No. 669,437. Patented Mar. 5, 1901.

# T. & W. H. COLDWELL.

## MOTOR LAWN MOWER.

(Application filed Nov. 6, 1900.)

(No Model.) 4 Sheets—Sheet 1.

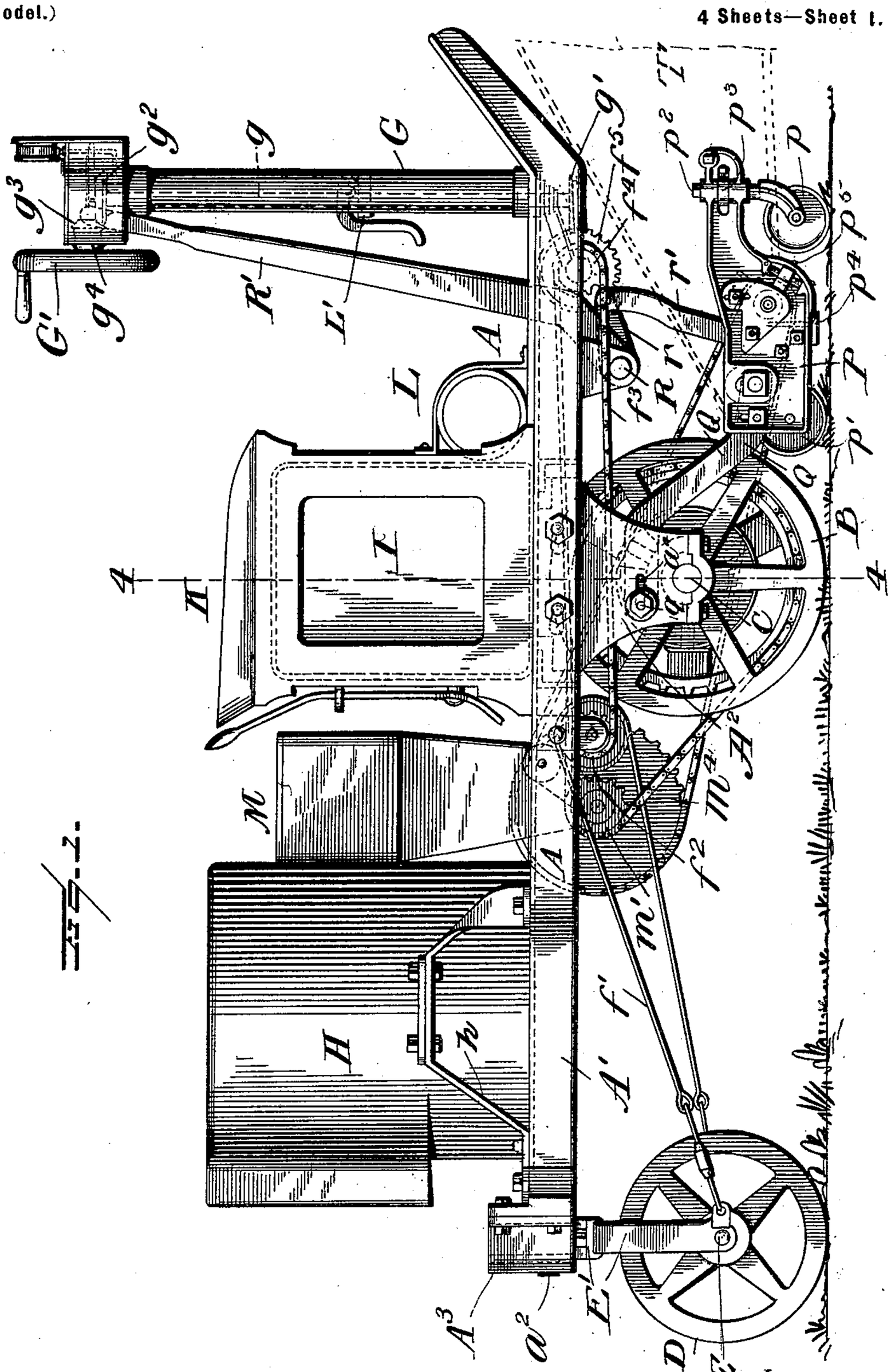


Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

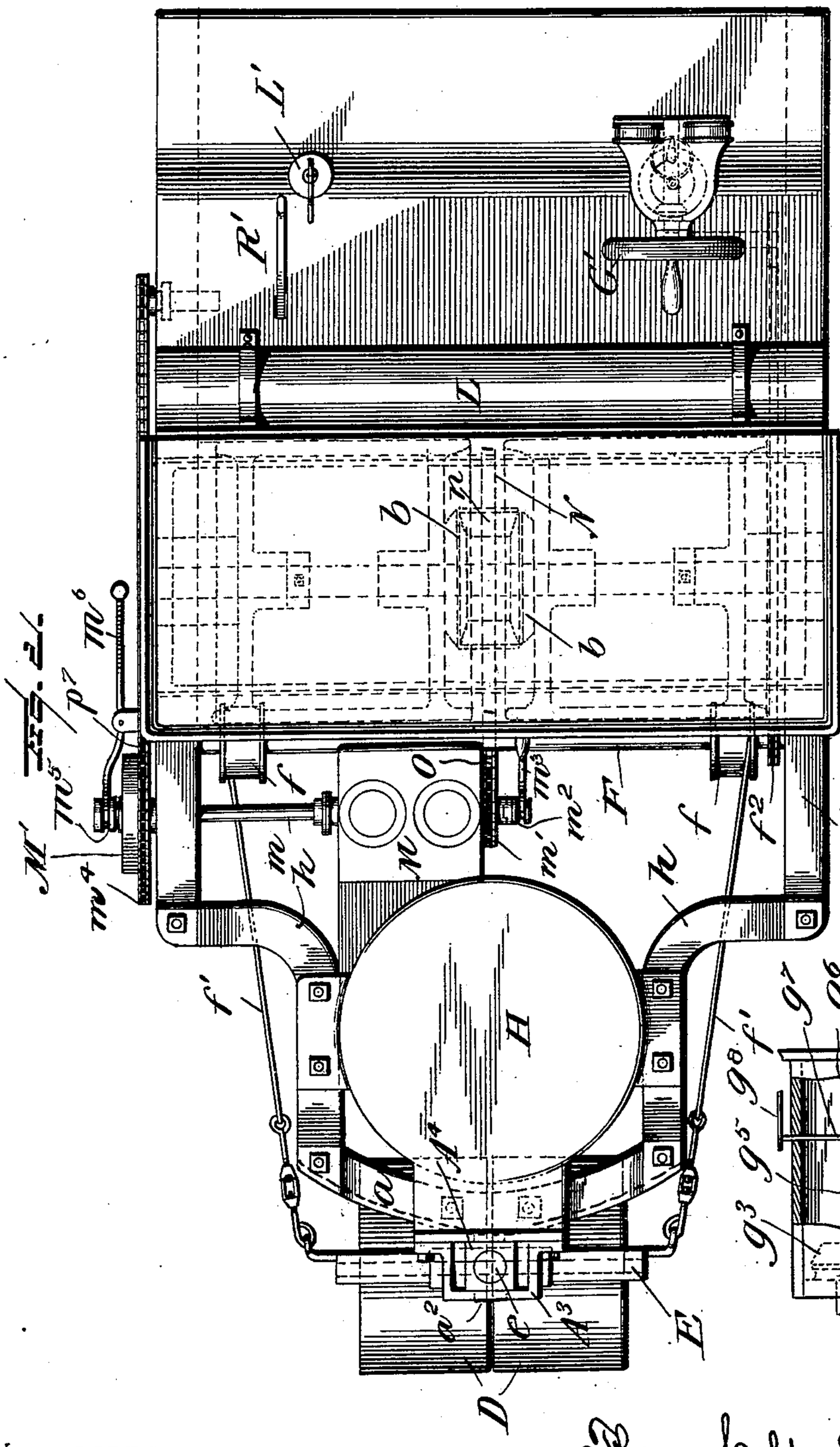


FIG. 2.

FIG. 2a.

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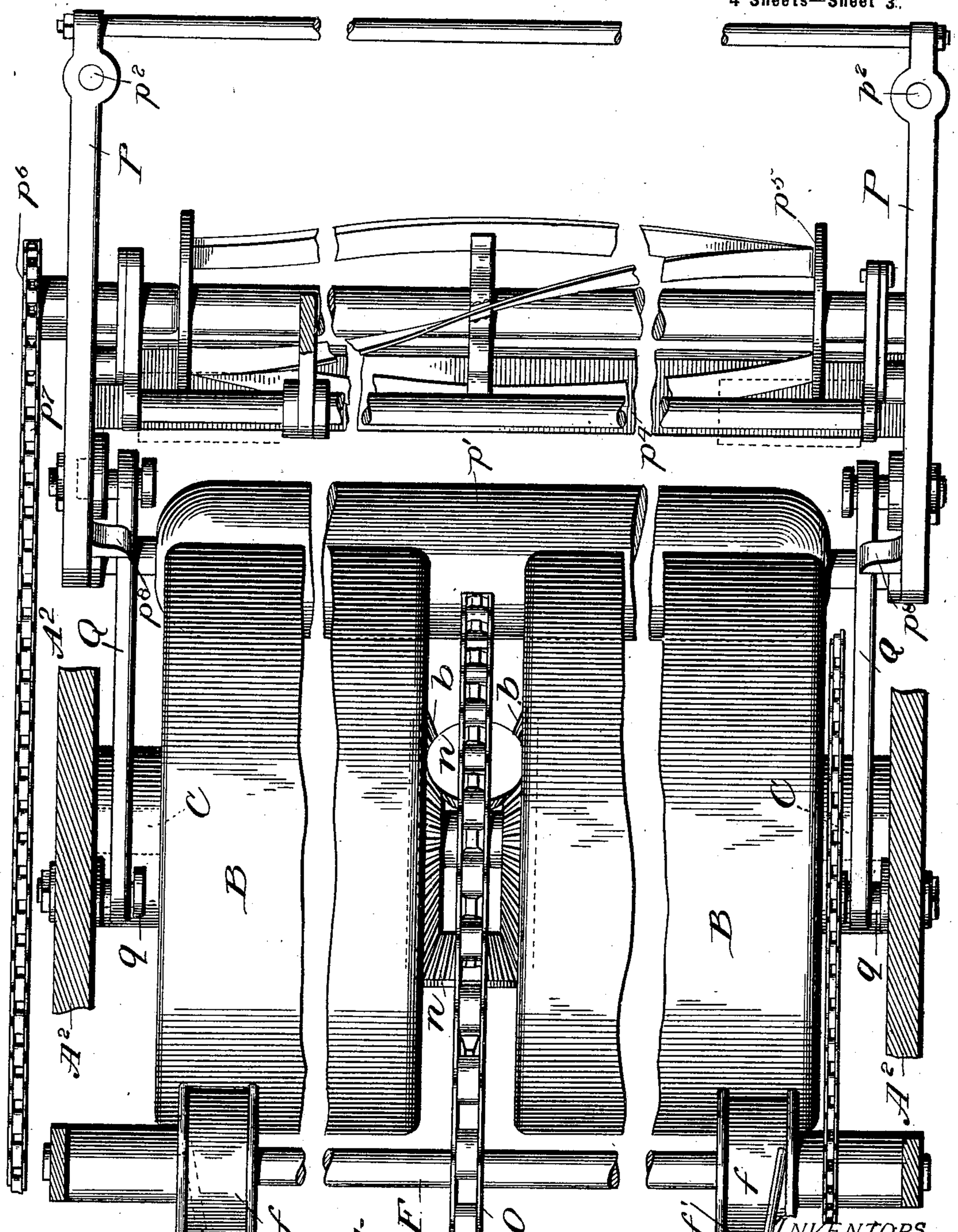
## MOTOR LAWN MOWER.

(Application filed Nov. 6, 1900.)

(No Model.) 4 Sheets—Sheet 3.

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## MOTOR LAWN MOWER.

(Application filed Nov. 6, 1900.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 2.

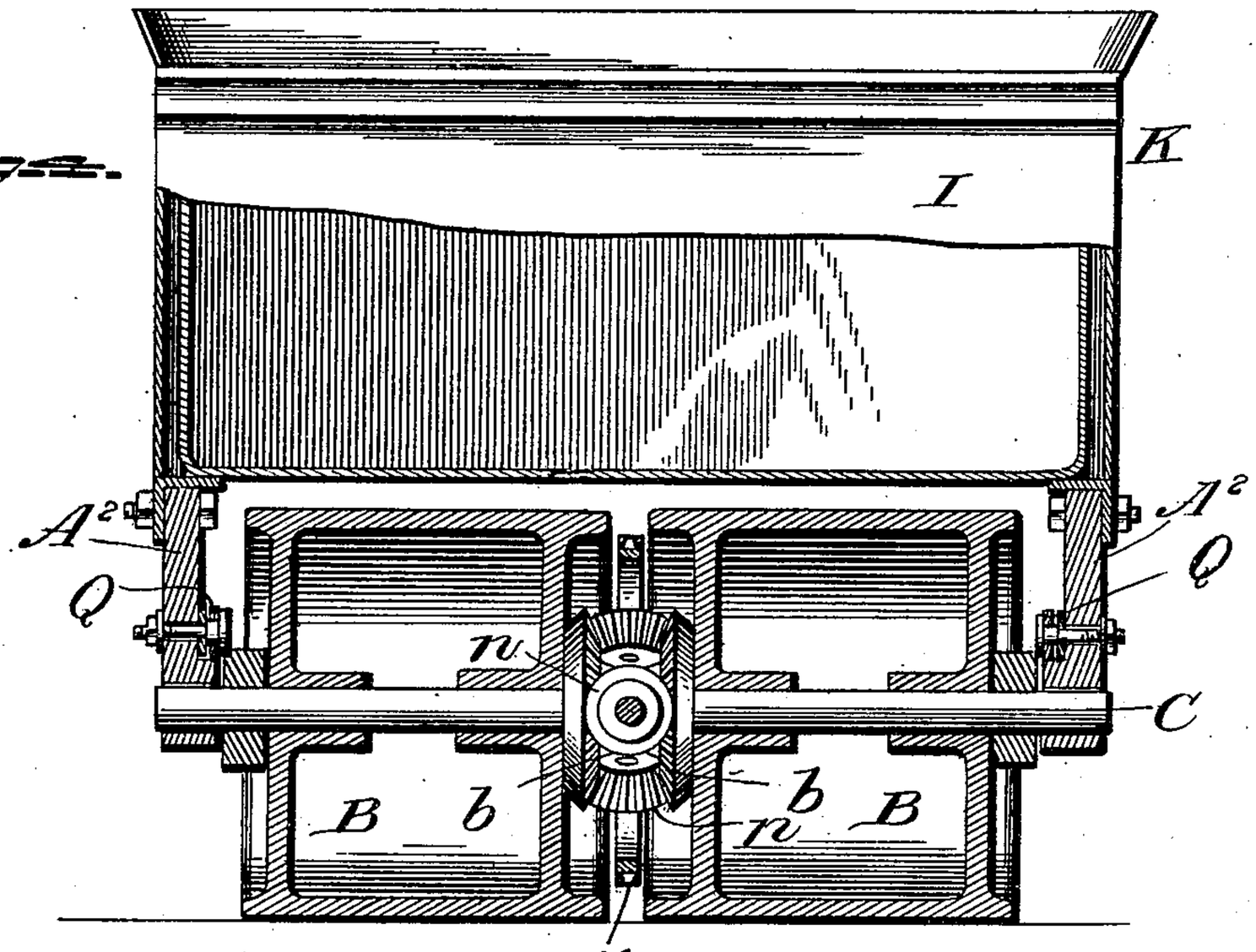



Fig. 5.

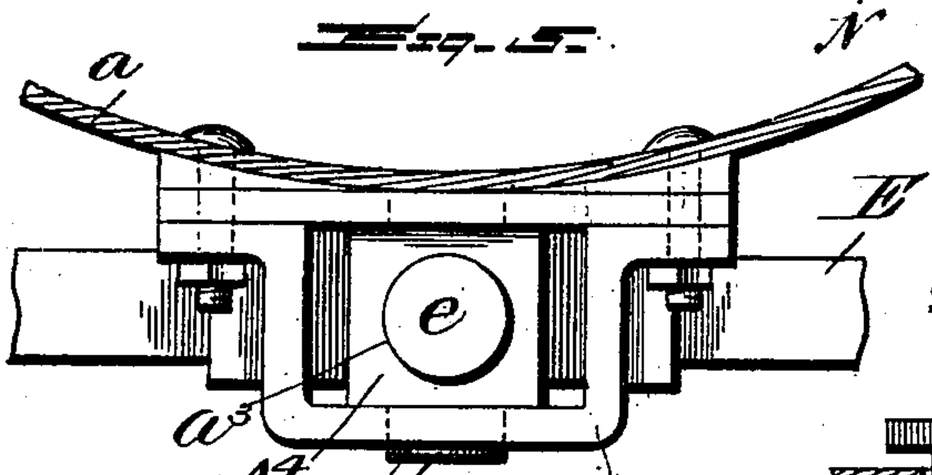



Fig. 6.

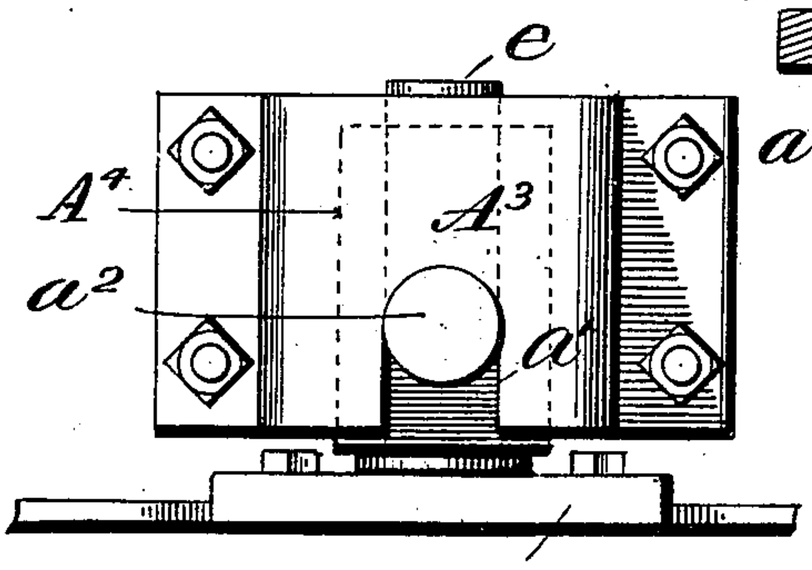



Fig. 7.

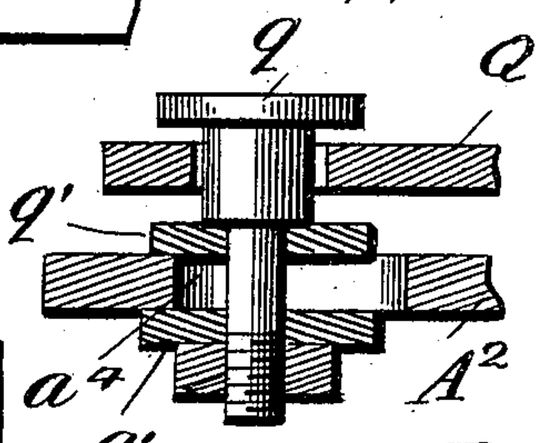



Fig. 8.

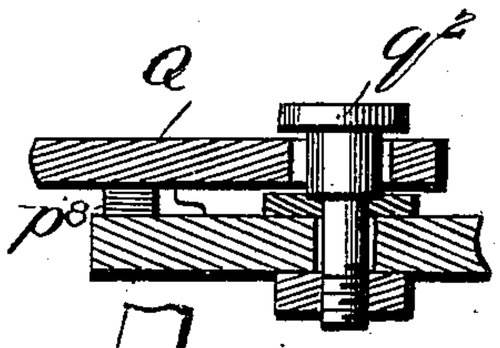
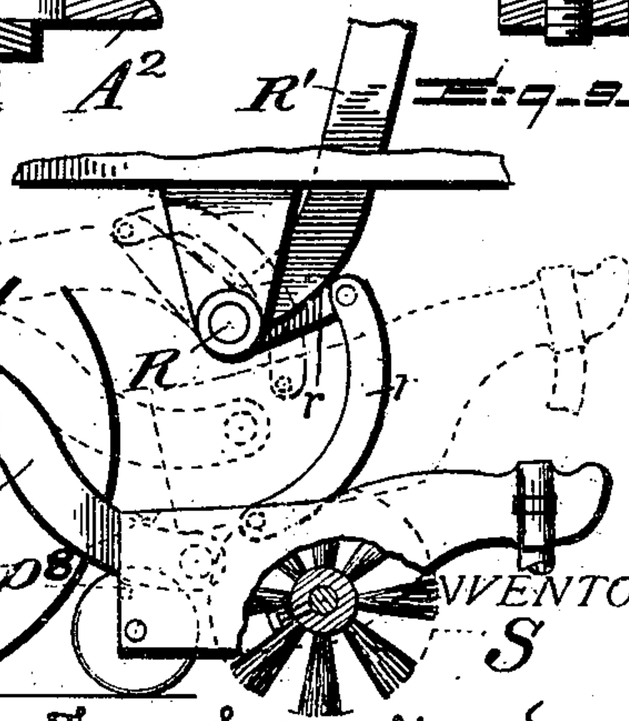



Fig. 9.

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# UNITED STATES PATENT OFFICE.

THOMAS COLDWELL AND WILLIAM H. COLDWELL, OF NEWBURG, NEW YORK.

## MOTOR LAWN-MOWER.

SPECIFICATION forming part of Letters Patent No. 669,437, dated March 5, 1901.

Application filed November 6, 1900. Serial No. 35,642. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS COLDWELL and WILLIAM H. COLDWELL, citizens of the United States, residing at Newburg, in the county of Orange and State of New York, have invented certain new and useful Improvements in Motor Lawn-Mowers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention is an improved motor lawn mower, sweeper, and roller; and it consists in the novel features hereinafter described with reference to the accompanying drawings, which illustrate one form in which we have contemplated embodying the invention, and the invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 represents a side elevation of the machine embodying our invention arranged as a lawn-mower. Fig. 2 is a top plan view of the same. Fig. 3 is an enlarged plan view of a portion of the machine, parts being broken away. Fig. 4 is a vertical transverse sectional view of the machine on line 4 4 of Fig. 1. Figs. 5 and 6 are detail views illustrating the connection between the steering-roller and the main frame. Figs. 7 and 8 are detail sectional views of the connections between the push-bars and the main frame and mower-frame, respectively. Fig. 9 is a detail view illustrating the operation of the lifting mechanism for the lawn-mower frame. Fig. 10 is a detail view, partly in section, of the indicating apparatus of the steering mechanism.

The object of our invention is to provide a machine operated by a prime motor capable of self-propulsion and adapted to roll a lawn, as hereinafter described.

In the drawings, A A′ represent the main frame of the machine, which consists of a rectangular horizontal framework A, having a rear portion A′, preferably somewhat narrower than the front portion and terminating in a curved back bar *a*. The forward portion of the frame is carried upon a pair of driving-rollers B B, loosely mounted on a shaft C, the ends of which are secured in hangers or brackets $A^2$ $A^2$, depending from the main frame. The rear portion of the frame is carried by a pair of rollers D D, by which the machine is also steered. The rollers D D are mounted on a shaft E, the ends of which are secured to a yoke E′, provided at its center with a vertically-disposed pivot-stud *e*. To the curved back bar *a* is bolted a U-shaped bracket $A^3$, and said bracket and the said back bar are provided on their lower edges with bearing-recesses *a′ a′*. (See Fig. 6.) Within the bracket $A^3$ is placed a block $A^4$, having trunnions $a^2$, which engage the recesses *a′ a′* just described, and said block is also provided with a vertical aperture $a^3$, which receives the vertical pivot-stud *e* of the yoke E′. The block $A^4$ is of such size as to permit its oscillating on its trunnions within the bracket $A^3$, and it will therefore be seen that the rollers E are free to move with respect to the frame, so as to conform to the inequalities of the ground without straining their connection with the frame or interfering with the steering of the machine.

It is obvious that very many different arrangements could be used to turn the rollers E so as to steer the machine.

In the present instance the steering mechanism is constructed and arranged as follows: F is a drum-shaft disposed transversely of the machine and supported in bearings secured thereto and provided with winding-drums *f f* at opposite sides of the machine on which are oppositely wound the cables (or other flexible connections) *f′ f′*, which extend rearward and are secured to the opposite sides of the yoke E, preferably by means of turnbuckles, as shown. Shaft F is provided with a sprocket-wheel $f^2$, connected by a chain $f^3$ with a sprocket-wheel $f^4$ on a shaft supported from the main frame adjacent to the forward end thereof, said sprocket-wheel $f^4$ having connected therewith a worm-wheel $f^5$. G represents the steering-pedestal, which extends vertically from the main frame near the forward end, and through which extends a vertical shaft *g*, carrying at its lower end a worm *g′*, engaging the worm-wheel $f^5$ and at its upper end a bevel-gear $g^2$, engaged by a bevel-gear $g^3$ on a short horizontal shaft $g^4$, carrying on its outer end the hand steering-wheel G′. The shaft *g* is also provided with

a small pinion $g^5$, meshing with a larger gear-wheel $g^6$ on a shaft $g^7$, which extends up through the top of the pedestal G and is provided with a pointer $g$, which indicates at all times the position of the steering-roller. It is to be noted that as one of the drums $f\,f$ winds up its cable while the other unwinds the two cables will always remain taut, and they will relieve the vertical pivot-stud $e$ from injurious strain, which might otherwise tend to break it.

The prime motor for propelling the machine and operating the cutter or sweeper thereof may be of any desired type—such as a steam-engine, a gasolene or explosive engine, or an electric motor. In the present instance the machine is shown as arranged for a steam-engine; but it is to be understood that our invention covers the use of any prime motor.

H represents the boiler, which is supported on brackets $h\,h$, secured to the main frame.

I represents the water-supply tank, which is placed beneath the operator's seat K, and L represents a tank for holding liquid hydrocarbon, which supplies the heat for the boiler in any desired or usual way and is charged with compressed air by means of an air-pump L′, secured to the forward part of the main frame.

M represents the motor proper, having a driving-shaft $m$. This motor (consisting in this instance of a steam-engine which is represented conventionally in the drawings) is located a little to one side of the center of the machine, as shown in Fig. 2, and its shaft $m$ is provided with a driving sprocket-wheel $m'$, loosely mounted thereon in line with the center of the vehicle and adapted to be secured to the shaft by a clutch $m^2$, operated by a suitable hand-lever $m^3$.

The main driving-rollers are provided with the well-known compensating gearing comprising a driving sprocket-wheel N, mounted on the shaft C and carrying three compensating-gear pinions $n$, which mesh with beveled gears $b\,b$, formed on or secured to the inner ends of the rollers B B. A driving-chain O connects the driving-sprockets $m'$ and N, thus imparting motion to the two rollers, but permitting one to turn faster than another when necessary.

P represents a vertically-movable frame adapted to carry the cutting apparatus or sweeper, said frame being provided with a pair of vertically-adjustable caster-wheels $p\,p$ at its forward end and with a small supporting-roller $p'$ at its rear end. The caster-wheels have vertical pivot-studs $p^2$, engaging vertical sockets in the frame, said sockets having central cut-away portions, in each of which is located a collar $p^3$, secured adjustably on one of the caster-wheel studs $p^2$ by means of a set-screw, for example, so that the caster-wheels can be adjusted vertically in the frame P to regulate the height of cut.

$p^4$ represents the removable stationary knife of the mower, and $p^5$ the rotary knife, the latter being mounted adjustably with respect to the stationary knife and being also removable, so that it may be replaced by a rotary brush when it is desired.

The shaft of the roller (or brush) is provided with a sprocket-wheel $p^6$, which is engaged by a chain $p^7$, passing over a driving-sprocket $m^4$, loosely mounted on the motor-shaft $m$ and adapted to connect therewith by a clutch $m^5$, operated by a suitable hand-lever $m^6$.

The frame P is connected to the main frame by devices which permit said frame P to rise and fall and assume positions angular to the main frame, so as to allow it to follow the contour of the ground over which it passes and also to prevent the movements of the main frame when passing over uneven ground from forcing the cutters into the ground. To this end the frame P is connected to the main frame at each side thereof by a push-bar Q. Each of these bars is provided at its rear end with an aperture loosely engaged by a shouldered bolt $q$, which passes through a slot $a^4$ in one of the brackets $A^2$, and a clamping-plate $q'$ is preferably interposed between the shoulder of the bolt and the bracket and between the nut and the opposite side of the bracket, as shown in Fig. 7, said plates having apertures through which the bolt passes, so that the bolt may be secured at any desired point in said slot, and the push-bar Q will still be allowed considerable play on the bolt. By adjusting the bolts $q$ in the slots $a^4$ the tension of sprocket-chain $p^7$ can be regulated.

The forward end of each push-bar Q is connected to the frame P by a similar shouldered bolt $q^2$, passing loosely through the push-bar and through an aperture in the side frame, the bolt being rigidly secured to the frame, but permitting the push-bar an amount of play thereon. (See Fig. 8.) The frame P is also provided with lugs $p^8\,p^8$ above and below each of the push-bars Q to prevent the frame P from doubling upon said push-bars.

R represents a rock-shaft which extends across and beneath the main frame and above the frame P, and is provided with lifting-arms $r\,r$, connected by links $r'\,r'$ to the frame P. The shaft R is also provided with a hand-lever R′, by means of which the frame P can be lifted bodily up against the under side of the main frame A when it is not desired to use it. The arms $r\,r$ are so placed on the shaft R that when the frame P is in its highest position the shaft R will be forward of a line connecting the points of pivoting of the links $r'\,r'$ with said arms and with the frame P, as shown in Fig. 9, (the links $r'\,r'$ being preferably slightly bent or curved, as shown, to facilitate this result,) so that the weight of the frame P will be directly supported by the shaft R, and the arms $r\,r$ will be prevented from moving farther rearwardly by the engagement of the links with the shaft R, as will be readily understood. In Fig. 9 we have

also shown the revolving cutter removed and the rotary brush S, before referred to, substituted therefor.

In some cases it may be desirable to use a grass box or collector with the mower, and in Fig. 1 we have illustrated in dotted lines a grass-box T, which may be of any desired or usual construction.

From the foregoing description it will be seen that by lowering the frame P to the ground (the revolving cutter being in place therein) and throwing in the clutches $m^2$ and $m^5$ the machine will move over the ground and operate the cutter to cut the grass at the height to which it has been set by the adjustment of the caster-wheels. By substituting a rotary brush for the rotary cutter, which may be accomplished by loosening the cutter from its shaft, drawing out the shaft, inserting the brush, replacing the shaft, and securing the brush thereto, the machine can be used as a lawn-sweeper. In either case the work is done more effectively than with a horse-drawn machine, as there is nothing in front of the cutter or brush to press down the grass.

When it is desired to roll the ground, the frame P is lifted, as before described, and thereby its weight is added to the weight of the machine carried by and upon the rollers B B D D, so that a very effective roller is produced, the clutch $m^5$ being thrown out when the knives are not in use. The driving-shaft of the engine is also preferably provided with a band or driving wheel or pulley M', which is conveniently attached to the sprocket $m^4$, so that when desired the machine may be propelled to any desired point, the motor disconnected from the running-gear by throwing out the clutch $m^3$ and from the cutting mechanism by detaching the sprocket-chain from sprocket $m^4$. The power of the engine may then be used for any desired purpose, as pumping water, sawing wood, &c., exactly as if it were a stationary engine.

The prime motor will be provided with the usual devices for starting, stopping, and reversing, which will preferably be controlled by means of a lever or levers adjacent to the driver's seat; but as these devices form no part of our invention they are not shown or described herein.

What we claim, and desire to secure by Letters Patent, is—

1. The combination with a frame, combined traction and lawn-rolling rollers connected therewith, of a second frame, arranged in front of said traction and lawn-rolling rollers and provided with supporting devices engaging the ground and supporting the entire weight of the frame, cutting mechanism carried by said second frame, a motor operatively connected with said traction-rollers and connections between said frames permitting them to rock transversely with respect to each other to accommodate them to inequalities of the ground, substantially as described.

2. The combination with a frame and combined traction and lawn-rolling rollers connected therewith, of a second frame, arranged in front of said traction and lawn-rolling rollers and provided with rollers supporting the entire weight of the frame, cutting mechanism carried by said second frame, a motor operatively connected with said traction-rollers and connections between said frames permitting them to rock longitudinally and transversely with respect to each other, substantially as described.

3. The combination with the main frame, of a motor mounted thereon, combined traction and lawn-rolling rollers connected with said main frame, connections between said motor and said traction-rollers, a second frame arranged in line longitudinally with the main frame, and movable bodily up and down with respect to the main frame, connections between said movable frame and the main frame permitting said frames to rock transversely with respect to each other, cutting mechanism and carrying-rollers mounted in the movable frame and mechanism for driving said cutting mechanism, substantially as described.

4. The combination with two frames arranged in line with each other longitudinally, of connections between said frames permitting them to rock transversely with respect to each other to accommodate them to inequalities of the surface traversed, combined traction and lawn-rolling rollers connected with one of said frames, cutting mechanism carried by the other frame, a motor operatively connected with said rollers and mechanism for transferring the weight of the frame carrying the cutting mechanism to the other frame, substantially as described.

5. The combination with the main frame, of a motor mounted thereon, combined traction and lawn-rolling rollers connected with said main frame, connections between said motor and said traction-rollers, a second frame arranged in line longitudinally with the main frame, and movable bodily up and down with respect to the main frame, connections between said movable frame and the main frame permitting said frames to rock transversely with respect to each other, cutting mechanism and carrying-rollers mounted in the movable frame, mechanism for driving said cutting mechanism, and mechanism for transferring the weight of the movable frame carrying the cutting mechanism to the other frame, substantially as described.

6. The combination with the main frame provided with supporting-rollers, of connections between certain of said rollers and the frame, whereby the angle of the axis of said rollers is automatically adjustable with respect to the plane of the frame to enable them to conform to the inequalities in the ground, a motor on said frame, operative connections between the motor and certain of said rollers, a vertically-movable frame, con-

tween said movable frame and the main frame permitting the movable frame to rock transversely to the main frame, cutting mechanism carried by said movable frame, and operative connections between said cutting mechanism and the motor, substantially as described.

7. The combination with the main frame provided with supporting-rollers, of connections between certain of said rollers and the frame, whereby the angle of the axis of said rollers is automatically adjustable with respect to the plane of the frame to enable them to conform to the inequalities in the ground, a motor on said frame, operative connections between the motor and certain of said rollers, a vertically-movable frame, connections between said movable frame and the main frame permitting the movable frame to rock transversely to the main frame, cutting mechanism carried by said movable frame, operative connections between said cutting mechanism and the motor, and means for elevating the vertically-movable frame to enable the machine to be used as a roller, substantially as described.

8. The combination with the main frame, rotary supports therefor and a prime motor connected with certain of said rotary supports, for propelling them, of a vertically-movable frame, cutting mechanism mounted therein, links extending from said main frame to the movable frame having connections with each frame permitting a limited sliding movement perpendicular to the plane of the frame and operative connections between said motor and the cutting mechanism carried by said movable frame and means for elevating said movable frame out of operative relation to the ground, substantially as described.

9. The combination with two frames arranged in line with each other longitudinally, of connections between said frames permitting them to rock transversely with respect to each other to accommodate them to inequalities of the ground, combined traction and lawn-rolling rollers connected with one of said frames, a removable rotary cutter carried by the other frame, and a motor operatively connected with said rollers, and detachably connected with said removable cutter, whereby said cutter may be removed and replaced by a rotary brush, to convert the machine into a lawn-sweeper, substantially as described.

10. The combination with the main frame, of a supporting driving-roller therefor, a supporting and steering roller therefor, provided with a vertical pivot, a block engaging said pivot and pivoted in said main frame so as to be capable of oscillating transversely thereof, steering mechanism connected with said steering-roller, and a prime motor mounted on said frame and operatively connected with said driving-roller, whereby the axes of said rollers may assume positions angularly to each other to allow the rollers to conform to [illegible] the ground, a supplemental frame in line longitudinally with the main frame, connections between the main frame and said supplemental frame permitting said frames to rock transversely with respect to each other, and cutting mechanism carried by said supplemental frame, substantially as described.

11. The combination with the main frame provided with transverse parallel portions adjacent to one end, a block pivotally mounted in said parallel portions, its pivots extending longitudinally of the main frame, a steering-roller provided with a vertical pivot engaging said block, a driving-roller mounted in said main frame, a motor mounted in said main frame, and operatively connected with the driving-roller, steering mechanism connected with said steering-roller, a supplemental frame in line longitudinally with the main frame, connections between the main frame and said supplemental frame permitting said frames to rock transversely with respect to each other, and cutting mechanism carried by said supplemental frame, substantially as described.

12. The combination with the main frame, of driving-rollers mounted therein, steering-rollers, connections between the steering-rollers and said main frame permitting said steering-rollers to rock transversely with respect to the main frame, steering mechanism connected with said steering-rollers therefor, links connected to said main frame and to the said movable frame by connections allowing said frames to rock transversely with respect to each other, cutting mechanism carried by said movable frame including a rotary cutter, a motor on the main frame, connections between said motor and the driving-rollers, a clutch controlling said connections, operative connections between said motor and the said rotary cutter, a clutch controlling said connections, a lifting-shaft adjacent to the said movable frame, a lifting-lever secured thereto and connections between said lifting-shaft and the said movable frame, substantially as described.

13. The combination with a frame and combined traction and lawn-rolling rollers connected therewith, of a second frame, arranged in line longitudinally with the first-mentioned frame and provided with supporting-rollers engaging the ground and supporting the entire weight of the said second frame when in operative position, cutting mechanism carried by said second frame, connections between said frames permitting them to rock transversely with respect to each other, a motor operatively connected with said traction-rollers and adjusting devices operatively connected with said supporting-rollers for the said second frame, substantially as described.

14. The combination with a frame and combined traction and lawn-rolling rollers connected therewith, of a second frame arranged in line longitudinally with the first-mentioned frame and provided with supporting-rollers

engaging the ground and supporting the entire weight of the said second frame when in operative position, cutting mechanism carried by said second frame, connections between said frames permitting them to rock transversely with respect to each other, a motor operatively connected with said traction-rollers, adjusting devices connected with the supporting-rollers of said second frame, and mechanism for lifting said second frame bodily off of the ground, substantially as described.

15. The combination with the main frame, combined traction and lawn-rolling rollers connected therewith and a steering-roller pivotally connected with said frame, a shaft mounted in said frame, flexible connections oppositely wound on said shaft and connected to said steering-roller below its point of pivoting, for steering said roller and also taking a portion of the draft thereof off of its pivotal connection, of a second frame arranged in line longitudinally with said main frame and provided with rollers engaging the ground and supporting the entire weight of the said second frame, cutting mechanism carried by said second frame, and connections between said frames permitting them to rock transversely with respect to each other, substantially as described.

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

THOMAS COLDWELL.
WILLIAM H. COLDWELL.

Witnesses as to signature of Thomas Coldwell:

L. P. WHITAKER,
J. K. MOORE.

Witnesses as to signature of William H. Coldwell:

WILLIAM J. WYGANT,
J. S. ANGUS.