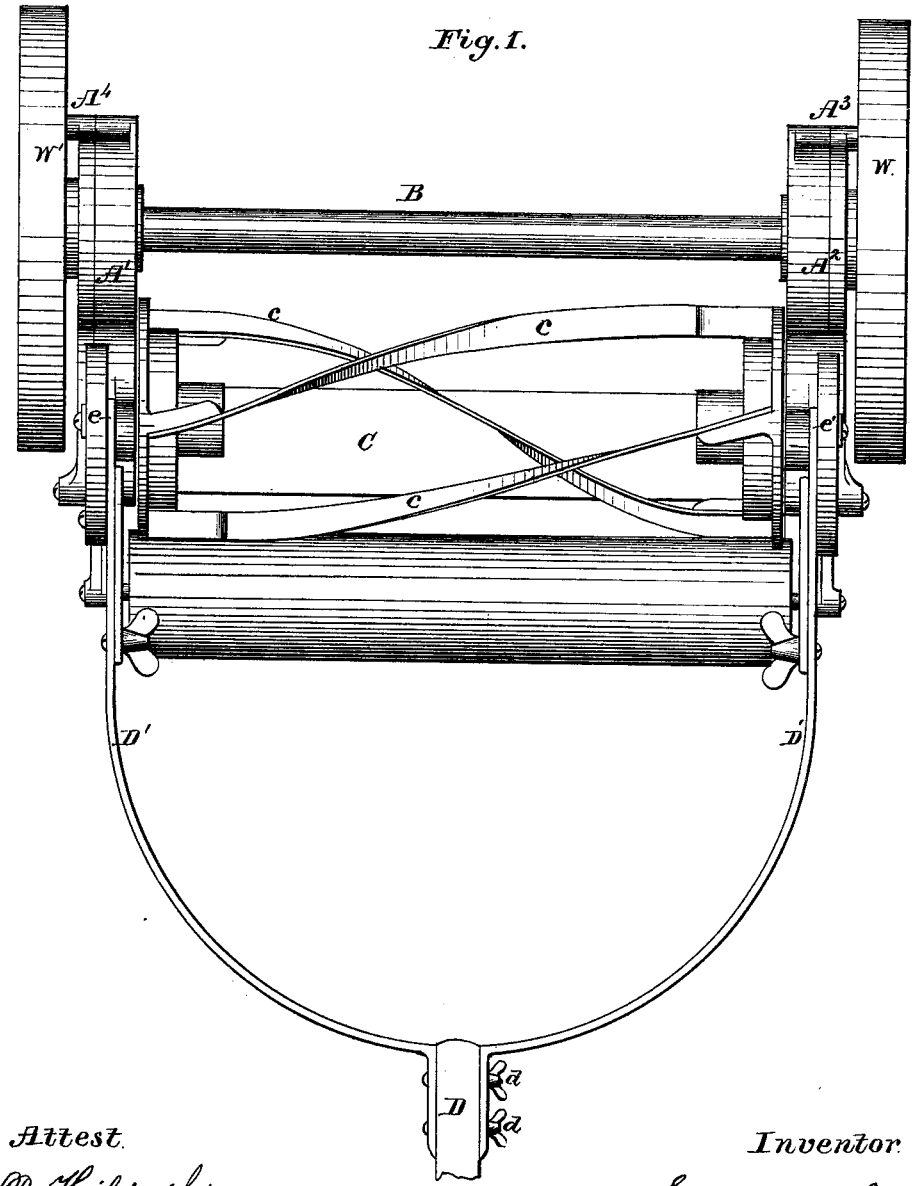
3 Sheets—Sheet 1.

E. A. HILDRETH.

Lawn-Mower.

No. 201,012. **Patented March 5, 1878.**

Fig. 1.



Attest.

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3 Sheets—Sheet 2.

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Fig. 2.

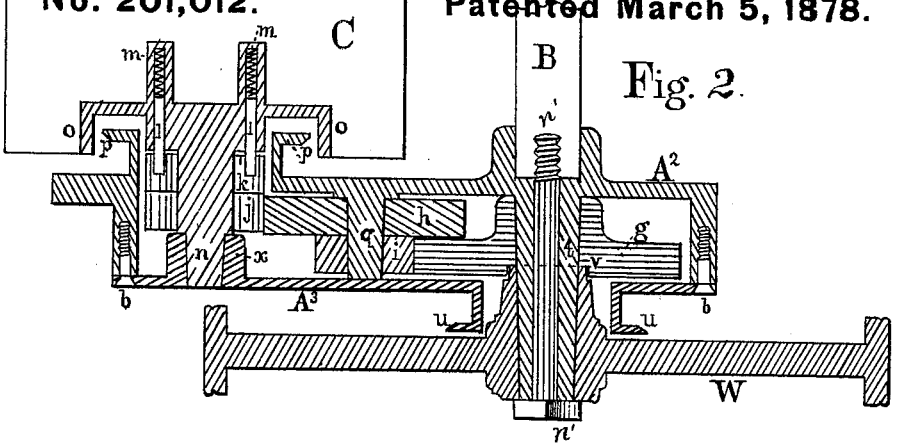


Fig. 3.

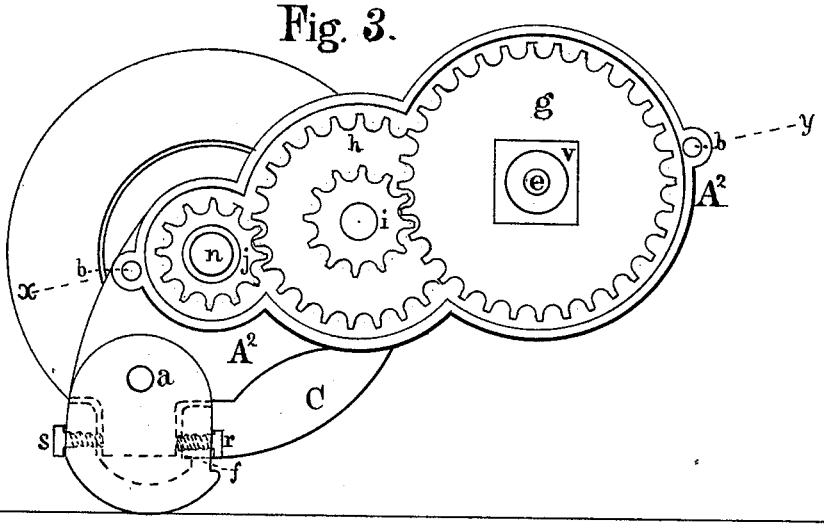
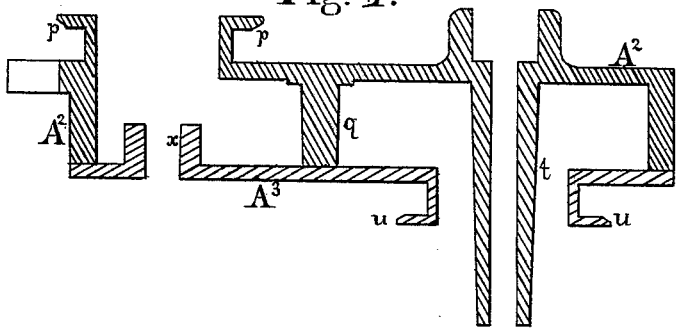


Fig. 4.



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3 Sheets—Sheet 3.

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Fig. 5.

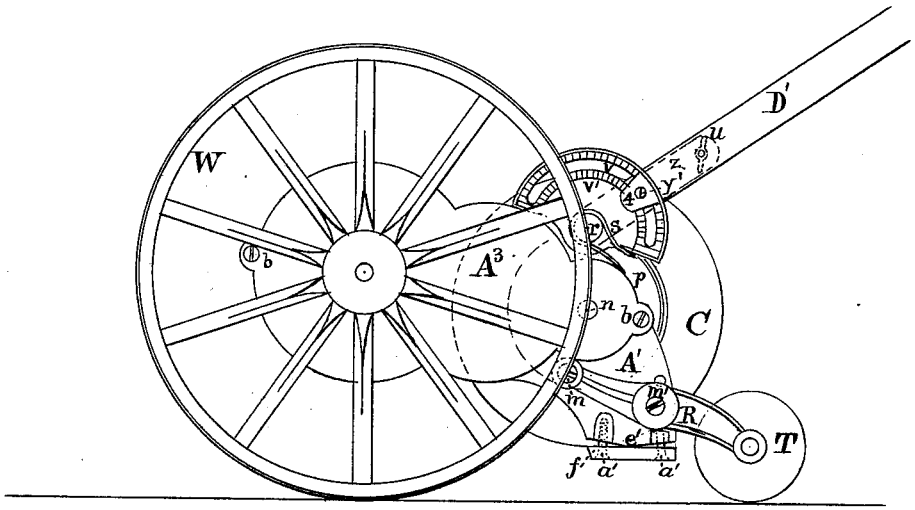
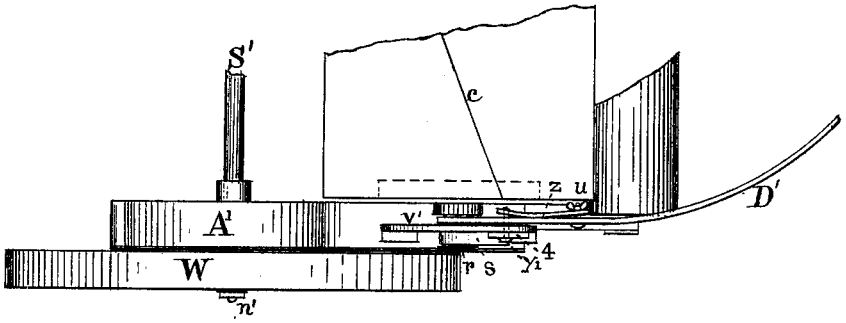


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWIN A. HILDRETH, OF HARVARD, MASSACHUSETTS.

IMPROVEMENT IN LAWN-MOWERS.

Specification forming part of Letters Patent No. **201,012**, dated March 5, 1878; application filed May 4, 1876.

To all whom it may concern:

Be it known that I, EDWIN A. HILDRETH, of Harvard, in the county of Worcester and State of Masachusetts, have invented an Improved Lawn-Mower, of which the following is a specification:

The nature of my invention consists in certain improvements in lawn-mowers, as hereinafter fully described in the specification, and pointed out in the claims.

In the accompanying drawings, Figure 1 is top view of my improved lawn-mower. Fig. 2 is a sectional view taken through one side of the mower on the line *x y* in Fig. 3. Fig. 3 is a side view of one of the gear-cases with cover removed, showing the gearing within, and also showing method of attaching lower knife to the main frame. Fig. 4 is a sectional view on the same line *x y*, showing only the side frame and gear-case with gears removed. Fig. 5 is a side view of my improved lawn-mower. Fig. 6 is a top view, showing one end only.

Like letters represent like parts in all the figures.

W W′ are the main driving and supporting wheels. C is the revolving cutter, provided with steel cutting-edges *c c*. The rear end of the main frame A^1 A^2 is supported on a small roll, T, in the rear of the cutter. The lower knife *f*, Fig. 6, is secured to the main frame on both sides of the machine by screws *a′ a′*. By loosening and tightening these screws front and rear, the lower knife may be rocked over the edges e^1 of the main frame, and thus adjusted to set close to the revolving cutters C.

D′ D′ are brace-irons connecting the mower-frame to the handle D, and are secured to the handle by the bolts *d d*. The gear-cases A^1 A^2, composing the main frame, are provided with covers. (Shown in Figs. 1 and 2 by A^3.) The covers are secured to the gear-cases by bolts *b b*. The revolving cutter C is provided with a shaft, *n*, (see Fig. 2,) which extends through the ratchet-disk *k* and through the small gear *j*, forming a bearing, which revolves in the box *x*, which is formed in the gear-case cover on the outside of the driving-gear *j*.

The ratchet-disk *k* is cast solid onto the gear *j*, and is provided with teeth, into which the pins *l l* are forced by the springs *m m*. When the gear *j* turns as the machine is rolled forward the ratchet-disk *k* and pins *l l* drive the cutter; but when the mower is rolled backward the springs *m m* allow the ratchet-pins *l l* to spring backward on the beveled teeth of the ratchet-disk *k*, leaving the driving-wheels W W′ free either in rolling the mower backward or in turning the machine around. The bearing or shaft which passes through the gears *k j* is surrounded by a covering-shield formed around the bearing, and having a projecting disk or flange, *p*, (see Fig. 2,) and the revolving cylinder is provided with a recess, *o o*, which completely covers the flange *p*, thereby preventing any grass from ever coming in contact with the revolving shaft; and as the grass is most liable to wind around a revolving shaft, or between a revolving shaft and its bearing, this difficulty is here entirely avoided.

The bearing *n* is placed on the outer side of the gear *j*, thereby avoiding much of the strain usually brought onto the bearing when placed between the gear and the revolving cylinder. By this arrangement a much smaller bearing is made practical, lessening the friction, and making the mower run easier, and with less exertion from the operator.

The gear *j* meshes into and is driven by the gear *h*. (See Figs. 2 and 3.) The gears *h* and *i* are cast together in one piece, and revolve on the bearing *q*, which is cast on the main frame, as shown in Fig. 4. A bearing, *t*, is also cast on the main frame, (see Fig. 4,) forming a bearing for the gear *g* and an axle for the main driving-wheels.

The gear *g* meshes into and drives the gear *i*, and is provided with a square recess, *v*, into which the hub of the driving-wheel W is fitted. Thus, whenever the main driving-wheel W is revolved forward, motion is communicated to the whole train of gears, and, by the ratchet, to the revolving cutter.

The cap-piece A^3 (see Fig. 2) is furnished with a shield, *u*, covering the inner portion of the hub, to prevent the grass from winding upon the hub. The bearings *q* and *t* are formed on the main frame, and are cast in chills, making them very hard and durable. The gears which revolve on these bearings also have chilled recesses through them to fit onto their bearings, making very durable and easy-running bearings. The recess in the box *x* and

the bearing *n* and the shaft upon which the gears *j k* revolve can also be chilled, and will make a very hard and durable bearing; and it is very important that the bearing on which the cutter revolves should be durable, as any play in this bearing will allow the revolving cutter either to strike the lower knife or to pass over the grass without cutting it. The wheel W is also cast with a chilled recess for a bearing, which fits onto the chilled axle *t*.

In order to cast the journals on the ends of the rotary cutter and the corresponding boxes in which they revolve, so that they can be withdrawn from the iron forms set in the sand for forming them, and so that they will fit together without further finishing, it will be of advantage to form both the journal and the corresponding box in which it revolves on a taper. This will have the double advantage of a stronger form when constructed and more easy and accurate withdrawal from the molds.

It will also be advantageous, for the same reasons, to form both the journals *q* and *t* on a taper, and also the gears and wheel turning on them with corresponding tapering recesses through them.

The bolt *n'* passes through the axle, and holds the wheel in place, and also strengthens the axle, as the bolt *n'* is screwed into the cross-piece B, which extends across the mower from side to side; or a straight axle-shaft, S', may be used, with ends turned smaller to form the bolts *n'*, as shown in Fig. 6.

The wheels W are formed of cast-iron, having the spokes formed up to an edge line, like a carriage-wheel, as shown in Fig. 5. The felly is beaded along its edge to represent a tire, as shown in Figs. 2 and 5. The wheel is thus formed to give a light and neat appearance to the mower.

The gearing is all incased within the side cases A^1 A^2, and the removable cover A^3 is placed over the gears before the wheel W is put onto the axle. This cover is provided with an opening, through which the hub of the driving-wheel passes to communicate motion to the gears, without presenting any openings through which the grass can reach and clog the gears or working parts.

Whenever the operator wishes to cut a lawn the mower is rolled over the grass, driving the main wheels W forward. The main driving-wheels communicate motion to the revolving cutter by means of the gearing and ratchet, and as the cutter revolves close to the lower stationary knife, which extends across the mower, all the grass over which the revolving cutter passes is cut. The handle-arms or brace-irons D' D' are pivoted on the bosses *r r*, projecting from the main frame, as shown in Figs. 5 and 6, and are held in position by clamps 4, pressed firmly against the segments *v'* by bolts or screws *y'*, cam-lever *z*, and bolt *u*. The segment *v'* is provided with a circular slot, *v*, for the bolt *y'*, which allows the handle D to be adjusted to any desirable position for pushing or drawing the machine by loosening the bolt *u*, and thus taking off the pressure from the clamp 4. When the segment *v'* is clamped firmly to the arm D', as above described, it yet allows a limited play of the handle D with reference to the main frame by rocking on the stud *r* until the segment *v'* strikes the main-frame case A^1. The springs *s*, Figs. 5 and 6, tend to hold the frame and cutter close to the ground or turf, to cut the grass short, but yet allow a limited rise and fall to follow the inequalities of the ground without affecting the position of the handle in the hands of the operator. Thus the handle can be turned on its center either toward the rear or front of the machine, and the operator can push the machine before him or draw it after him, reversing the operation from time to time, and avoiding any constant strain in one direction, making it much easier to operate the mower for any considerable time.

As the cutting apparatus is all in rear of the axle, it is both convenient and safe for any person to turn the handle toward the front to draw the machine after the operator, as the cutter is well back out of the way, and is guarded by the other parts of the machine, both from the clothes and feet of the operator.

The main frame of the mower is pendent from the center of the main driving-wheels, and is left free to follow all the inequalities of the ground, rising and falling freely to any degree allowed by the spring *s* and handle D, so that it can easily pass over obstacles. The cutter can easily adjust itself to ride on any border, while the wheels can run lower in a walk or bed, or higher, if desired.

A roller, T, Fig. 5, in the rear of the cutter C, turns in bearings in the arms R R, attached to the main frame at each side by screws *m m'*, which have several seats in the main frame, so as to adjust the knives for different heights of cut. The object of this roller is to keep the cutters at a uniform distance from the ground, and thus cut the grass even, and shorter or longer, as it may be adjusted.

The main frame of the mower is placed almost wholly in the rear of the center of the main driving-wheels, and is allowed to turn freely on this center. Were the main frame allowed to extend forward, as well as in the rear of the center of the driving-wheel, the action of the gearing might raise the cutter from the ground; but by constructing the frame, as I have done, almost entirely in the rear of the center of the driving-wheels, the weight of the main frame, the cutters, and the gearing act to overcome the driving action of the main wheels, and the whole mower runs very lightly and freely over the most uneven surfaces.

The force applied to the handle in operating the lawn-mower may have a tendency to press the cutters toward the ground, or to raise them from it, according to the direction in which the force is applied; but the action of the springs *s s* and segments *v'*, in combination

with the handle D, is, in either case, such as to keep the cutters close to the grass, so as to cut it short and even.

It is not usually intended to use a lawn-mower on very rough ground; but it is very essential that it should mow the edges of a grass-plat and borders freely and easily, and the easier any mower can pass any unusual obstacle, the less liability of dulling the knives or of annoying the operator.

Having thus described the nature and operation of my improved lawn-mower, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the swinging main frame of the lawn-mower, forming a gear-case independently from any part of the supporting-wheels, and free to float along the surface of the ground in rear of the tread of the main driving-wheels, the driving handle or pole attached to the main frame in the rear of the axle, and the supporting truck-wheels outside of and independent from the frame and gear-case, substantially as described.

2. The combination and arrangement of the following parts: the truck-wheels formed without any gearing on the same, the main frame of the lawn-mower, and the gear-case A between said wheels and in rear of the axle, the lower stationary knife connecting the two sides of the main frame, and the revolving cutter, substantially as described.

3. The main frame of the lawn-mower or gear-case A, arranged in the rear of the axle of the main driving-wheels, and independent of the latter, to support and protect the inclosed train of spur-gearing, substantially as described.

4. The combination of the ring or flange surrounding the revolving hub of the main driving-wheel with the gear-case cover, substantially as described.

5. The combination of the extended hub of the main driving-wheel, passing through the gear-case, with the projection on the inner end of the hub formed to fit into the corresponding recess in the gear within the case, substantially as described.

6. The combination, with the floating main frame of a lawn-mower, carrying the cutting apparatus in rear of the axle, of a handle pivoted to said frame, and adapted to be swung to front or rear, to be used as a draw or push handle at will.

7. The combination, with the main frame of the lawn-mower, of a draft pole or handle, hinged to be turned either to the front or rear of the machine, to adapt for drawing or pushing at will, and a clamping device adapted to clamp the handle in any desired position within its sweep, and allowing, when clamped, a limited amount of free play, substantially as described.

8. The combination and arrangement, in a lawn-mower, of the revolving journal, the rotary cutter, the inclosed driving-gear, and the stationary box or bearing in the main frame placed outside of the driving-gear, substantially as described.

9. The main frame of a lawn-mower, having the tapering journals formed integral therewith, substantially as shown and for the purpose described.

10. The revolving cutter, having the tapering journals formed integral therewith, in combination with the corresponding tapering boxes formed in the main frame of the mower, as and for the purpose set forth.

11. The combination of the handle-arm D′, plate-piece v', turning on the same center, and having a certain amount of free play, and a clamping device between the handle and said plate, substantially as described.

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Witnesses:
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M. G. HILDRETH.