

No. 670,197.

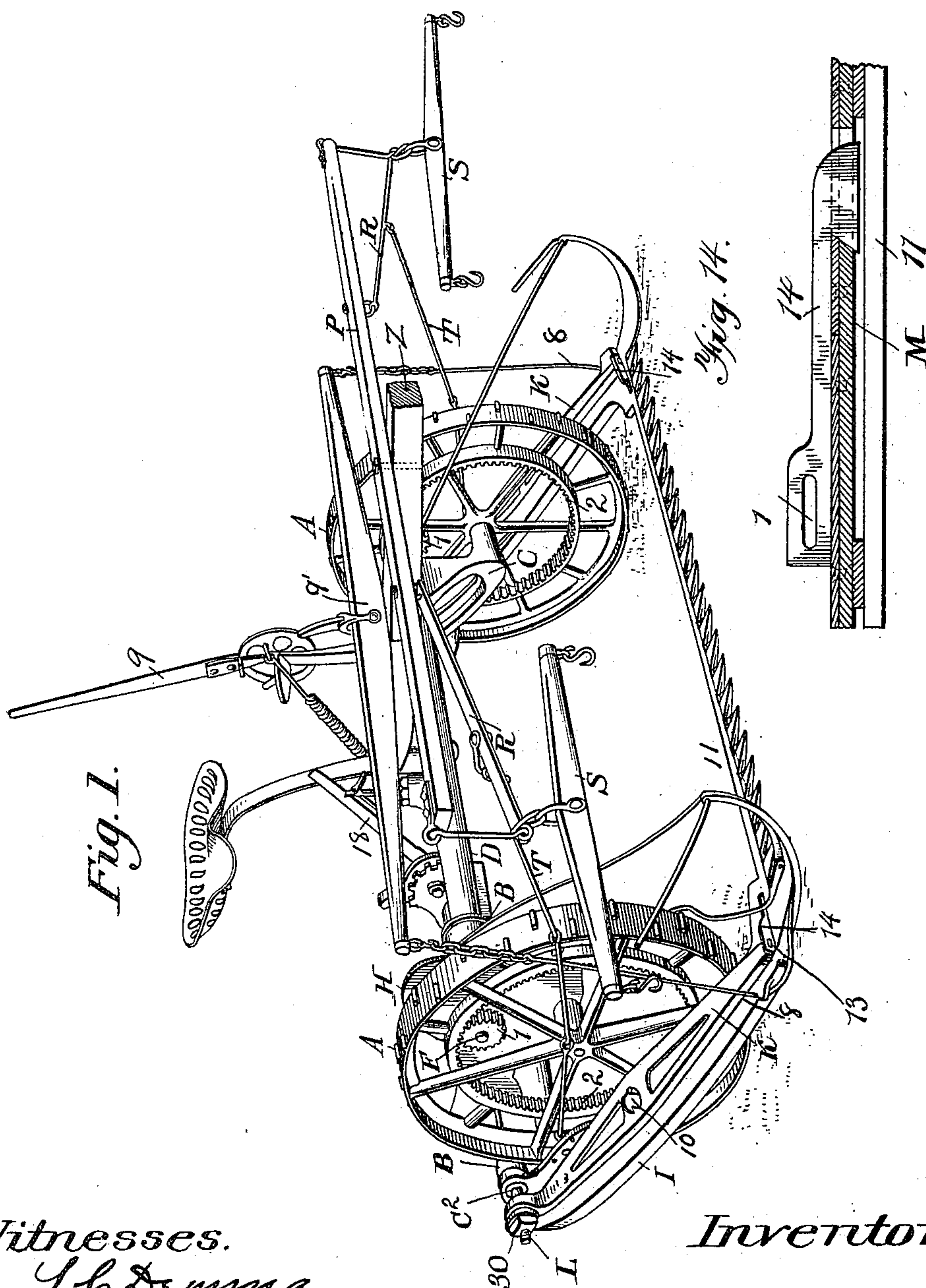
Patented Mar. 19, 1901.

H. M. DEMING.
MOWING MACHINE.

(Application filed Dec. 24, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.

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Reed H. Deming

Inventor.

Henry M. Deming

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3 Sheets—Sheet 2.

Fig. 2.

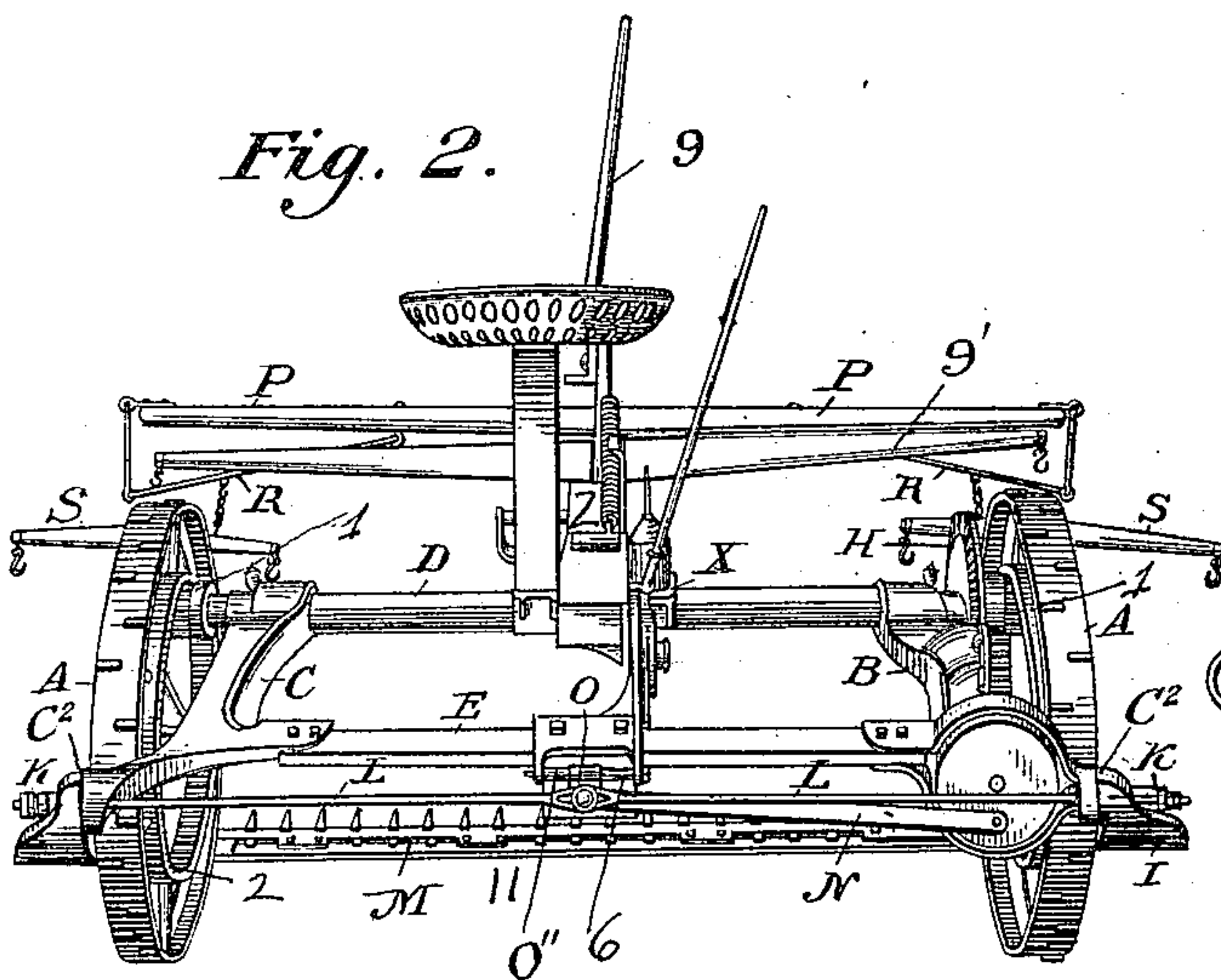


Fig. 9.



Fig. 5.

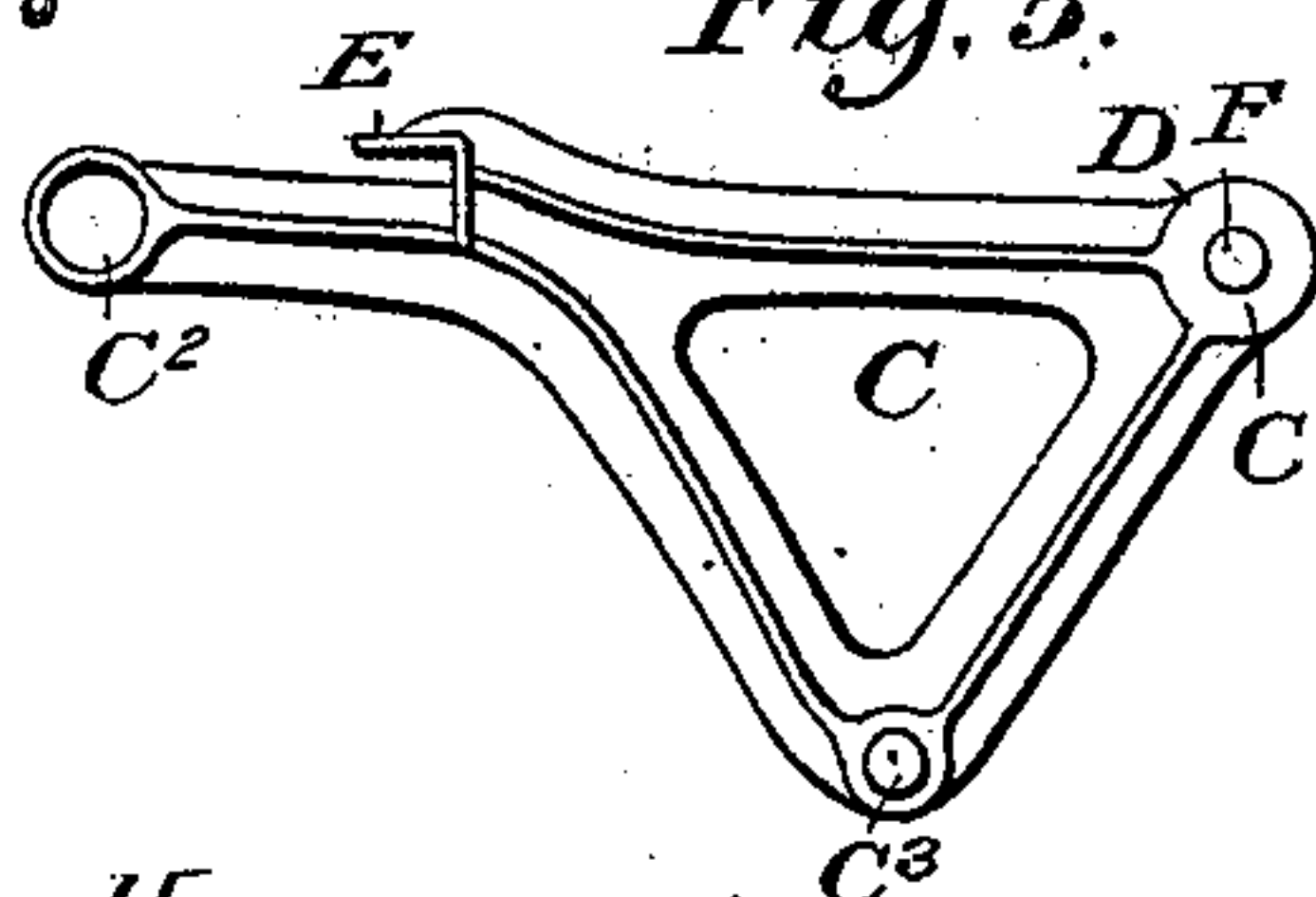


Fig. 3.

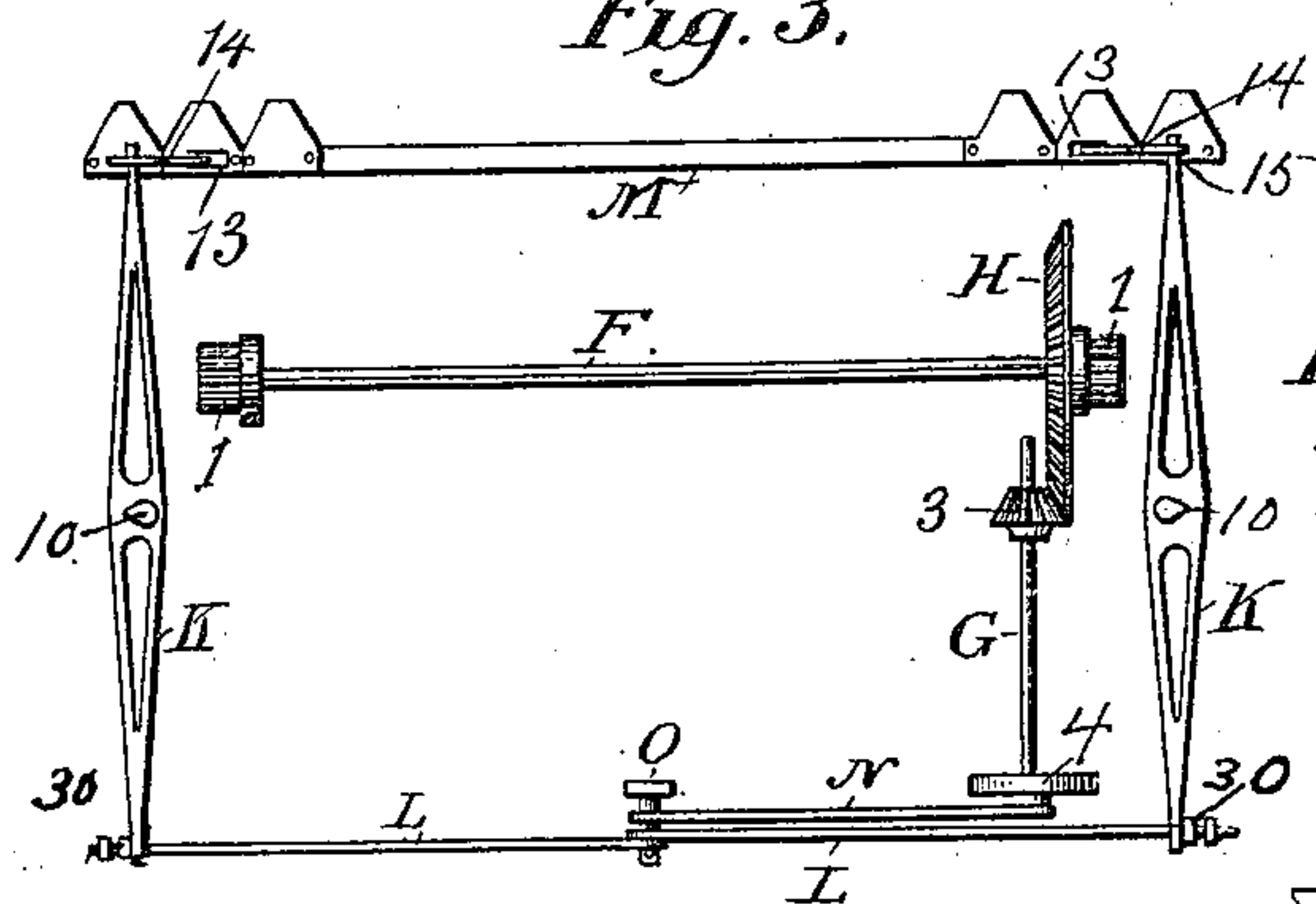


Fig. 6.

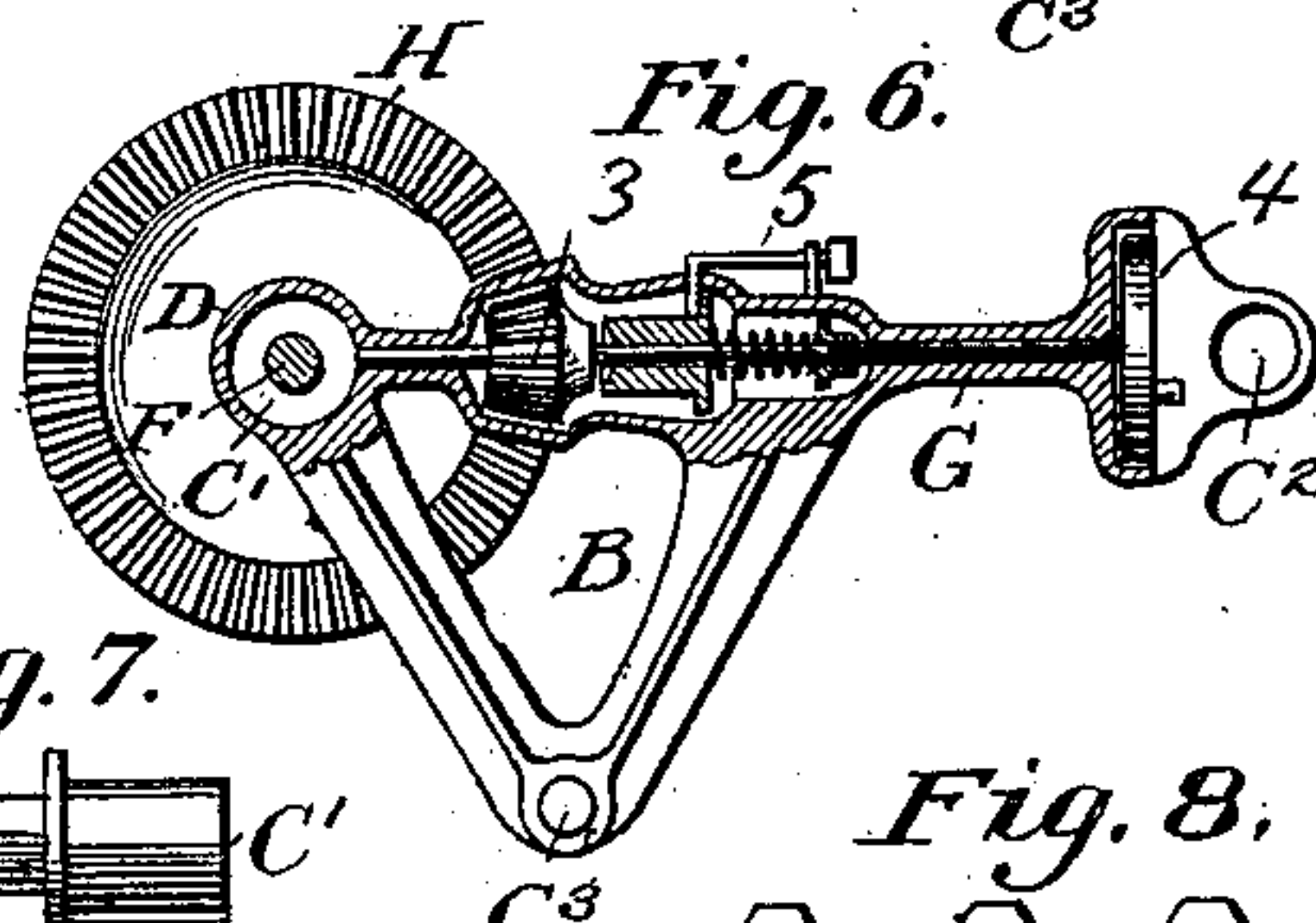


Fig. 7.

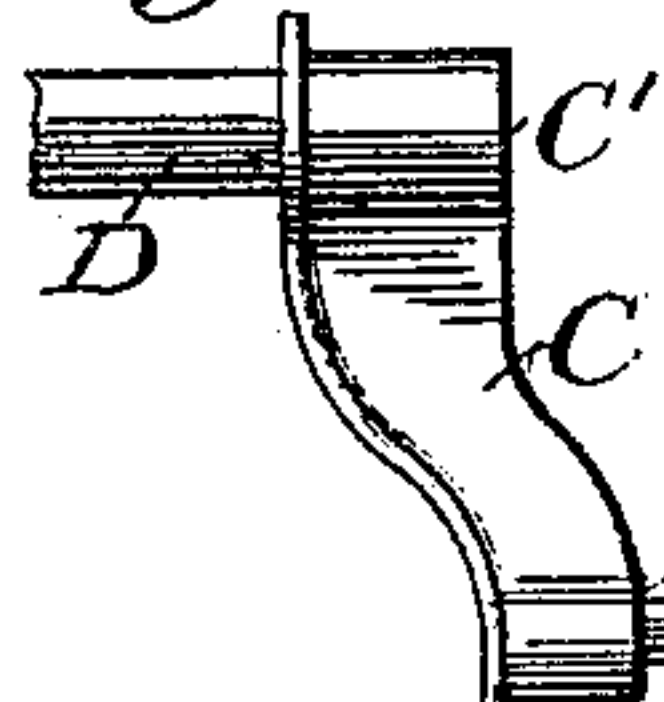


Fig. 8.



Fig. 10.

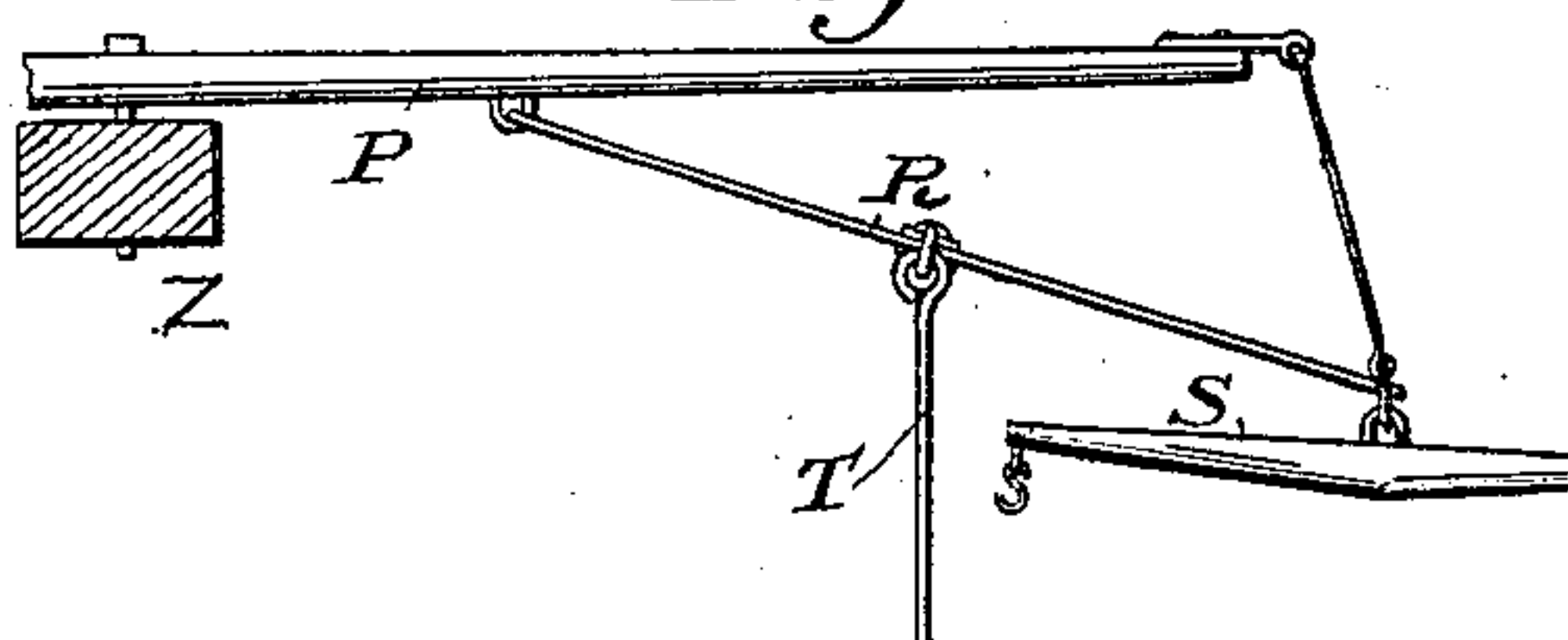


Fig. 4.

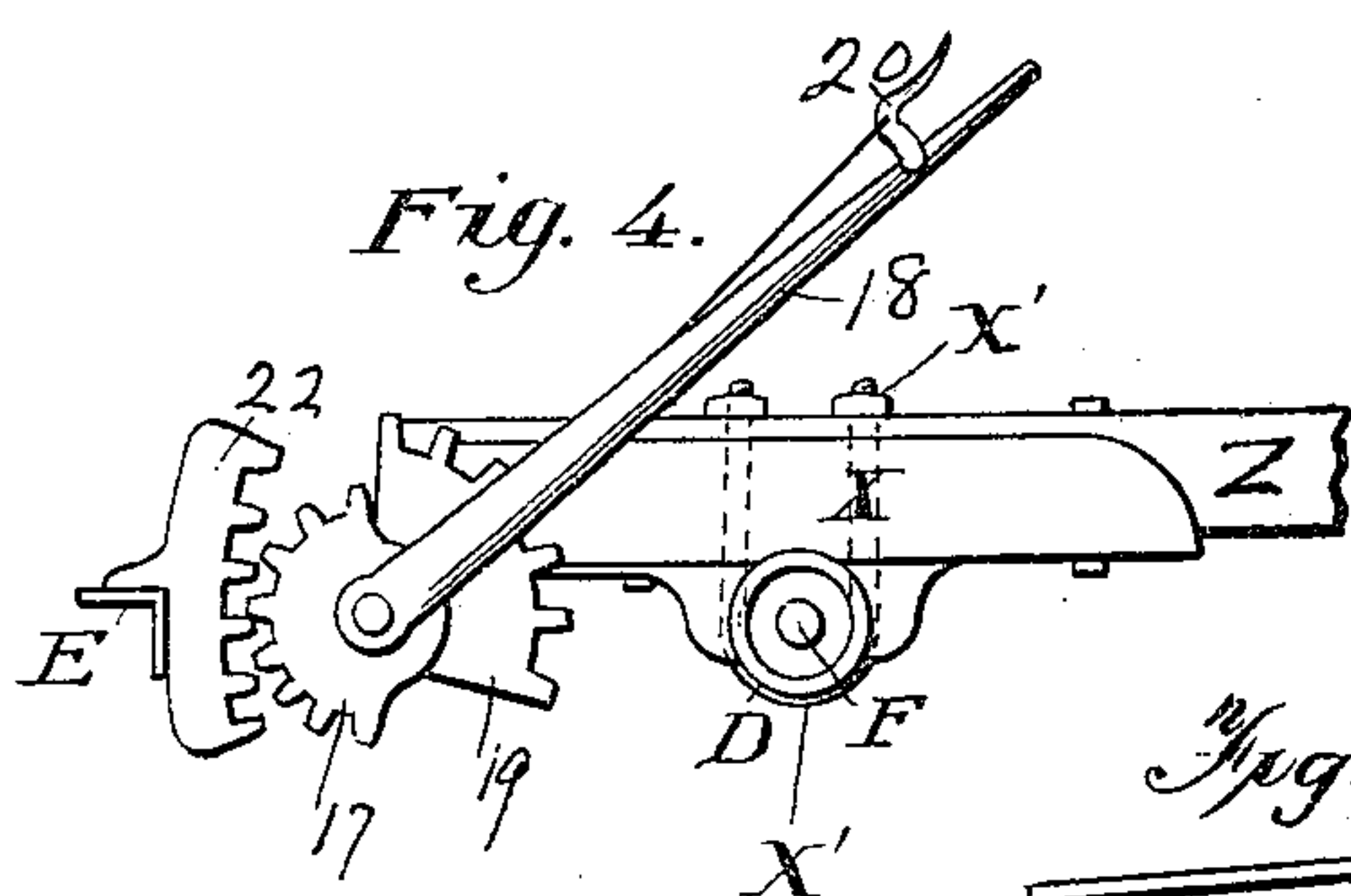
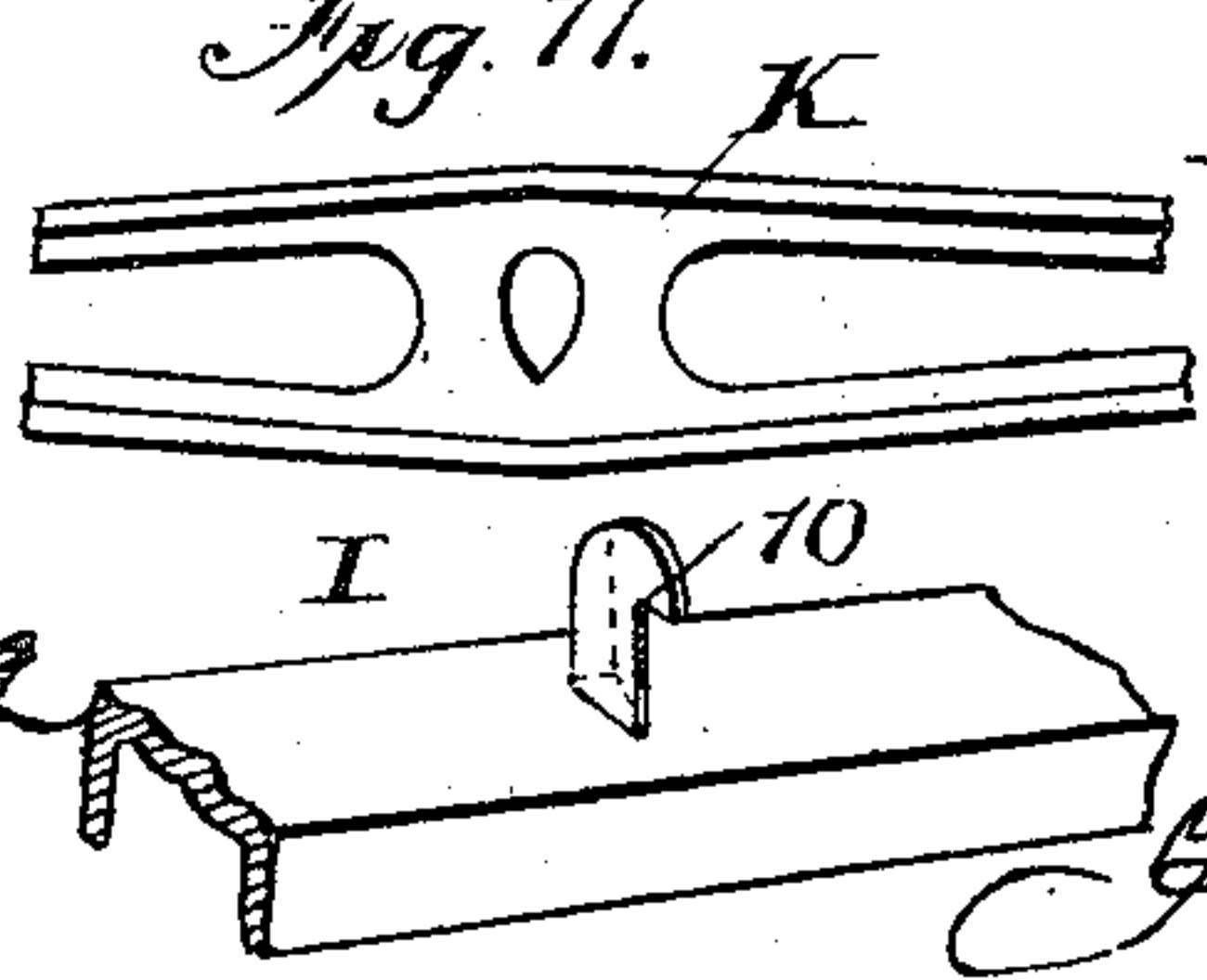


Fig. 11.



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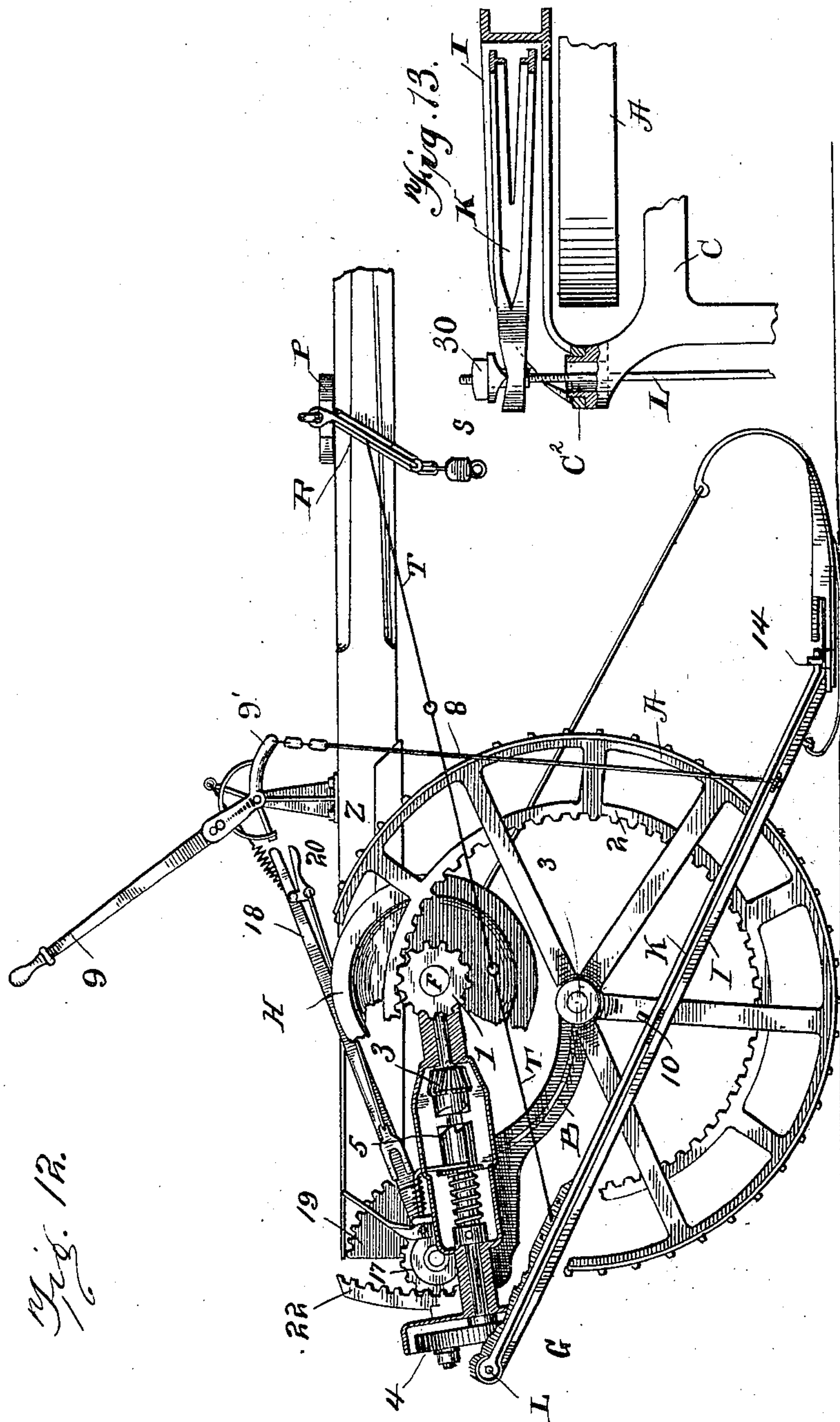
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3 Sheets—Sheet 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY M. DEMING, OF ROOTSTOWN, OHIO.

MOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 670,197, dated March 19, 1901.

Application filed December 24, 1897. Serial No. 663,381. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. DEMING, a citizen of the United States, residing at Rootstown, in the county of Portage and State of Ohio, have invented a new and useful Mowing-Machine, of which the following is a specification.

In the accompanying drawings, Figure 1 is a front perspective view of the mower, the tongue being partially broken away. Fig. 2 is a rear perspective view of the mower. Fig. 3 is a detail plan view, in the nature of a diagrammatical view, illustrating the movable parts conveying motion from the drive-wheels to the knife-bar. Fig. 4 is a detail side elevation of the rear portion of the tongue, showing the front and rear frame-bars and the adjusting mechanism between the rear of the tongue and the rear frame-bar. Fig. 5 is an elevation of one of the frame ends looking at the inner side thereof. Fig. 6 is a sectional elevation of the frame end, the drive-shaft, crank-shaft, and connecting-gearing being shown. Fig. 7 is an edge view of the frame end shown in Fig. 5. Fig. 8 is a detail top plan of a portion of the knife-bar. Fig. 9 is a detail side elevation of one of the connecting-hooks between the knife-bars and sway-bars. Fig. 10 is a detail front elevation of part of the draft connections, the tongue being shown in section. Fig. 11 is a detail perspective showing parts of a thrust-bar and sway-bar, the parts being separated to illustrate the fulcrum. Fig. 12 is a side elevation of the mower, parts being broken away. Fig. 13 is a detail sectional top plan showing the hinged connection between a frame end and a thrust-bar, the frame-end boss and the eye or opening of the thrust-bar which fits thereon being shown in section. Fig. 14 is a detail longitudinal sectional view through an end of the knife-bar, showing the hook thereon in elevation.

In a thrust-cut mower it is desirable to have the main frame and gearing mechanism located sufficiently above the ground to give plenty of clear space under them, so that the mown grass may remain as nearly as may be in the upright position in which it grew to facilitate curing. This has heretofore been attained by the use of drive-wheels of large diameter. I attain this result by dispensing

with the intermediate portion of the shaft or axle as heretofore used and placing my wheels on axle-stubs firmly attached to the main-frame castings B and C. I take motion from the drive-wheels by means of a gear cast therewith or attached thereto and engaging pinions placed upon the ends of the transverse shaft F and driving it forward by the use of suitable ratchets. Motion is communicated to the knife by means of the bevel-gear H, the crank-shaft G, the tension-rods L L, and the sway-bars K K, Fig. 3.

D is a tube which rigidly connects B and C, forming a part of the main frame and in which the shaft F is placed. B and C are also connected at the rear by the bar E, the whole forming the frame of the mower so elevated above the axis of the drive-wheels that an ordinary or moderate-sized drive-wheel can be used and still have sufficient clear space under it, so that it will not pack down the mown grass.

I attach my finger-bar to the main frame of the mower by means of two thrust-bars I I, Figs. 1 and 2. These thrust-bars are alike right and left, one being attached to each end of the finger-bar and being hinged to the rear corners of the main frame, so as to permit the finger-bar to rise and fall at C², Figs. 1, 2, 5, and 6. Upon these thrust-bars pivots are placed, upon which the sway-bars K K vibrate, Figs. 1, 2, 3, and 11. These sway-bars are connected to the tension-rods L L at their rear ends and to the knife at their front and communicate the reciprocal motion of the driving-pitman to the knife. For the purpose of keeping these tension-rods in their proper position with the varying positions of the cutter-bar I have made the thrust-bar hinges with open centers or hollow trunnions through which the tension-rods pass, the hinges and tension-rods being concentric, or nearly so. One form of this hinge is shown in the drawings, Figs. 1, 2, 5, and 6, C² being a view of the hollow trunnion upon which the thrust-bar I is placed and through which the tension-rod passes. These hinges may be of any form having their centers open for the passage of the tension-rods. In other words, the upper rear ends or corners of the frame ends B C are provided with outwardly-projecting cylindrical bosses or trunnions, and the up-

per ends of the thrust-bars are provided with horizontaleyes or bearing-openings, receiving said bosses, respectively, and turning thereon. The tension-rods pass freely through
 5 said bosses, respectively, concentric with the center or axis on which the thrust-bars swing or rock vertically. The upper ends of the sway-bars are located outwardly beyond said hinges, and the tension-rods pass freely
 10 through the upper ends of their respective sway-bars and at their outer ends, at the outer sides of the sway-bar ends, are provided with suitable adjustable stops, such as nuts. By this means the tension-rods can be tightened
 15 to the desired extent, and thereby keep the knife-bar and the sway-bars under tension and the thrust-bars on said bosses against lateral displacement.

For the purpose of making a better connection with the driving-pitman I have improved my tension-rod in this wise: I make it in two parts, each part being attached to the pitman and receiving impulse therefrom, one part extending each way and being similarly
 25 attached to its respective sway-bar. By this two-part construction of the tension-rod I am enabled to make my pitman of the proper length and to prevent the vertical jar or vibration of the pitman from being communicated to the sway-bars K K. The tension
 30 also takes up any slack or looseness at the connection of the pitman and tension-rods.

In Fig. 3, N represents the driving-pitman, L L the tension-rods, and O the guide, provided to keep the pitman in position at its connection with the tension-rods. This guide can be of any convenient form. Each tension-rod passes through the axis of the hinge to the thrust-bar and communicates the reciprocal motion of the pitman to the sway-bar,
 40 to which it is attached by alternately drawing it in its direction. The whole gear is placed under firm tension by the adjusting-nuts with which the extremities of the tension-rods are provided or in any other convenient way. The necessary motion is thus communicated to the knife by drawing it in each direction. This arrangement effectually eliminates lost motion, shock, and jar caused
 50 by the method heretofore used of alternately pushing and pulling the knife back and forth.

The guide O, as shown, although my invention is not so limited, comprises a horizontally-reciprocating slide confined to reciprocate on
 55 a suitable guideway arranged transversely of and rigid with the framework of the machine. For instance, I show a bracket rigid with and depending from an intermediate portion of the rear frame bar or cross connection E and
 60 carrying the rigid slide or guide-bar O'', on which the slide O reciprocates back and forth with the pitman and tension-rods. The pitman N is loosely connected to the tension-rods L L, and said parts are loosely confined
 65 to said slide to guide the same in their movements and prevent the transmission of the side motion of the pitman to the tension-rods

and preventing vibration and trembling thereof. Usually the end of the pitman is formed or provided with opposite laterally-projecting
 70 trunnions or bosses rigid therewith, one of which is loosely confined in the depending portion of the slide, the tension-rod ends being loosely confined on the opposite trunnion. Suitable means can be provided to confine
 75 the tension-rod ends and the slide on the trunnions—such, for instance, as a cross-bolt passing through said trunnions longitudinally and provided with ends, heads, or washers at the outer ends of the trunnions. However,
 80 my invention is not so limited, and it is not necessary that the tension-rods be of the same length or that a slide be employed in all cases.

I have invented an improved method of attaching the sway-bars to the knife. It is desirable to have the power applied to the knife as near as possible in line with the knife-bar. This obviates much friction and loss of power. It is also desirable to have the knife free from
 90 attachments at its ends to facilitate boxing, removing from guards, grinding, and repairing. To accomplish these ends I have provided the knife with a mortise near each end, into which I place the actuating-hooks with which the
 95 front ends of the sway-bars are provided. Fig. 8 shows one end of the knife with the mortise, and Fig. 9 shows the hook with which the sway-bar is connected to the knife. This mortise may be of any shape, the essential
 100 thing being a hole in the knife to connect it with the power operating it by a hook or similar device. The mortise or slot 13 is formed longitudinally in the knife-bar near its end (each end of the knife-bar is formed with such a mortise) and preferably, although not necessarily,
 105 extends down through a knife of such bar and also through the longitudinal backing or bar to which the knives are secured. The bar is usually undercut or beveled downwardly
 110 and outwardly at the outer ends of said mortises or slots. The attaching links, loops, blocks, or hooks rest longitudinally on the upper face of the knife-bar along their under longitudinal edges. Each such hook at or near
 115 its inner end has a tenon or hook 14 depending from its under edge and of a size to fit and enter said mortise. The greatest length of said tenon is approximately the same as the length of the mortise 13, so that the tenon
 120 can enter the mortise with the under edge of the elongated shank or body of the hook resting on the top face of the knife-bar and extending toward the adjacent end of the knife-bar. The outer end of the tenon is beveled
 125 inwardly and upwardly or undercut or otherwise formed to constitute a hook and catch under the knife-bar at the outer end of the mortise. When inserting the hook, said tenon is dropped into the mortise, and the hook is
 130 then moved longitudinally toward the adjacent end of the knife-bar, which causes the end of the tenon to project under the knife-bar beyond the slot, and thereby lock the

hook. The outer ends of the hooks have the transverse eyes or openings 15, into which the lower ends of the sway-bars project and through the medium of which said sway-bars alternately pull the knife-bar longitudinally. The tension-rods at the rear are so adjusted as to keep the sway-bars under tension, tending to draw their rear ends toward each other and their front ends away from each other, and consequently the tenons of the hooks are maintained in their locked positions at the outer ends of the mortises. The hooks can be easily removed when desired by adjusting the tension-rods to relieve the sway-bars of tension, so that the hooks can be moved inwardly longitudinally of the knife-bar. Material practical advantages are attained by the means thus described for coupling the sway-bars to the knife-bar; but my invention is not limited to the exact specific construction illustrated.

In carrying out my invention any suitable or desirable form or construction of finger-bar can be employed on which the knife-bar reciprocates and to which it is confined by any suitable or ordinary means.

The crank-shaft G is usually arranged at one end of the main frame. For instance, I show the frame end B formed with bearings or journal-boxes and a casing receiving said crank-shaft and parts thereon, said shaft being provided with a bevel-pinion 3, meshing with bevel-gear H, rigid on the main drive-shaft F. The rear end of said crank-shaft is shown provided with the balance crank-disk 4, carrying the crank-pin for the pitman N. If desired, the bevel-pinion 3 can be loose on the crank-shaft and a clutch mechanism 5 provided to throw the pinion into and out of gear with said shaft. This clutch is shown provided with an operating-handle, whereby the operator can throw the cutting mechanism into and out of gear with its driving parts when desired. As this clutch forms no part of my invention, I do not herein specifically describe the same.

The transverse or main drive-shaft F, arranged at the forward portion of the main frame, has the end pinions 1 1 meshing with the gearing 2 2 of the ground-wheels A A of the machine. Although I show said main drive-shaft mounted in the end pieces of the frame and passing longitudinally through the tube D, yet my invention is not limited to such specific arrangement nor to the employment of the tube D, as the end pieces can be otherwise secured together at their front portions or ends and end pieces can be provided otherwise than shown or the frame can be otherwise constructed or arched to elevate the same above the axis on which the wheels rotate or to dispense with the axle usually employed heretofore.

For the purpose of getting sufficient clear space under the main frame to not interfere with the mown grass and also to properly balance the same upon the drive-wheels I

have made the bearings C' C² C³, so as to form an acute-angled triangle. At C' is placed the connecting-tube D covering the transverse shaft F. At C² the trunions are placed, upon which the thrust-bars I I are hinged and through which the tension-rod L works. At C³ the axle-stub for the drive-wheel is placed.

I have made an improved pivot for the sway-bar K. Upon the thrust-bar I, I have placed a V-shaped pivot-stud with the V-point outward. In the sway-bar K, I have placed an opening V-shaped, but wider than the pivot-stud, in which the stud is placed, coming in contact with the sway-bar only at the V-point, upon which it can rock. I have illustrated this improvement in Fig. 11. This arrangement may be entirely reversed by placing the V-point upon the sway-bar and the seat in which it rocks upon the thrust-bar.

It should be observed that the tension on the sway-bars maintained by the tension-rods, as hereinbefore mentioned, keeps the knife-edges of the pivots or fulcrums against the corresponding coacting V-bearing surfaces of the opposite coacting member at the fulcrums or bearing-points of the sway-bars on the thrust-bar and prevents lateral play or knocking of the sway-bars at their fulcrum-points.

In a thrust-cut mower the doubletree must be sufficiently high to pass over the standing grass. The labor of cutting has a tendency to increase the pressure of the cutter-bar upon the ground. This, combined with the high line of draft, tends to roll the weight of the machine forward onto the tongue and onto the cutter-bar and lift up the rear part of the mower. "Kicking up" it is usually called. To obviate this difficulty, I have invented the drawing mechanism illustrated in Figs. 1 and 10. P is the doubletree, attached to the tongue in the usual manner by a pin through its center, upon which it can freely turn. It is of sufficient length to place the horses just outside of the swath to be mowed. R R are draw-bars hinged to the under side of the doubletree at their inner ends, their outer ends being suspended, by a rod or otherwise, sufficiently below the ends of the doubletree to bring the singletree S, which is attached thereto, in a proper position for ease of draft. T T are draw-chains attached to the draw-bars R R in an intermediate position, which is at or very near in line with the edge of the swath which is cut and connecting them each with its respective thrust-bar I, the fastening being adjusted thereto, so as to give the amount of lift required to make the cutter-bar ride lightly over the ground.

For the purpose of tilting the cutter-bar, so as to raise or lower the points of the guards, I have attached the tongue to the mower by the casting X, Fig. 4. This casting turns to a limited extent upon the connecting-pipe D and has an adjustable attachment to the rear main-frame-connecting bar E, so that by

means of a lever or otherwise the rear part of the main frame can be raised or lowered, and, acting in connection with the hinged thrust-bars, tilts the cutter-bar to any required position. Fig. 4 is a side view of the casting X and the rear of the tongue, giving end views of D, E, and F.

As just mentioned, it will be understood that the tongue Z is arranged centrally of the machine and is loosely coupled to a forward portion of the main frame, such as tube D, by any suitable means, such as clip X', so that the tongue and frame can rock or swing on each other at such point of connection or bearing. Usually the tongue is provided with a recessed bearing-block or saddle X, as described, at this joint or connection, receiving and resting on the tube or frame-bar D. Any suitable mechanism is provided to tilt or swing the main frame with respect to said tongue or to otherwise shift the relative positions of the main frame and tongue for the purpose of varying the tilt or angle of the finger-bar or cutting apparatus. As an example of means which might be employed for this purpose I show the rear portion of the main frame—for instance, rear cross-bar E thereof—provided with a rigid vertical toothed segment or rack 22, while a rocking toothed wheel or sector 17 is suitably mounted on or carried by the rear end or portion of the tongue and meshes with said vertical rack rigid with the rear of the main frame. Thus by rocking said sector the relative vertical positions of the tongue and main frame are shifted, preferably by raising and lowering the rear end of the main frame. Suitable actuating and locking mechanisms can be provided, whereby the sector is actuated and whereby the main frame is locked at the desired position or angle with respect to the tongue. For instance, I show the sector rigid with a hand-lever 18, provided with a pawl or dog arranged to engage the teeth of a toothed segment 19, rigid with the tongue. The lever is preferably provided with a hand-clip for actuating the dog and suitable spring mechanism for holding the dog to the locking ratchet-segment 19.

Any suitable lifting mechanism can be provided, if desirable, to elevate the cutting mechanism of the machine. For instance, I show a lifting-bar 9', arranged transversely above the tongue, at its ends loosely coupled to the thrust-bars, respectively, by any suitable connections. 9 is a lifting-lever mounted on the tongue and connected to elevate said lifting-bar when it is desired to elevate the cutting mechanism. However, my invention is not limited to the employment of such lifting mechanism.

I have described the constructions illustrated with exactness and specifically in detail; but my invention is not limited to the various features so described nor are all the features of my invention limited to employment in the machine illustrated, and it is evi-

dent that various changes might be made in the forms, constructions, and arrangements of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the constructions as shown or exactly described.

Having thus described my invention, I now set forth the following claims, which I wish to secure by Letters Patent:

1. In a thrust-cut mowing-machine, the combination of a wheeled main frame provided with the driving-gearing, thrust-bars, hinged connections between the rear ends of the thrust-bars and the rear corners of the main frame, said connections being eccentric to the axle, a guard-bar secured to the front ends of the thrust-bars, the reciprocating knife-bar, sway-bars fulcrumed to the thrust-bars and connected to operate the knife-bar, actuating connections between the driving-gearing carried by the frame and said sway-bars, said actuating connections arranged concentrically with said hinged connections between the thrust-bars and the main frame, and mechanism for vertically tilting the main frame of the axle and thereby rocking the guard-bar on its ground-bearing without bodily varying the vertical position of said bar, to vary the tilt of the guard-fingers, substantially as described.

2. In a thrust-cut mowing-machine, the combination, of the vertically-disposed end frames having depending portions, the ground-wheels mounted on said depending portions, rigid cross connections between the front and rear ends of said frame ends, said cross connections being located a distance above the horizontal plane of the axis of the ground-wheels, whereby a clearance-space is provided beneath the main frame for the cut grass, thrust-bars having hinged connection with said main frame eccentric to the axial line of the ground-wheels, the knife-bar and guard-bar carried by the thrust-bars, sway-bars coupled to actuate the knife-bar, driving-gearing carried by the main frame, actuating connections from the driving-gearing to said sway-bars arranged concentrically with the hinged connections between the thrust-bars and main frame, and draft attachments to the thrust-bars, substantially as described.

3. In a thrust-cut mower, the combination of vertically-arranged frame end pieces, ground-wheels mounted at the lower portions of said end pieces, said end pieces connected in front and in rear of the vertical plane of the axial line of said wheels and above the horizontal plane of said axial line to form the main frame of the machine with a clearance-space beneath, cutting apparatus having supports loosely joined with the rear of the main frame, and actuating mechanism from said ground-wheels for said cutting apparatus, substantially as described.

4. In a thrust-cut mowing-machine, the combination of a main frame comprising verti-

cally-disposed end pieces having intermediate depending portions and rigid cross-bars connecting the front and rear portions of said end pieces, ground-wheels mounted on said depending portions, said cross-bars arranged above the horizontal plane of, and in front of and behind, respectively, the vertical plane of the axial line of said wheels, whereby said frame is approximately balanced on said wheels and a clearance-space is provided beneath said frame for the cut grass, a draft-tongue, a hinged connection between said tongue and one cross-bar, adjusting mechanism between said tongue and an opposite cross-bar, a thrust-cutting mechanism having hinged connection with said frame eccentric to the axial line of said wheels, whereby the vertical movement of said frame controls the pitch of the guard-fingers, and actuating devices for the cutting mechanism, substantially as described.

5. In a thrust-cut mower, the combination of vertically-arranged triangular-shaped frame ends, ground-wheels mounted at the lower intermediate portions of said frame ends, cross connections between the upper portions of said frame ends, a cross-shaft arranged transversely of the frame ends and driven from said ground-wheels, a cutting apparatus having thrust-bars pivotally joined at the upper rear ends of said frame ends, and actuating connections between said shaft and said cutting apparatus, substantially as described.

6. In a thrust-cut mower, the combination of the vertically-disposed frame ends, cross connections rigidly secured to their upper front and rear ends, ground-wheels mounted at their lower intermediate portions, whereby an elevated frame with a clearance-space for the grass is formed, the front cutting apparatus, thrust-bars therefor pivotally joined to the rear upper ends of said frame ends, and actuating mechanism for said cutting apparatus, substantially as described.

7. In combination, the triangular-shaped frame ends, provided with outwardly-projecting axle-stubs at their lower intermediate corners, ground-wheels mounted on said stubs, a rigid cross-bar connecting the rear upper corners of said frame ends, the rigid tube connecting the front upper corners of said frame ends, a drive-shaft passing through said tube and geared to and driven from the ground-wheels, a crank-shaft mounted on one of said frame ends and geared to said drive-shaft, thrust-bars at their upper ends hinged to the frame ends at their rear upper corners, cutting apparatus carried by said thrust-bars, and actuating connections from said crank-shaft to said cutting apparatus, substantially as described.

8. The combination of the main frame comprising front and rear rigid cross connections and depending frame ends, front cutting apparatus loosely connected to the frame ends, ground-wheels mounted at the lower interme-

mediate portions of said frame ends so that the frame approximately balances on the wheels and is afforded a central clearance-space in rear of the cutting apparatus, a tongue arranged transversely of said cross connections and pivotally joined thereto to permit vertical shifting of the relative positions of the frame and tongue, and operating and locking mechanisms, substantially as described.

9. In a thrust-cut mowing-machine, the combination, of the main frame provided with the driving and supporting wheels, driving-gearing carried by said main frame, forwardly-extending thrust-bars, the guard-bars secured thereto and carried thereby, the reciprocating knife-bar, hinged connections between the thrust-bars and said main frame arranged eccentrically to the axial line of said drive-wheels, sway-bars fulcrumed on the thrust-bars and connected to reciprocate the knife-bar, reciprocating actuating devices between the driving means and the rear ends of the sway-bars arranged concentrically to said hinged connections between the thrust-bars and main frame, means for tilting the main frame and thereby rocking the guard-bar on its bearing without bodily elevating the same to vary the tilt of the guard-fingers, and mechanism for raising the thrust-bars independently of the main frame to lift the cutting apparatus from the ground, substantially as described.

10. In a thrust-cut mower, the combination of drive-wheels, a main frame to which said wheels are mounted, said frame arched or elevated between said wheels and above the center line or axis thereof, a tongue arranged transversely of said frame and hinged thereto and provided with means for holding the frame at the desired angle with respect thereto, cutting apparatus in front of and having hinged connection with said frame, and actuating means therefor, and means for elevating the cutting apparatus, whereby a clearance-space under the main frame is provided in rear of the cutting apparatus, and the cutting apparatus can be deflected up or down at its front edge by said adjustment between the frame and tongue, substantially as described.

11. A thrust-cut mowing-machine consisting essentially in the combination of a main frame provided with ground-wheels and with front and rear portions in advance of and behind the vertical plane including the axial line of said wheels, the cutting apparatus comprising thrust-bars hinged to the rear portion of the main frame, actuating mechanism for the cutting apparatus, the draft-tongue arranged transversely of the main frame, a hinged connection between said tongue and said front portion of the main frame, lifting and depressing mechanism provided with locking means between the rear of the tongue and said rear portion of the main frame, whereby the rear of the main frame to which said thrust-bars are hinged can be shifted

vertically and locked at the desired adjustment, thereby determining the pitch of the guard-fingers of the thrust-cutting mechanism, substantially as described.

- 5 12. In a thrust-cut mower, the combination of a main frame mounted on ground-wheels, thrust-bars at their rear ends loosely connected to the opposite rear portions of the main frame, a finger-bar at its end portions
10 secured to the front ends of said thrust-bars, a cutter-bar, actuating mechanism therefor, a draft-tongue arranged transversely of the main frame and hinged to one portion thereof, and vertically adjusting and locking means
15 between the opposite portion of the frame and said tongue, whereby the main frame can be tilted and locked in the desired position to vary the pitch of the fingers of said finger-bar, substantially as described.
- 20 13. The combination of a main frame comprising end pieces, driving-wheels mounted at the lower intermediate portions thereof, front and rear rigid cross-bars between the front and rear upper portions of said end
25 pieces, the front cutting apparatus having thrust-bars pivotally joined to the rear portions of said end pieces so that tilting the main frame vertically varies the pitch of the cutting apparatus guard-fingers, a tongue arranged transversely above said cross-bars and
30 loosely confined on the front cross-bar, and adjustable connections between the rear of the tongue and rear cross-bar, substantially as described.
- 35 14. In a thrust-cut mower, the combination of a wheeled frame having laterally-extending cylindrical bosses at its opposite rear ends, thrust-bars having cylindrical openings at
40 their rear ends receiving and swinging on said bosses in vertical planes, a finger-bar secured to the front ends of the thrust-bars, a knife-bar, sway-bars connected thereto and mounted on the thrust-bars, and actuating
45 mechanism for the sway-bars passing freely through said bosses, substantially as described.
- 50 15. The main frame comprising end pieces having rigid cross connections, drive-wheels, the rear upper corners of said end pieces formed with outwardly-projecting cylindrical
55 bosses, the thrust-bars at their upper rear ends mounted and swinging on said bosses, the cutting apparatus comprising means connecting the front ends of said thrust-bars, sway-bars actuating the cutting apparatus
60 and mounted on said thrust-bars, and actuating mechanism for said sway-bars comprising rods or links passing freely through said bosses, substantially as described.
- 65 16. In combination, a wheeled main frame, thrust-bars hinged to the main frame and carrying the cutting apparatus, sway-bars actuating the cutting apparatus, and driving means for the sway-bars comprising rods or
connections passing freely and concentrically through the hinged joints of the thrust-bars

with the main frame, substantially as described.

17. In combination, a wheeled main frame having rear lateral journal-bosses, thrust-bars
70 having horizontal openings receiving said bosses so that the thrust-bars swing vertically on the bosses, the cutting apparatus carried by the thrust-bars, sway-bars operating the cutting apparatus and mounted on the
75 thrust-bars, tension-rods operating the sway-bars and passing concentrically through and beyond said bosses, and driving mechanism reciprocating said tension-rods, substantially
80 as described.

18. In a thrust-cut mower, the combination of a main frame having ground-wheels, thrust-bars, a cutting mechanism, sway-bars actuating the cutting mechanism, connections between the rear ends of and passing loosely
85 through said sway-bars and provided with adjustable stops exerting tension on the sway-bars to draw their rear ends toward each other and their front ends apart, and actuating mechanism for said connections comprising
90 means loosely joining said connections at a point between the rear ends of said sway-bars, substantially as described.

19. In a thrust-cut mower, the combination of a main wheeled frame, thrust-bars having
95 hinged connections with said frame, cutting mechanism carried by the thrust-bars, sway-bars actuating said cutting mechanism, and actuating means for the sway-bars comprising connection devices passing concentrically
100 through said hinged connections, substantially as described.

20. In a thrust-cut mower, the combination of a main frame, a cutting apparatus carried
105 by the frame, sway-bars actuating said cutting apparatus, the jointed tension-rods between the sway-bars, and actuating means applied to and connecting said tension-rods at said joint and comprising a reciprocating
110 device, substantially as described.

21. In a thrust-cut mower, the combination of a wheeled main frame, thrust-bars hinged
115 thereto, a guard-bar secured to the front ends of said thrust-bars, a cutter-bar, sway-bars fulcrumed to the thrust-bars and actuating the cutter-bar, a guideway, a slide, means for reciprocating the slide, tension-rods from the sway-bars, and means connecting said
120 tension-rods with said slide, substantially as described.

22. In combination, a wheeled frame, thrust-bars, cutting apparatus, sway-bars, a
125 guideway carried by the frame, a slide confined thereto, a pitman for reciprocating the slide, crank means for actuating the pitman, tension-rods passing through the sway-bars and provided with adjustable stops at the outer sides thereof, means connecting the inner ends of said rods to said slide and pitman, substantially as described.

23. In combination, a wheeled frame, cutting apparatus carried thereby, the sway-

bars, the two tension-rods passing freely through the sway-bars, respectively, and provided with adjustable stops at the outersides thereof, actuating means for reciprocating
 5 said rods, and means pivotally connecting the inner ends of said rods with said actuating means, substantially as described.

24. In combination, in a thrust-cut mowing-machine, a main frame tilting on the axle
 10 comprising end pieces and rigid cross connecting-bars, one of said cross-bars being a tube, ground driving-wheels, a drive-shaft geared to said wheels and passing through said tube, thrust-bars having hinged connection with the main frame eccentric to the axle,
 15 the guard-bar carried thereby, a reciprocating knife-bar, sway-bars for reciprocating the same, actuating devices from said drive-shaft to said sway-bars comprising actuating connection arranged concentrically with said
 20 hinged connections between the thrust-bars and the main frame, substantially as described.

25. In a thrust-cut mower, the combination
 25 of a wheeled main frame, front cutting apparatus connected therewith and having actuating means, forwardly-extending thrust-bars, a draft-tongue extending forwardly from the frame, a doubletree carried by the
 30 tongue, draw-bars R, R, at their inner ends hinged to said doubletree and extending outwardly, depending connections from the doubletree end portions to the outer end portions of said draw-bars, respectively, draw
 35 connections from said draw-bars to said thrust-bars, and singletrees suspended by said draw-bars and depending connections, whereby the draft-animals are located just outside of the swath to be mowed, substantially
 40 as described.

26. In a thrust-cut mower, the combination of the triangular frame end castings having axle-stubs at their lower ends, ground-wheels mounted thereon, cross-bars between the front
 45 and rear ends of said frame ends, a cross-shaft mounted in said frame ends and driven from said ground-wheels, a crank-shaft mounted in one of said frame ends and having a gear driven from said cross-shaft, a clutch mechanism mounted on said crank-shaft for throwing
 50 said gear into and out of operative connection therewith, the thrust-cutting mechanism comprising thrust-bars hinged to the rear ends of said frame ends, sway-bars fulcrumed to said thrust-bars, and actuating connections from said crank-shaft to said sway-

bars comprising tension connections passing freely through the frame ends, thrust-bar ends and sway-bars, substantially as described.

27. In a thrust-cut mowing-machine, the
 60 combination of a wheeled main frame, a thrust-cutting apparatus comprising the sway-bars, tension-rods passed freely through the sway-bars and provided with stops at the outer faces thereof, a pitman provided with eccentric ac-
 65 tuating mechanism, movable guiding means, and connections pivotally uniting the inner ends of said tension-rods with said pitman and guiding means, substantially as described.

28. In a thrust-cut mowing-machine, the
 70 combination of a wheeled main frame, the thrust-cutting mechanism comprising a finger-bar, a reciprocating cutter-bar, supporting devices, and sway-bars, actuating mechanism for said sway-bars comprising tension-
 75 rods passing freely through portions of the main frame and said supporting devices and connected to the sway-bars, substantially as described.

29. In a thrust-cut mower, the combination
 80 with the thrust-cutting mechanism, of the triangular frame end castings having ground-wheels mounted on their lower ends, the tube rigidly connecting the front portions of said frame ends, the drive-shaft passing there-
 85 through and driven from said wheels, a crank-shaft in one of said castings and driven from said drive-shaft, actuating connections therefrom to said cutting mechanism, a cross connection between the rear portions of said
 90 frame ends, a tongue hinged to said tube, and adjustable connections between the rear of said tongue and said rear cross-bar, substantially as described.

30. In a thrust-cut mower, the combination
 95 of a wheeled frame comprising front and rear cross connections said frame tiltable on the axis of the wheels, a thrust-cutting mechanism comprising thrust-bars hinged to the rear portion of the frame eccentric to said axis,
 100 actuating means for the cutting mechanism, a tongue provided with a saddle resting on and hinged to the front cross-bar, a toothed rack rigid with the rear cross-bar, a toothed sector meshing therewith and mounted on the tongue
 105 and provided with a hand-lever and locking means, substantially as described.

HENRY M. DEMING.

Witnesses:

REED H. DEMING,
 L. C. DEMING.