No. 837,058. PATENTED NOV. 27, 1906.

P. HANSON.

MOWING MACHINE.

APPLICATION FILED JULY 6, 1903.

3 SHEETS—SHEET 1.

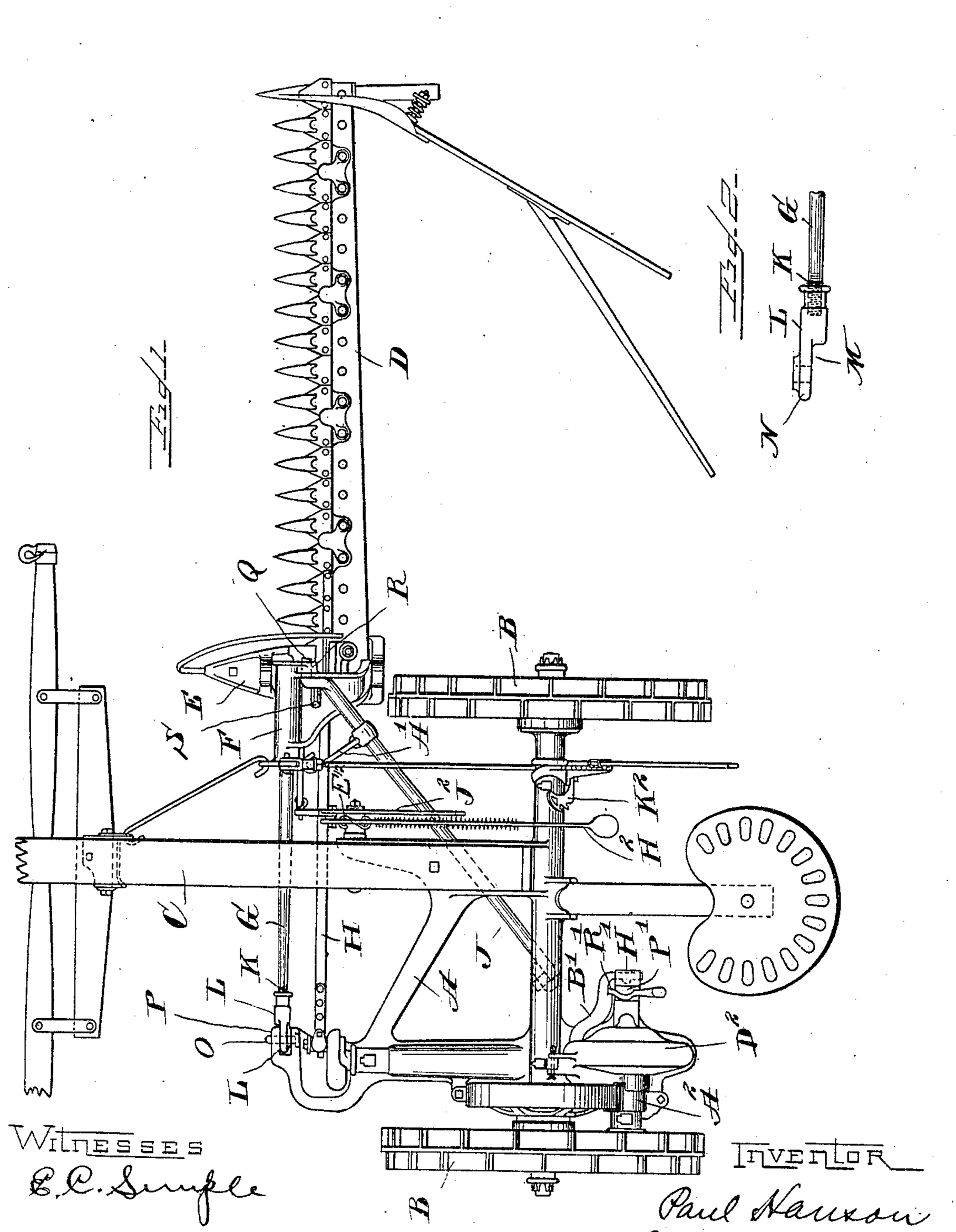

FIG 1.

FIG 2.

Witnesses
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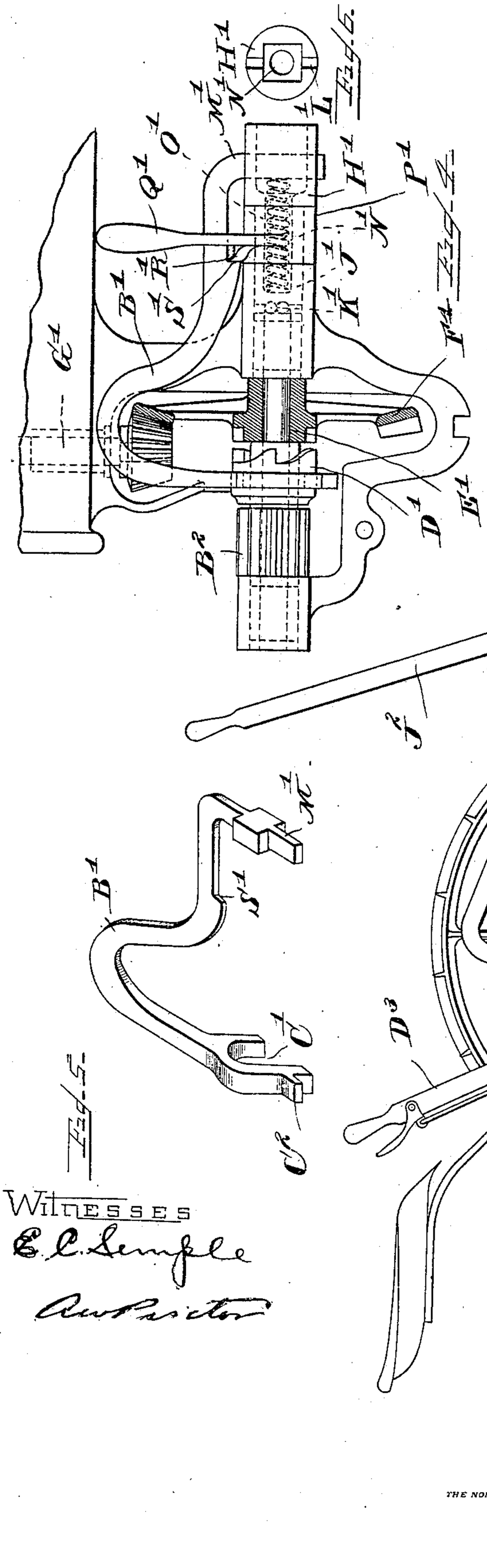

Fig. 2.

Fig. 3.

Witnesses
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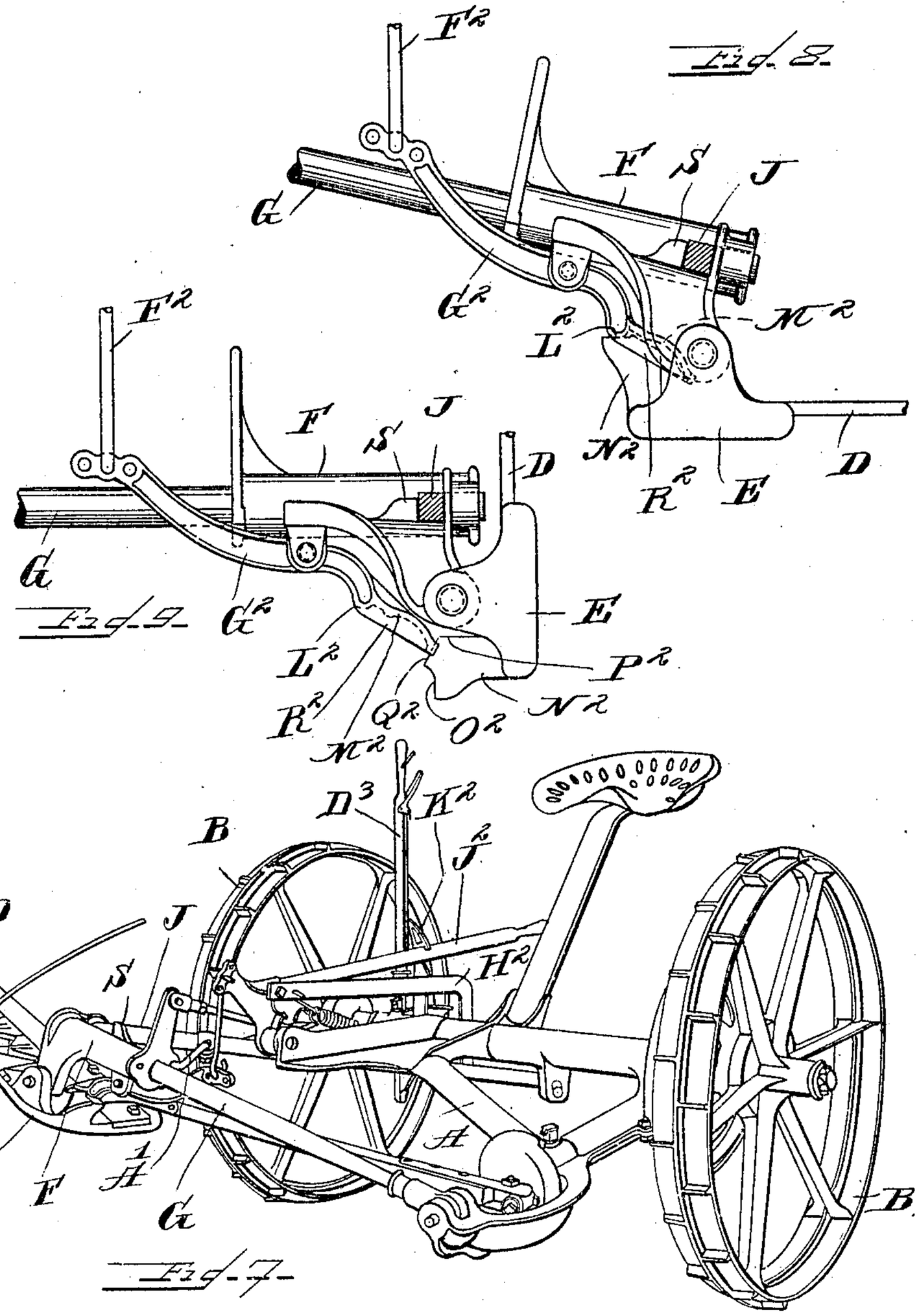

Fig. 8.

Fig. 9.

Fig. 7.

Witnesses

E. C. Semple

Conductor

Inventor

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UNITED STATES PATENT OFFICE.

PAUL HANSON, OF ST. PAUL, MINNESOTA.

MOWING-MACHINE.

No. 837,058. Specification of Letters Patent. Patented Nov. 27, 1906.

Application filed July 6, 1903. Serial No. 164,449.

To all whom it may concern:

Be it known that I, PAUL HANSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improvement in Mowing-Machines, of which the following is a specification.

This invention relates to mowing-machines.

The object of the invention is to simplify and improve the construction of mowing-machines and to render the same efficient in operation.

A further object of the invention is to provide means whereby the alinement of the cutter-bar may be adjusted.

A further object of the invention is to provide means whereby the yoke upon which the shoe is pivoted is secured to rock with the coupling-arm, thereby reducing the wear and looseness of the parts.

A further object of the invention is to efficiently tie or brace the coupling-arm and diagonal brace-rod together.

A further object of the invention is to provide an extra hand-lever for raising the cutter-bar to an extremely high position and for locking the same in said position.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, Figure 1 is a view in plan, parts of the tongue broken off, of a mowing-machine embodying the principles of my invention. Fig. 2 is a broken detail view in top plan of the connection by which the inner end of the coupling-arm is pivotally connected to the frame of the machine. Fig. 3 is a view in side elevation, the cutter-bar being in vertical transverse section. Fig. 4 is a broken detail view in top plan of the clutch mechanism for throwing the sickle-bar-operating pitman into and out of action. Fig. 5 is a detached detail view in perspective of the yoke employed in connection with the clutch mechanism. Fig. 6 is a detail view, in end elevation, looking from the right of Fig. 4 of the plug employed in connection with the clutch mechanism and in which the end of the yoke shown in Fig. 5 is received. Fig. 7 is a view in perspective looking from the front of the machine, the tongue being removed. Fig. 8 is a broken detail view, in side elevation, of the outer end of the coupling-arm, showing the yoke mounted thereon, the shoe connected to the yoke, and the relation of the gag-lever and shoe. Fig. 9 is a view similar to Fig. 8, showing the parts in the relation occupied when the cutter-bar is in raised position.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

Reference-sign A designates the frame of the machine; B, the supporting-wheels therefor; C, the tongue; D, the finger-bar; E, the shoe upon which the finger-bar is supported; F, the yoke upon which the shoe is pivotally mounted; G, the coupling-arm; H, the sickle-bar-operating pitman, and J the diagonal brace arm or rod. Except in the details hereinafter noted these parts may be of the usual or any ordinary and well-known construction and arrangement.

In the practical operation of mowing-machines the backward pressure of the grain upon the cutter-bar as the machine advances through the field, causing wear in the hinge connections of the shoe and associated parts, rapidly develops a backward sag in the cutter-bar, thereby destroying the proper alinement of the sickle-bar with reference to its operating-pitman.

It is among the purposes of my invention to provide a construction which is simple for adjusting the alinement of the cutter-bar, and this result is accomplished in accordance with the principles of my invention by the following construction: The inner end of the coupling-arm G is threaded, as indicated at K, Figs. 1 and 2, to receive a threaded socket formed in a head piece or block L. This head-piece is offset or shouldered on one face thereof, as indicated at M, Fig. 2, the base surface of such offset or shoulder being in the line of the axis of the coupling-arm G. The portion or end N of the head L is received in a fork formed in the main frame and is pivotally mounted therein upon a bolt O or otherwise, as most clearly shown in Fig. 1. By arranging the shoulder or offset M to present forwardly with respect to the machine, as seen in Fig. 1, the arm P of the fork in the frame which receives the head receives or seats up into the offset or shoulder M of the head L. This secures the cutter-bar in one position of adjustment with reference to its

alinement with its actuating-pitman. When an objectionable degree of backward sag of the cutter-bar develops to carry the same out of proper alinement with its actuating-pitman, the bolt O is removed and the head L is given a half-turn, thereby carrying the offset or shoulder M into position to present rearwardly with respect to the machine or into the position shown in Fig. 2. This brings the flat back surface of the head L against the inner surface of the arm P of the yoke or fork, and hence carries the inner end of the coupling-arm G rearwardly slightly. This rearward movement of the inner end of the coupling-arm causes the shoe and the cutter-bar to rock or swing forward slightly or correspondingly, thereby restoring the proper alinement of the cutter-bar with respect to its actuating-pitman. Of course it will be seen that a small movement of the inner end of the coupling-arm will be magnified at the outer end of the cutter-bar, and hence the desired adjustment is attained in a most simple and efficient manner.

It has been a common practice heretofore to sleeve the yoke upon the outer end of the coupling-arm, so as to permit the yoke to rock axially upon the coupling-arm. The result of such construction is a constant wear upon the bore of the yoke at the points of its bearing upon the coupling-arm, thereby rapidly developing looseness and lost motion in the parts and necessitating the provision of special mechanism to take up such wear. It is among the purposes of my invention to avoid this objection, and I secure the desired object by mounting the yoke F upon the end of the coupling-arm rigidly with reference thereto and without relative rocking movement thereon. With such construction in order to permit the vertical tilting movement of the points of the guard-fingers and of the cutters the yoke which supports the shoe is permitted to rock through the axial rocking movement of the coupling-arm, the coupling-arm and yoke rocking in unison, the threaded connection of the coupling-arm with the head L permitting such axial rotation of the coupling-arm, and to permit such axial rotation or rocking movement of the yoke the lower or outer end of the diagonal brace-rod J is bent, as indicated at Q, and is received within a bearing formed in a convenient flange of the yoke. (See Figs. 1 and 3.) By this construction it will be seen that the yoke does not wear loose upon its bearing upon the coupling-arm, and hence the necessity for frequent readjustments to compensate for such wear is avoided. The bent end Q of the diagonal brace-rod J forms a pintle which is received in the bearing formed in the yoke. At its lower or pintle end the brace-rod J is received between the flange R, in which the bearing for the pintle Q is formed, and the lug S, formed on the yoke, thereby forming a lock for the brace-bar without interfering with the rocking movement of the yoke. In order to place the brace-bar into position with reference to the yoke, said brace-bar is raised to a vertical position and the pintle on the lower end thereof is slipped into its bearing in the boss R, formed on the yoke from a point in front or in advance of the lug S. The brace-bar is then swung downwardly into position between the lug S and the boss R. By this construction rocking movement of the yoke is permitted, while at the same time maintaining efficient journal or loose connection with the outer or pintle end of the diagonal brace-rod. In order to efficiently stiffen and tie or brace the brace-bar under the strains to which it is subjected in the operation of the machine and in the raising and lowering movements of the cutter-bar, a tie-brace or arm A′ is clamped at one end upon the brace-rod J and is hooked into a hole or opening formed in a flange of the yoke, as clearly shown in Figs. 1 and 7.

It is desirable in a machine of the class to which the present invention relates to provide means which may be operated from a point within easy and convenient reach of the driver for quickly disconnecting or uncoupling the cutter-bar-actuating pitman from its actuating mechanism. I have shown a simple and efficient construction for accomplishing this purpose, wherein is employed a yoke B′, having a forked end (indicated at C′, Fig. 5) arranged to straddle and engage in a groove formed in the hub of a clutch-sleeve D′, the latter being mounted to slide longitudinally upon but keyed or otherwise connected to rotate with the shaft E′, driven in the usual or any convenient manner from the axle of the machine. Upon this shaft E′ is mounted bevel wheel or gear F′, through which rotation is imparted to the shaft G′, to which the pitman H is connected in the ordinary manner. The end thrust imposed upon this bevel-gear is taken upon the end of a plug H′, having a reduced end (indicated in dotted lines at J′, Fig. 4) and received within a bearing formed in the framework of the machine and against the end of which bears the shaft E′, with a ball-bearing (indicated at K′) interposed therebetween. At its outer end the plug H′ is slotted, as indicated at L′, Fig. 6, in which is received the end M′ of the yoke B′. The plug H′ is provided with an internal recess or chamber, (indicated by dotted lines at N′,) in which is received a spring O′, the inner end of said spring bearing against the base of the recess or chamber N′, and the outer end of said spring bearing against the arm M′ of yoke B′, the tension of said spring being constantly exerted upon the yoke B′ in a direction to cause said yoke to move or slide the clutch-sleeve D′ into engaging relation with clutch-teeth formed on the hub of bevel-gear F′.

By this arrangement it will be seen that the tension of spring O′ is arranged in the axial line of the shaft E′, and hence is applied in the most efficient direction and manner for accomplishing its functions. Suitably sleeved upon the reduced portion J′ of plug H′ is a sleeve P′, carrying an operating-handle Q′, on which is formed a cam-flange R′. This cam-flange is arranged to bear against a shoulder S′, formed on shipper-yoke B′, whereby when handle Q′ is rocked in one direction said cam-surface R′ engages shoulder S′ and shifts or moves yoke B′ to the left and against the tension of spring O′, and when arm Q′ is rocked or swung in the opposite direction the tension of spring O′ draws yoke B′ to the right, as shown in Fig. 4, thus accomplishing the movements which result in coupling and uncoupling the sickle-bar-operating gearing, and by placing the operating-lever in the position shown it is brought within easy reach of the foot of the driver, thereby enabling the same to be operated by his foot without the necessity of bending over or otherwise detracting his attention from the proper handling or driving of the machine. The yoke B′ straddles the bevel-gear F′. The fixed shield or cover A^2, which incloses pinion B^2, is arranged to rest upon a lug or extension C^2 at the forked end of yoke B′, thereby efficiently maintaining proper engagement of such forked end with respect to the hub of clutch-sleeve D′. The hinged cover D^2, which incloses the bevel-gear and clutch when in closed position, engages the looped part of the shipper-yoke and holds the same in place.

Another part of my invention relates to means whereby the cutter-bar may be raised to an extreme height or to a position very nearly equivalent in height to a vertical-lift machine and without the necessity for additional mechanism for such purpose.

E^2 designates a pivotally-mounted bell-crank lever, to one arm of which is connected a link F^2, said link being connected to the gag-lever G^2 in the usual manner, said gag-lever being pivotally mounted upon yoke F. To another arm of bell-crank lever E^2 is connected the ordinary foot-lever H^2, through which the bell-crank lever E^2 is rocked, under the influence of which the cutter-bar is raised to its ordinary height in the ordinary manner—as, for instance, where it is desired to clear merely ordinary obstructions in the operation of the machine in a meadow or field of ordinary characteristics of surface. When, however, it is desired to raise the cutter-bar to an extraordinary height, I provide a hand-lever J^2, which is connected to bell-crank lever E^2 and through which the cutter-bar, coupling-arm, yoke, and shoe may be raised to an extraordinary height, the hand-lever J^2 when employed for this purpose being engaged and retained in any suitable or convenient manner—as, for instance, by means of a notched engaging plate K^2, suitably supported in convenient position. The gag-lever G^2 is provided with an engaging surface L^2 and also with an integral extension M^2. A lug N^2 is formed on the shoe E. This lug is provided with an engaging surface or seat O^2, with which the bearing-surface L^2 of the gag-lever coöperates, and also with the engaging surface P^2 and Q^2, (see Fig. 9,) with which the extension M^2 of the gag-lever coöperates. The bearing-surface Q^2 is preferably flat or plain. The ordinary raising of the cutter-bar is accomplished through the engagement of the bearing-surface L^2 of the gag-lever upon the bearing-surface O^2 of the lug N^2 of the shoe. The extraordinary raising hereinbefore referred to is accomplished by the bearing of the extension M^2 of the gag-lever upon the surface P^2 of the shoe-lug. The extension M^2 of the gag-lever is provided with a guiding side flange R^2, the end of which, cooperating with the side surface of lug N^2, forms a guide. When the cutter-bar is raised to the extraordinary height by the actuation of the hand-lever J^2, the parts are raised until the brace-bar J is arrested by coming into engagement with the under side of the frame. When this point is reached, further rocking of the extra hand-lever J^2 effects a tilt of the cutter-bar or of the shoe upon its hinge connections upon the yoke through the extension M^2 of the gag-lever in engaging the lug N^2 or the surface P^2 thereof. When the cutter-bar has been tilted to its highest point, the gag-lever extension rides over and onto the plain surface Q^2 of the lug N^2, as shown in Fig. 9, thereby forming a lock to hold the cutter-bar in tilted or vertical position. This lock cannot be released until the cutter-bar, shoe, and yoke are lowered. These parts are lowered by releasing the lever J^2. When the yoke and shoe are thus lowered, a reverse rocking movement is given the gag-lever G^2, thereby carrying the end thereof out of engagement with the locking-surface Q^2 of lug N^2, and hence permitting the cutter-bar to fold down into operating position parallel with the ground.

From the foregoing description it will be seen that I provide an exceedingly simple and efficient means whereby the cutter-bar, shoe, and yoke may be raised to an extraordinary height without the necessity for special mechanism for accomplishing such result.

Reference-sign A^3 designates the counter-balance-spring. This spring is connected at one end to a fixed part of the framework, and at the other end it is loosely connected to one end of a link E^{12}, said link after passing over a lug E^9 on the casting being connected at its other end to foot-lever H^2. By reason of the link passing over lug E^9 said link is slightly deflected, whereby the point of connection of

said link to the foot-lever H^2 is carried slightly out of the true line of pull of the spring, as clearly shown in Fig. 3. In other words, the link is slightly inclined relative to the line of pull of the spring, so that a line drawn from the point of connection of the link and foot-lever to the point of connection of the spring and frame is somewhat inclined relatively to the line of pull exerted by the spring. As a result of this construction the depression of the foot-lever H^2, resulting in the rocking of the casting E^2 about its pivot, gradually brings the link into the line of pull of the spring, the lug E^9 acting as a compensating device, whereby the spring is enabled to maintain uniform leverage in the initial raising movement of the shoe and cutter-bar from substantially a horizontal position, while at the same time exerting a tension on the foot-lever tending to prevent the same from working loose and flapping about when the machine is in operation. Upon the continued depression of the foot-lever said lever rocks the casting E^2 into position to gradually straighten out the line of pull of spring A^3—that is, it causes the line joining the points of attachment of the spring to the frame and foot-lever, respectively, to approach and finally coincide with the axial line of the spring, and by the time this point is reached the hand-lever J^2 is in position to exert its greatest leverage.

The rocking movement of the yoke F and coupling-arm G to secure the vertical tilt of the cutters may be accomplished in the usual or any ordinary manner—as, for instance, through a link B^3, connected at one end to an extension C^3 of the yoke and at the other end to the usual tilting lever D^3, said tilting lever being pivoted upon a casting or quadrant-bracket E^3. This bracket is yoked upon or around the axle and is clamped in position by a bolt F^3, which bolt may also serve the purpose of clamping the retainer K^2 for hand-lever J^2.

From the foregoing description it will be seen that I provide features of improvement which are simple and efficient and which greatly increase the efficiency of the machine.

Many variations and changes in the details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a mowing-machine, a cutter-bar, an actuating-pitman therefor, and a support for said cutter-bar including a yoke, a coupling-arm on which said yoke is rigidly mounted, a brace-bar having pivotal connection with the yoke, a reversible head to which said coupling-arm is connected for axial rotation, said head being detachably pivoted to the frame of the machine and provided on one side or surface thereof with an offset or shoulder, whereby by detaching said head and reversing its position the yoke is rocked about its point of pivotal connection to the brace-bar to adjust the alinement of the cutter-bar with reference to its actuating-pitman.

2. In a mowing-machine, the combination with a cutter-bar and its actuating-pitman, of means for supporting such bar, including a yoke, a coupling-arm on which said yoke is rigidly mounted, a brace-bar having pivotal connection with the yoke, the inner end of said coupling-arm being threaded, a reversible head provided with a threaded socket arranged to receive the threaded end of the coupling-arm, whereby said coupling-arm is permitted axial rotation, said head having an offset or shoulder formed on one side or surface thereof, the base surface of said offset or shoulder being substantially in axial alinement with the coupling-arm, a bearing formed on the frame of the machine, a detachable pivot-polt passing through said bearing and head to pivotally and detachably connect the head of the frame to the machine, whereby by detaching and reversing said head the yoke is rocked about its point of pivotal connection to the brace-bar to adjust the alinement of the cutter-bar with reference to its actuating-pitman.

3. In a mowing-machine, a coupling-arm hinged or pivoted to the frame of the machine and mounted for axial rotative movement, a yoke mounted upon said arm to rotate therewith, and provided with a bearing, a diagonal brace-bar having a pintle formed at the end thereof, said pintle arranged to be journaled in said bearing, a lug formed on said yoke to lock said brace-bar in position with reference to said bearing, and a cutter-bar supported from said yoke, as and for the purpose set forth.

4. In a mowing-machine, a coupling-arm, a yoke mounted thereon to rock therewith, a brace-bar having a pintle, said yoke provided with a bearing to receive said pintle, and a tie-brace connected to said brace-bar and hooked into a flange formed on said yoke, and a cutter-bar supported by said yoke, as and for the purpose set forth.

5. In a mowing-machine, and in combination with a cutter-bar, its supporting-shoe, and a yoke upon which the shoe is pivotally mounted, said shoe having a lug provided with bearing-surfaces, a gag-lever having a bearing-point engaging with one of the bearing-surfaces of the lug on the shoe to rock the shoe to ordinary heights, and having an extension arranged to engage another bearing-surface of the lug on the shoe to rock the lat-

ter to extraordinary heights, said lever having a side flange to form a guide for the lug on the shoe during the rocking movements thereof, and means for operating the gag-lever, as and for the purpose set forth.

6. In a mowing-machine, and in combination with a cutter-bar and its supporting shoe and yoke, a bell-crank lever, connections between said bell-crank lever and shoe, an operating-lever connected to said bell-crank lever to rock the same for raising the cutter-bar, shoe and yoke, and a counter-balance-spring connected to said operating-lever slightly out of the line of pull of the spring, as and for the purpose set forth.

7. In a mowing-machine, and in combination with the cutter-bar and its supporting mechanism, a tilting lever, a quadrant upon which said tilting lever is mounted, and a yoke-strap formed with said quadrant and arranged to straddle over the axle of the machine and a single bolt for clamping said yoke-strap, as and for the purpose set forth.

8. In a mowing-machine, the combination of a cutter-bar, a tilting lever therefor, a quadrant for locking said tilting lever in position, said quadrant provided with a yoke arranged to engage over the axle of the machine, a bolt for locking said quadrant in position, a foot-lever for raising and lowering said cutter-bar, a hand-lever for raising the cutter-bar to extraordinary heights, a locking-plate for said hand-lever, said bolt also locking said plate in position to engage said hand-lever, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 3d day of July, 1903, in the presence of the subscribing witnesses.

PAUL HANSON.

Witnesses:

E. C. SEMPLE,

S. E. DARBY.