3 Sheets—Sheet 1.

H. F. SHAW.

Harvesting-Machine.

No. 220,037. Patented Sept. 30, 1879.

Fig. 8.

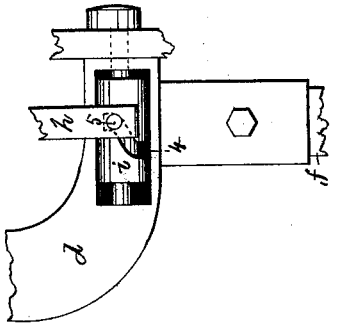

Fig. 1.

Witnesses.

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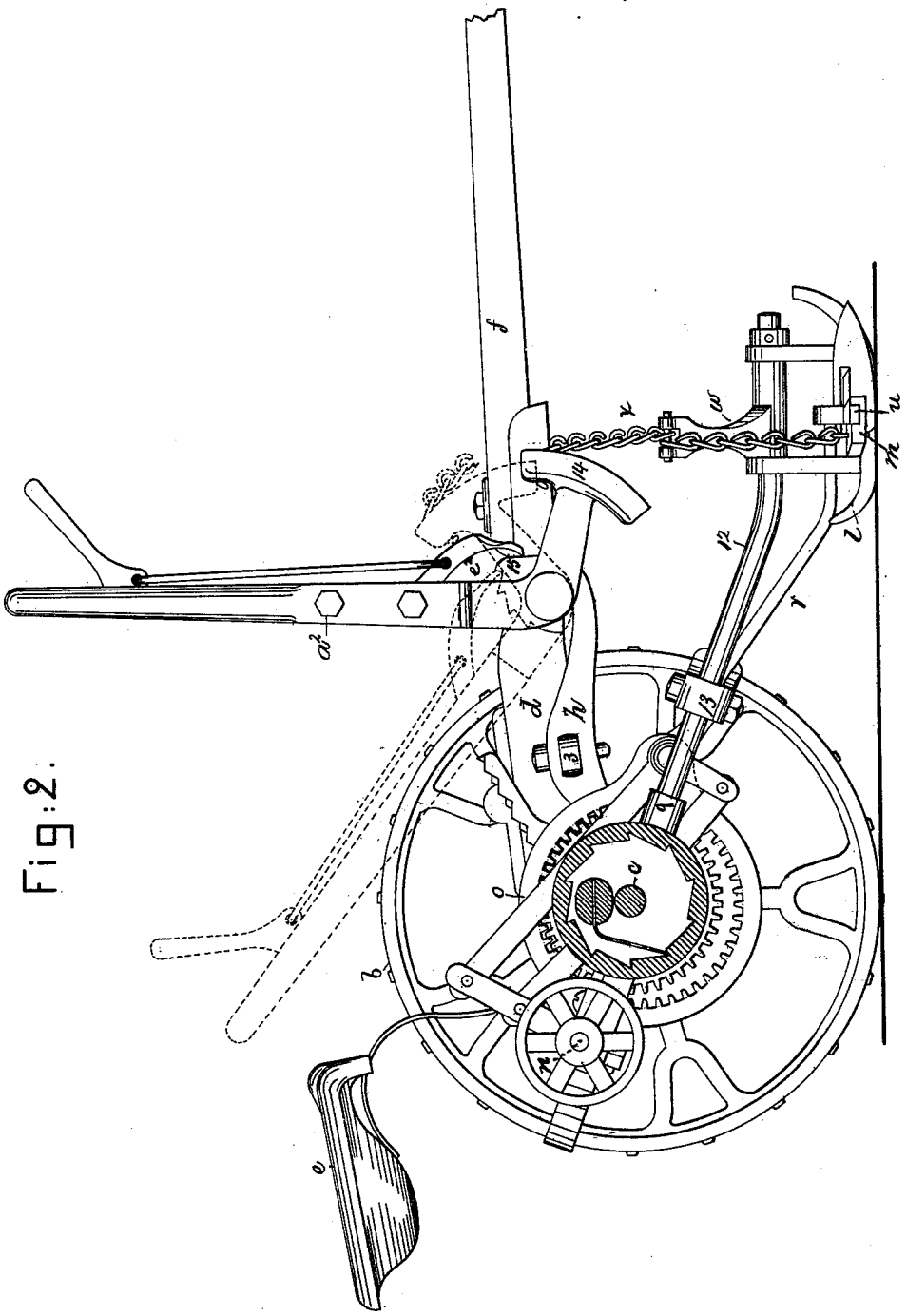

Fig. 2.

Witnesses.

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Fig: 3.

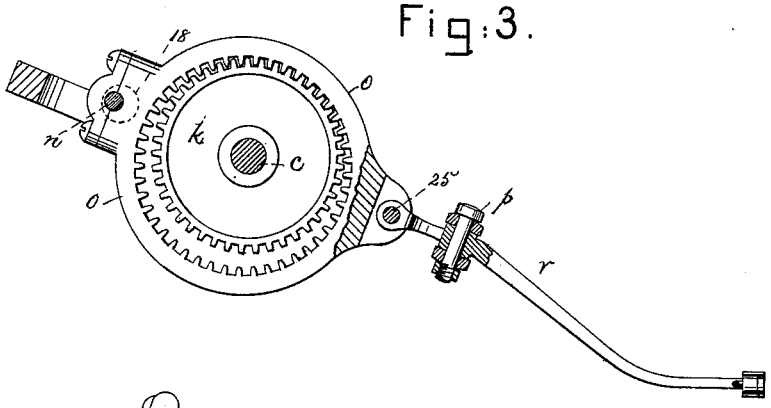


Fig: 4.

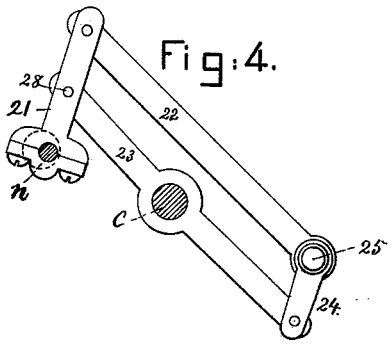


Fig: 5.

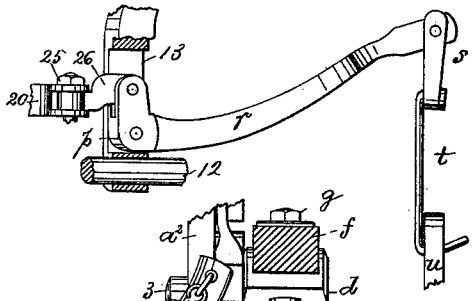


Fig: 7.

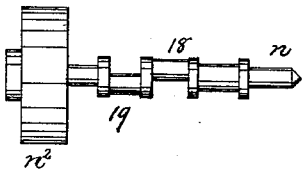
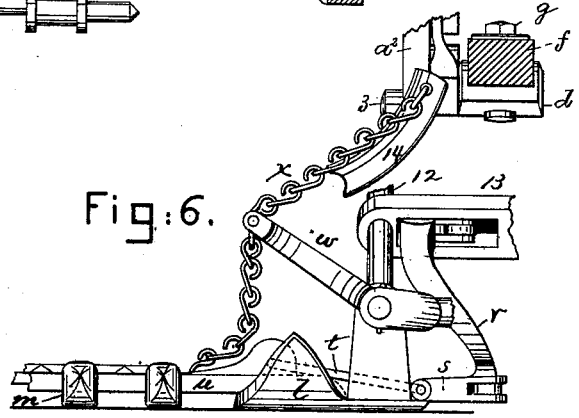


Fig: 6.



Witnesses.

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Jos. P. Livermore.

Inventor.

Henry F. Shaw

by Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

HENRY F. SHAW, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THOMAS B. EVERETT, OF SAME PLACE.

IMPROVEMENT IN HARVESTING-MACHINES.

Specification forming part of Letters Patent No. **220,037**, dated September 30, 1879; application filed January 8, 1879.

To all whom it may concern:

Be it known that I, HENRY F. SHAW, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Harvesting-Machines, of which the following is a specification.

The invention relates to improvements in harvesting-machines, and is shown as applied to that class of machines employed to cut grass.

My invention has for one of its objects to actuate the cutter-bar positively and rapidly by the fewest possible parts; and under this head my invention consists in combining, with the cutter-bar, by suitable connections, one spur and one ring gear surrounding it, co-operating with two cranks, or a double crank, and bars of parallel-motion mechanism, as hereinafter described, the said bars insuring uniform parallel motion to the ring-gear.

Another part of my invention, as hereinafter claimed, consists in combining the cutter-bar lifting-lever with a clutch-lever, which controls the engagement of the spur-gear with the axle, so that when the cutter-bar is lifted somewhat above such point, as is necessary or required to clear obstructions when mowing, the lifting-lever will operate the clutch-sleeve and disengage the spur-gear from the main driving-axle of the machine.

Figure 1 is a top view of a mowing-machine constructed in accordance with my invention; Fig. 2, a side view, one of the driving-wheels being removed, its hub being shown, however, in section; Fig. 3, a detail of the spur and ring gear and its connecting-lever for moving the cutter-bar; Fig. 4, a detail of the parallel-motion mechanism for the ring-gear; Fig. 5, a top view of the cutter-bar moving-lever and its connections; Fig. 6, a detail showing the cutter-bar on the ground and the chain slack; Fig. 7, a detail of the double-cranked balance-wheel shaft; and Fig. 8, an under-side view of the forward end of the seat and pole frame, showing the cam-hub which operates the clutch-lever which extends back to the main axle.

The main driving-wheels *a b* of the machine are applied to the axle *c* by means of any usual ratchet-and-pawl mechanism, which will cause the wheels to rotate the said axle when the machine is running forward. The pole and seat frame *d* has a sleeve, 2, which is fitted loosely to the axle *c*, and the said frame supports the seat *e*, and has the pole *f* attached to it by a bolt, *g*, and has a stud or projection, 3, to serve as the support for the clutch-lever *h*.

In a recess at the forward end of the said frame is a short shaft or hub, *i*, having a cam-shaped groove, 4, to receive within it a pin or roller, 5, connected with one end of, and acting to move, the clutch-lever *h*, and at the end of the shaft or hub *i* is attached the cutter or finger bar lifting-lever a^2, this lever being employed to turn the said shaft *i*, so as to cause the outer forked end, 6, of the lever *h* to move the clutch-sleeve *j*, with which it is engaged, longitudinally on the said axle *c* to engage the said clutch-sleeve, which is splined upon the axle, with the spur-gear *k*, which is loose on the axle when not engaged by the clutch-sleeve.

The pole-frame, of metal, is provided in front of the seat with a recess cast therein, which forms a box, b^2, to receive tools, &c., and the hinged lid c^2 of this box is provided with foot-rests d^2, cast with the said lid.

The frame which supports the shoe *l*, finger-bar *m*, balance-wheel shaft *n*, and ring-gear *o* is composed of sleeves 8 9, a rearward projection, 10, two rods or braces, 11 12, and a brace-connecting bar, 13, the latter bar serving to support the fulcrum-pin *p* for the vibrating lever *r*, which, at its outer end, is, by links *s t*, connected with the end of the cutter-bar *u*, adapted to slide in and be guided by the finger-bar *m* in any usual way. The rod or brace 12 serves as the fulcrum for the shoe *l* of the finger-bar, and in this present embodiment of my invention it also serves as the fulcrum for the brace-lever *w*, which, at its outer end, is connected with the chain *x*, employed to join the finger-bar with the lower end, 14, of the lifting-lever a^2.

The frame *d* has ratchet-teeth 15, to be engaged by a pawl, e^2, which holds the said lever, finger-bar, and machine-frame in any desired position. When the finger-bar is upon the ground in operative position the lever a^2 will be thrown forward and the chain *x* will

be bent out of a straight line, as shown in Fig. 6.

The first movement of the lifting-lever backward will cause the outer end of the finger-bar to be raised until the chain is straightened, after which both ends of the finger-bar will be raised together. This upward movement of the lever a^2 and finger-bar for such a distance as is necessary to clear obstructions will not affect the clutch-lever and sleeve; but when the lever a^2 is moved yet farther back, it will turn the grooved hub i into such position that its grooves 4 will act upon and move the clutch-lever h, to disengage the clutch-sleeve j from the spur-gear k and leave it loose upon the axle c.

From this description it will be obvious that the groove 4 of the hub also acts to hold the clutch-lever and lock the clutch-sleeve and spur-gear firmly upon the axle when the finger-bar is down in an operative position.

Parallel with the axle c is a balance-wheel shaft, n, provided with two cranks, 18 19, set diametrically opposite each other, the one 18 supporting the ring-gear o, provided with internal teeth greater in number than the teeth of the spur-gear within the ring-gear, and the other crank, 19, supporting the lever 21, to which are pivoted the bars 22 23 of the so-called parallel-motion mechanism. The bar 23 has its fulcrum upon the axle c, (or, it may be, upon a sleeve thereon,) so that the said bar may vibrate about the said axle, and a link, 24, at the end of the said bar 23 connects it with a pin, 25, which pin extends loosely through the end of bar 22, is fixed with relation to the outer portion of the ring-gear o, and enters loosely (see Fig. 3) a hole in the short link 26, which connects the said ring-gear with the rear end of the vibrating lever r, which actuates the cutter-bar u. The shaft n has upon it a balance-wheel, n^2.

When the spur-gear k is held fixed to be rotated by and with the axle c its movement, in unison with the said axle, causes a certain number of the teeth of the spur-gear (in a working machine having, preferably, forty-six teeth) to engage a certain number of the teeth at the interior of the ring-gear surrounding the spur-gear, (the said ring-gear in a full-sized machine having, preferably, forty-eight teeth,) and the said ring-gear so engaged is thus actuated or set in motion by the spur-gear in such manner as to cause it, operating upon the crank 18, to set in motion the balance-wheel shaft n, and the latter, through the crank 19, to vibrate the lever 21, which, by its vibration, also vibrates the bar 23 about the axle c as a center and reciprocates the bar 22.

In this way, it will be noticed that the crank 19, operating the bar 23, will elevate and lower the front end of the ring-gear in exact opposition to the motion of its rear end by the crank 18, and the lever 21, by the bar 22, having its center of vibration substantially at the point 28 of lever 21, moves or guides the ring-gear longitudinally in opposition to the crank, thereby insuring to the ring-gear a positive uniform parallel motion, which gradually and uniformly throws the teeth of the ring-gear in contact with successive teeth of the spur-gear.

In this way I am enabled to impart to both ends of the ring-gear the same uniform motion, and it will be apparent that the pin 25, at the front end of the ring-gear, travels in the arc of a circle of the same diameter as that in which the crank 18, at the other end of the ring-gear, moves.

In a mowing-machine having a spur and ring gear as herein described, the one with forty-six and the other with forty-eight teeth, I am enabled to rotate the balance-wheel shaft n twenty-four times to each rotation of the axle c, and this relative speed may be increased or diminished by a relative change in the number of teeth in the said gears. The less the difference in number of teeth the greater will be the number of rotations, and vice versa.

In this my invention it will be noticed that the ring-gear acts as a link to rotate a crank-shaft, the power to move the link is applied to it from within by the spur-gear, and the outer end of the ring-gear or link, as I have just supposed it, is taken hold of, guided, supported, and moved by the parallel-motion devices, and communicates motion directly to the lever which reciprocates the cutter-bar, thus obviating the usual plan of driving the lever of the cutter-bar from a crank, and enabling me to thereby apply the power directly to the lever of the cutter-bar rather than to waste much of the power of the machine by transmitting it, in an indirect manner, to the crank-shaft and from it to the cutter-bar lever.

The shape of the lever 21 and bars 22 23 may be varied without departing from my invention, as may also the shape of the main frame of the machine.

I claim—

1. In a harvesting-machine, a balance-wheel shaft provided with two cranks, connected, the one with the end of a ring-gear, and the other with the lever of a parallel-motion mechanism adapted to be connected with and to operate the other end of the ring-gear, substantially as described.

2. In a harvesting-machine, a spur-gear adapted to be clutched with or released from the shaft c, a ring-gear placed outside of it, a crank-shaft with which the ring-gear is connected, a second crank thereon, a lever moved by it, and a vibrating and a reciprocating bar, and a pin and link to connect the other end of the ring-gear with the said bars, substantially as and for the purpose described.

3. In a harvesting-machine, the cutter-bar and its actuating-lever, combined with a ring-gear, with which it is connected, and with a spur-gear, a two-cranked shaft, and a lever and bars to operate the outer end of the said

ring-gear where it is connected with the actuating-lever of the cutter-bar, substantially as described.

4. The finger-bar lifting-lever and cam moved by it, combined with the clutch-lever, clutch-sleeve, and spur-gear, to unclutch the spur-gear from the axle when the finger-bar is elevated, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY F. SHAW.

Witnesses:
G. W. GREGORY,
L. F. CONNOR.