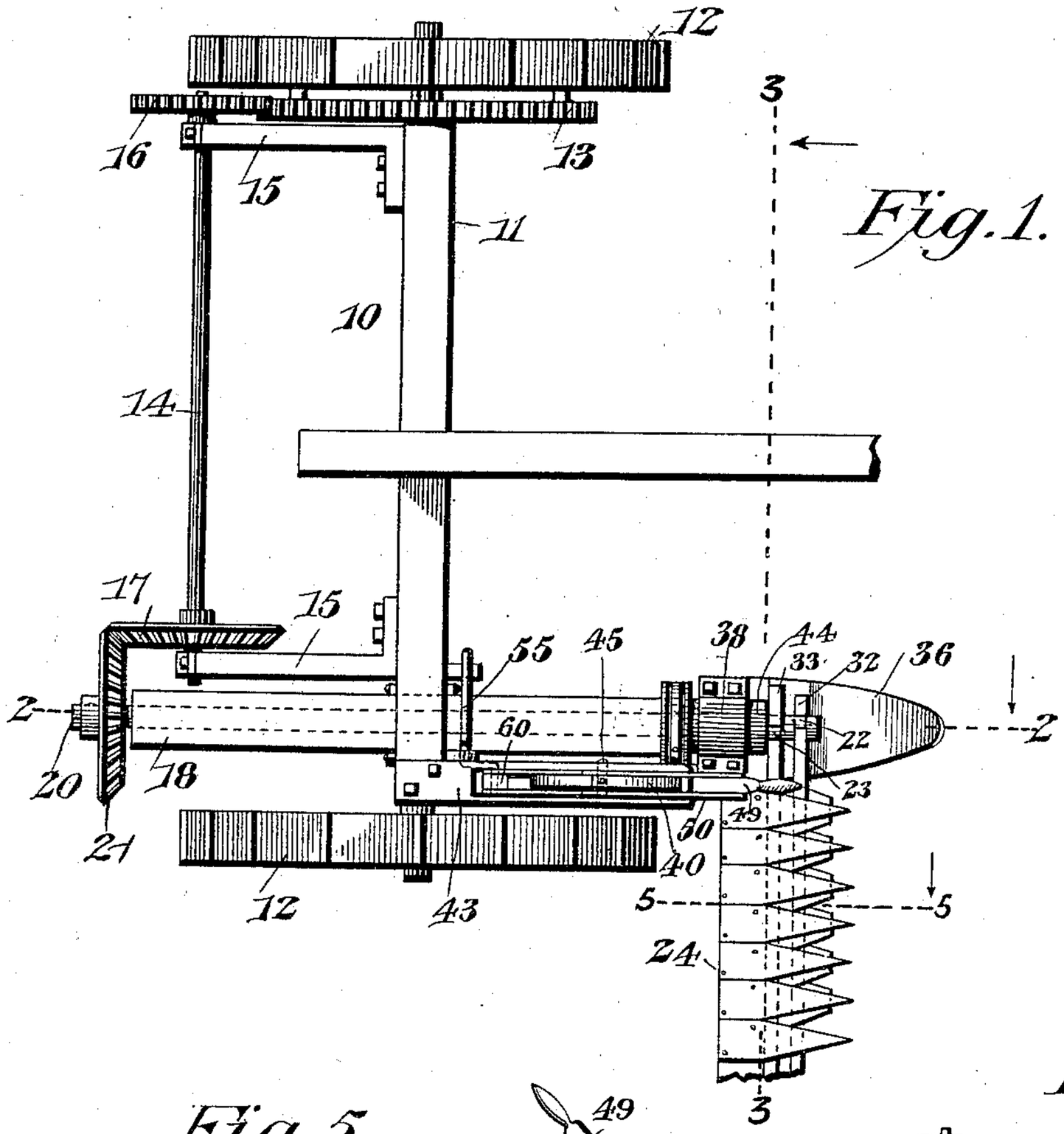

Fig. 1.

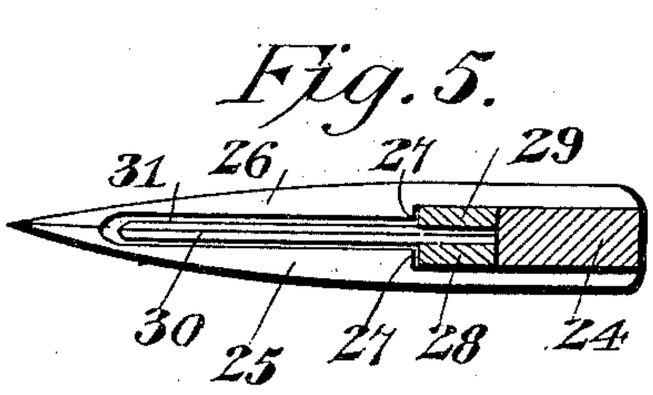

Fig. 5.

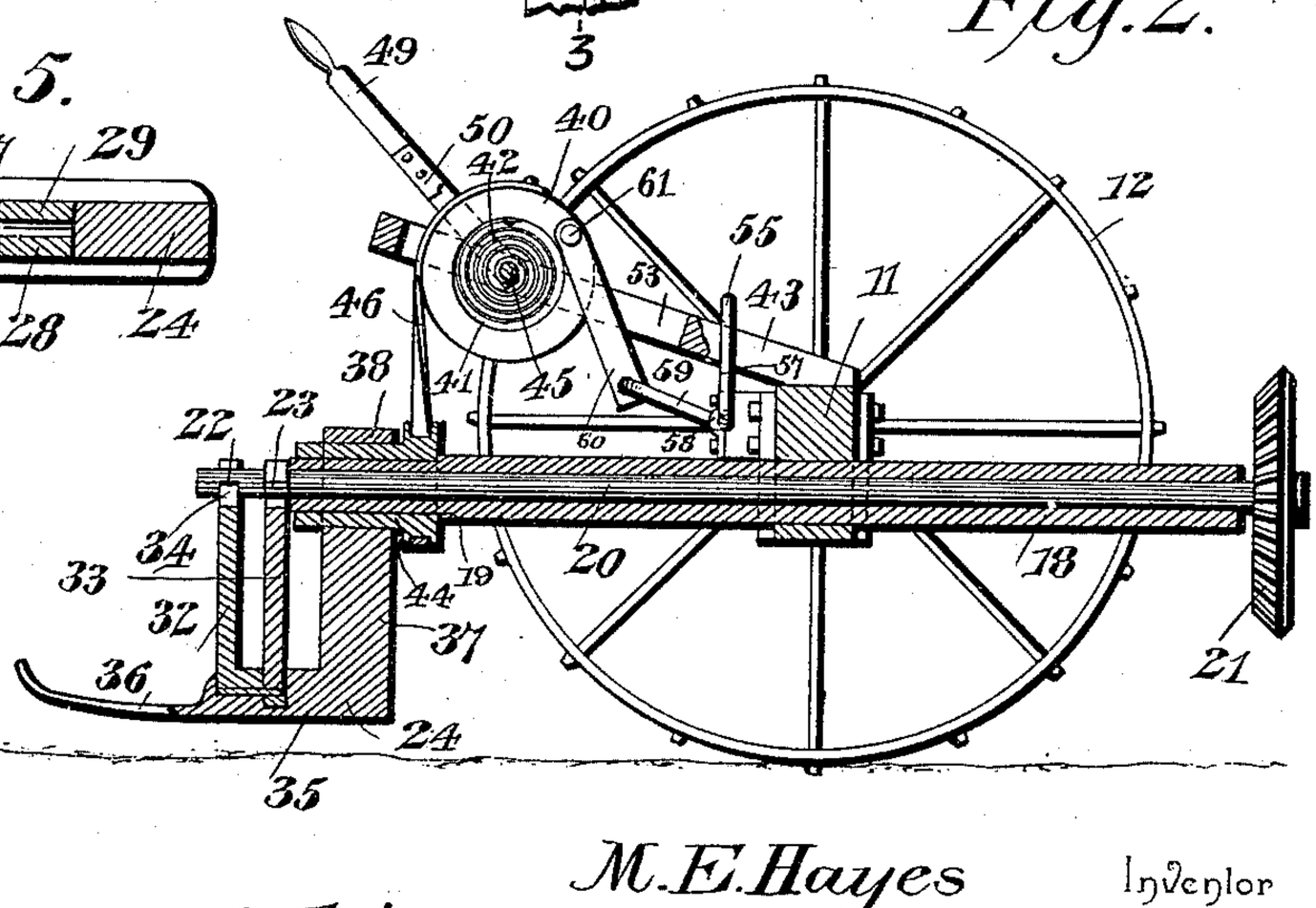

Fig. 2.

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Fig. 3.

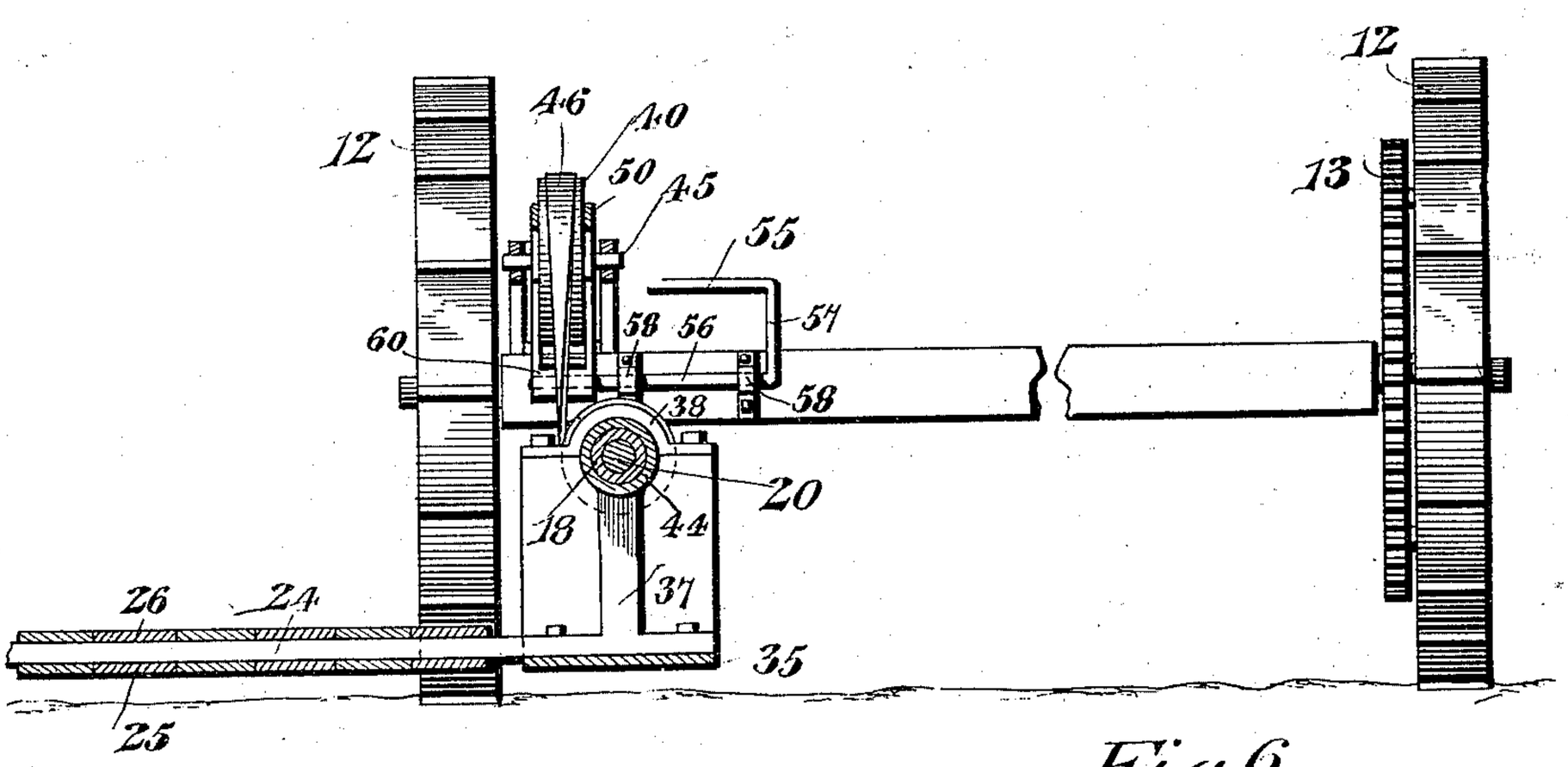
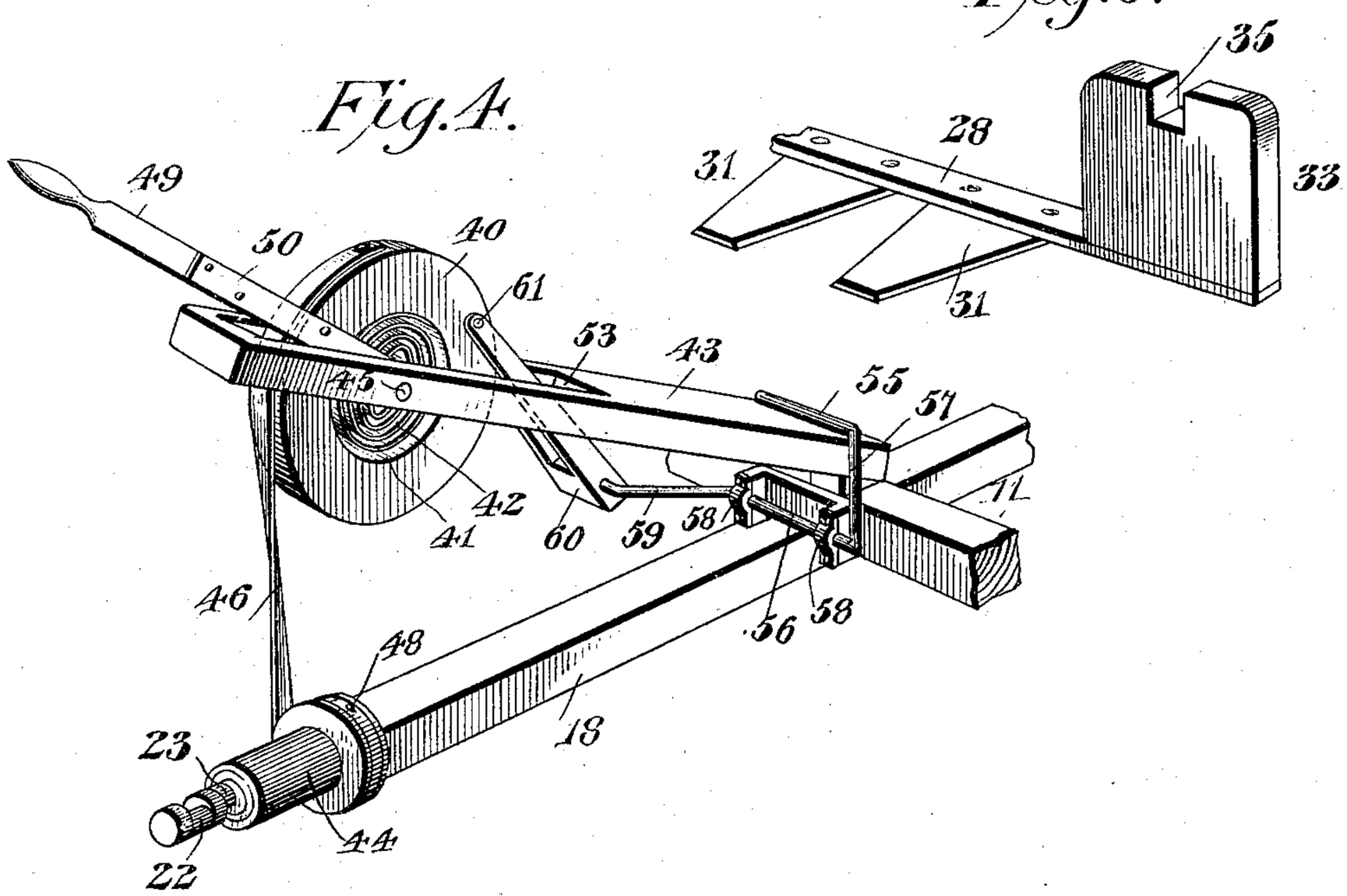


Fig. 6.

Fig. 4.



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UNITED STATES PATENT OFFICE.

MERITT E. HAYES, OF LEICESTER, NORTH CAROLINA.

MOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 637,932, dated November 28, 1899.

Application filed May 12, 1899. Serial No. 716,552. (No model.)

To all whom it may concern:

Be it known that I, MERITT E. HAYES, a citizen of the United States, residing at Leicester, in the county of Buncombe and State of North Carolina, have invented a new and useful Mowing-Machine, of which the following is a specification.

My invention relates to improvements in mowing-machines of that class known to the art as "forward cut;" and its objects are, first, to provide an improved cutter apparatus in which the parts are combined for operation to require less power than can be obtained by ordinary single-stroke mechanism; secondly, to provide means for counterbalancing the weight of the cutter apparatus, so that it will not bear too heavily upon the ground and may be easily adjusted either by hand or foot power to clear obstructions in its path, and, thirdly, to arrange the cutter apparatus and its driving mechanism in a manner which will insure the operation of the sickles at all points in the adjustment or elevation of the cutter apparatus.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

In the drawings, Figure 1 is a plan view of a mowing-machine constructed in accordance with the principles of my invention. Fig. 2 is a longitudinal sectional elevation through the machine on the plane indicated by the dotted line 2 2 of Fig. 1. Fig. 3 is a cross-section on the plane indicated by the dotted line 3 3 of Fig. 1, looking in the direction indicated by the arrow. Fig. 4 is an enlarged detail view of the compensating-spring drum and its adjusting device. Fig. 5 is a detail cross-sectional view through the cutter apparatus on the plane indicated by the dotted line 5 5 of Fig. 1. Fig. 6 is a detail view of one sickle-bar, showing the head-block adapted to be connected to one of the cranks on the cutter-driving shaft.

The same reference-numerals denote like and corresponding parts in each of the several figures of the drawings.

The framework 10 of the machine carries an ordinary axle 11, on which are fitted the traction-wheels 12, one of said wheels adapted to propel a counter-shaft through suitable driving mechanism. One element of the driving mechanism is a gear 13, which is fast with one of the traction-wheels, and on the rear side of the framework 10 are provided suitable bearings 15, in which the counter-shaft 14 is journaled. One end of this counter-shaft is provided with a spur-gear 16, which meshes directly with the driving-gear 13, and at its other end said counter-shaft has a bevel-gear 17, adapted to rotate the cutter-driving shaft. The framework 10 is provided with a hollow bar 18, which lies at right angles to the axle 11 and which furnishes an elongated bearing for the cutter-driving shaft 20, and near its front end this hollow bar 18 of said frame has a circumferential recess or groove 19, adapted to receive the devices by which the cutter apparatus is hung or jointed to the frame.

The cutter-driving shaft 20 extends longitudinally through the hollow bar 18 to have its front and rear ends protrude beyond the extremities of said hollow bar, and at its rear end said shaft 20 is provided with a bevel-gear 21, which meshes directly with the bevel-gear 17 on the counter-shaft 14, thus operatively connecting the counter-shaft to the cutter-driving shaft. The protruding front end of said cutter-driving shaft is provided with the spaced eccentrics 22 23, which are set on different centers to project from opposite sides of the axis of the cutter-driving shaft, and in connection with the double-crank-formed cutter-driving shaft I employ a duplex-sickle mechanism that is supported by a finger-bar 24, the latter having a jointed or hinged connection with the mower-frame 10, the axis of said hinged connection being concentric with the cutter-driving shaft for the purpose of adjusting the cutter mechanism without throwing the sickle mechanism out of operation to the cutter-driving shaft.

The finger-bar 24 is a single piece of metal provided with upper and lower series of guard-fingers 25 26, and these fingers are fastened to the bar in matching relation. The guard-fingers project a suitable distance in front of the finger-bar 24, and in the opposing faces of said fingers are formed the transverse grooves 27, which coincide or register in order to produce a guideway for the sickle-bars 28 29. The sickle-bar 28 is adapted to rest upon

the lower series of fingers 25, within the grooves thereof, and at one end the sickle-bar is provided with a head 32, having a groove 34 to receive the eccentric 22 of the cutter-driving shaft. The other sickle-bar 29 is confined within the grooves of the guard-fingers 26 and rests upon the lower sickle-bar 28, said sickle-bars being confined slidably in the grooves of their respective series of fingers and in slidable relation to each other. At one end the upper sickle-bar is formed or provided with a head 33, having a groove 34 similar to the grooved head of the sickle-bar 28, and the head 33 of the upper sickle-bar 29 is disposed at one side of the head 32 on the lower sickle-bar, so that the head 33 may engage with the eccentric 23 of the cutter-driving shaft.

The sickle-bars 28 29 are provided with knives or blades 30 31, respectively, and said knives project from the sickle-bars in order to work in the intervals between the series of guard-fingers, and as the eccentrics are disposed at opposite sides of the center of the cutter-driving shaft they will rotate with the shaft to drive the sickle-bars simultaneously in opposite directions, and thus said knives will operate upon the grain with a draw or shear cut due to the simultaneous reciprocation of the sickle-bars.

The finger-bar 24 is formed at its inner end with an integral head 35, and the front end of this head is extended or prolonged at one end of the cutter apparatus to form a broad flat shoe or runner 36, adapted to travel on the ground and to support and guide the inner end of the cutter apparatus.

The grooved end 19 of the hollow bar 18, forming a part of the mower-frame, loosely receives a pivotal sleeve 44, and to this sleeve is firmly clamped a hanger or post 37, which serves to operatively connect the sleeve and the cutter apparatus. The post or hanger 37 is made fast or integral with the head 35 at the inner end of the finger-bar which forms a part of the cutter apparatus, and this post or hanger extends upwardly from the head 35, as shown by Figs. 2 and 3. The upper extremity of said post 37 is fashioned to fit snugly to the lower side of the pivotal sleeve 44, and said post receives a clamp 38, which is fitted to the upper face of the sleeve 44. This clamp is secured firmly to the post or hanger 37 by suitable bolts, as shown by Fig. 3, and thus the post, the hanger, and the sleeve are joined firmly together; but at the same time the clamp may easily be removed to detach the cutter apparatus from the pivotal sleeve. The sleeve 44 is held against endwise displacement by the groove 19 of the hollow arm 18 of the mower-frame, and as the finger-bar is clamped firmly to the pivotal sleeve said finger-bar is mounted in a loosely-confined condition on the mower-frame to prevent endwise movement of the parts which form the cutter apparatus. The described construction of means for attaching the finger-bar to the mower-frame provides a hinge or joint connection between the finger-bar and the framework 10, the axis of said hinge or joint being approximately horizontal and coincident with the axis of the cutter-driving shaft 20. This connection and relation of the finger-bar to the cutter-driving shaft permit the cutter apparatus to be adjusted in a vertical direction without disturbing the concentric relation of the cutter-driving shaft and the finger-bar, and thus the cams of the cutter-driving shaft are adapted to positively propel the sickle-bars at all points in the adjustment of the cutter apparatus.

One of the important features of my improved mowing-machine resides in the employment of means by which the weight of the cutter apparatus is borne partly by a compensating-spring device which is carried by the mower-frame, and this compensating-spring mechanism tends to exert a lifting strain on the cutter apparatus for the purpose of preventing the latter from riding or pressing too heavily on the ground. In the preferred embodiment of this part of my invention I employ a yielding drum 40, which is provided with a chamber 41, adapted to inclose a convolute spring 42. The framework 10 of the mower is constructed with a fixed arm 43, which is shown by Figs. 2 and 4 as extending in a forwardly and upwardly inclined direction from the axle, and this carries a stub-shaft 45, on which is loosely fitted the compensating-spring drum. Said drum is adapted to turn freely on the stub-shaft within the limits permitted by the spring 42, and one end of this spring is fixed to the stub-shaft, while its other end is attached to the loosely-mounted drum, whereby the spring exerts tension on the drum in a direction to strain operative connections from the said drum to the cutter apparatus for the purpose of normally lifting the cutter apparatus more or less, according to the adjustment of the drum, through the medium of a hand-lever or a foot-treadle. The compensating-spring-controlled drum has one end of a chain or cable 46 attached to a suitable point of its periphery, as shown in Fig. 4, and the opposite end of said chain, cable, or strap is fastened at 48 to a grooved part of the sleeve 44, as shown by Figs. 2 and 4, said sleeve forming the hinged or jointed connection between the finger-bar and the mower-frame.

49 designates the hand-lever, which is forked at one end or provided with the plates 50, and said forked end or plates of the lever are arranged to loosely embrace the drum 40. The forked end or the plates of said lever are fitted loosely on the stub-shaft 45, and they are also fixed to the spring-drum 40, in order that a movement of the lever on the stub-shaft 45 will turn or rock the drum 40, so as to draw on the chain 46, and thereby raise the cutter apparatus. The lever 49 provides a convenient means by which the cutter apparatus may be raised by hand through the medium of the drum, the strap or chain, the sleeve,

and the post or hanger; but I also contemplate the employment of a foot-treadle, which is fitted on the mower-frame in a position convenient to the operator, and which treadle has linked connections with the compensating-spring drum to rock or turn the latter for the purpose of adjusting the cutter apparatus. In embodying my invention I employ a rock-shaft 56, which is shown by Figs. 2 and 4 as arranged in horizontal position on the front side of the machine-axle 11 and adjacent to the hollow arm 18. One end of this rock-shaft is bent or provided with a crank-arm 57, which carries at its upper end the foot-treadle 55. The horizontal rock-shaft 56 is journaled in proper bearings 58 on the mower-frame, and at its end opposite to the arm 57 of the rock-shaft is provided with another crank-arm 59. A link 60 is pivoted to the free extremity of the crank-arm 59, and said link is extended or carried through a slot 53 in the fixed inclined arm 43 on the mower-frame. This link is forked or slotted to embrace the spring-drum 40, and the extremity of said link is pivoted, as at 61, to the drum, whereby the link and crank-arm 59 serve to operatively connect the foot-treadle 55 with the compensating-spring drum.

The spring 42 is connected with the drum to normally impel the latter in a direction which will strain the strap, cable, or chain 46, so as to turn the pivotal sleeve 44 and balance the cutter apparatus. The said lever 49 is made fast with the drum to rock or turn therewith, and the link 60 provides a loose connection between the drum and the rock-shaft which carries the treadle, said link playing freely in the slotted arm 53 under the movement of the drum 40. It is evident that the operator may throw the lever 49 in a rearward direction for the purpose of turning the drum to coil the strap or chain 46 on the drum and turn the pivotal sleeve 44 on the hollow arm 18 in a direction to lift the cutter apparatus for the purpose of clearing obstructions in its path. The same end may be attained by operating the foot-treadle 55 to rock the shaft 56 and throw the crank-arm 59 in a rearward direction, thus making the link 60 pull on the drum to rock or turn the latter.

In operation the hand-lever is moved to its extreme forward position by the spring-drum, and the cutter apparatus is sustained yieldably in its proper operative position by said drum. The traction of one wheel 12 propels the counter-shaft to rotate the cutter-driving shaft 20, the eccentrics of which actuate the sickle-bars simultaneously for the blades thereof to sever the grain with a draw or shear cut. The operator may manipulate the hand-lever or the foot-treadle to operate the spring-drum 40 positively for the purpose of raising the cutter apparatus to clear obstructions in its path; but normally the hand-lever and the treadle are free from the restraint, so that the compensating spring exerts its tension on the finger-bar of the cutter apparatus.

Changes in the form, proportion, size, and the minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what I claim is—

1. In a mowing-machine, the combination of a framework, a hollow arm on the framework, a cutter-driving shaft passed through said arm and having eccentrics disposed on opposite sides of the center of the shaft, a sleeve rotatably mounted upon the arm, a finger-bar fixed to said sleeve for rotatable adjustment therewith in a vertical plane concentric with the axis of the cutter-driving shaft, positively-movable sickle-bars confined slidably in the finger-bar and having recessed heads receiving the eccentrics respectively to be driven thereby, a counter-shaft geared to the cutter-driving shaft, and means connected with said sleeve for sustaining the finger-bar under yieldable tension, the entire cutter apparatus being movable with the sleeve for the eccentrics to actuate the cutter-bars at all points in the adjustment of the cutter apparatus.

2. In a mowing-machine, the combination of a framework, a hollow arm on the framework, a cutter-driving shaft passed through said arm and having eccentrics disposed on opposite sides of the center of the shaft, a sleeve rotatably mounted upon the arm, a finger-bar fixed to said sleeve for rotatable adjustment therewith in a vertical plane concentric with the axis of the cutter-driving shaft, positively-movable sickle-bars confined slidably in the finger-bar and having recessed heads receiving the eccentrics respectively to be driven thereby, a counter-shaft geared to the cutter-driving shaft, and a counterbalancing-spring mechanism carried by the mower-frame and connected with said sleeve at a point to one side of its center, said mechanism comprising means for increasing the tension of the spring to rotate the sleeve and the cutter apparatus carried thereby.

3. In a mowing-machine, the combination of a framework, a hollow arm on the framework, a cutter-driving shaft passed through said arm and having eccentrics disposed on opposite sides of the center of the shaft, a sleeve rotatably mounted upon the arm, a finger-bar fixed to said sleeve for rotatable adjustment therewith in a vertical plane concentric with the axis of the cutter-driving shaft, positively-movable sickle-bars confined slidably in the finger-bar and having recessed heads receiving the eccentrics respectively to be driven thereby, a counter-shaft geared to the cutter-driving shaft, a drum mounted loosely on the mower-frame and having positive connection with said sleeve, a convolute spring housed within said drum connected thereto to place the drum under tension and sustain a part of the weight of the cutter ap-

paratus, and a lever in operative relation to said drum for positively turning the latter to rotate the sleeve and lift the cutter apparatus.

4. In a mowing-machine, the combination of a cutter apparatus having a hinged or jointed connection with the mower-frame, a drum mounted loosely on a stub-axle of said mower-frame, a convolute spring housed within the drum and connected thereto for placing said drum under tension, a chain or flexible connection attached to the drum and to the hinged connection of the cutter apparatus, a lever attached to the drum to move therewith, and a pivoted treadle having a linked connection with said drum, substantially as described.

5. In a mowing-machine, a cutter apparatus comprising a finger-bar, the matching fingers fixed to the finger-bar in pairs and having the transverse grooves in their opposing faces arranged to form a guideway, a pair of sickle-bars superposed upon the lower fingers and upon one another and provided with the guides and with the recessed heads, and a cutter-driving shaft having oppositely-disposed eccentrics fitted in the heads of the sickle-bars for simultaneously moving the latter in opposite directions, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

MERITT E. HAYES.

Witnesses:
GEO. W. YOUNG,
T. T. PATTON.