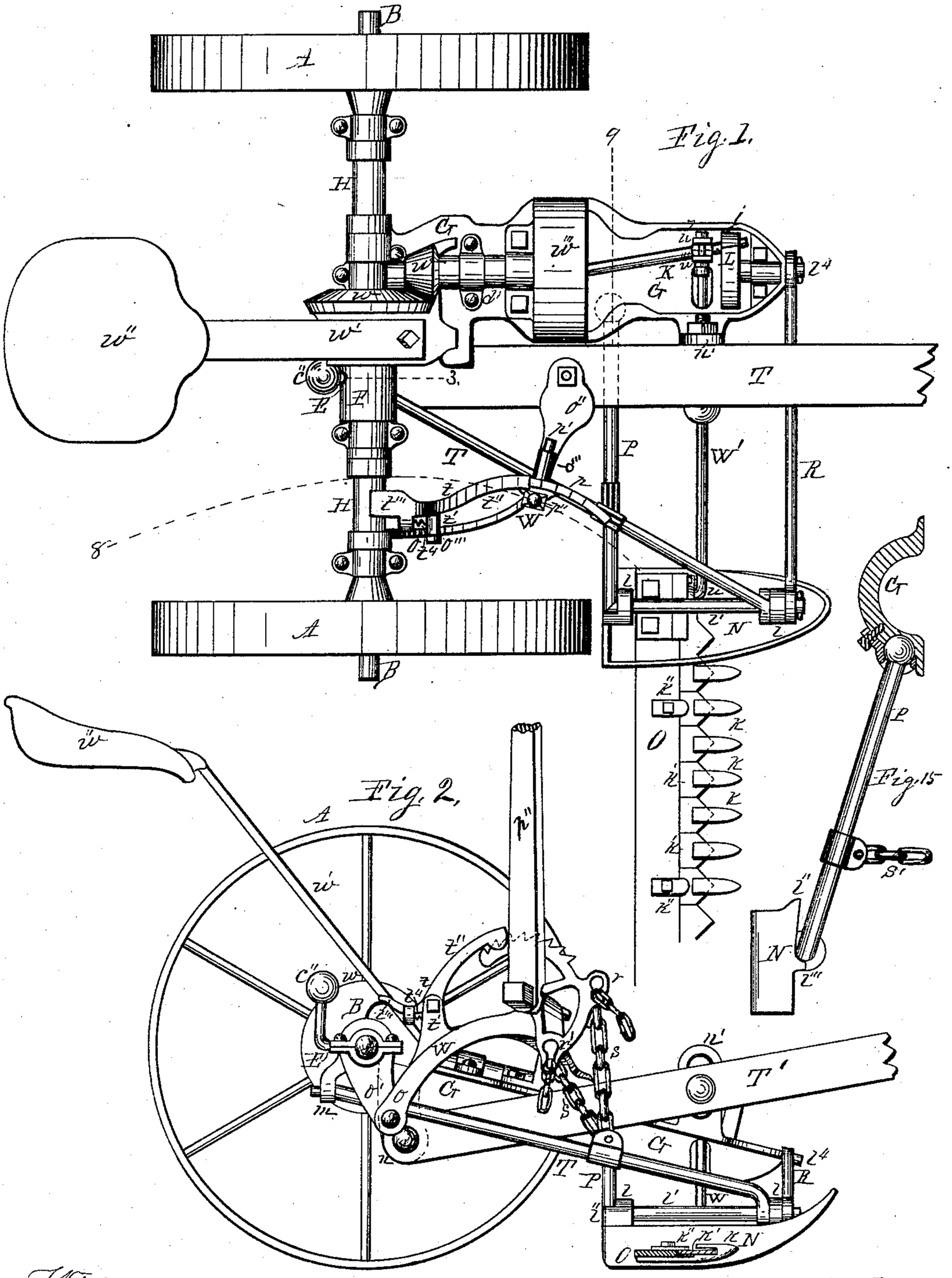
(Model.) 2 Sheets—Sheet 1.

S. T. HOLLY.

MOWING MACHINE.

No. 264,291. Patented Sept. 12, 1882.



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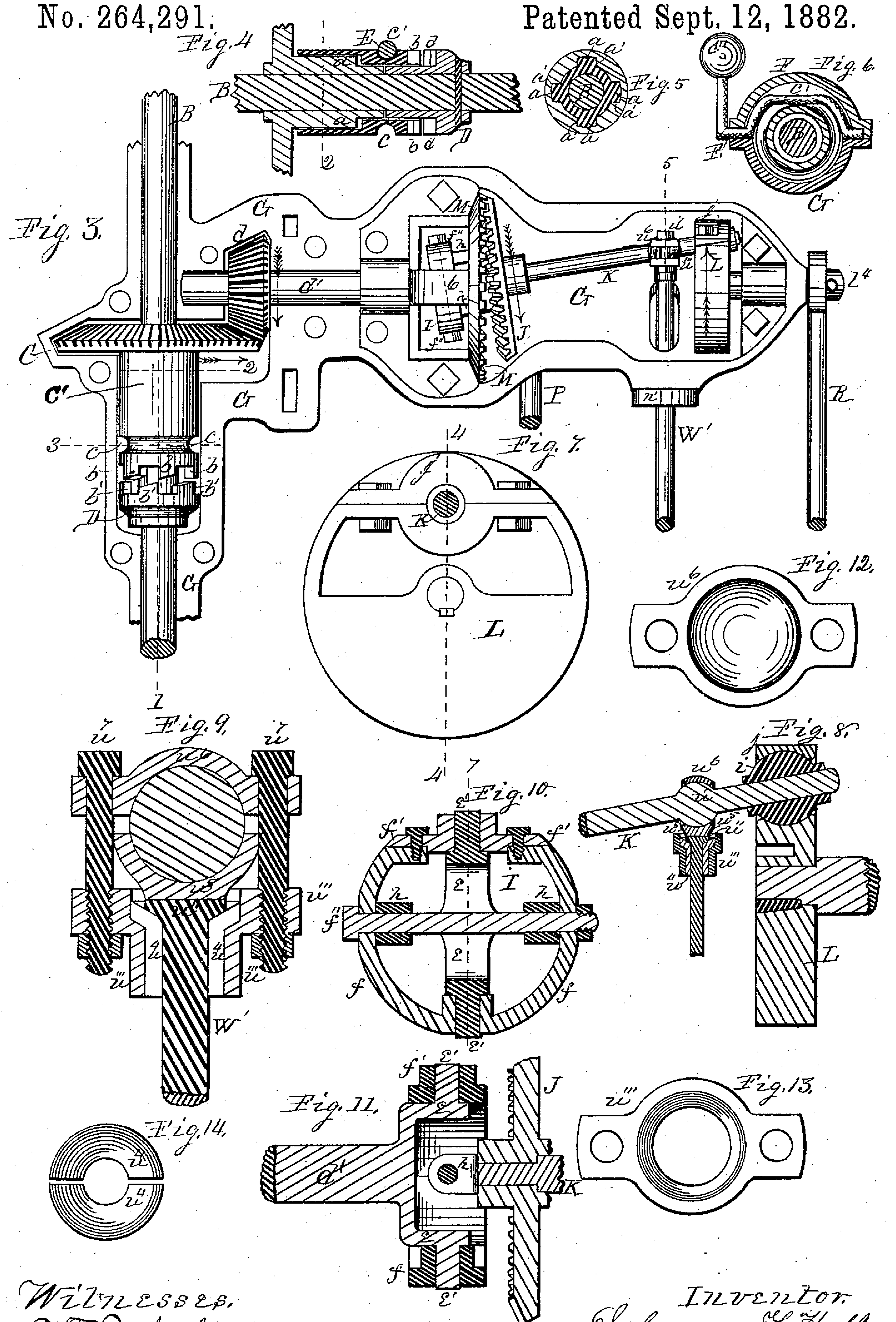

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UNITED STATES PATENT OFFICE.

SOLOMON T. HOLLY, OF ROCKFORD, ILLINOIS.

MOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 264,291, dated September 12, 1882.

Application filed June 27, 1881. (Model.)

To all whom it may concern:

Be it known that I, SOLOMON T. HOLLY, 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 Harvesting-Machines, of which the following is a specification.

My invention relates to improvements in harvesting-machines in the gear-train of which is employed a revolving gyrating gear; and my invention consists in a gyrating revolving gear having a universal-joint connection with a revolving counter-shaft and with a non-revolving gear, in a gyrating revolving shaft in connection with a gyrating revolving gear and with a revolving balance-wheel, in the connection of a gyrating revolving shaft with a balance-wheel, in the connection of the tongue or pole with the machine, and in the raising and lowering mechanism, all of which and other improvements will be hereinafter more fully described.

In the accompanying drawings, Figure 1 is a plan view of a mowing-machine embodying my invention, of which Fig. 2 is a side elevation, and Fig. 3 is a plan view of the gearing with the gear-case removed. Fig. 4 is a vertical section of the clutching mechanism on dotted line 1, Fig. 3. Fig. 5 is a transverse section of the clutching mechanism on dotted line 2, Fig. 2. Fig. 6 is a transverse section of the clutching mechanism on dotted line 3, Fig. 1, showing the shipping-lever. Fig. 7 is an inner or rear face view of the balance-wheel. Fig. 8 is a central section of the balance-wheel cut on the dotted line 4, Fig. 7, through the lengthwise center of the gyrating shaft and pitman connected therewith. Fig. 9 is a vertical central section of the pitman-connection with the gyrating shaft on dotted line 5, Fig. 7, cut lengthwise of the pitman. Fig. 10 is a transverse vertical section of the universal joint connecting the gyrating gear with the counter-shaft, cut on the dotted line 6, Fig. 3. Fig. 11 is a section of the universal joint, cut on dotted line 7, Fig. 10, lengthwise of the counter-shaft. Fig. 12 is a view of the concave face of the outer cup-formed cap-bearing of pitman-head. Fig. 13 is the tubular clamping-socket of the pitman-head. Fig. 14 is a plan view of the enlarged end of the two-part washer of the pitman-head. Fig. 15 is a vertical section through the main frame on the dotted line 9, Fig. 1, showing the connection therewith of the connecting-bar by ball-and-socket joint, and its connection with the shoe as seen from the rear.

In the figures, A represents the driving or carrying wheels, which are of the usual construction of such parts as are commonly used on such machines, and are loosely mounted on the outer ends of a suitable transverse shaft, B. These wheels, in their connection with the shaft, are provided with the usual clutching mechanism commonly used in such machines, operating to cause the shaft to revolve with the wheels in the forward movement of the machine, and in its backward movement to permit the wheels to revolve on the shaft.

At C is represented a beveled-toothed gear-wheel loosely mounted on the main shaft, B, and in this instance is the master gear-wheel in the train. The hub of this master-wheel is provided with ribs *a*, projecting radially from its outer surface, and extends in the lengthwise direction of its axis.

At C′ is represented a sleeve having its inner surface provided with grooves *a′*, adapted to receive the radial ribs *a* on the wheel-hub in such a manner as to revolve with the wheel, and capable of a free endwise sliding movement on the hub. The outer end of this sliding sleeve is provided with clutching-teeth *b*, projecting therefrom in a direction parallel to its axis, which are designed to engage like clutching-teeth, *b′*, formed on the clutch-head D, fixed to the main shaft in such relative position to the gear-wheel that when the sleeve is moved toward the gear-wheel, as represented in Figs. 3 and 4, the clutching-teeth will be disengaged and permit the shaft to revolve without imparting motion to the gear-wheel, and when the sleeve is moved from the gear-wheel its clutching-teeth will engage the clutching-teeth of the clutch-head D, and by means of the connection of the several parts will operate to compel the gear-wheel to revolve with the shaft. This sliding sleeve is provided with an annular groove (represented at *c*) designed to receive the wrist portion *c′* of a crank-formed shifting-

lever, E. This shifting-lever is supported on opposite sides of the main shaft in suitable pivot-bearings in the cap portion F of the casing, and by means of its weighted lever-arm c'' the sliding sleeve may be carried in either direction, and held in such position by means of the weight c'' having passed the vertical line of its support.

At G is represented the gear-frame of my improved machine, and which in this instance is of cast-iron and of a suitable conformation to receive the main shaft on each side of the master gear-wheel, and furnish suitable bearings for the gear-train and furnish the under casing therefor. This frame is held in position on the axle-arm by means of suitable caps, H, which embrace the shaft, and are fixed to the under portion of the frame in a removable manner by means of suitable screw-bolts.

At d is represented a beveled-toothed pinion fixed upon a counter-shaft, d', having its bearing-supports in the main frame, and in such position that the teeth of the pinion mounted on the counter-shaft shall engage the teeth of the master gear-wheel. The forward end of this counter-shaft is provided with fork-arms e of the form usually employed in universal or gimbal joint connections, and are provided with outward-projecting stud-journals e'.

At I is represented a two-part ring consisting of a main portion, f, and a removable portion, f', which are suitably joined to each other, and are fitted with suitable bearings to receive the stud-journal e' of the forked arms of the counter-shaft. This ring is perforated on each side centrally between the bearings which receive the stud-journals, and receives a suitable screw-bolt, f''.

At J is represented a revolving gyrating beveled-toothed gear-wheel having arms h projecting from the opposite sides of its hub on its gear-toothed side and parallel thereto. These arms h enter the two-part ring I, and are perforated to receive the screw-bolt f'' in such a manner as to produce a universal-joint connection with the counter-shaft. The axial center of this revolving gyrating gear-wheel is fitted with a shaft, K, projecting from its side opposite the projecting arms h, and the forward end of this shaft is received in the axial center of a ball, i, having its socket-bearing in the outer portion of a suitable balance-wheel, L. This balance-wheel L is mounted to revolve on suitable bearings in the forward end portion of the main frame G, having its axial center in a continuation of the line of the axial center of the counter-shaft d'. A portion of this balance-wheel, as represented at j, is made removable, being fixed in place by means of suitable screw-bolts. The center of this removable portion, in connection with the main portion of the balance-wheel contiguous thereto, is provided with a spherical socket, in which is placed the spherical ball-bearing i, in the axial center of which the forward end of the gyrating shaft K is supported.

At M is represented a non-revolving beveled-toothed gear-wheel fixed to the main frame in such relative position with the revolving gyrating gear-wheel J that their gear-teeth shall engage each other in working contact. From this connection of the gear-train with the balance-wheel it will be seen that in the forward movement of the machine motion will be imparted to the several gear-wheels in the direction indicated by the arrows, which will be transmitted through the gyratory shaft K to the balance-wheel, causing it to revolve in the direction indicated by the arrows thereon, which rotation is in the opposite direction to that of the gyrating wheel, and in this instance is twelve revolutions of the balance-wheel to one of the gyrating wheel.

At N is represented that portion of a harvester known as the "shoe," to which the finger-bar O is fixed in the usual manner. Fingers k, of the usual form, are fixed to this finger-bar in the usual manner.

At k' are represented cutters of the usual form, held in position on the finger-bar in a suitable manner to vibrate thereon by means of guides k''. The shoe N is provided with ears l, rising from the upper surface of its end portions, and are fitted with suitable openings in the lengthwise direction of the shoe to receive the angle-arm l' of the connecting-bar P. A suitable ball-and-socket joint, as represented in section at Fig. 15, serves to connect the inner end of the connecting bar P to the main frame to permit of an axial rocking movement of the cutting apparatus, and to permit it to be raised and lowered. The connection of this bar P with the heel of the shoe is such that in raising the shoe its inner edge, as at l'', will engage the under side of the bar P and render the cutting apparatus rig'd therewith in such a manner that the further raising of the shoe will cause the cutting apparatus to rise in its whole length. This hinge-joint of the shoe and connecting-bar is such that when the free end of the cutter-bar is raised to place the bar in a vertical position the uprising portion l''' (see Fig. 15) of the shoe, on its rear end and outside of the connecting-arm, will engage the upper side of the connecting-arm and operate to limit the upward overturning movement of the bar.

At R is represented a coupling-arm having its end portions made in I form, the outer end of which receives the end portions of the angle-arm l' of the connecting-bar P, which projects through the forward ear of the shoe, and its inner end receives a stud, l^4, which projects from the forward end of the main frame.

At T is represented a bracing push-bar having its forward end made in I form to receive the angle-arm l' of the connecting-bar P immediately in rear of the forward uprising ear of the shoe, and its rear end is supported by a free joint-connection with an arm, m, depending from the main frame. This connection of the cutting apparatus with the main frame is such as to permit of a free though limited move-

ment of the cutting apparatus, by which the points of the fingers may be raised and lowered to vary the height of the cut, and permits the free end of the cutters to be raised for the purpose of transportation. It also provides for the elevation of the cutters to pass obstructions.

At T′ is represented the tongue or pole of the machine, having its rear end pivoted to an arm, *n*, depending from the main frame, from which point it extends forward.

At *n′* is represented a slotted arm which rises from the forward portion of the main frame and rests against the side of the pole, at which point a suitable clamping-bolt is passed through the pole and slotted arm, and by means of a suitable screw-nut is employed to fix the pole in position to the arm and furnishes the means for the vertical adjustment of the forward end of the main frame, as circumstances may require, and to meet the views of the party using the machine. This connection of the pole with the machine also enables me to obtain a low draft, which is a desirable feature in all heavy-draft implements.

At W is represented a curved bracket consisting of a suitable curved arm, *o*, having its rear end pivoted to an arm, *o′*, depending from the main frame, and a forward arm, *o″*, securely fixed to the tongue. This bracket is provided at its summit with an oblique tubular bearing, *o‴*, extending inward and inclining downward toward the tongue and having a slight forward inclination.

At *p* is represented a ratchet-toothed segment provided with a stud-journal, *p′*, fitted to enter the inclined tubular bearing *o‴* of the bracket W, to oscillate therein freely. This toothed segment, as will be seen at *p*, Fig. 1, is curved sidewise sufficiently to cause it to conform to the curved line of travel in which the segment moves in its oscillatory movements upon its inclined axis.

At *p″* is represented a hand-lever having its lower end securely fixed to the side of the toothed segment, from which its free end rises in position to be operated by the driver mounted in his seat, and the movement of which will be in a sidewise curve, substantially as represented by the dotted line 8 on Fig. 1, which is found to be a natural and very desirable movement, enabling the operator to raise and lower the cutters more readily and with less effort in carrying the lever from the front to the rear. The forward portion of the toothed segment is fitted with chain-locks *r* and *r′*, designed to receive the links of chains employed in raising and lowering the cutting apparatus.

At *s* is represented a chain having one of its ends fixed to the bracing push-bar T by a suitable clasp-connection, and the links of its other end portion engage the chain-lock *r* in the forward upper portion of the segment-ratchet.

At *s′* is represented a chain having one of its ends fixed to the connecting-bar P by a suitable clasp-connection, and the links of its other end portion engage the chain-lock *r′* at the lower rear portion of the segment-ratchet. The length of these chains and their relative connection with the connecting-bar P, push-bar T, and the toothed segment *p* are such that the first action of the hand-lever in its rearward movement will operate to produce a rolling axial movement of the cutting apparatus, causing the finger-points to rise; and in the further rearward movement of the lever the shoe and inner end of the cutting apparatus will be raised until the inner edge of the rear portion, *l″*, of the shoe engages the connecting-bar P, after which the further continued rearward movement of the lever will raise the entire cutting apparatus, and in this raising operation, if continued, the position of the chain-connections with the toothed ratchet will be so changed relatively with each other in such a manner as to bring the shoe to a horizontal position to hold the cutter-bar in a position substantially vertical when in the position for transportation. These chains in their connection with the chain-locks are made adjustable in such a manner that their relative lengths may be varied in such a manner as to vary the position of the shoe and the cutters thereto attached, in the raising and lowering operation, by means of the lever.

At *t* is represented a pawl having a pivot-joint connection with an arm, *t′*, rising from the rear portion of the curved bracket-support of the hand-lever, and its forward arm, *t″*, is of a suitable curved form to engage the teeth of the ratchet-segment operating to hold it in position when moved by the hand-lever. The rear portion of this pawl is provided with a pedal, *t‴*, in convenient position for the driver to operate to disengage it from the teeth of the ratchet-segment.

At t^4 is represented a spiral spring, one end portion of which is suitably incased in a socket in the rear arm of the pawl, and its free end engages the pivoted support on its rear, operating to hold the pawl in contact with the ratchet.

At W′ is represented a pitman, one end of which is connected to the knife-head, as at *u*, by a suitable joint. The other end of this pitman is passed through a suitable opening in the main frame, and is also fitted with a ball-and-socket-joint connection with the gyrating shaft K, which at the point of the pitman-connection therewith is provided with a spherical enlargement, *w′*. This end of the pitman is fitted with an enlargement, as at *w″*, forming a head having beveled shoulders.

At *w‴* is represented the tubular socket-clamp of the pitman-head, the socket of which is of proper size to admit the head *w″*.

At u^4 is represented a two-part tubular washer fitted to embrace the pitman-head, and the inner bevel of its enlarged end receives the beveled shoulders of the pitman-head. The outer diameter of the tubular portion of this two-part washer is of a proper size to snugly

enter the tube of the socket-clamping head, and the outer bevel of its enlarged end engages the bevel of the socket thereof. By this construction of these parts it will be seen that the head w'' of the pitman will pass through the socket from its outer end and receive the two-part washer, after which it, with the washer, will pass into the socket-seat of the clamping-head and prevent its withdrawal.

At w^5 is represented a semi-spherical socket adapted to receive the spherical enlargement of the gyrating shaft, and its concave portion is fitted to rest on the enlarged head of the pitman in the socket-clamp.

At w^6 is represented a semi-spherical socket-clamping head adapted to receive the spherical enlargement on the gyrating shaft, and in connection with the semi-spherical socket w^5 forms the socket-bearing which connects the pitman with the gyrating shaft. These socket-clamping heads are provided on opposite sides with projecting ears perforated to receive suitable clamping-bolts, w^7, and in this instance these clamping-bolts have a screw-thread connection with the tubular socket-clamp, and are employed to fix the pitman in position on the gyrating shaft to impart a reciprocating motion to the cutters. These clamping-bolts are provided with lock-nuts in the usual manner for the purpose of holding the parts with greater certainty.

At w is represented the upper portion of the gear-case to the main gear-wheels, having a lock-arm connection at its forward end with the main frame, by which it is made readily removable.

At w' is represented a spring-support for the driver's seat, having its foot portion fixed in a seat prepared for its reception in the removable portion of the gear-case.

At w'' is represented the driver's seat, supported on the upper end of the spring-support w'.

At w''' is represented the upper portion of the case to the gyrating gear, suitably fixed to the main frame in a removable manner. In this instance this case only incloses the gyrating gear and the fixed gear with which it is connected; but it may be extended forward to inclose the gyrating shaft and the balance-wheel.

I do not claim in this application the improvements in clutch mechanism and pitman-connections hereinbefore described, and illustrated in the drawings, but reserve to myself the right to make separate applications for Letters Patent thereon.

I claim as my invention—

1. The combination, with a fixed or non-revolving toothed gear-wheel and a revolving balance-wheel or crank-head, having their centers in the same line, of a revolving gyrating toothed gear-wheel having a gear-toothed connection with the non-revolving toothed gear-wheel and axial-shaft connection with the balance-wheel, and pitman operated by the gyrating shaft as a crank to impart a reciprocating motion to the cutters, substantially as set forth.

2. The combination, with a counter-shaft and a non-revolving toothed gear-wheel mounted thereon, of a rotary gyrating toothed gear-wheel having a universal-joint connection with the counter-shaft, and a gyrating shaft connected by a ball-and-socket joint with a revolving balance-wheel, substantially as set forth.

3. The combination, with the gyrating shaft, of a two-part revolving balance-wheel provided with a spherical socket, and adapted to receive a ball having an axial bearing for said shaft, substantially as set forth.

4. The combination, with the counter-shaft provided with a forked end and stud-journals, of a two-part ring adapted to receive the stud-journals, and the gyrating shaft having projecting perforated arms and a fastening-bolt, substantially as set forth.

5. The combination, with a shoe hinged to the frame, having the finger-bar secured thereto, and the rod P and push-bar T, of a lifting-lever having independent chain or equivalent connection with the forward and rear end portions of the shoe, operating to raise and lower the fingers to vary the height of the cut, and to elevate the cutting apparatus, substantially as set forth.

6. The combination, with the lifting-lever having the axis of its pivotal support inclined to the axis of the lever, of a segment provided with an upper and lower chain-lock, as described, and cutting apparatus whose shoe-supports are connected to said segment by means of chains connected to said supports and to said chain-locks, substantially as set forth.

7. The combination, with the ratchet-toothed segment, of the curved bracket provided with an upwardly-projecting arm, and a spring-pawl pivoted to said arm and provided with a rear extension to form a pedal, substantially as set forth.

8. The combination, with the gyrating shaft provided with a spherical enlargement, of a pitman connected at one end to the cutting apparatus, and provided at its opposite end with a spherical bearing-socket to receive said enlargement, and a semi-spherical clamping-head, substantially as set forth.

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