(No Model.) 3 Sheets—Sheet 1.

A. L. SLAGER & G. E. LINN.

LAWN MOWER.

No. 432,092. Patented July 15, 1890.

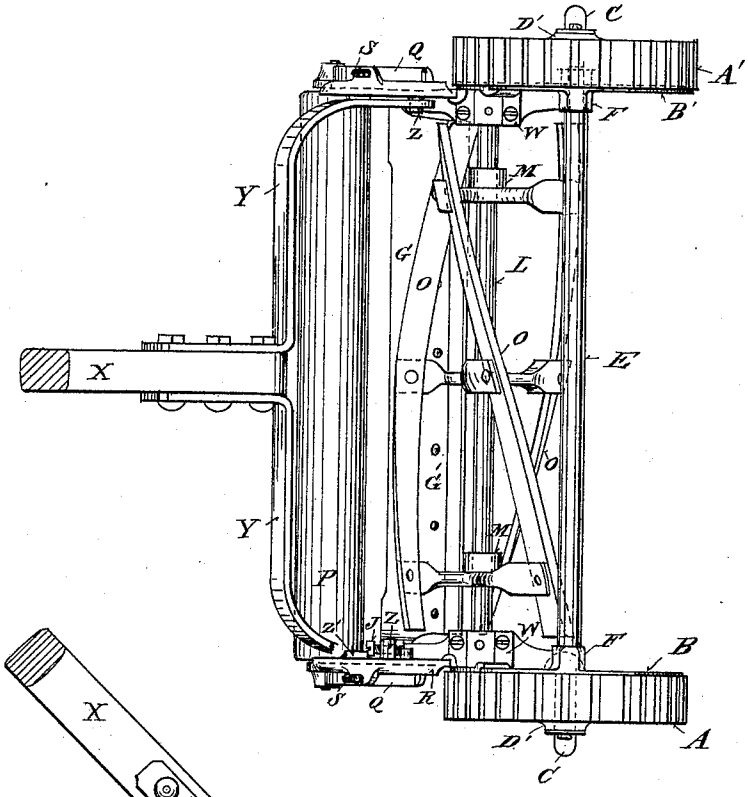


Fig. 1.

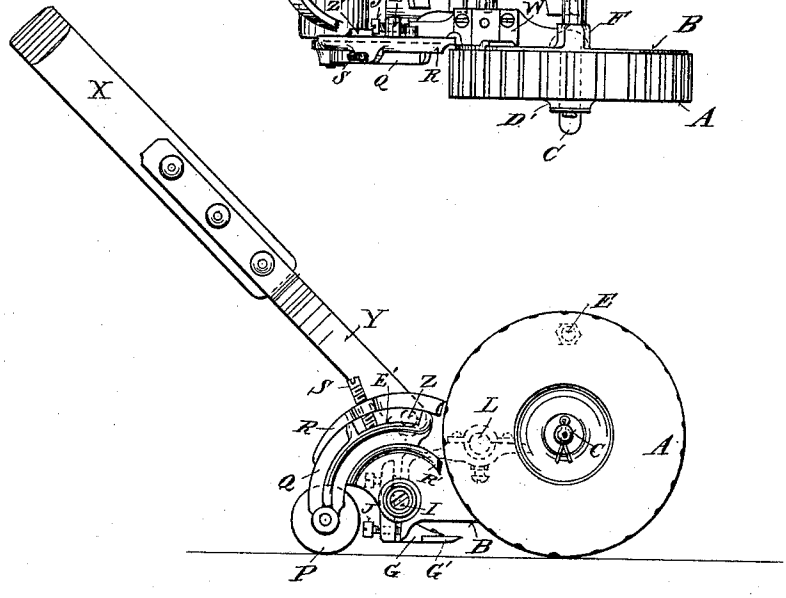


Fig. 2.

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Fig. 4

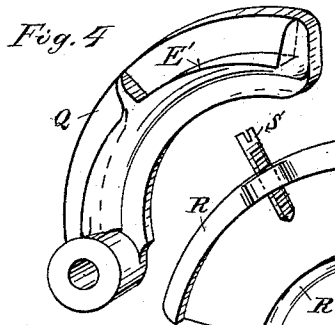
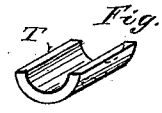


Fig. 5.



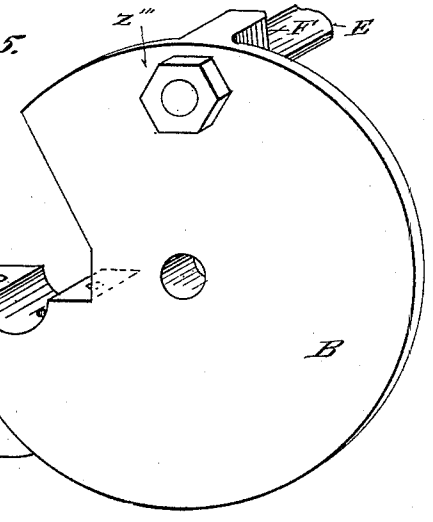


Fig. 3.

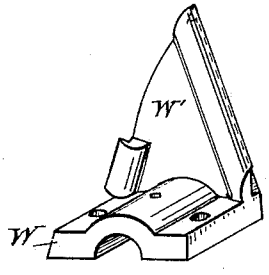


Fig. 7.

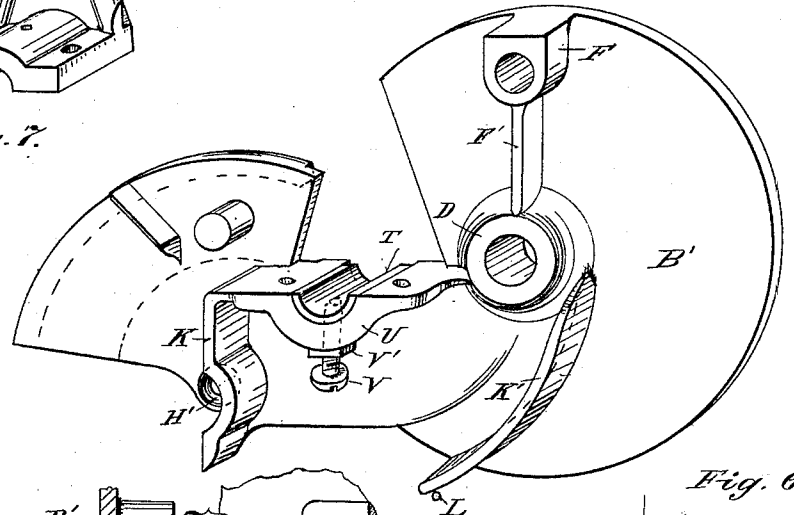


Fig. 6.

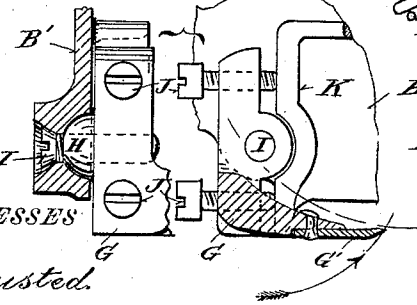


Fig. 8.

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A. L. SLAGER & G. E. LINN.

LAWN MOWER.

No. 432,092. Patented July 15, 1890.

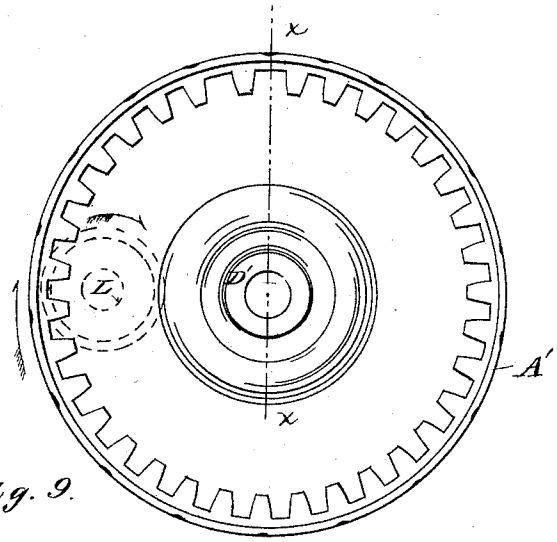


Fig. 9.

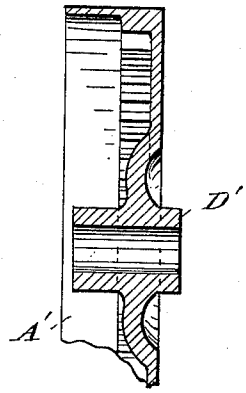


Fig. 10.

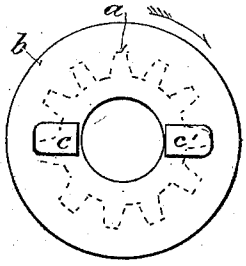


Fig. 12.

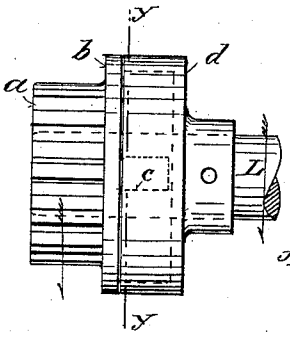


Fig. 11.

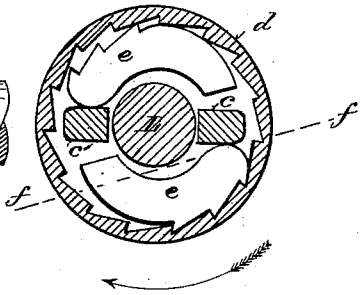


Fig. 13.

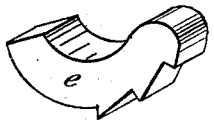


Fig. 14.

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UNITED STATES PATENT OFFICE.

ALBERT L. SLAGER AND GEORGE E. LINN, OF SPRINGFIELD, OHIO, ASSIGNORS TO THE G. S. FOOS COMPANY, OF SAME PLACE.

LAWN-MOWER.

SPECIFICATION forming part of Letters Patent No. 432,092, dated July 15, 1890.

Application filed February 14, 1890. Serial No. 340,419. (No model.)

To all whom it may concern:

Be it known that we, ALBERT L. SLAGER and GEORGE E. LINN, citizens of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Lawn-Mowers, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to certain new and useful improvements in lawn-mowers. These improvements have reference to adjusting the reel-shaft to and from the cutter-bar to secure quick alignment in setting up the same; have reference to pivotally supporting the cutter-bar, so as to present always the sharp edge thereof against the stubble whatever the depth of cut; have reference to supporting the said cutter-bar, so as to take the strain from the pivot-pin; have reference to adjusting the roller to secure small variations in the depth of cut; have reference to providing an end plate cast in one piece, having an enlarged semicircular opening for the purpose of receiving a bushing; have reference to a new and improved clutch-connection for the reel-shaft, and have reference to other matters of detail more fully described hereinafter, and brought out in the claims.

In the accompanying drawings, forming a part of this specification, and in which like reference-letters indicate corresponding parts, Figure 1 represents a plan view of a lawn-mower having one of the handle yokes or braces broken away and the handle-stock in section; Fig. 2, an end view of the same; Fig. 3, an outside view in perspective of one of the end plates and a set-screw therein; Fig. 4, a perspective view of the roller-support engaged by the said set-screw; Fig. 5, a perspective view of the reel-shaft bushing; Fig. 6, an inside view in perspective of one of the end plates with the reel-shaft bushing and its adjusting-screw in position; Fig. 7, a perspective view of the reel-shaft cap; Fig. 8, a section across the cutter-bar, showing its relation to a portion of one end plate and the path of the reel-shaft blades and a partial section of an end plate with one end of the cutter-bar secured in its socket; Fig. 9, an elevation of the inside of a driving-wheel, showing its inside gearing and the position of the clutch indicated in dotted lines; Fig. 10, a partial sectional view of the said wheel on the line $x\,x$ of Fig. 9; Fig. 11, a side view, on a larger scale, of the pinion and its cap mounted on a portion of the reel-shaft; Fig. 12, an elevation of the inside face of the pinion, showing the driving-lugs thereon; Fig. 13, a section on the line $y\,y$ of Fig. 11, showing the relative position of the driving-lugs, the pinion-cap, and the dogs in operative engagement; and Fig. 14, a perspective view of one dog.

The letters A A′ designate the right and left hand driving-wheels, respectively, of a lawn-mower, and having slight corrugations or grooving on their rims to prevent slipping on the lawn. They are cast with their inner faces open, but are closed in the machine by circular disks forming parts of the solid end plates B B′, to which said wheels are preferably secured by round-headed stubs C, each extending through a boss D on the end plate and through a hub D′ on the drive-wheels and forming a journal therefor, and having a washer and pin or other means to retain the wheel thereon, so it may freely revolve. An annular chamber is thus formed in each wheel, in which is located the reel-shaft clutch arrangement to be hereinafter described. These end plates are kept at the required distance apart at the forward end of the machine by a rod E, shouldered at the ends thereof, and extending through the bosses F on the end plates, and preferably secured thereto by a nut on each end, as indicated at Z‴ in Fig. 3. A rib F′ extends between the boss F and the boss D to stiffen the end plate. This rod also serves as a guard for the reel-blades in the rear. The rear ends of the plates are held apart by a cutter-bar G, to which is secured by rivets or otherwise a cutter-blade G′. The ends of said cutter-bar extend upward, as shown in Figs. 2 and 8, and are provided with projections H, of hemispherical or

other convenient shape, that fit into bearing-sockets H′ in the end plates, and are secured therein by screw-threaded pivot-pins I. Thus the projections, and not the pivot-pins, carry most of the strains of the cutter-bar, and will admit of a slight motion in the direction of the arrow, Fig. 8, about I as a center when necessary to adjust the cutter-blade to or from the reel-blades by means of set-screws J J, that bear against the rib K of the end plate. It will be observed that the pivotal point of the cutter-bar is above and substantially over the bar instead of being located approximately in the same plane as the bar. There is decided practical advantage in this change of location of the pivot. The advantage is this: By pivoting the bar at a point above it and substantially over it it may be adjusted at its entering edge up to the line of rotation of the reel, and at the same time be not so tipped as to present the bevel of the cutter-bar toward the stubble and at a decided angle thereto. Thus the cutting-edge is always kept ahead and against the stubble instead of ever allowing the bevel to assume such position. If the pivot were in about the same plane as the cutter-bar, it is obvious that the more the cutting-edge is elevated the more the bevel is turned toward the stubble. To avoid this objection causes the machine to cut faster and easier and lessens the labor of the operator. The user gets the advantage.

The reel-shaft L is provided with spiders M, of three or any convenient number of arms, and fixed at intervals along its length, and carrying on their ends a similar number of blades O, secured thereto by rivets or otherwise. These reel-blades are preferably arranged spirally, as in Fig. 1, in order to make a draw cut on the grass along the edge of the cutter-blade G′ in the circle indicated by the broken arc in Fig. 8. The location of the point I above the cutter-bar results in an improved action of the blade thereof on the grass presented to it, as already described, when the edge is adjusted by the set-screws in the direction of the arrow in Fig. 8 and by the adjustment for depth of cut, as described hereinafter.

The roller P revolves in boxes on the ends of segments or roller-brackets Q, said segments being provided with bearing flanges or ribs E′, and are each slidingly mounted between respective guides R R′ of the end plates, and are held therein by set-screws S S, which pass on the outside of the thin upper portion of the segments Q and bear against the upper side of projecting flanges or ribs E′, as shown in Figs. 2, 3, and 4. Projections or lugs on the said segments or roller-brackets engage the set-screws and form the limits of adjustment of the segments, whereby the rear end of the mower is raised or lowered on the said roller P, and also the cutter-bar in proportion, thus varying the distance of the cutter-blade from the ground, and hence the depth of cut. A projecting rib K serves to brace the end plate and to guide the grass to the reel-blades and cutter-bar.

A handle-stock X, preferably of wood, is fastened by bolts to yoke-straps or handle-braces Y, that are pivoted to stubs Z on the plates or otherwise, and are supported in a convenient position by stops Z′ on the said end plates.

The reel-shaft revolves in bushings T, fitting in boxes U of the end plates, each provided with a vertical adjustment, preferably by means of a set-screw V, passing through the box portion of the rib K into each box and engaging with the under side of the bushing, whereby each end of the reel-shaft may be raised or lowered independently to secure the proper adjustment of the reel-blades to the cutter-blades. This adjustment is thus quickly made in setting up the machine, and a jam-nut V′ on each set-screw prevents accidental displacement. A cap W for each box is conveniently held by screws, so as to admit of its removal, and has a plate portion W′, that matches with its respective disk on the end plate, so as to overlap the end plate at both the front and rear portions by suitable projections on said cap and interlock with the end plate by the wedge-shaped or enlarged bottom on the cap whereby the cap may be disengaged laterally only by first sliding it along the reel-shaft till free from the interlocking portions. This plate portion of the cap admits of lifting out the reel-shaft and its attachments entire without dismembering the clutch, which will now be described.

The driving-wheel and clutch shown in Figs. 9 to 14, inclusive, may be conveniently regarded as belonging to the left-hand side of the mower and lettered accordingly.

The driving-wheel A′ has an outer face, but is cast open on its inner side, and is provided with teeth, forming inside gearing on a portion of its depth. A pinion *a* meshes with said teeth and is revolubly and loosely mounted on the end of said reel-shaft L, so that it can revolve independently of the reel—that is, the pinion will revolve on the end of the shaft like a loose pulley when the mower is drawn backward, but will positively clutch the reel-shaft on a forward movement by means of the following mechanism:

The pinion has a face-plate *b*, provided with lugs or projections *c c′*, that extend within an annular recess of a cap or housing *d*, secured by a pin or otherwise to the reel-shaft, so as always to turn with it. Teeth like a ratchet, or other convenient shape, are formed within the said recess, and dogs *e* are loosely arranged therein, so as to engage with the said teeth when acted on by the said lugs. These dogs are curved to substantially the shape shown in Fig. 13, and each has teeth near one end that match with those in the cap. In other words, the toothed ends of

these pawls or dogs have the same radius upon their peripheries as the inside radius of the ratchet-teeth within the cap or housing, and the smooth ends have a smaller radius from the last tooth to the square bearing-surface at the opposite end from the teeth. At the same end is formed a bearing-surface for the lug *c*—for instance, on a line *f f*, that passes to one side of the center of the reel-shaft, so as to cause the toothed end of the dog to slide outward and engage with the cap-teeth when acted on by the lug *c*. The clutch and its attachments will turn in the direction of the arrow, Fig. 13, until a reversed movement of the wheel and pinion causes the lug *c'* to strike the opposite end of the said dog and disengage the teeth. This clutching action does not depend upon the gravity of the dog *e*, for it will clutch equally well with the axis perpendicular, as shown in Fig. 13, and is therefore a positive force-clutch. It will be observed that both dogs do not clutch at once; but while one is in full engagement the other will be in the position shown in Fig. 13. The effect is that engagement will be obtained quicker after a reverse movement, thus giving the same effect as a finer division of the teeth, with the advantage of strong teeth, due to the larger size thereof.

We do not wish to limit ourselves to these exact forms and construction as long as the principles herein set forth are carried out.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a lawn-mower, the combination, with the end plates having webs hollowed out on the upper side, of a bushing fitted into the said hollowed-out parts, and a set-screw in each of said bushings, and engaging at its upper end with the bushing and adapted to adjust the bushing from the web and to allow the bushing to tilt or pivot on its end, whereby the bushings of the respective plates will assume the position to snugly fit the reel-shaft, whether such shaft be absolutely straight or not.

2. In a lawn-mower, the combination, with end plates and guides thereon, of solid segments carrying a roller on the lower ends and loosely fitting said guides and having a central rib provided with lugs, and a set-screw mounted in one of said guides and adapted to bear on said rib between said lugs, which act as stops for said set-screw, whereby said segments are held in their adjusted position in said guides.

3. In a lawn-mower, the combination, with a driving-wheel having teeth therein, of a reel-shaft and a pinion loosely and revolubly mounted thereon and having lugs with symmetrical faces on both sides perpendicular to the end of said pinion, a cap fixed to said shaft next to said pinion and inclosing said lugs and having ratchet-teeth or irregularities therein, and dogs having matching teeth to engage said cap in one direction only when acted on by the said lugs, which act squarely on said dogs by said perpendicular faces to force them into or out of engagement at any point during their revolution, irrespective of gravity.

4. In a lawn-mower, the combination, with the end plates having each a portion cut away and a web formed adjacent thereto, and bearings formed at the base of the cut-away portion within said web, said bearings having enlarged openings of suitable form, of a detachable plate and cap adapted to occupy the cut-away portion and cover the end of the reel-shaft and overlapping and interlocking with both the front and rear portions of each of said end plates, an adjustable bushing carried by each web and matching said cap, and a set-screw and jam-nut for adjusting said bushing.

5. In a clutch, the combination, with a shaft and a cap fixed thereon and having interior teeth, of a pinion mounted on said shaft and having lugs or projections located within the said cap, and one or more dogs having teeth and located within the said cap and alternately engaged at the heel by a lug or projection, whereby they are forced in a conjoint circular and outward direction to engage the cap and at their other end by a lug or projection to disengage them from the cap.

6. In a clutch, the combination, with a shaft and a cap fixed thereon and having an interior succession of teeth, of a pinion mounted on said shaft and having lugs or projections located within the cap, and one or more curved dogs located loosely within the said cap and between the lugs and having exterior teeth, the lugs or projections engaging at one side with the inner portion of the heel end of the dogs, whereby the lugs tend to move said dogs in a conjoint circular and outward direction and to effect a forced engagement of the dogs and cap, irrespective of the influence of gravity.

7. In a clutch, the herein-described dog, consisting of a curved piece having teeth near one end and a bearing-surface at the same end inclined behind said teeth to cause a positive outward movement of the same when engaged by a projection on the driving portion of the clutch, and a square bearing-surface at the other end to cause disengagement of the said teeth when the dog is acted on in a reversed direction by engaging with the opposite side of a similar projection.

8. In a clutch, the combination, with a cap or housing having interior ratchet-teeth, a pinion having projecting lugs located within said cap, and a shaft upon which the cap and pinion are mounted, the one rigidly and the other loosely, of one or more dogs having curved outer edges toothed a part of the way and smooth the remainder of the length, the circle occupied by said teeth being on the same radius as the circle of the

teeth in the cap and the smooth part on a shorter radius, the lugs engaging the end of the dogs nearest the teeth on the inner portion of such end, so as to move the dogs in a conjoint circular and outward direction, and the lugs engaging the other ends of the dogs to move the dogs in a reverse circular direction.

In testimony whereof we affix our signatures in presence of two witnesses.

ALBERT L. SLAGER.
GEORGE E. LINN.

Witnesses:
GEO. D. LEEDLE,
J. L. KERSHUER.