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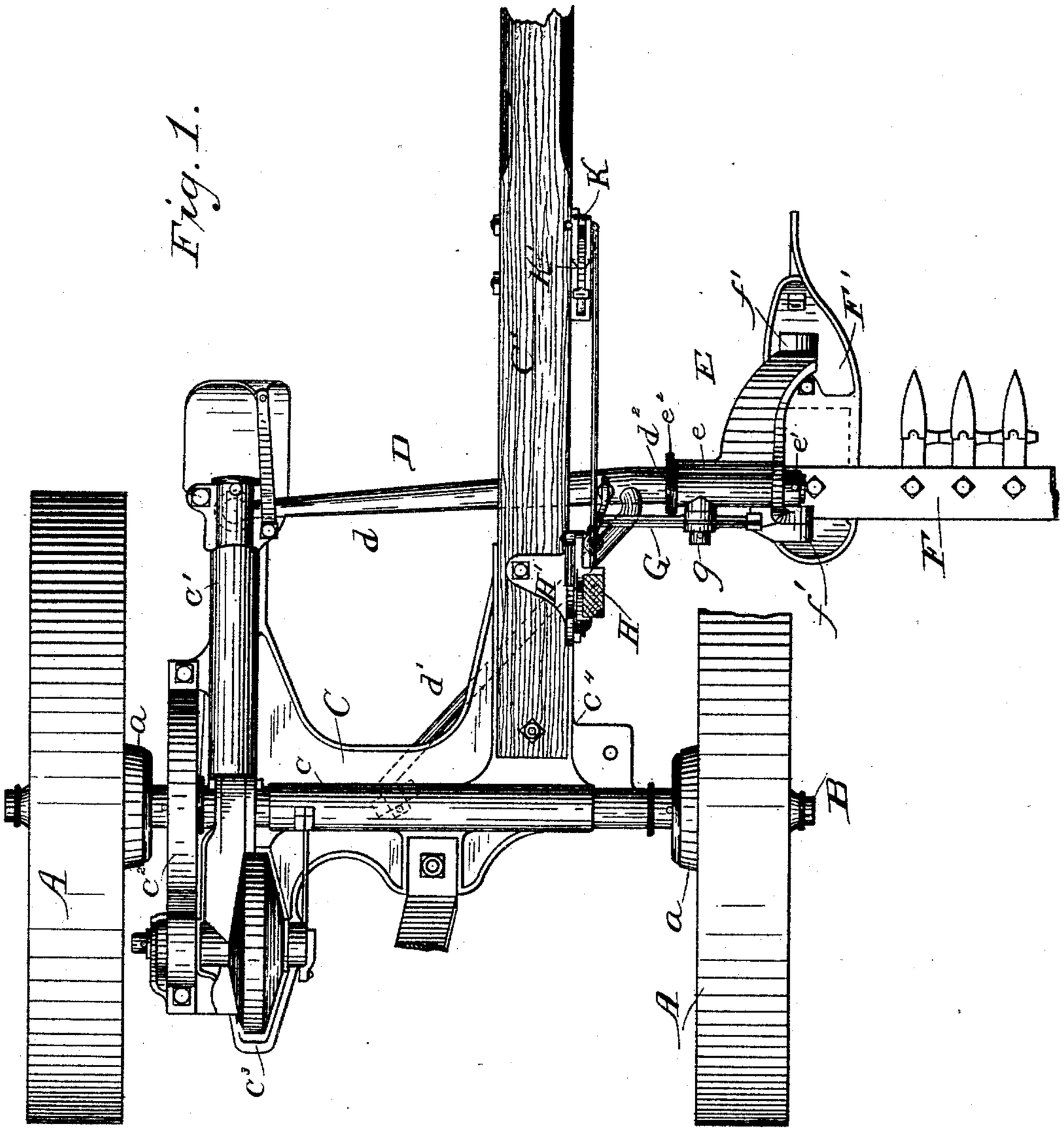
H. E. PRIDMORE.

MOWER.

No. 497,817. Patented May 23, 1893.

Fig. 1.



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(No Model.) 5 Sheets—Sheet 2.

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Fig. 2.

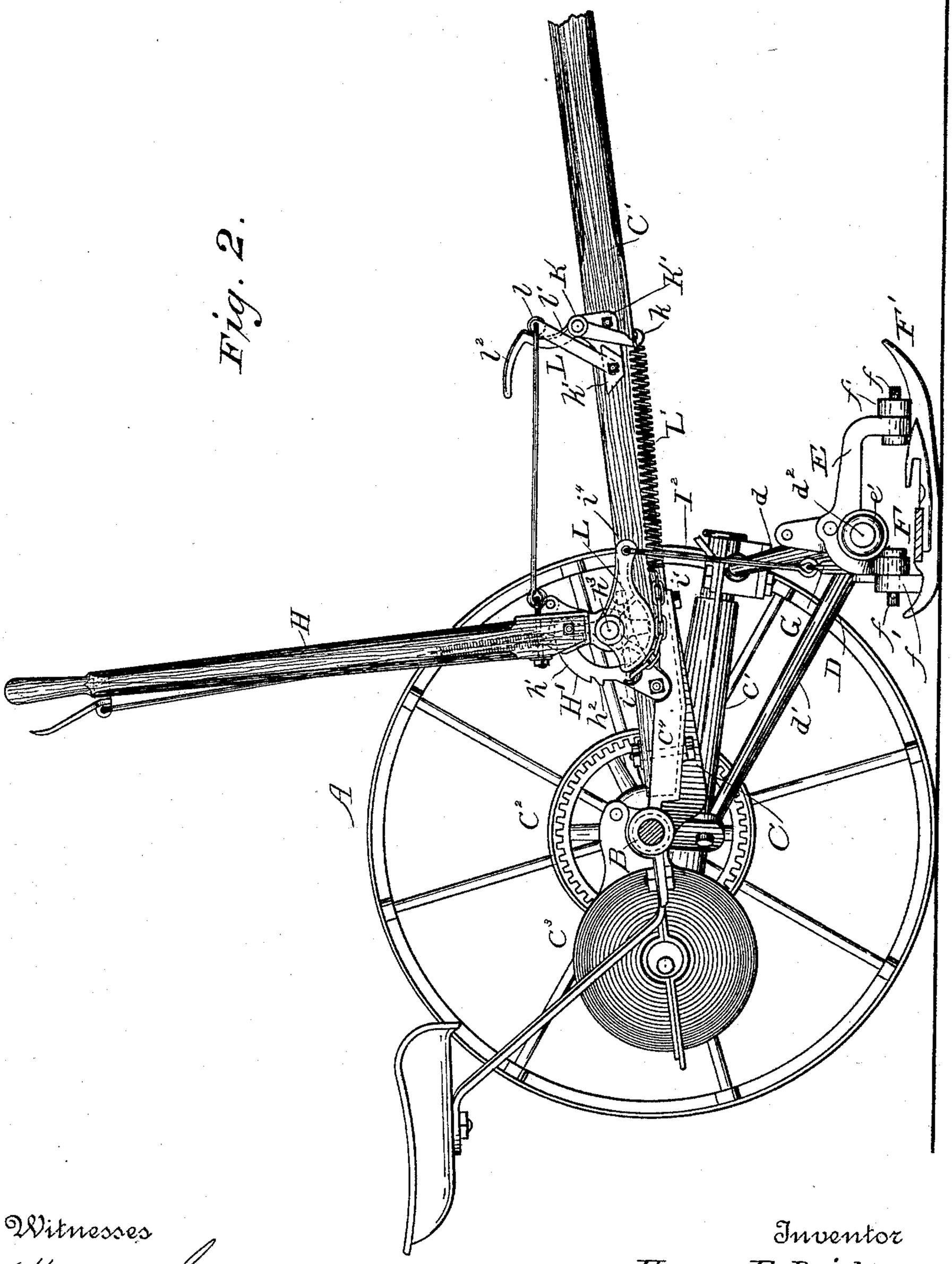

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Fig. 3.

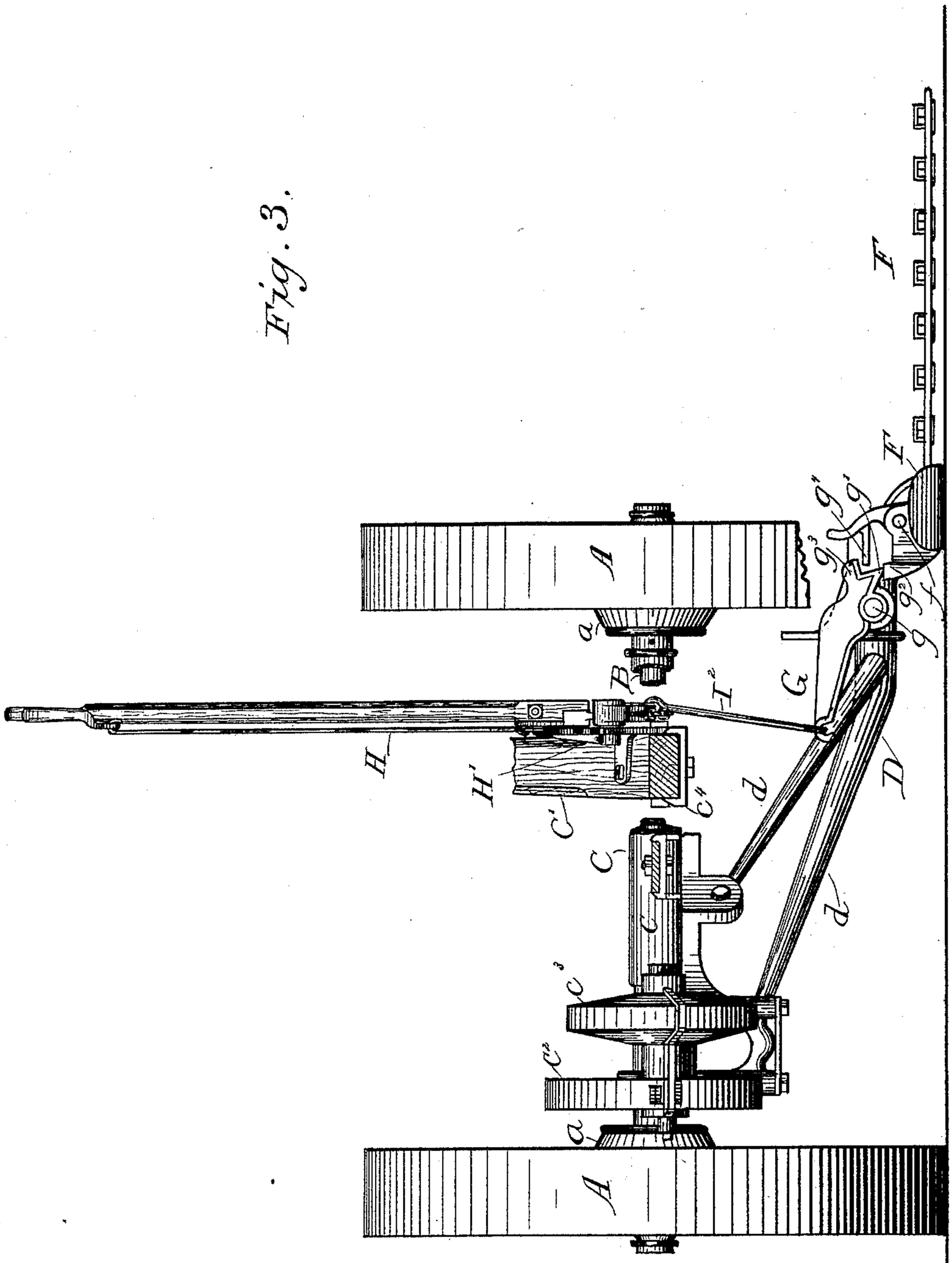

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Fig. 7

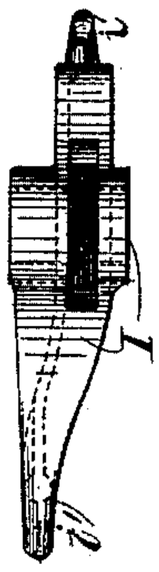

Fig. 8.

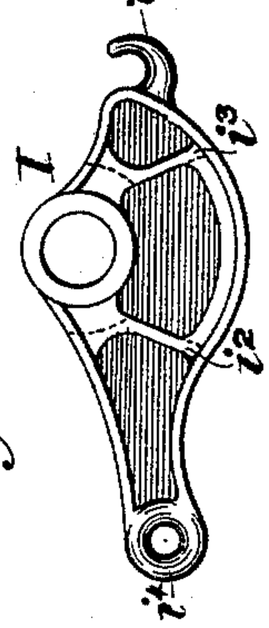

Fig. 9.

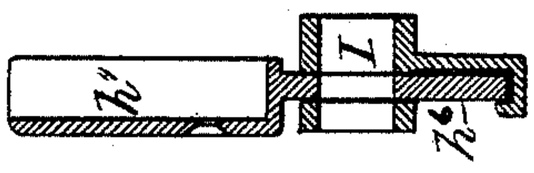

Fig. 6

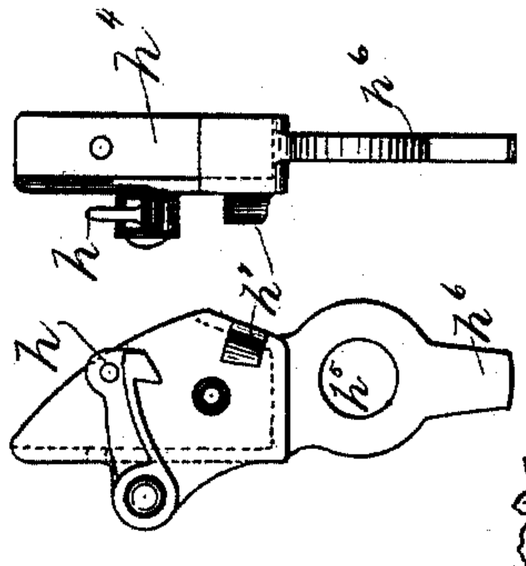

Fig. 5

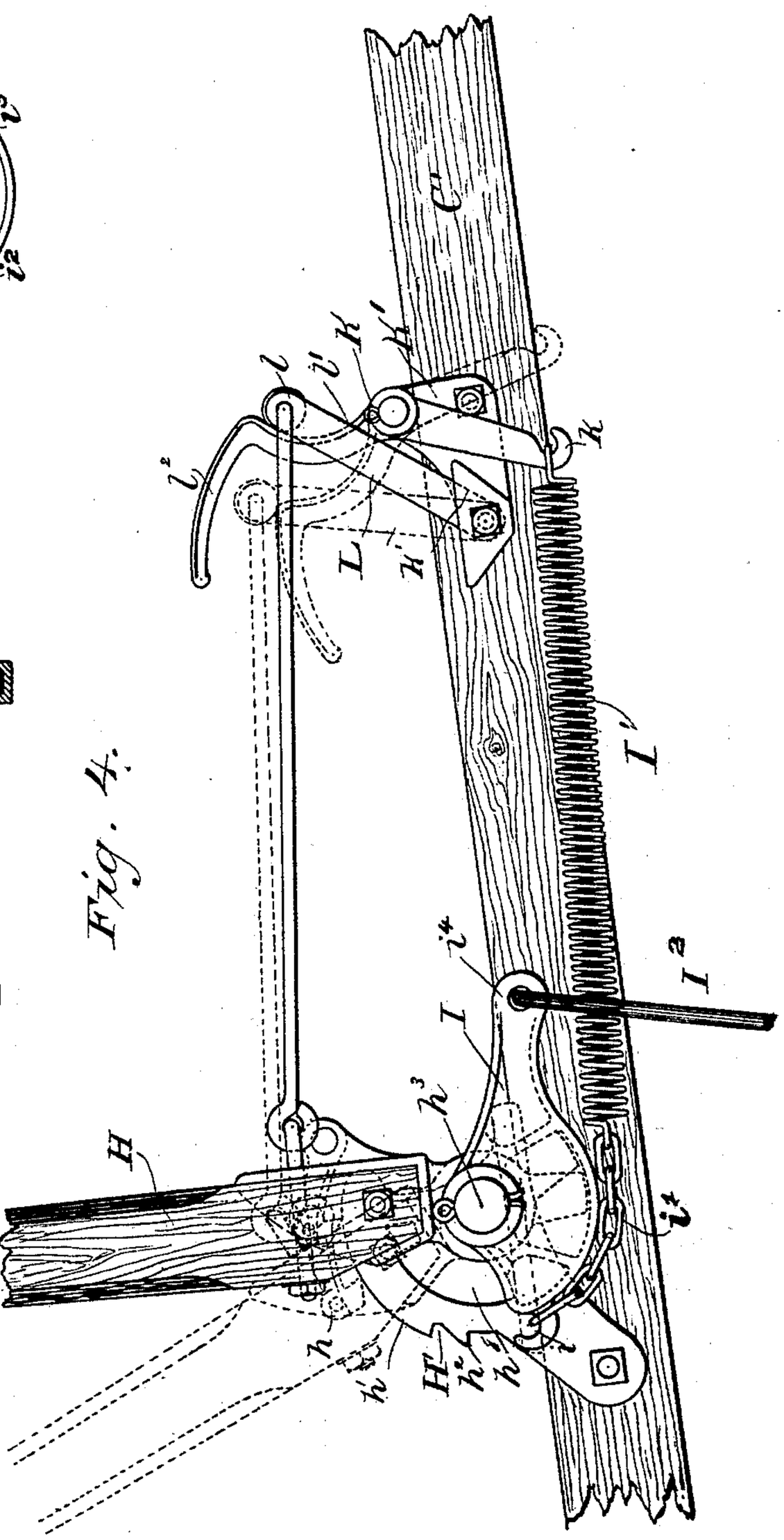

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Fig. 11.

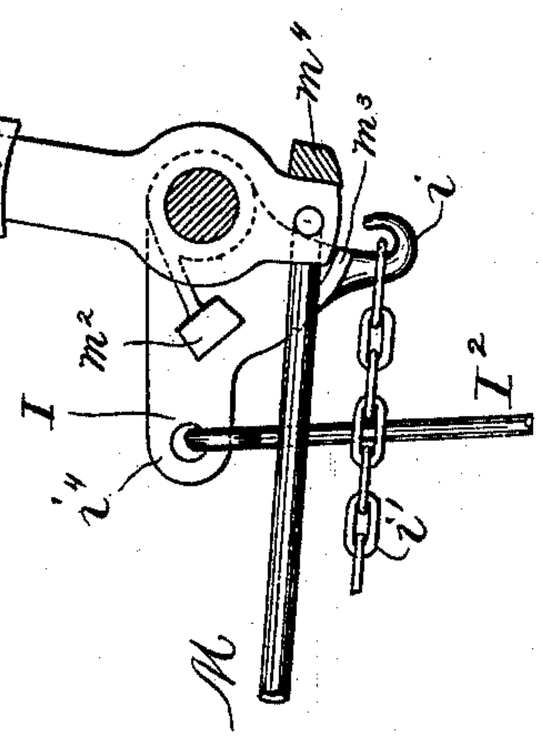


Fig. 12.

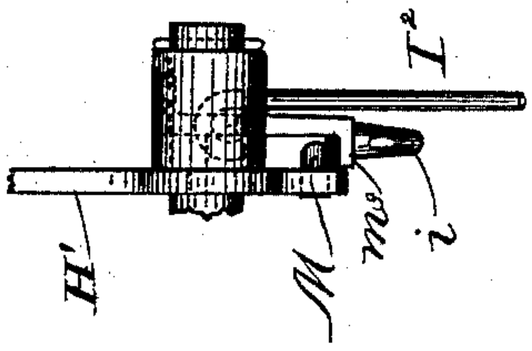
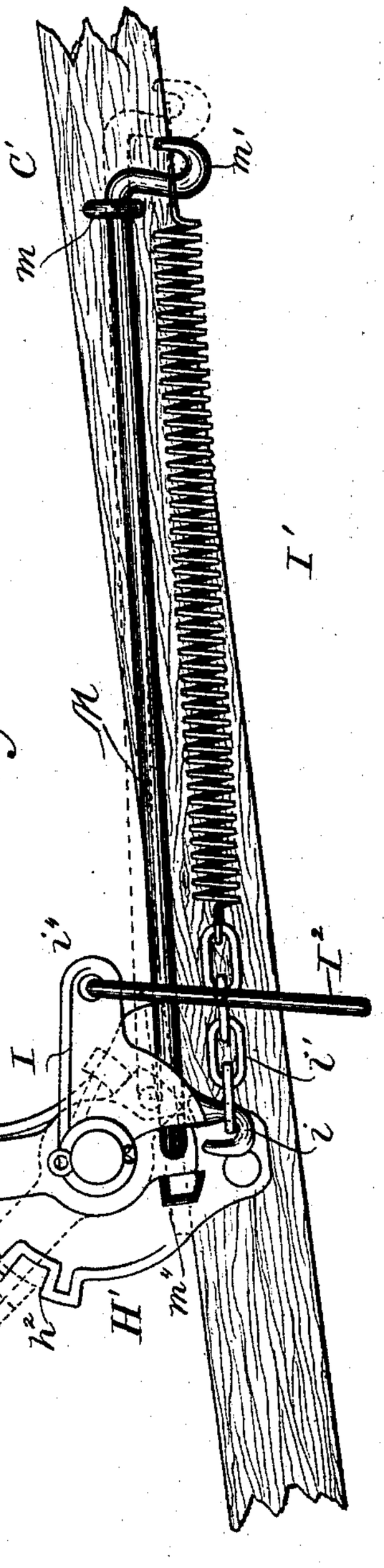


Fig. 10.



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UNITED STATES PATENT OFFICE.

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MOWER.

SPECIFICATION forming part of Letters Patent No. 497,817, dated May 23, 1893.

Application filed October 5, 1889. Serial No. 326,125. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. PRIDMORE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mowers, of which the following is a specification.

My invention relates to the mechanism for supporting and lifting the finger-bar of mowers, more particularly in two-wheeled, hinged-bar, floating-frame mowers, and to the employment of a spring under variable tension in connection with said mechanism, both to elastically support the finger-bar and coupling-frame and to aid in lifting the two.

In another application filed of even date herewith, Serial No. 326,123, I have described and claimed lifting mechanism wherein a spring under normal tension is employed in connection with means for storing up energy in said spring, and distributing its power during the lifting operation so that while it is constantly exerting its force to raise the outer end of the finger-bar and incidentally the floating-frame and shoe, it may, in the lifting operation, first store up power when the lifting lever is raising but a part of the weight of the finger-beam and then expend said power or energy in assisting the lever in raising the shoe, finger-beam and coupling-frame. In said concurrent application also I have explained how that which otherwise would be the lost motion of the lever in taking up slack, is utilized in increasing the power of the spring prior to the actual lifting movement or strain upon the finger-bar. In said first application the lifting-lever is rigidly connected to a segment-sheave taking in and letting out a chain to which is attached one end of a coiled spring running forward along the draft-tongue and at one end connected with the lower arm of a cam-lever. An offset from the segment-sheave is connected by a rigid link with the power-arm of the gag-lever or gag-iron which has a chin pressing constantly against a spur from the inner end of the finger-bar with a force determined by the tension of the spring and acting to ease up or lift the outer end or divider end of the finger-bar. Such a gag-lever has also a nose which normally is out of contact with a ledge beneath it on the coupling-frame, but whenever the iron has been sufficiently depressed in forcing up the divider end of the finger-bar, it comes in contact with said ledge and causes a stiff connection between coupling-frame and finger-bar so that a further pull upon the lifting link will raise both. The lifting-lever is also link-connected with a radius-bar pivoted to the draft-tongue adjacent to a cam-lever attached to the front end of the spring, and a roller on this radius-bar travels on the irregular outline or track-ways of said cam-lever, the arrangement and position of parts being such that when the lifting-lever is retracted it may or may not, during its initial movement, increase the tension of the spring until it reaches the point where the coupling-frame and finger-bar become stiff and the lift is applied to both, when the entire energy of the spring, whether at normal or above it, comes into action to assist in such lifting operation.

In the present invention I propose to use a spring under low tension at its normal, say about twenty pounds, that is, lifting through the gag-lever and a spur at the inner end of the finger-beam with a normal stress of about twenty pounds. Instead of attaching the lifting-lever rigidly to a segment-sheave with which the spring is connected, such lever is pivoted independently of, but upon the same axle as, the sheave, and plays between stops on the latter, and is connected intermediately with the other end of a spring running from said sheave alongside the draft-tongue, so that as it is drawn back in the beginning of the lifting movement it expands said spring, increasing its tension, say to sixty pounds or more, without disturbing the segment sheave, then finally comes in contact with one of the stops on said segment and rolls the latter while the stored up energy of the spring is expended in assisting said lever and sheave in raising the weight of the coupling-frame and finger-bar through the lifting-link and gag-lever.

In the drawings: Figure 1 is a top-plan view of a two-wheeled, hinged-bar, floating-frame, front cut mower embodying my inven-

tion in one of the forms now best known to me. Fig. 2 is a side elevation with the carrying wheel at the grain side removed and the main axle in section to more clearly expose the operating parts. Fig. 3 is a rear elevation thereof partly broken away; Fig. 4, an enlarged detail view in side elevation showing the lifting-lever, loose segment-sheave, lifting spring and cam-lever and the connections of the latter with the lifting-lever. Fig. 5 is an enlarged detail in side elevation from the stubble side of the casting forming the lower end of the lifting-lever and Fig. 6 is an elevation thereof from the rear. Fig. 7 is a top-plan view of a segment-sheave detached and enlarged, and Fig. 8 an elevation of said sheave from the stubble-side; Fig. 9, a vertical transverse section through said sheave and the casting at the lower end of the lifting lever. Fig. 10 represents in side elevation, an alternative form of my lifting-lever. Fig. 11 is an enlarged detail view from the stubble side, of said modification showing the lifting lever, its dog, the segment-sheave and the lifting-link and a portion of the chain connecting the segment-sheave with the spring, and Fig. 12 is an enlarged detail, taken from the rear, of the lower part of the apparatus shown in the preceding figure.

A represents the two carrying wheels of a mower, each having a pawl and ratchet case or box, *a*, for independent connection with the main axle, B, as usual in this class of machines.

C is the metal gear-frame, cast in one piece, and having a long sleeve, *c*, whereby it is mounted upon the main axle, a forwardly extending sleeve, *c'*, at right angles to the axle-sleeve and adjacent to the carrying-wheel at the stubble-side for the reception of a bearing for the cutter crank-shaft, a casing, c^2, for the main gear and prime-pinion and another casing, c^3, for the bevel-gear whereby motion is communicated to the crank-shaft from the main axle and a seat, c^4, for the draft-tongue, C', which is rigidly bolted therein and together with the gear-frame, constitutes the main frame of the machine.

Thus far the structure is a common type of machine used in the field at the present time and is chosen for the purpose of this description, not for any supereminent adaptability to my improvements, but simply for the purpose of illustrating their mode of application.

D is a forked coupling-frame also well known heretofore, one arm, *d*, of which is connected with the gear-frame by a universal joint at the forward end of the crank and extends nearly parallel with the main axle, at the front of the carrying-wheel at the grain side of the machine, while the other arm or bracket, *d'*, rigidly connected with the first extends obliquely rearward to a point beneath the main axle where it is pivoted to the gear-frame upon an axis intersecting the center of vibration of the other arm. Beyond the fork of the coupling-frame is formed a cylindrical journal connection, d^2, upon which the sleeve, *e*, of the finger-bar bridge, E, takes bearing and to which it is confined by a pin and collar, *e'*, at the outer end of a journal, and a collar, e^2, fixed at the inner end thereof.

The finger-bar, F, is pivoted or secured to the bridge by pins, *f*, passing through the pendants of said bridge and through ears, *f'*, upstanding from the inner shoe, F', on an axis parallel with the line of advance of the machine or nearly so, that the finger-bar may be capable of folding up toward the draft-tongue. From the rear side of the sleeve on the finger-bar bridge projects a pivot-pin, *g*, upon which vibrates the gag-lever, G, provided between its pivot and the shoe with a chin, *g'*, which comes above and rests upon a spur, g^2, insetting from the heel of the finger-bar, that is, from the inner shoe forming a portion of said bar, and above this chin said lever has a nose, g^3, which, at the normal, is somewhat raised above a ledge, g^4, projecting from the sleeve, but when sufficiently depressed as the spur from the finger-bar yields to the pressure of the chin of the gag-lever and lifts the outer end of the finger-bar, will strike against said ledge and prevent the gag-lever from rocking or vibrating further on its pivot, establishing in fact a sort of rigid connection between the gag-lever and coupling-frame and finger-bar, so that further power applied to the gag-lever will lift the coupling-frame and finger-bar together as if rigidly connected.

H is the lifting-lever mounted upon the main frame and having a spring-latch or dog, *h*, which engages with a rack-segment, H', rigidly secured to said main-frame. Preferably this segment is made with a smooth periphery, *h'*, for a part of its distance, corresponding with the normal position of the lever and finger-bar when the latter is in action and with the limit of play which may be expected in the floating-frame, and, if desired, further extended to correspond with a part of the lifting movement, and at the rear end of this smooth peripheral surface, is notched as at h^2 so that the dog or pawl may engage when the lever is depressed and the finger-bar lifted; and the smooth surface also corresponds or nearly so with the limit of vibration of the gag-lever before its nose comes in contact with the ledge on the finger-bar sleeve. The rack-segment carries the stub-pivot, h^3, for the lifting-lever, the lower end of which, in the construction represented in the figures running from 1 to 9 inclusive, is formed as a metal casting having a socket, h^4, for the wooden handle-piece of the lever, below that a bearing, h^5, to take over the pivot and finally a depending tang, h^6. It also has an outsetting lug, h^7, which enters a curved slot, h^8, in the rack-segment and serves to limit the forward movement of the lever.

Mounted upon the same pivot with the lift-

ing-lever, but independently thereof, is a sheave-segment, I, having at its rear end, a hook, *i*, to receive a link for the short chain, *i'*, connected to the rear end of the spring, I', which extends alongside the draft-tongue a suitable distance and at the front end is attached to the lower pendent-arm of a cam-lever such as described in my before mentioned concurrent application.

Two ribs or stops, i^2, i^3, are formed upon the segment-sheave between which the tang of the lifting-lever plays, so that the segment may rise and fall or play about its pivots as the finger-bar rises or falls without necessarily disturbing the lever, the front end of the segment having an offset or arm, i^4, connected by a link, I^2, with the power arm of the gag-lever, the other arm of which acts as aforesaid upon a lug on the inner side or heel of the finger-bar or inner shoe, and upon a flange on the bridge-sleeve thereabove, so as first to lift the finger-bar at the outer end and then to lift the coupling-frame and finger-bar together.

The cam-lever, K, to the lower arm, *k*, of which the lifting and compensating spring is attached is pivoted to a bracket, K', upon the draft-tongue. This bracket has a stop, *k'*, and at the normal; that is, when the parts are in the position represented in full lines in the second figure of the drawings, with the finger-bar resting naturally on the ground, it is intended that the spring strained between the segment sheave, and the cam-lever stayed by the stop, shall be of a tension of about twenty pounds, so as to exert through said sheave and link and gag-lever a force of that amount upon the heel-end of the finger-bar and correspondingly ease the divider-end. To the rear of the cam-lever a radius-bar, L, is pivoted to the bracket, and at its upper end is connected by a link with the lifting-lever above the pivot of the latter and carries an anti-friction roll, *l*, which bears against the track, *l'*, of the cam-lever. This track is re-entrantly curved, so that as the radius-bar is pulled back by retracting the lifting-lever, it may, in traveling up out of the curve, throw the lower arm of the cam-lever forward and strain the spring and it is succeeded by an outwardly curved track, l^2, described upon such a line that when the action of the anti-friction roll and radius-arm in the movement imparted by the lifting-lever has drawn the arm of the cam-lever to the position represented in dotted lines in Fig. 4 this second track will be concentric to the axis of the radius bar, and therefore the anti-friction roll will travel over it without moving the cam-lever; it simply holds the latter rigidly in position as if locked.

In the former construction the pendent arm of the cam-lever was stated to be longer than the distance of the pivots of the radius-bar and the axis of the anti-friction roll bearing against the cam-track, so that notwithstanding the connection between said radius-bar and lifting-lever the force of the spring acting upon the lower arm of the cam-lever holds it back against its stop. In the present construction this is not so material, since the segment-sheave vibrates independently of the lifting-lever. Still it is desirable.

Now with the construction described, supposing the parts to be at normal with the lifting spring at a tension of twenty-pounds and the lifting-lever to be actuated, its initial movement strains the spring to the full tension, say sixty pounds, before the tang of the lever comes in contact with the front rib or stop on the quadrant or segment sheave and the lifting of the shoe and of the cutter-bar commences. This increased tension, however, is imparted to the gag-lever, and through it to the finger-bar, and it may be to the coupling-frame. As in the former application the lifting end of the segment-sheave, that is, its offsetting arm from which the lifting-link depends, rises into a more advantageous position as the spring weakens in lifting; or, in other words, the lever-arm of resistance is shortened, so that the forces opposed to the hand-lever are about the same throughout its movement. While the hand-lever is swinging between the two stops on the lifting-segment it does not affect the latter, and its entire force is expended in straining the spring. As soon as the hand-lever engages with the front rib or stop on the segment which practically corresponds with the moment when the second track is reached by the radius roller, it begins to exert a positive lifting action therethrough, first raising the divider end of the cutter-bar, and then as the gag-lever comes in contact with the ledge on the sleeve or finger-bar bridge raising the entire coupling-frame, being assisted in this by the accumulated sixty pounds of force pulling upon the segment, and which have been released from the hand lever by the action of the second track and radius-link just as the positive lift commences.

In the modification illustrated in the last three figures of the drawings, the lifting-lever, as before, swings upon its pivot, independently of the segment-sheave upon the same pivot, and the lower arm or tang of the lifting-lever has pivoted thereto a thrust-bar, M, extending forward along the tongue and guided by a staple, *m*, fixed to the side thereof. Beyond the staple the thrust-bar is bent down to form a hook, *m'*, to receive one end of the coiled spring, the other end, as before, being connected by links with the hook upon the segment sheave. An arm from this sheave, as before, carries one end of the lifting-link. This sheave has also a lug or stop, m^2, standing in the path of the lower-arm of the lever and in front thereof, so that when the lever is swung against it it may serve to positively lift the finger-bar and coupling-frame through said segment and lifting-link. The sheave has also a flange, m^3, which strikes either against the link or against the thrust-rod to limit the independent upward movement of

the segment as the shoe at the inner end of the finger-bar rises and falls over uneven surfaces of ground.

As in the first described construction, the spring will be strained to say twenty pounds at the normal, the weight of the shaft and finger-bar holding the segment rack down against this spring tension. The spring pulling back on the thrust-rod will hold the lower arm or tang of the lever back against the stop-lug m^4 on the pivot bracket or segment-rack when the parts are at the normal. Now, in lifting, the initial movement of the lever will force the thrust-rod forward, straining the spring up to a tension of say sixty pounds before the tang of the lever comes in contact with the stop-lug on the sheave, at which point the connecting point of the thrust-rod and hand lever has moved so as to be nearly in a line drawn from the hook at the front of the rod to the pivotal center of the lever, and consequently the back thrust on the rod is not seriously detrimental to the swinging movement of the lever. In the further movement of the lever, carrying the sheave up around its pivot the lever-arm of resistance will be shortened by a swinging upward toward a vertical of the arm outsetting from the sheave concurrently with the decreasing of tension in the spring which will be but gradual since the movement of the lifting-lever will continue to strain it at the forward end through the thrust-rod. As it is taken up at the other end the straining will be slower than the taking up or slackening. Therefore this slackening or contraction will be effectively expended in lifting the coupling-frame and finger-bar with little effort on the lever.

I claim as my invention—

1. The combination substantially as hereinbefore set forth, of the finger-bar and coupling-frame, the lifting-segment, a lifting lever playing unimpeded between stops in said segment, a lifting-spring attached to the segment at one end, and connections between the lifting-lever and the opposite end of the lifting-spring whereby said spring is stretched or its tension increased in the initial movement of the lifting-lever before it begins to operate the segment, and such increased tension thereafter employed to aid the further movement of the lever.

2. The combination substantially as hereinbefore set forth, of the finger-bar, the coupling-frame, the lifting-segment, the lifting-lever playing between stops on said segment, the lifting-spring attached to the segment at one end, the cam-lever to which the other end of the spring is attached, and intermediate connections between said levers whereby the lifting-lever operates said cam-lever to increase the tension of the spring.

3. The combination substantially as hereinbefore set forth, of the finger-bar, the coupling-frame, the lifting-segment, the lifting-lever playing between stops on said segment, the lifting-spring, the cam-lever, the radius-bar and the link connecting the radius-bar with said lifting-lever.

4. The combination substantially as hereinbefore set forth, with the finger-bar and coupling-frame, of the gag-lever, the lifting-link, the lifting-segment, the lifting-lever playing between stops on said segment, the lifting-spring, the cam-lever, the radius-bar, and the link connecting the said radius-bar with the lifting-lever.

5. The combination substantially as hereinbefore set forth with the finger-bar and coupling-frame, of the lifting segment, the lifting lever having a limited movement independent of the segment, the lifting spring normally under low tension, and means whereby it is increased to high tension in the initial movement of the lifting-lever before the latter acts positively upon the segment and coupling-frame, the arrangement being such that the energy of said high tension is effectively expended to assist the lifting-lever as it lifts the coupling-frame.

6. The combination substantially as hereinbefore set forth, with the finger-bar and coupling-frame, of the lifting-lever playing between stops on said segment, the coiled lifting spring attached at one end to said segment and running alongside the draft-pole, and a connection between the opposite end of the spring and the lifting-lever whereby said spring is raised to a state of high tension in the initial movement of the lifting-lever before it strikes the forward stop on the segment, and such increased tension caused to aid the lever in its further lifting movement.

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Witnesses:
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