C. MAUL.

VERTICAL LIFT MOWER.

APPLICATION FILED APR. 17, 1909.

952,125.

Patented Mar. 15, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

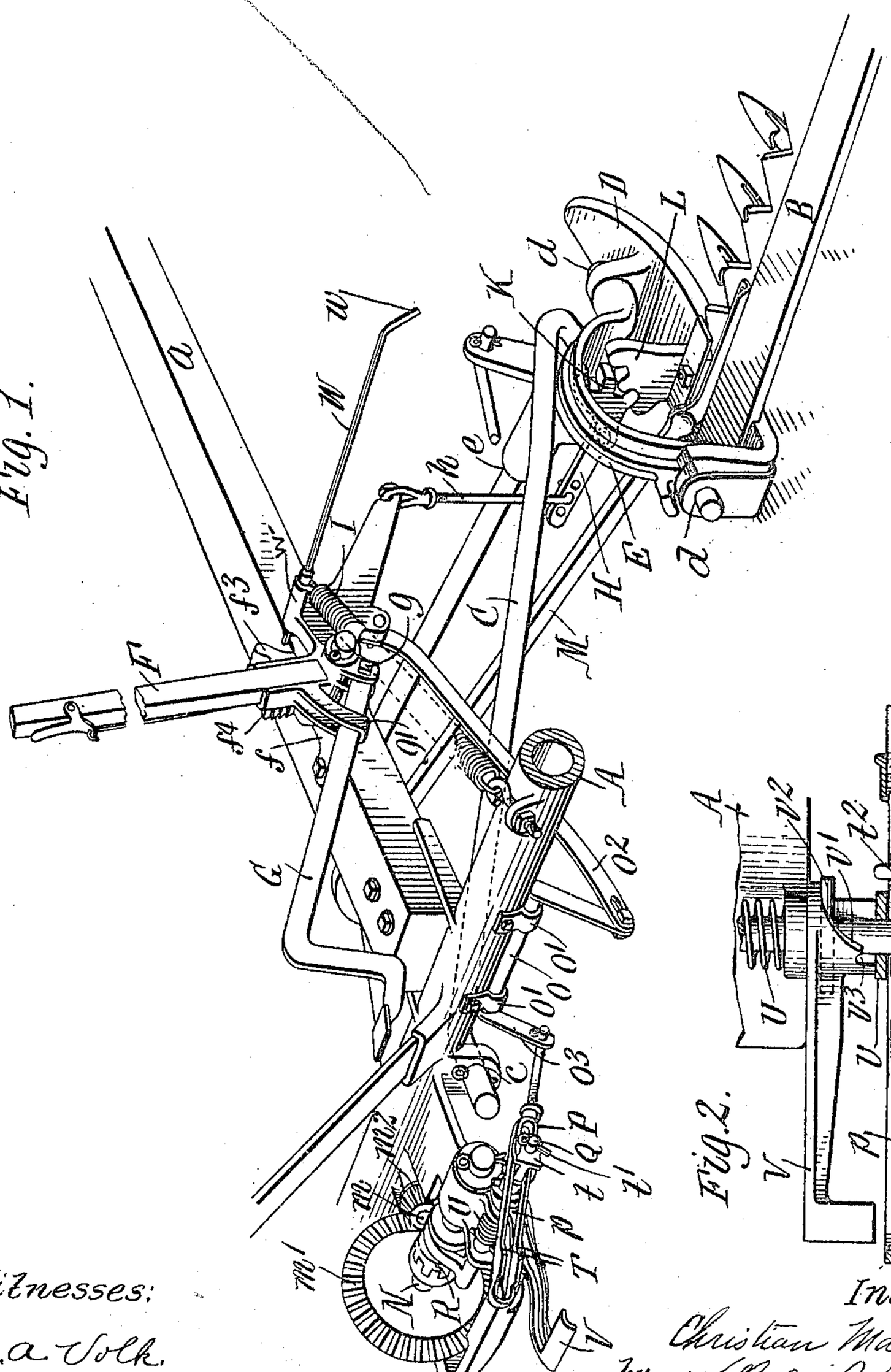


Fig. 2.




Witnesses:

E. A. Volk.

A. G. Dimond.

Inventor.

Christian Maul

by Wilhelm, Pastle & Hard,

Attorneys.

C. MAUL.

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3 SHEETS—SHEET 2.

Fig. 3.

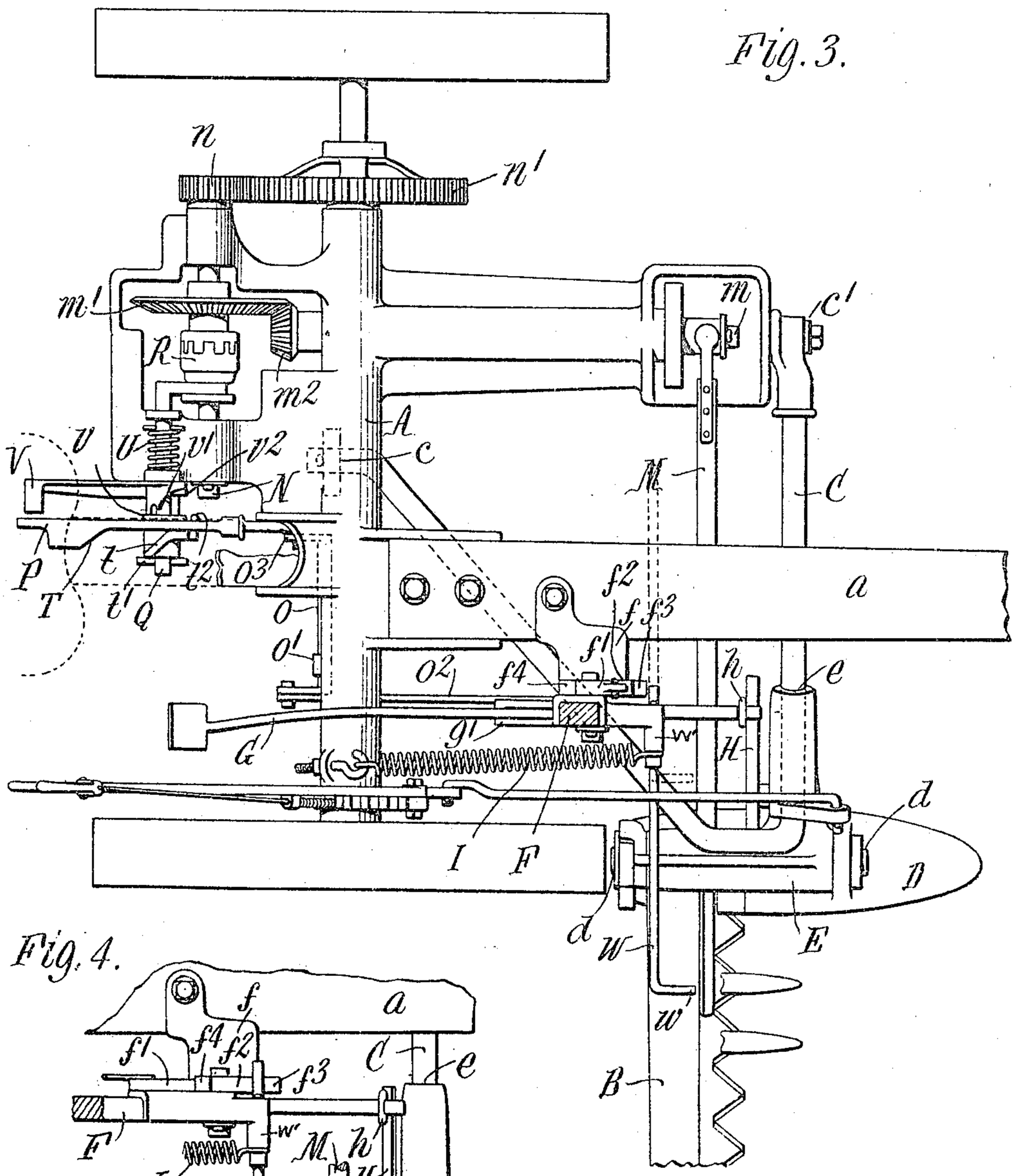
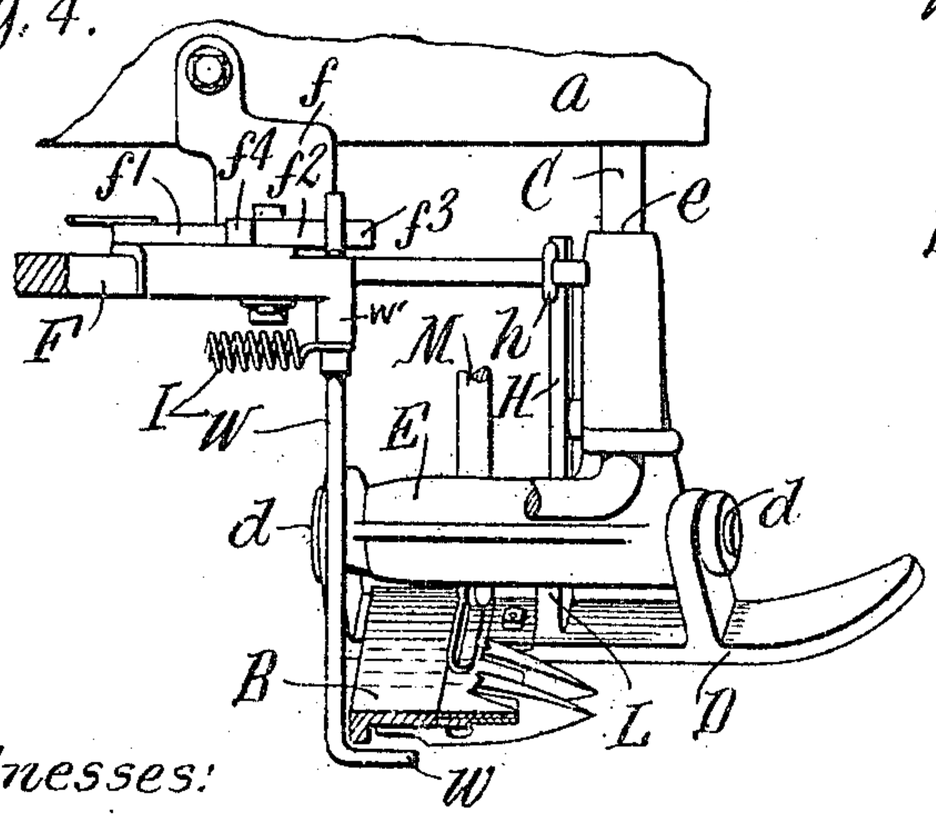



Fig. 4.




Witnesses:

E. A. Volk.

C. F. Dimond

Inventor.

Christian Maul,

by Wilkin, Parker & Hand,

Attorneys.

C. MAUL.

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3 SHEETS—SHEET 3.

Fig. 5.

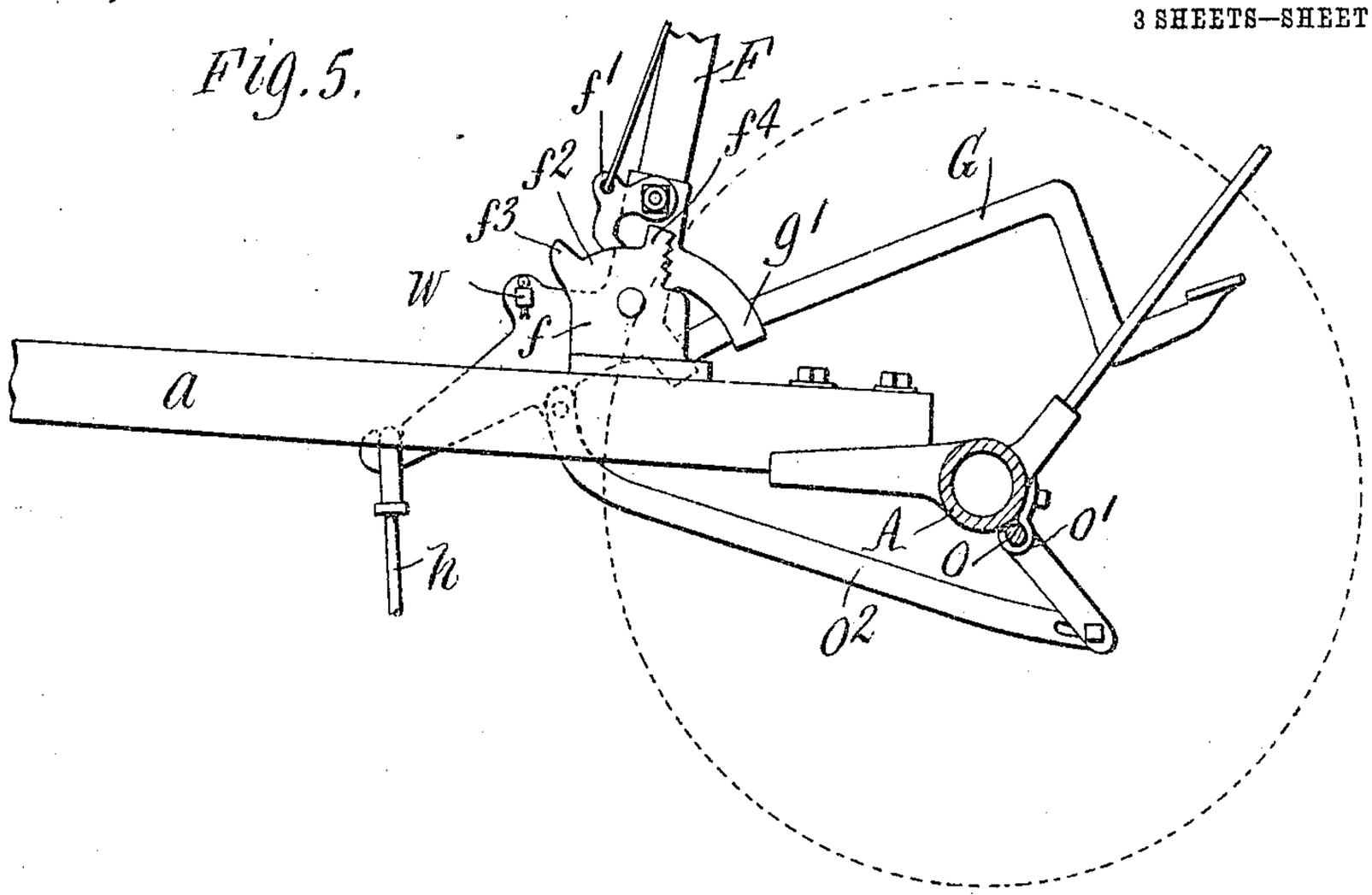



Fig. 6.

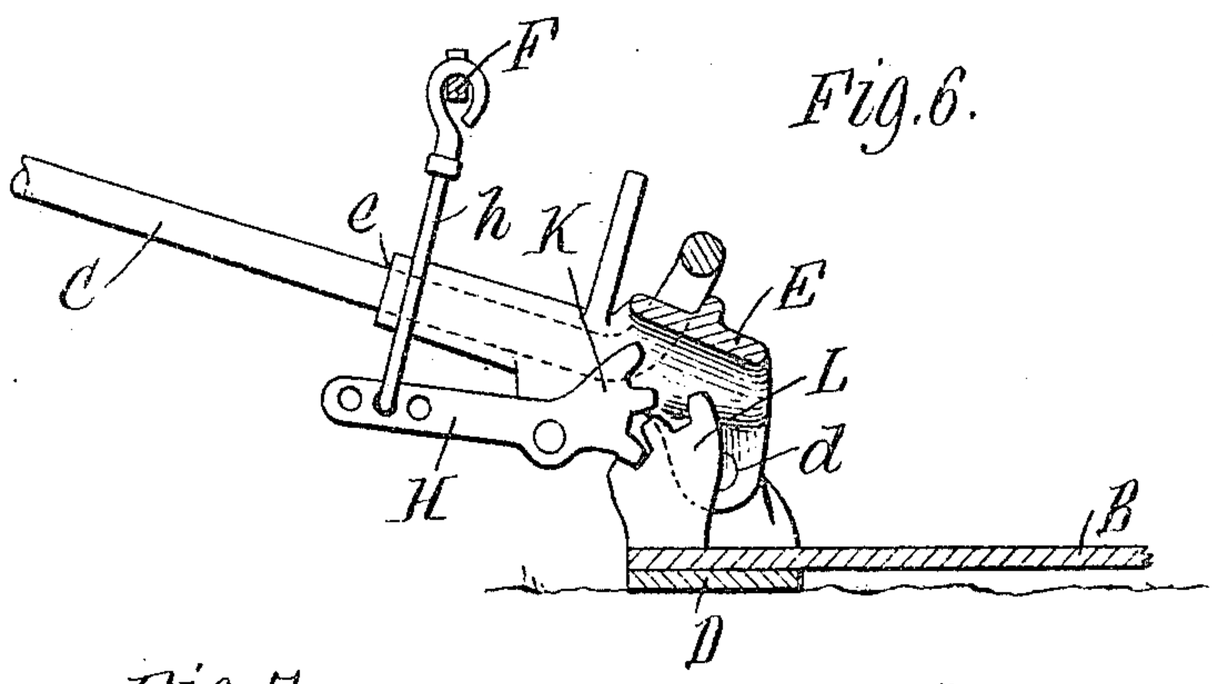
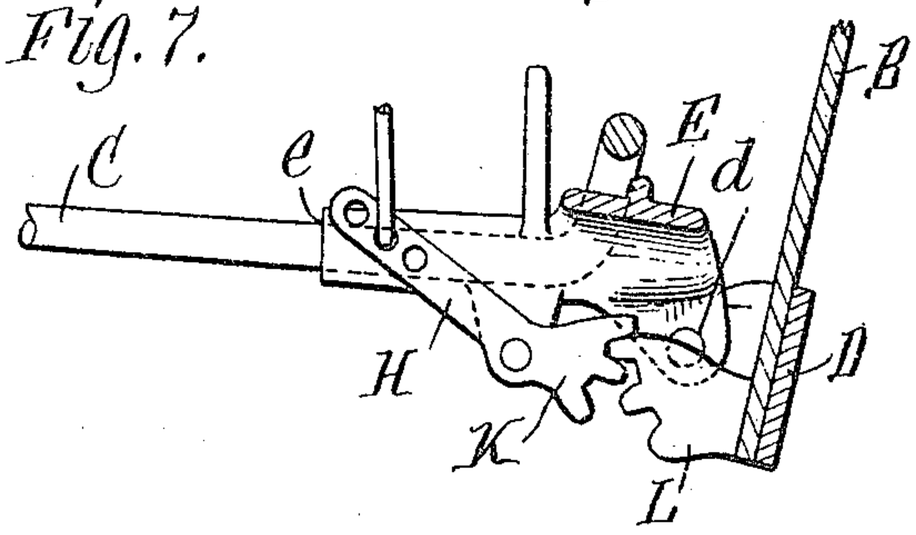



Fig. 7.




Witnesses:

E. A. Volk.

A. F. Dumont.

Inventor.

Christian Maul.

By Wilhelm, Parker & Hard,

Attorneys.

# UNITED STATES PATENT OFFICE.

CHRISTIAN MAUL, OF BATAVIA, NEW YORK, ASSIGNOR TO THE JOHNSTON HARVESTER COMPANY, OF BATAVIA, NEW YORK.

## VERTICAL-LIFT MOWER.

952,125. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed April 17, 1909. Serial No. 490,545.

*To all whom it may concern:*

Be it known that I, CHRISTIAN MAUL, a citizen of the United States, residing at Batavia, in the county of Genesee and State of New York, have invented a new and useful Improvement in Vertical-Lift Mowers, of which the following is a specification.

This invention relates to improvements in mowing machines of that type in which the finger bar is pivotally secured to the machine so that it can be swung or raised by the driver of the machine to a vertical position.

One object of this invention is to provide in a machine of this type desirable means of simple construction for raising the finger bar, which can be operated by the driver on his seat with the minimum effort and by which he can readily lift the finger bar either to an inclined position or to an upright position, as may be necessary for avoiding obstacles and in turning corners and hauling the machine to and from the field or through narrow spaces.

Further objects of the invention are to provide simple and desirable means which are actuated by the lifting means to automatically throw the knife reciprocating mechanism out of action when the finger bar has been partially raised so that the knife-operating mechanism will not interfere with the finger bar being swung to its upright position; and also to provide a device for holding the finger bar stationary in its upright position and relieving the lifting mechanism from this duty and the strain incident thereto.

In the accompanying drawings, consisting of three sheets: Figure 1 is a fragmentary perspective view of a mowing machine embodying the invention. Fig. 2 is an enlarged fragmentary plan view, partly in section, of the clutch-operating mechanism. Fig. 3 is a fragmentary plan view of the machine. Fig. 4 is a fragmentary plan view, partly in section, showing the finger bar in its upright position. Fig. 5 is a fragmentary side elevation of the lifting lever and adjoining parts. Fig. 6 is a fragmentary sectional elevation of the gag lever and the associated parts, showing the operative position of the finger bar. Fig. 7 is a similar view showing the position of the parts when the finger bar is in its raised position.

Like reference characters refer to like parts in the several figures.

The general construction of the machine, which is well known, may be briefly described as follows:

A represents the frame of the machine truck, or main frame, *a* the tongue, B the finger bar, and C the pivoted coupling frame which supports the finger bar. The coupling frame extends transversely of the machine and has diverging arms pivoted at their inner ends to the truck frame at *c c'* so that the outer end of the coupling frame can swing up and down. The inner shoe D of the finger bar is pivoted at *d d* to swing vertically transversely of the machine on the opposite ends of a yoke piece E which is swiveled at *e* on the coupling frame to tilt fore and aft of the machine, thus enabling the finger bar, as usual, to be swung transversely of the machine and also to be tilted forwardly and rearwardly to regulate the height of the cut.

F and G represents respectively hand and foot levers arranged within convenient reach of the driver on the seat for raising and lowering the coupling frame and finger bar. The hand lever is fulcrumed on a bracket *f* on the tongue *a* and is provided with the ordinary hand operated dog *f'* cooperating with a toothed segment $f^2$ to hold the lever in different positions. The foot lever is pivoted at *g* to the hand lever and passes through a loop *g'* on the hand lever, which enables both levers to be started together by both hand and foot pressure and the movement of the hand lever to be continued after the foot lever has been depressed to the limit. The hand lever has a forwardly projecting arm which is connected by a link *h* to a gag-lever H which is fulcrumed on the yoke piece E and engages an arm or part on the shoe D to raise and lower the finger bar.

I represents the usual counterbalancing spring for the finger bar.

The holding segment $f^2$ for the lifting lever is preferably of the shape shown in Fig. 5, having a tooth $f^3$ at its front end to limit the forward swing of the hand lever, and a large tooth $f^4$ at its rear end with an abrupt front face for the dog to engage to prevent the lever from flying back and hitting the driver under the action of the lift-

ing spring for the finger bar in the event of the connection between the lever and the finger bar being broken. The rear face of this tooth is also abrupt for the engagement of the dog to hold the finger bar upright and is provided with small teeth to enable the lever to be held in the different positions to which it may be necessary to swing it to fully raise the finger bar.

The gag-lever H is provided at its outer end with a toothed segment K, the teeth of which mesh with the teeth of a segment L projecting from the shoe D. The teeth of these segments are arranged in lines eccentric with the pivotal axes of the gag-lever and shoe, the radial distance of the teeth on the gag-lever from the axis of the lever increasing from the bottom to the top of such segment K, and the radial distance of the corresponding teeth on the shoe from the axis of the shoe decreasing from the bottom to the top of the segment L. This gives the greatest leverage to the gag-lever upon the finger bar at the beginning of its lifting movement, and the leverage decreases as the finger bar is raised and thus causes an acceleration in the motion of the finger bar as its upward movement is continued. The bar can thus be raised with the minimum amount of effort and can be quickly swung to its upright position by a shorter movement of the lifting lever than would be possible with a concentric arrangement of the teeth giving the same starting leverage. After the finger bar has been raised to the vertical position by the lifting lever, as described, the usual tilting lever (not shown) is operated to swing the swivel piece E on the coupling frame C so as to tilt the finger bar rearwardly. As the gag lever is fulcrumed on the rear side of the bearing sleeve of the swivel piece, this tilting of the latter moves the gag lever downwardly, and owing to the described arrangment of the gag lever and its connection with the lifting lever F, a much greater lifting pressure is brought to bear on the gag lever than it is possible to exert with the lifting lever alone, and as a result the finger bar is held rigidly in the upright position and prevented from whiffing or swaying.

The machine is provided with an additional device, hereinafter described, for holding the finger bar steady, but this is not required except when an exceptionally long finger bar is used.

The knife, as usual, is reciprocated by a pitman M, Fig. 3, connected to a crank shaft $m$ which is geared by bevel wheels $m'$ $m^2$ to a clutch shaft N geared by wheels $n$ $n'$ to the axle of the ground wheels of the mower.

For automatically throwing the knife reciprocating mechanism out of action when the finger bar has been partially raised so that it will not interfere with the further raising of the bar to its upright position, the following means are employed, see Figs. 1–3. A rock shaft O is journaled in suitable bearings O′ on the frame A, and is provided with an arm which preferably has a slotted or lost motion connection with a link $O^2$ connected to the hand lever F and with another arm $O^3$ connected to a bar P having an elongated slot $p$ through which extends the end of a clutch shifting rod Q, see Fig. 1. The rod Q is slidably mounted in guides on the frame A and engages at its outer end a clutch R which is mounted on the clutch shaft N and serves to connect this shaft with the bevel pinion $m'$. The clutch R rotates with its shaft and is slidable thereon into and out of engagement with the pinion $m'$ under the action of the shifting rod Q. The slotted bar P is provided near its end with cam or wedge faces T which are adapted to engage inclined faces on a collar $t$ on the shifting rod Q. The collar $t$ is loosely confined on the shifting rod Q between the slotted bar P and a pin $t'$ at the end of the rod and is provided with lugs $t^2$ which project into the slot of the bar P, see Fig. 2. By this construction the collar is caused to swing with the bar P on the shifting rod when the bar is operated, so that when the wedge faces T on the bar are brought into engagement with the inclined faces of the collar they will bear thereon for their full length. The wear is thus distributed over a greater area than it would be if the collar $t$ were fixed on the shifting rod, and the life of the parts is consequently increased. A spring U mounted on the rod Q serves to throw the clutch R in engagement with the pinion $m'$ and hold the rod Q normally in its retracted position. As the lifting lever F is moved for raising the finger bar to its upright position, the slotted bar P is moved accordingly, bringing its wedge faces into engagement with the inclined faces of the collar $t$ on the shifting rod Q. This shifts the rod Q and moves the clutch R out of engagement with the pinion $m'$, thus throwing the knife reciprocating mechanism out of action. The slot $p$ permits the lifting lever F to be moved far enough to raise the finger bar to an inclined position before the clutch is thrown out of engagement. When operating the lifting lever F to lower the finger bar from its raised position, the link $O^2$ rocks the rock shaft O and moves the wedge bar P rearwardly until the wedge faces thereof are brought opposite to the inclined faces on the collar $t$. The spring U then suddenly throws the clutch into driving engagement with the pinion $m'$, the slotted connection between the link $O^2$ and arm of the rock shaft permitting the rock shaft to move independently of the lifting lever F and link $O^2$ for this purpose. The clutch is thus

shifted quickly notwithstanding that the lifting lever may be operated slowly. This slotted connection between the link $O^2$ and rock shaft O also leaves the rock shaft free, so that if one of its arms should strike an obstruction of any sort the shaft can turn to allow the arm to clear the obstruction.

V represents a lever for releasing the clutch R independently of the finger bar lifting mechanism. This lever is loose on the shifting rod Q between the bearing for the latter and a washer *v* which bears against the slotted bar P. The hub of the releasing lever has cam faces *v'* which engage a cross pin $v^2$ in the shifting rod and act to move the shifting bar to release the clutch when the rear end of the lever is raised. Notches $v^3$ are also provided in the hub of the releasing lever for receiving the pin $v^2$ to retain the clutch released.

W, Figs. 1, 3 and 4, represents the device for holding the finger bar stationary in its upright position. This device consists of a rod mounted on and projecting outwardly from the lifting lever F and having a bent or hooked outer end *w*. When the finger bar has been raised to the upright position by the lifting lever, it can be tilted rearwardly by the tilting lever and engaged with the hooked end of the rod, as indicated in Fig. 4. The rod W is preferably of square cross section and arranged to slide lengthwise without turning in a bearing *w'* on the lifting lever, which permits the rod to be shoved inwardly in its bearing to a position in which it will be out of the way when it is not desired to use it. It is not necessary for the driver to leave his seat to engage the finger bar with this holding device W. He only has to raise the finger bar by means of the lifting lever F and then tilt it rearwardly into engagement with the hook by means of the tilting lever.

I claim as my invention:

1. In a mowing machine, the combination of a pivoted finger bar having a toothed segment arranged eccentrically to the finger bar pivot, and a lever for operating said finger bar having a toothed segment arranged eccentrically to the lever pivot and meshing with said segment on the finger bar, the teeth of said segments being arranged in eccentric arcs which recede in opposite directions from the axes of the segments, substantially as set forth.

2. In a mowing machine, the combination of a pivoted finger bar having a toothed segment arranged eccentrically to the finger bar pivot, and a lever for operating said finger bar having a toothed segment arranged eccentrically to the lever pivot and meshing with said segment on the finger bar, said segments being arranged so that the portion of shortest radius of the lever segment meshes with the portion of longest radius of the segment on the finger bar when the finger bar is horizontal, substantially as set forth.

3. In a mowing machine, the combination of a pivoted coupling frame, a finger bar pivoted to said coupling frame and having a toothed segment arranged eccentrically to the finger bar pivot, a gag-lever pivoted on said coupling frame and having a toothed segment arranged eccentrically to the lever pivot and meshing with said segment on the finger bar, said segments being arranged so that the portion of shortest radius of one segment meshes with the portion of longest radius of the other segment, and a lifting lever connected to said gag-lever for operating the latter, substantially as set forth.

4. In a mowing machine, the combination of a finger bar pivoted to swing in a direction transversely of the machine and also mounted to tilt in a direction fore and aft of the machine, said finger bar having a toothed segment arranged eccentrically to its pivot, a gag-lever having a toothed segment arranged eccentrically to the lever pivot and meshing with said finger bar segment, said segments being arranged so that the portion of shortest radius of the lever segment meshes with the portion of longest radius of the finger bar segment when the finger bar is horizontal, and a lifting lever connected to said gag-lever for operating the latter, said gag-lever being mounted to tilt with the finger bar, substantially as set forth.

5. In a mowing machine, the combination with a pivoted finger bar, a knife, and knife reciprocating mechanism, of lifting mechanism for said finger bar, a clutch for said knife reciprocating mechanism, a sliding clutch shifting rod, a bar operated by said lifting mechanism and having a slot through which said shifting rod passes and a wedge portion adapted to engage a part on said shifting rod for moving it endwise, and a clutch releasing lever which is loosely fulcrumed on said shifting rod and is provided with a cam face adapted to engage a part on said shifting rod for moving it, substantially as set forth.

6. In a mowing machine, the combination with a pivoted finger bar, a knife, and knife reciprocating mechanism, of lifting mechanism for said finger bar, a clutch for said knife reciprocating mechanism, a sliding clutch shifting rod, a bar operated by said lifting mechanism and having a slot through which said shifting rod passes and a wedge portion, and a collar which is loose on said shifting rod and is connected with said slotted bar to swing with the bar on the shifting rod and is provided with an inclined face adapted to be engaged by the wedge portion of said slotted bar, substantially as set forth.

7. In a mowing machine, the combination

with a pivoted finger bar, a knife, and knife reciprocating mechanism, of lifting mechanism for said finger bar, a clutch for said knife reciprocating mechanism, a clutch shifting device, a rock shaft having a lost motion connection with said shifting device, and a lost motion connection between said lifting mechanism and said rock shaft, whereby said rock shaft is free to rock independently of both said lifting mechanism and said clutch shifting device, substantially as set forth.

8. In a mowing machine, the combination of a pivoted finger bar, a lifting lever and connections for lifting the finger bar to an upright position, and a hooked rod projecting from said lifting lever and adapted to engage the finger bar to hold it stationary in the upright position, substantially as set forth.

9. In a mowing machine, the combination of a pivoted finger bar, a lifting lever and connections for raising the finger bar to an upright position, a holding device for the finger bar with which the finger bar is adapted to be engaged by tilting the raised finger bar rearwardly.

10. In a mowing machine, the combination of a pivoted finger bar, a lifting lever and connections for lifting the finger bar to an upright position, and a hooked rod slidably mounted on said lifting lever and adapted to engage the finger bar to hold it stationary in the upright position, substantially as set forth.

Witness my hand in the presence of two subscribing witnesses.

CHRISTIAN MAUL.

Witnesses:
E. A. FARRALL,
HULLDA M. PFEIFER.