(Model.)

3 Sheets—Sheet 1.

J. DAIN, Jr.

MOWING MACHINE.

No. 382,592. Patented May 8, 1888.

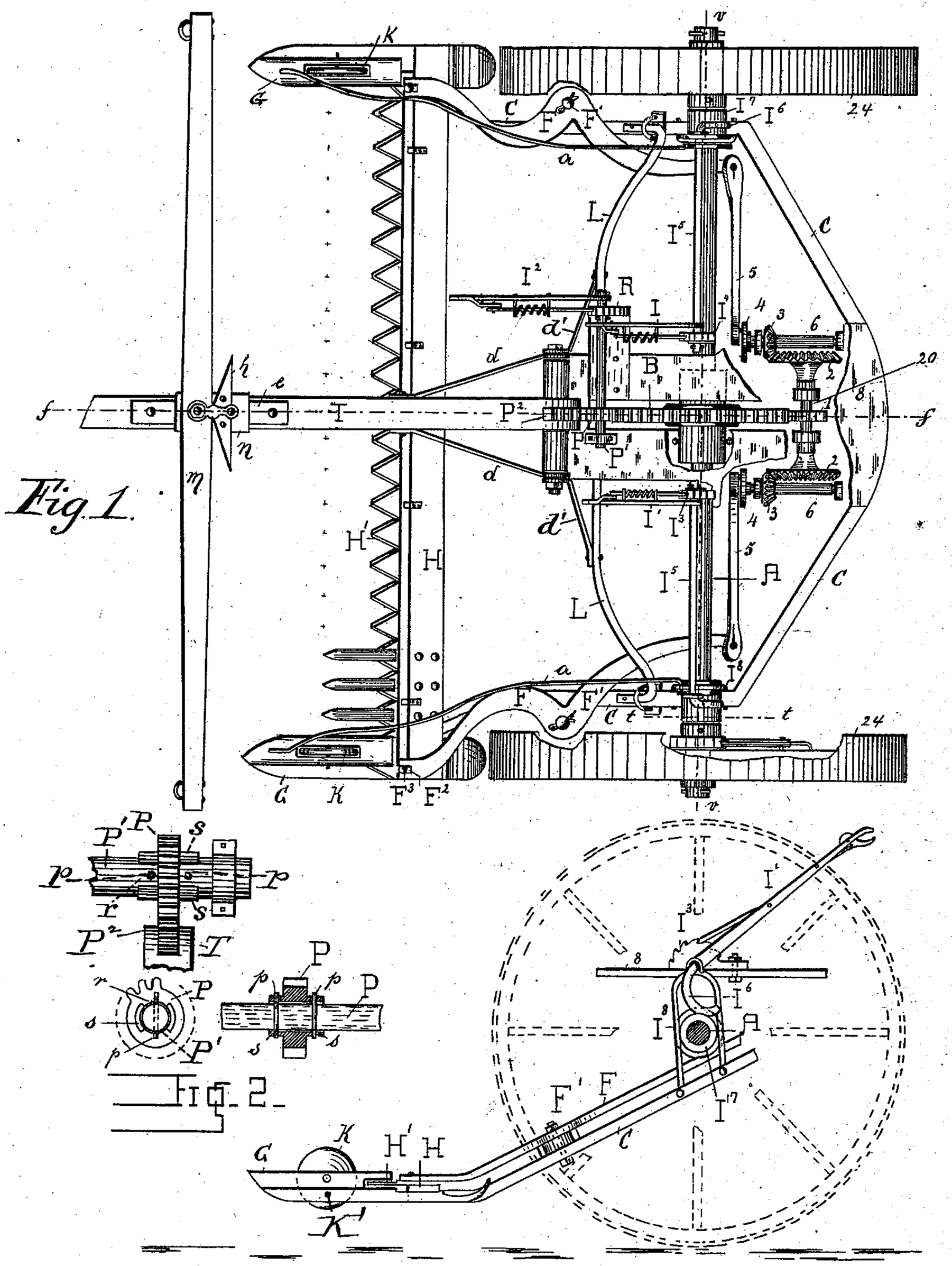

Fig. 1.

FIG. 2.

FIG. 3.

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(Model.)

3 Sheets—Sheet 2.

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MOWING MACHINE.

No. 382,592. Patented May 8, 1888.

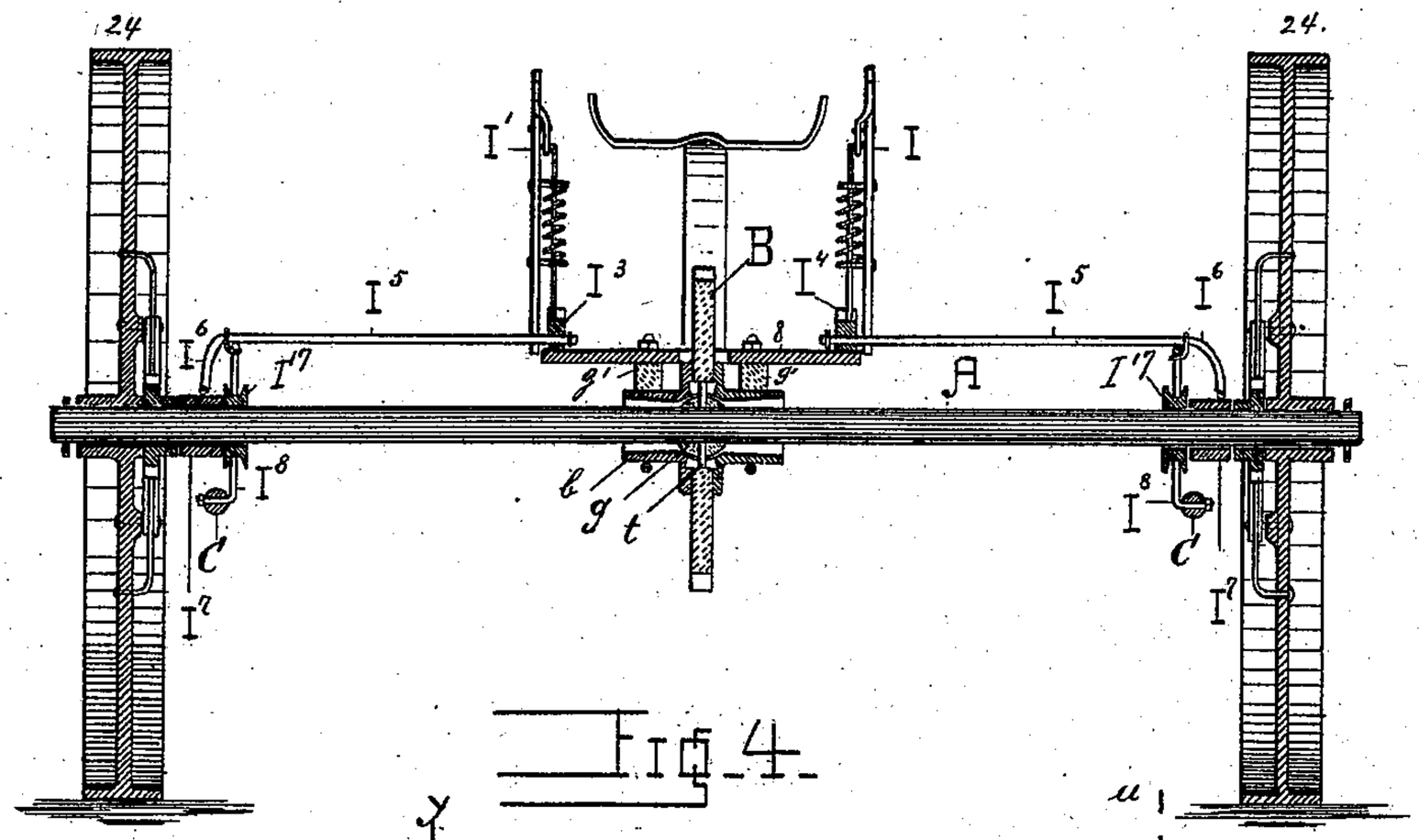

FIG. 4.

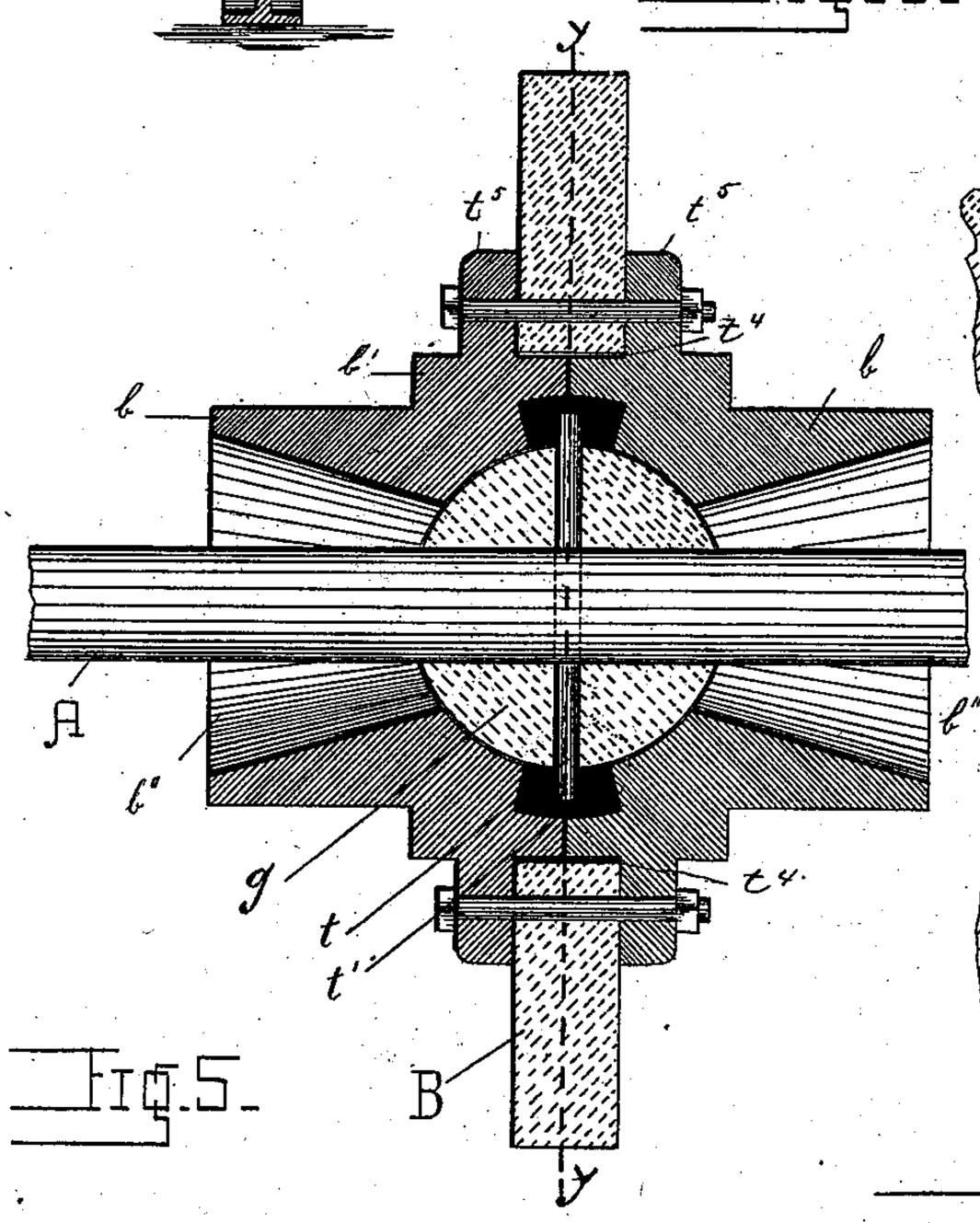

FIG. 5.

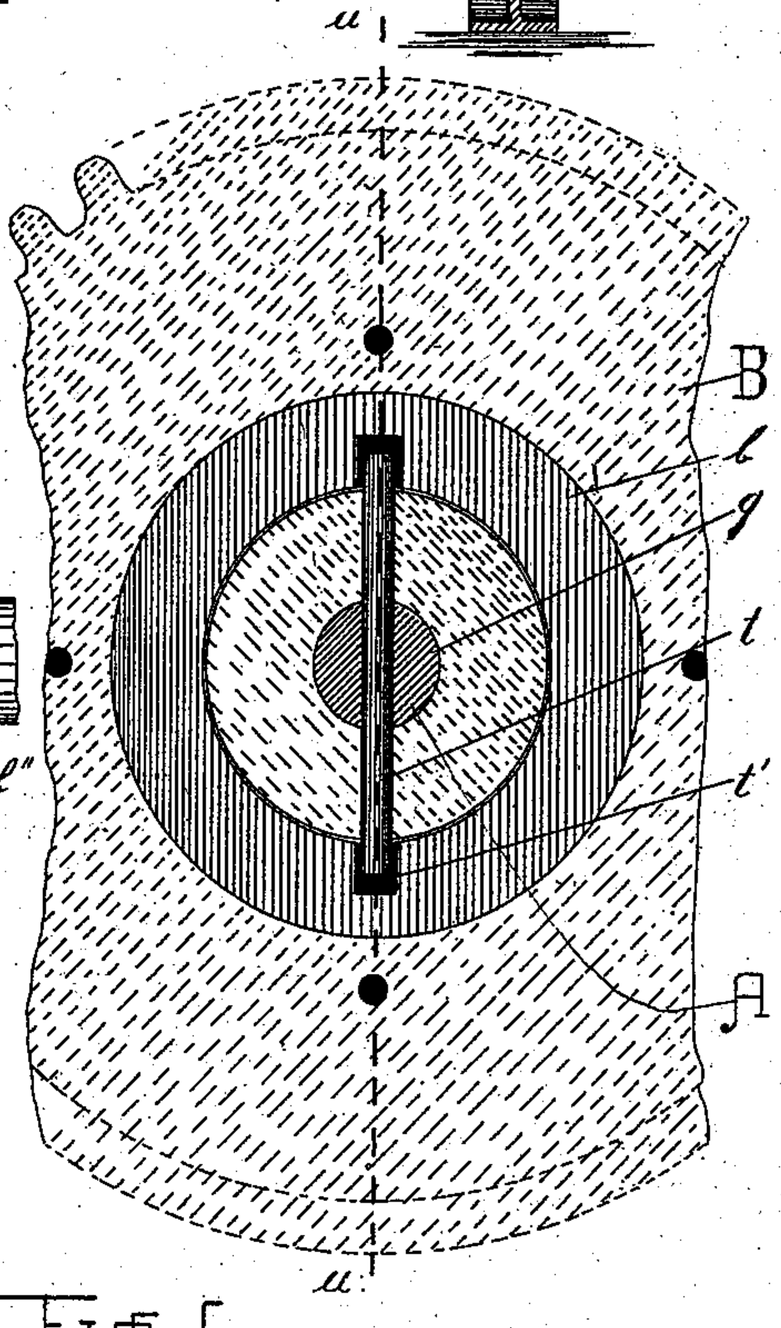

FIG. 6.

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(Model.) 3 Sheets—Sheet 3.

J. DAIN, Jr.

MOWING MACHINE.

No. 382,592. Patented May 8, 1888.

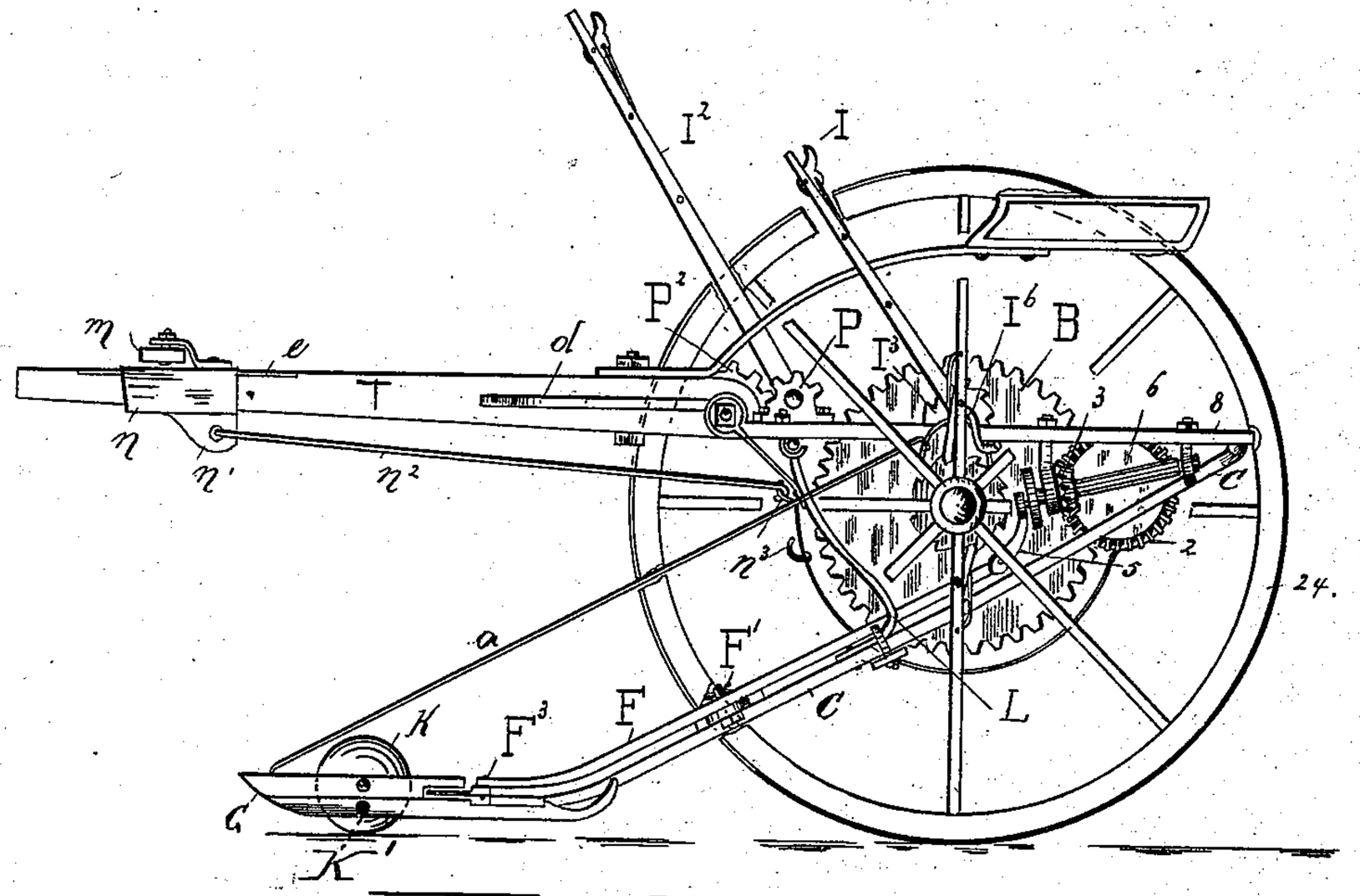

FIG. 7.

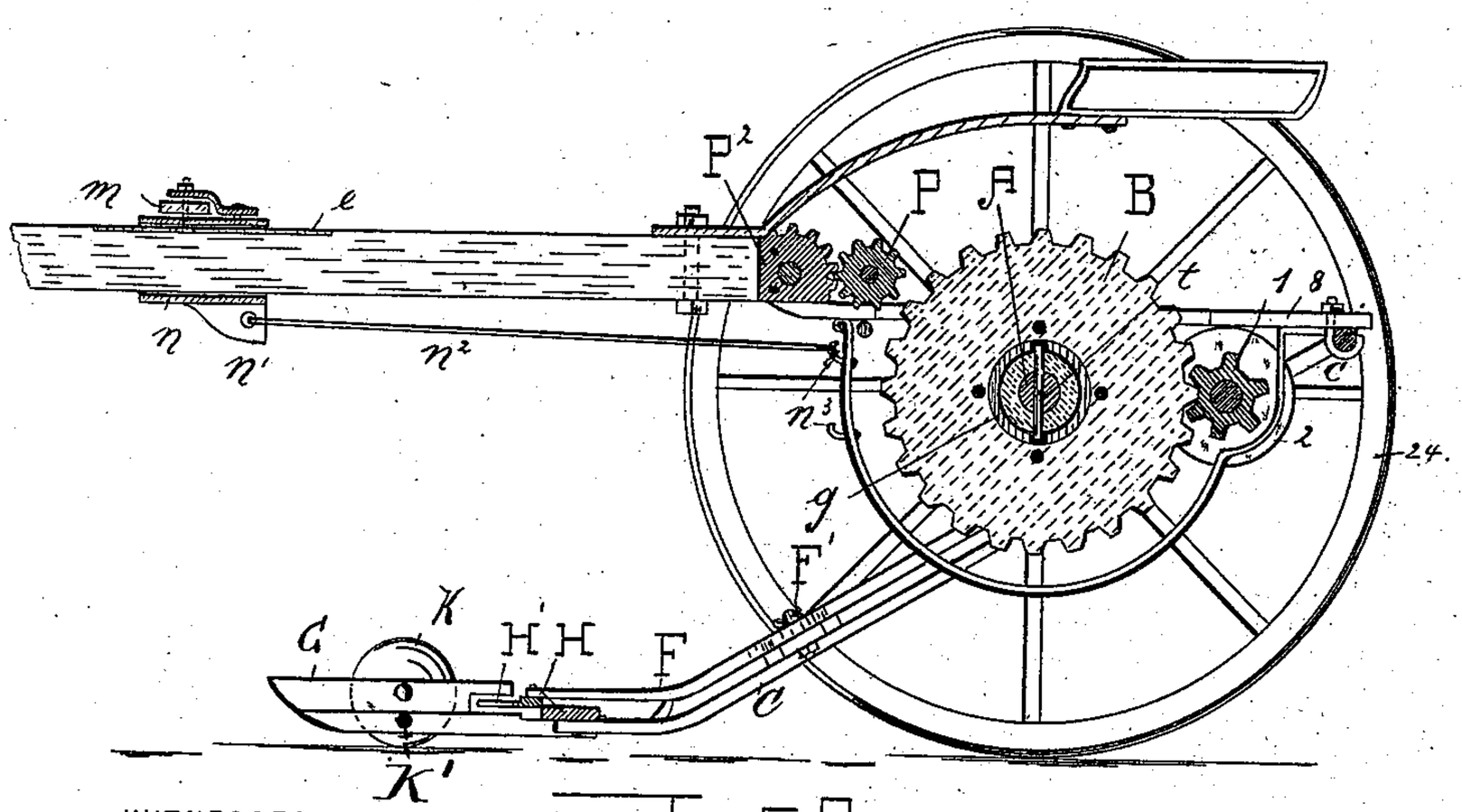

FIG. 8.

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UNITED STATES PATENT OFFICE.

JOSEPH DAIN, JR., OF KANSAS CITY, MISSOURI.

MOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 382,592, dated May 8, 1888.

Application filed February 23, 1886. Serial No. 192,832. (Model.)

To all whom it may concern:

Be it known that I, JOSEPH DAIN, Jr., of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Mowing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

The object of my invention is to provide a mowing-machine arranged with a main axle that can vibrate in a vertical plane and still not affect the position of the sickle-bar; and my invention consists in certain novel features of construction and combinations of parts, as will be more fully described hereinafter, and pointed out in the claims.

In the drawings, Figure 1 represents a plan view of a machine embodying my improvements. Fig. 2 is a detail view of devices located on the end of the tongue for raising the front end of the machine from the ground. Fig. 3 is a sectional elevation taken on line *t t*, Fig. 1. Fig. 4 is a section through the machine, looking toward the front in Fig. 1, and taken on transverse line *v v*, same figure. Fig. 5 is a detail view, enlarged, of the devices which allow the axle of the machine to vibrate or oscillate, the section being taken on line *u u*, Fig. 6. Fig. 6 is a section through the same devices taken on line *y y*, Fig. 5. Fig. 7 is a side elevation of a machine embodying my improvements, and Fig. 8 is a longitudinal section through the machine on line *f f*, Fig. 1.

The construction of the machine may be as follows: A pair of supporting and driving wheels, 24, are attached to the axle A in the usual manner, and having the usual ratchets to force the axle to revolve when either wheel moves forward, and which allow either or both of them to turn backward without revolving the axle and the sickle-driving mechanism.

On and about at the center of the length of the axle A a cast-iron ball or sphere, *g*, is located. This may be driven on the axle, and it has a steel pin, *t*, driven or screwed through it and through the axle at right angles to the axle, so that it will project about an inch on each side of the ball.

The main gear-wheel B is securely connected to this ball by a pair of castings, *b*, located on the axle and on opposite sides of the ball *g*. These castings are oppositely concaved or hollowed out, so as to fit the surface of the ball; but the hole in them, or the bearing for the ball, is made a little larger than the diameter of the ball, so that the ball will not be clamped so tightly as to prevent its free rotation.

From the bearing of the ball the bore of the castings *b* flares outwardly, and the bore *b''* being much larger than the axle A, it is obvious that the axle can oscillate or move a considerable distance from a true right angle from the plane of the main gear B without throwing undue strain on it and still be connected to it.

The castings *b* are made with hubs, which project toward the ground-wheels, and the outer surfaces of which form bearing-surfaces for the center of the platform, as shown by the letter *g'*, Fig. 4. On the inner side of the castings *b* a rectangular recess, t^4, is formed for the purpose of clamping the internal periphery of the main gear-wheel B, and thereby securing it firmly to said castings. A series of bolts passed through the flanges t^5 of the castings and through the body of the said gear-wheel make the three pieces practically one solid piece of metal, and is a very desirable way of constructing them, as it will allow the ball to be removed and again inserted with but little trouble.

On the inner surface of the castings *b*, and on each side of the bearing for the ball *g*, a notch or recess, *t'*, is made for the reception of the projecting ends of the pin *t*. This recess (or it may be called a "short slot") extends in a direction that is parallel to the axle A, and allows the ends of the pin to play freely when the axle is oscillated, as in passing over an obstruction or over rough ground. It should be observed, however, that no matter how much the axle may oscillate, the construction is such that it is always in a position to revolve the main gear-wheel when the machine is run forward.

Mounted on the hubs of the castings *b*, directly contiguous to a flange or shoulder, *b'*, formed thereon, or connected to the axle in any other preferred way, is the platform 8, which supports the gearing of the machine.

The frame C, that supports the cutter-bar H, is made of a steel bar, preferably, and is all in one continuous piece. One end of this continuous frame is connected to the cutter-bar

H and extends back to and in the rear of the axle, where it is firmly connected to the rear end of the platform 8. It then extends on around the said platform, and has its other end attached to the end of the cutter-bar that is opposite the point where the first-mentioned end of the continuous frame is attached. It will be noticed, then, that the continuous frame extends entirely around the machine, excepting only the front side, which is occupied by the cutter-bar. Diverging from the said continuous frame at a point just in advance of the axle A is an arch-bar, L, which passes upward and over from one side to the other. Said arch-bar is connected at the middle of its length to the front of the platform 8 and in front of the gear-wheel B, thus forming a very strong brace for the platform. By this construction the platform, the continuous frame C, the cutter-bar, and the arch-bar L are all rigidly connected together.

Connected to the frame C just in the rear of the arch-bar L, and embracing the axle A, is a pair of stirrups, I^8. One of these stirrups is located on each side of the platform, and they should be placed as near to the ground-wheels as possible, so as to afford a wide framing for the machine. These stirrups have such a length as will permit the respective ends of the axle to rise and lower to a considerable extent without coming in contact with their ends. Mounted on the axle near each end, and fitted to engage the sides of the stirrups I^8, is a grooved roller, I^{17}, the purpose of which is to diminish the friction which otherwise would occur if the stirrups directly engaged the axle. It, or they, rather, (for there are two of them,) allow the axle to move up and down in the stirrups perfectly free and easy. Yet with this construction the axle cannot move forward or backward nor get out of line with the cutter-bar. The axle can only move or oscillate up and down.

The top of the stirrups I^8 is braced by means of a bar or rod, *a*, running from the front end of the shoes G backward and connecting to the said stirrups. The bars *a* also serve to guide the grass inwardly and out of the way of the wheels 24.

Mounted on the top of one of the stirrups I^8, and having a suitable bearing there, is one end of a shaft or a rod, I^5. One end of this rod has a cam, I^6, formed upon or affixed to it, and on the opposite end is a hand-lever, L, by which the cam is brought in contact with the anti-friction pulley I^7, and acts in an eccentric manner for the purpose of lifting one end of the framing and cutter-bar. The other side of the machine is fitted with another rod and cam that is like the one just described, and it has a hand-lever, I′. Both of the hand-levers are fitted with the usual devices for holding them at any desired point—that is, the lever I is fitted with a spring-pawl which engages a ratchet-bar, I^4, that is attached to the framing, and the lever I′ is fitted with a spring-pawl or a similar device which engages the toothed bar I^3, also attached to the framing or the platform 8 on the opposite side of the driver's seat.

The operation of the levers may be described as follows: By pulling back the lever I the right-hand side of the framing and the cutter-bar will be raised from the ground, and by placing the lever I back to its normal position, or as far forward as it will go, and pulling back the lever I′, the opposite end of the cutter-bar will be raised, as shown in Fig. 3. Thus it will be observed either end of the cutter-bar H can be raised independently of the other. To prevent undue friction between the cams I^6 and the axle a roller, I^7, is located on the axle just outside of the grooved roller I^{17}.

Pivoted to the forward end of the platform 8 is the tongue T, which is braced from the arch-bar L by the braces *d′* upon either side thereof, thus making it very strong sidewise. The rear end of the tongue has a casting, P^2, rigidly attached to it, and the rear edge of this casting is provided with a series of teeth, which engage a pinion, P, mounted on or attached to a hand-lever shaft, P′. A hand-lever, I^2, is located on the outer end of the shaft P′, and by moving it backward the sickle-bar or the cutter-bar H will be raised from the ground its entire length. As shown more clearly in Fig. 2, the pinion P is fastened on the shaft P′ in such a manner that it will have a limited amount of rotative play on the same, so that in working the tongue will be allowed a limited amount of up-and-down motion without raising or pressing down on the cutter-bar. To explain more clearly, the pinion P is formed with a sleeve, *s*, on each of its sides, and these sleeves are cut away for a little distance at points which are opposite each other, thereby forming opposite recesses or notches, *r*. A small pin, *p*, passes through the shaft P′ on each side of the pinion, and engages with the sides of the recesses *r* after the limit of up or down motion of the tongue is reached. Hence by throwing the lever I^2 sufficiently far back the pins *p* will engage the sides of the recesses *r*, and the pinion P will be rotated and the cutter-bar H will be raised from the ground. The lever I^2 is held in any desired position by means of a rack-bar, such as R.

The seat for the driver should be mounted on the rear end of the tongue T, so that his weight will partly relieve the horses' necks from the weight of the tongue. The doubletree *m* is made sufficiently long to enable the horses to walk outside of the path of the shoes G, and the draft is communicated from the doubletree to the machine through a draft-rod, n^2, which is connected to the forward end of the platform 8 in any desired way; or it may have its rear end connected to the hook n^3, located on the gearing-shield below the platform. A series of hooks such as n^3 can be located on the gearing-shield, so that the draft-rod can be attached higher up or lower down, as may be desired. The doubletree is carried on

a slide, *n*, that is loosely mounted on the tongue, and the forward end of the draft-rod n^2 is attached to an ear, *n'*, depending from its under side. In this way the draft of the horses will have a tendency to pull up on the cutter-bar and not allow the weight of the machine to be pulled by the tongue.

To prevent the slide *n* from cutting into the tongue T, I may place a metal plate such as *e* on the top side of the tongue. To support the cutter-bar H and the shoes G, the latter are provided with small guide-wheels K. Said guide-wheels can be fixed higher up or lower down in the shoes by removing the pin on which said wheels revolve and locating it in a hole, K', that is in a different plane, as may be required.

Motion is communicated from the main gear-wheel B to the sickle H' through the medium of the following instrumentalities: Meshing with the main gear B is a small pinion, 1, that is mounted on a transverse shaft, 20. Meshing with the bevel-gears 2 are a pair of small bevel-pinions, 3, which are mounted on longitudinal shafts 6. There are two of these shafts, one on each side of the main gear-wheel B, and on their forward ends are mounted the pitman wheels or cranks 4. A pair of pitman-rods, 5, extend out toward the ground-wheels from the cranks 4, and connect with the rear end of the rocker shafts or bars F. The rocker-bars F are pivoted at or near the middle of their length by means of a pivot, F', to the forward end of the continuous frame C. The forward ends of this frame may be termed the "thrust-bars" of the machine. The forward end of each of the rocker-bars F is attached to the respective ends of the sickle H' by means of a pin, F^3, which projects from the upper side of the sickle, and a slot, F^2, which is formed in the forward ends of the said bars. Any other connection can be used here, however, which will allow the rocker-bars to oscillate on their pivots without throwing a strain on the pins F^3.

With the construction described, when the main gear-wheel is revolved, motion is communicated from the pitmen to the rocker-bars and from them to the sickle, which will be positively driven from each of its ends.

It will be observed that the wrist-pins are so located in the cranks that the rocker-bars move simultaneously and in the same direction.

The slide *n* is provided with a stay-block, *h*, on its upper side, against which the doubletree will bear and be stayed from swiveling so far around as to allow the feet of the horses to come in contact with the sickle. The cutter-bar H is fitted with the usual guards for the sickle, as indicated more clearly in Fig. 1.

In conclusion, I would say that my machine is so constructed that the main axle is perfectly free to vibrate in a substantially vertical plane independently of any part of the framing; or, in other words, no portion of the framing, or, in fact, no part of the machine, oscillates with the axle in passing over obstructions or in running upon rough ground. Another point: raising either end of the cutter-bar by means of the small levers I I' does not throw the cutter bar forward and its front edge upward, as in some machines of this class. The reason why this can be done is the fact that the entire framing and the cutter-bar are pivotally attached to the axle. As the cutter-bar is raised by means of the large lever I^2, it will be observed that the doubletree slides forward on the tongue.

Having thus described my invention, what I claim is—

1. In a mowing-machine, the combination of the main axle, a ball fixed thereon and rotating therewith, a gear-wheel mounted on the ball and provided with transversely-projecting hubs, through which said axle passes, and the framing of the machine which carries the cutter mechanism and its driving-gear mounted on said hubs, substantially as described.

2. The combination of the main axle A, the ball *g*, fixed thereon, a pin, *t*, projecting beyond the surface of the ball, and a surrounding casting provided with an oblong recess, in which the projecting end of said pin vibrates, said recess having its longest diameter parallel with the main axle, for the purpose substantially as described.

3. A mowing-machine having the frame which carries the cutter mechanism and its driving-gear centrally pivoted to the main-wheel axle, whereby they are allowed a lateral rocking movement thereon, in combination with stirrups secured at the sides of said framing, and provided with lifting-levers having cams which engage anti-friction rollers upon the axle, whereby either end of the cutter-bar can be alternately raised and lowered, substantially as described.

4. In a direct-draft mowing-machine having a continuous thrust-framing, the combination of the framing and an arch-bar having its ends attached to the side bars of the framing, and supporting the forward end of the platform of the machine at its arch, substantially as described.

5. The combination of the main driving-wheels and their axle, the spherical support upon the axle, said support being provided with a pin projecting from its surface, a casting, *b*, having flaring bores and oblong recesses and mounted upon said spherical support, and the cutter and driving-gear frames supported by said casting, all arranged and adapted to operate as described.

6. In a mowing-machine, the combination of the main driving-wheels and their axle, a ball mounted upon the axle and provided with a pin projecting from its surface, the casting *b*, loosely mounted upon the ball, said casting being provided with oblong recesses *t'*, and encircled by a main gear-wheel, B, and having the cutter and gear frames mounted thereon, all arranged and adapted to operate substantially as described.

7. The combination of the main gear B, the pinion 1, mounted on transverse shaft 20, bevel-gears 2, also mounted on said shaft, bevel-pinions 3, mounted on longitudinal shafts 6 and meshing with the bevel-gears, and cranks 4, mounted on the forward ends of shafts 6, substantially as set forth.

8. In combination with the axle A, the roller I^7 on the shaft, the cam I^6, formed on or secured to the shaft I^5, and the operating-lever I, substantially as and for the purpose set forth.

9. In a mowing-machine, the combination of the tongue T, the toothed casting P^2, the pinion P, having flanges and opposite recesses *r* in said flanges, the shaft P′, pins *p*, and an operating-lever, substantially as described.

10. In a mower, the combination of the supporting-wheels, the axle, the main gear-wheel mounted loosely thereon, so as to rotate therewith and rock laterally thereon, and the gear and cutter carrying frames mounted upon said wheel, substantially as described.

11. A mower wherein the cutter-bar is rigidly connected at both ends to the thrust-frame, said thrust-frame being rigidly attached to the gear-carrying frame and the latter being mounted on the main gear-wheel, and said gear-wheel mounted loosely on the main axle of the machine, so as to rotate therewith and have a lateral motion thereon, whereby the cutter-bar may conform to the undulations of the ground independent of the supporting wheels and axle, substantially as described.

In testimony whereof I affix my siguature in presence of two witnesses.

JOSEPH DAIN, JR.

Witnesses:
J. W. NORTON,
JO S. DENNY.