William Allen Impt in Lawn Mowers.

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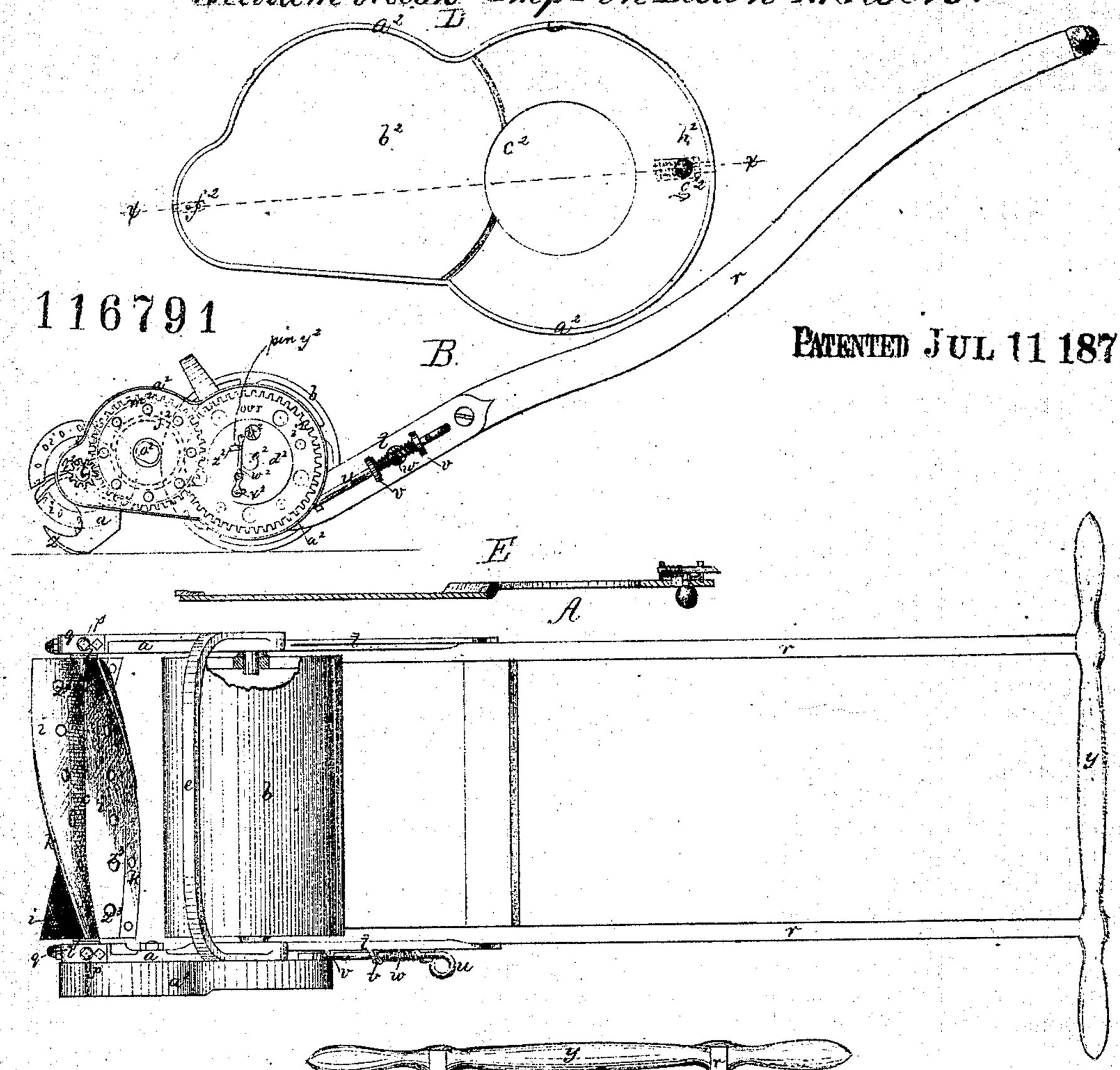

116,791

UNITED STATES PATENT OFFICE.

WILLIAM ALLEN, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN LAWN-MOWERS.

Specification forming part of Letters Patent No. 116,791, dated July 11, 1871.

To all whom it may concern:

Be it known that I, WILLIAM ALLEN, of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improved Lawn-Mower; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention, sufficient to enable those skilled in the art to practice it.

My invention relates to the construction of that class of lawn mowing-machines in which a rotary cylinder of spirally-arranged knives operates in connection with a stationary bed-knife or ledger-bar to cut the grass, the stationary knife being arranged to be run at the height at which the grass is to be cut, and the rotary knife-cylinder being journaled directly over the bed or stationary knife. The invention consists in certain details of construction and arrangement of the parts.

The drawing represents a machine embodying the invention. A shows the machine in plan. B is a side elevation of it, the gear-covering cap or outer plate being removed. C is a front elevation. D is a view of the outer side of the gear-case. E is a section of the cap-plate of the gear-case taken on the line *x x*. F is an elevation of the ratchet-and-pawl mechanism. G is a section of the intermediate gear and the gear-case. H is a section of the cutter-cylinder adjusting mechanism. I is a cross-section of the bed-cutter or ledger-bar. J is a detail view, showing the connection of the handle with the cutter-frame and the locking mechanism. K is a view of the frame, in which the cutter-cylinder, roller, and gears are journaled.

a denotes the main frame, in which is journaled the driving-cylinder or roller *b*, and the cutter-cylinder *c*. The journals of the roller run in stationary bearings or journal-holes in the main frame, and the journals of the cutter-cylinder in movable or vertically-sliding boxes *d*, as seen at H, and the frame *a*, in which the cylinders *b c* are thus journaled, is made in one casting, the two side pieces or cheeks being connected by a cross-bar, *e*, running over the roller, and another cross-bar, *f*, under the cutter-cylinder, as seen at C, these bars *e f* and the two journal-frames being cast together. Upon the cross-bar *f* is fixed the stationary knife or cutter *g*, the bar forming a bed for the knife. The bed-knife is formed of cast-iron, and at its front edge it has an upturned lip or flange, *h*, which is chill-hardened, the front edge of this lip forming the cutting-edge and the depression or portion of the upper surface of the cutter-plate below the cutting-edge, enabling the cutter-cylinder to make a clean cut, and preventing obstruction of the rotating blades by accumulation of grass between the path of rotary movement of the cylinder-cutters and the upper surface of the stationary blade. The main cutter-cylinder *c* is formed with a series of spiral flanges or spokes, *i*, to the edge of each of which a spiral blade or cutter, *k*, is fixed, the cylinder being made of cast-iron, and each cutter-blade *k* being of steel. The journals *l* of the cutter-cylinder turn in the boxes *d*, which slide vertically in housings *n* of the frame *a;* and to adjust the cutter-cylinder, with reference to the bed-knife, each box rests upon a strong spring, *o*, at the bottom of the housing, and a set-screw, *p*, working through a nut-thread in the housing-cap *q*, bears upon the top of the box. By turning each screw down, and thereby forcing the cylinder down until the whole length of either cutter-blade runs just in contact or slightly out of contact with the cutting-edge of the bed-knife, the cylinder may be kept in position to cut properly, and may be fed down to compensate for wear of the cutter-blades, the cutting-edges of all of the blades being in the same circumference. The springs keep the cylinder up to the position at all times when the machine is running, and against unyielding stops, while they permit the cylinder to be lowered or to be raised by simply turning the single screw connected with each bearing. Each journal-cap is fastened in place by a vertical screw and a horizontal screw, and by unscrewing them the caps may be released and the cylinder removed. *r* denotes the handle or bale by which the machine is propelled. This handle or bale is hinged to the frame *a* by pins *s*, cast upon the frame and entering holes made in the ends of the irons *t* of the handle, the hinge-pins being located between the journals or axes of the two cylinders. The handle tips freely on the pins, but it is locked in position, relatively to the frame *a*, by a spring-bolt, *u*, sliding through ears *v*, cast on one of the irons *t*, the bolt being drawn back by hand, and thrown forward by a spring, *w*, the point of the

bolt sliding into some one of a series of notches, x, formed on the side of the frame-casting a. When the frame and handle are locked together the whole machine tips upon the axle or journals of the roller, and the height or degree of inclination of the handle controls and determines the height of the bed or stationary cutter and the consequent plane of cut.

A person in using the mower rests the breast-bar y against the front part of the body, and by maintaining the bar at this position the height of cut will be uniform or without material deviation, the handle and frame being locked at such an angle as will not only keep the bed-cutter above the ground, but will also keep shoes z on the front ends of the frame a above the ground, these shoes being in such position as to permit the bed-cutter to come as near to the surface of the ground as is consistent with the safety of the cutting apparatus, while, by pressing down the handle the grass may be cut at any height desirable in lawn-cutting. By drawing back the bolt the handle may be arranged at any angle to adapt the machine to the height or fancy of any person running or designing to operate the machine, the bolt being released and being pressed into the opposite notch by the spring, when the proper position of the handle is ascertained. The side piece or journal-plate, to which the gearing is applied, is formed with a flange, a^2, that surrounds and covers the gear-train, and into the open side of this flange fits the removable cover-plate or head b^2, this plate covering all the gearing, and having a large opening, c^2, over the back of which extends a disk, d^2, fixed on the end of one of the journal-pins or gudgeons e^2 of the roller b. The disk d^2 and plate b^2 effectually prevent entrance of grass-clippings into the gear-case and obstruction of the gearing thereby. The head b^2 is fastened in place by a pin, f^2, on the head, entering a hole in one end of the flange a^2, and a spring-bolt, g^2, entering a hole in the opposite end of the flange. By pressing back the bolt g^2 (by means of a knob, h^2) the plate can be easily slid out from place to get at the gearing.

The gear-train is arranged and operates as follows: The main gear-wheel i^2 is mounted and turns loosely on a circular or peripheral flange, k^2, projecting from a disk, l^2, keyed to the journal-pin e^2. The gear i^2 meshes into and drives a pinion, j^2, on the inner side of a gear-wheel, m^2, mounted and turning on a screw-stud or pin, o^2, screwed into the adjacent frame-plate, or secured thereto by a nut, p^2. The intermediate gear m^2 meshes into and drives the pinion q^2, fixed on the adjacent journal of the cutter-cylinder. On the front side of the disk l^2 is an arm, r^2, to which is jointed a pawl, s^2, that extends through an opening, t^2, in the flange k^2, and meshes into ratchet-notches u^2 in the gear-ring i^2. The pawl engages with the gear and drives it, and (through the gearing) actuates the cutter-cylinder as the roller is turned by pushing the machine forward, while, when the roller turns in the opposite direction, (by drawing the machine back,) the pawl rides over the notches and imparts no motion to the gear, the pawl being pressed out by a spring, v^2, to engage with the gear-ring, and being pressed back against such spring by the ring as the roll turns back.

To lock the pawl out of position to engage with the gear-hub, so that the machine may be driven forward as well as backward without actuating the cutter mechanism, I apply the following mechanism: The disk d^2 is fastened to the disk l^2 by a screw, v^2, the two disks and roller moving as one piece. To the plate or disk d^2 a hand-lever, w^2, is fulcrumed. On one end of this lever is a handle, x^2, and on the other end is a pin, y^2, projecting through a slot, z^2, in the plate, and in between the pawl and the inner surface of the flange k^2. By swinging the lever in one direction, the pin y^2 is carried back from the pawl, leaving the pawl free to act, while, by swinging the lever in the opposite direction, the pin y^2 presses the pawl down into the slot, so that it cannot engage with the gear-hub, thus leaving the roller free to turn in either direction without actuating the gear. The lever is locked in either position by springing it over a slight projection on the face of the disk d^2, or by any other suitable means. The pins s, upon which the handle is hung, are studs cast upon the inner sides of the two journal plate of the frame-casting. By loosening the screws of either of the bail-irons t the bail may be removed from or connected to the frame a, and by tightening the screws the connection of the bail is made secure, the bail freely rocking upon the pins, but without danger of disconnection. On the inner side of one of the journal-plates are also cast the teeth that form the notches x, into which the bolt u is shot to lock the handle or bail in angular position with reference to the cutting mechanism. This bolt slides in the bearings v, and is pressed into and held in any one of the notches by the spring w. By drawing back the bolt the handle may be tipped to the position desired, being then fastened by allowing the bolt to spring forward.

The whole machine or any part thereof is very easily dislocated. By removing the housing-caps q the roller drops from the frame, the gears i^2 m^2 being first removed. By loosening the screws of either bail-iron the handle is detached. By removing the caps q the cutter-cylinder is taken out, the pinion q^2 and gear m^2 being first removed; and the gearing is all removed by unscrewing the stud-pin o^2, or its nut, the teeth of the gear m^2 projecting over a flange on the pinion q^2 and over the teeth of the gear.

To enable the cutting mechanism of lawn-mowers to work successfully the cylinder has to be driven very fast, and the action of the blades of the cutter-cylinder produces a current of air tending to throw down the grass in front of the cylinder. To obviate this I construct the blades of the cylinder with perforations z^2, which very much reduce the agitation of the air by allowing it to pass freely through the blades as the machine is driven forward.

To sharpen the cutting-edges of the spiral knives, the main gear is disconnected from the

cylinder and turned by hand so as to rotate the cutter-cylinder in a direction opposite to that in which it is turned to cut, and oil and emery being placed along the edge of the bed-cutter the edges are quickly and truly ground.

I employ no leader roll, but I place the front point of the shoes back of a vertical plane, tangential to the front of the cylinder, so that the cutters can work entirely up to any upright wall or other surface, and gather and present the grass to the bed-knife.

Instead of casting the shoes *z* upon the frame, they may be made as movable attachments, capable of adjustment, so as to raise the front of the frame more or less, in accordance with the height at which it is desirable to cut the grass.

The bed-knife is shown at I as applied to the top of the cross-bar *f;* but instead of this location or method of attachment it may be fastened to the under surface of the bar, as shown at M, a rabbet being preferably formed for reception of the cutter, as there shown, and the cutter being attached by screws, the heads of which being in the under surface of the cutter, allows the cutter to be readily removed or applied without disturbing the cutter-cylinder.

I claim—

The arrangement of the gear mechanism, the roller-gear i^2 being a ring turning on a circular peripheral flange, k^2, on a disk, l^2, fixed upon the journal of the driving-roller and meshing into a pinion, j^2, on a gear-wheel, m^2, which meshes into and drives a pinion, q^2, on the journal of the cutter-cylinder, the gear m^2 turning on a stud, pin, or bolt, fixed to the journal-plate, and said gear lapping the main gear i^2 and a flange on the cutter-cylinder gear q^2, and keeping them in position.

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Witnesses:

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CHAS. R. AYRES.