

No. 678,103.

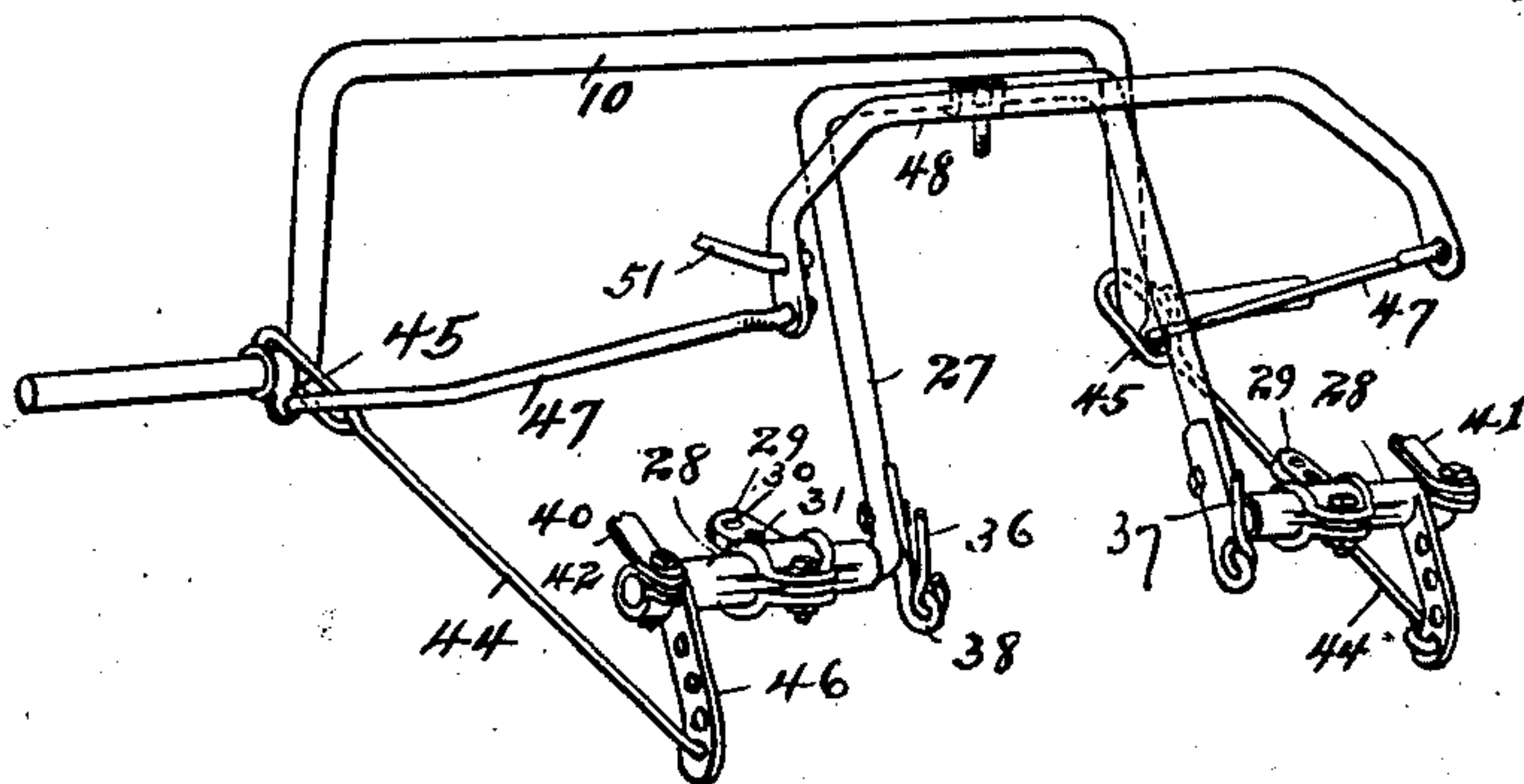
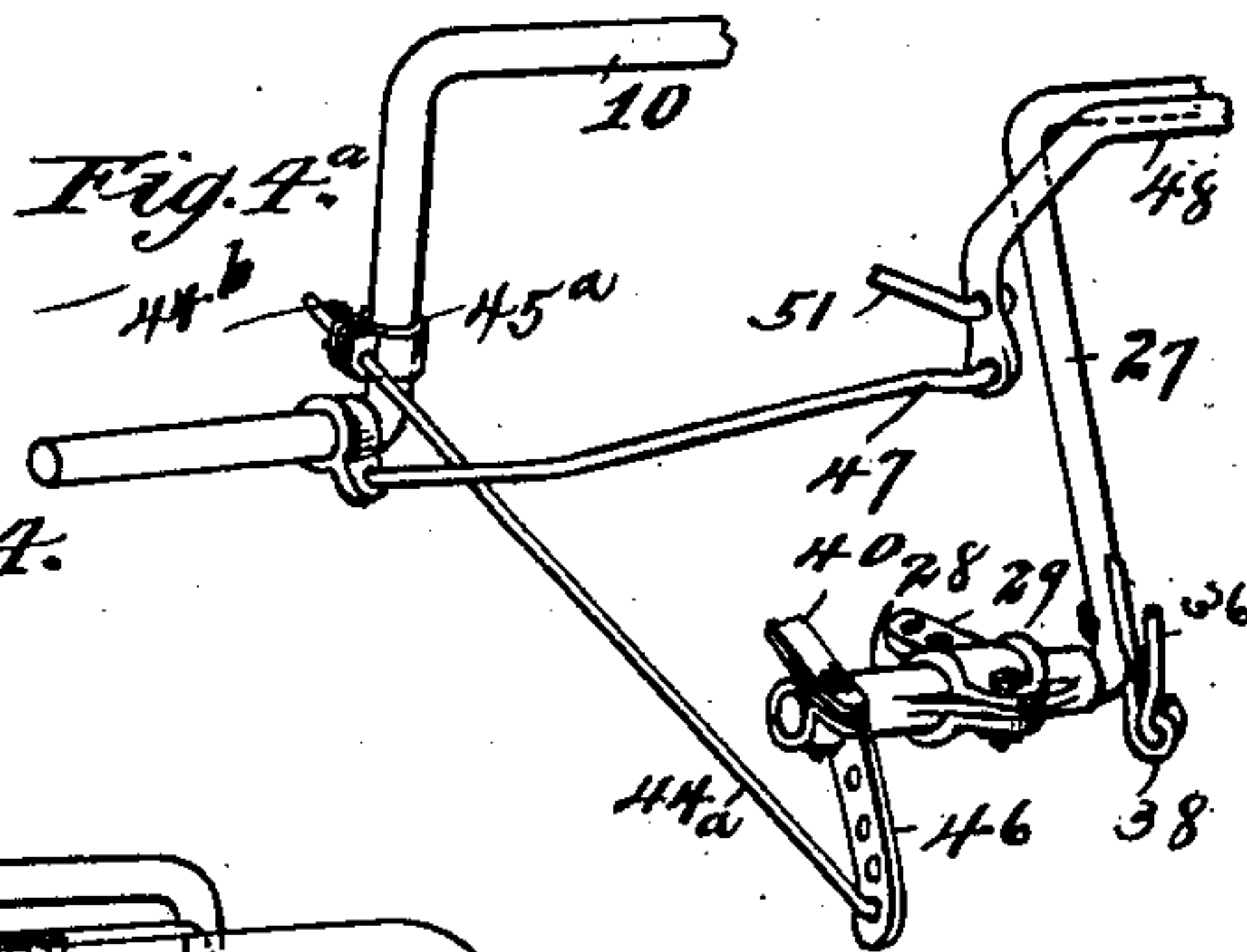
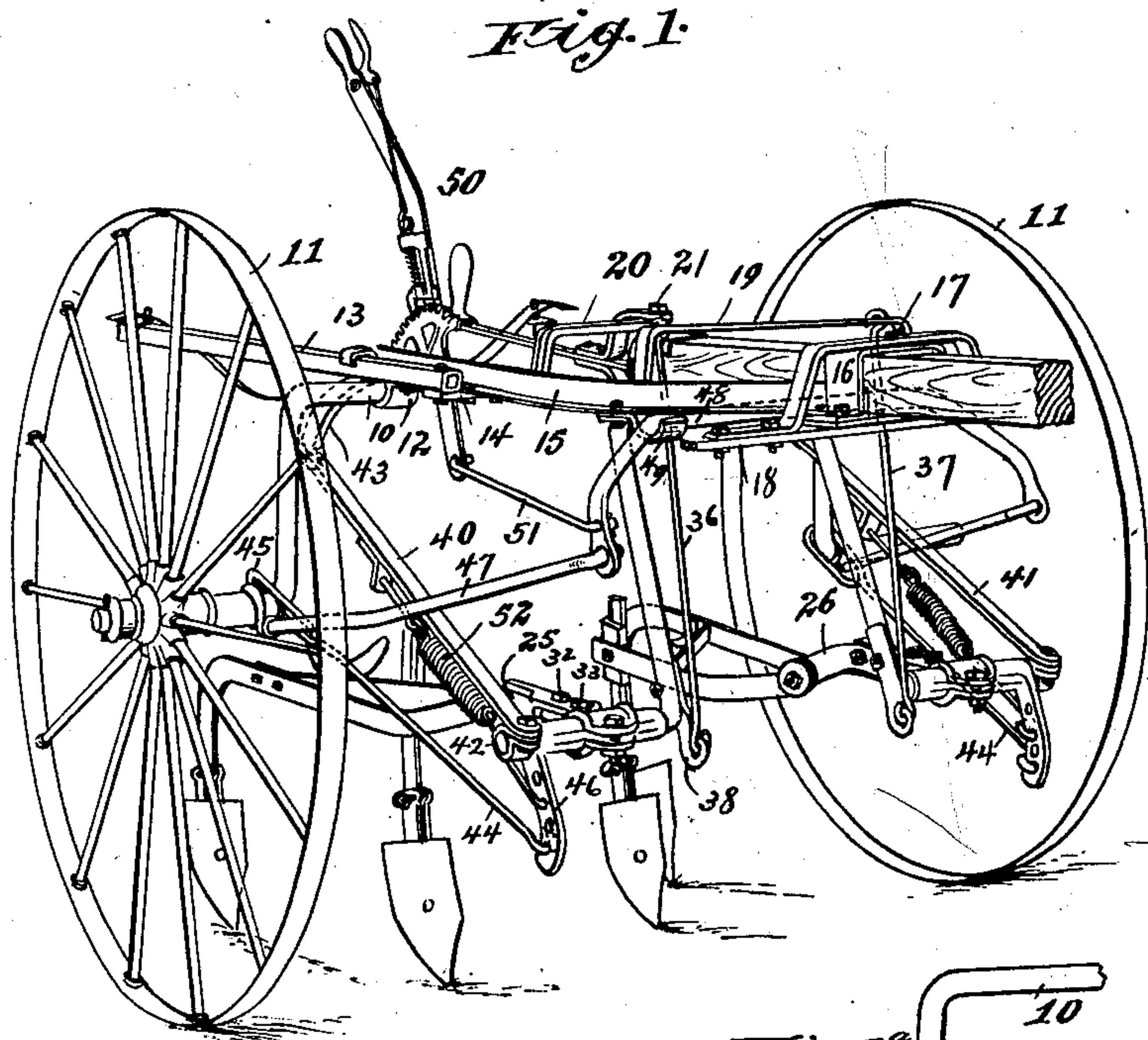
Patented July 9, 1901.

F. E. DAVIS.
CULTIVATOR.

(Application filed June 8, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses,
J. J. Mann,
Frederick F. Goodrum

Inventor,
Frank E. Davis
By Offield, Towle & Lathum
Attys.

No. 678,103.

Patented July 9, 1901.

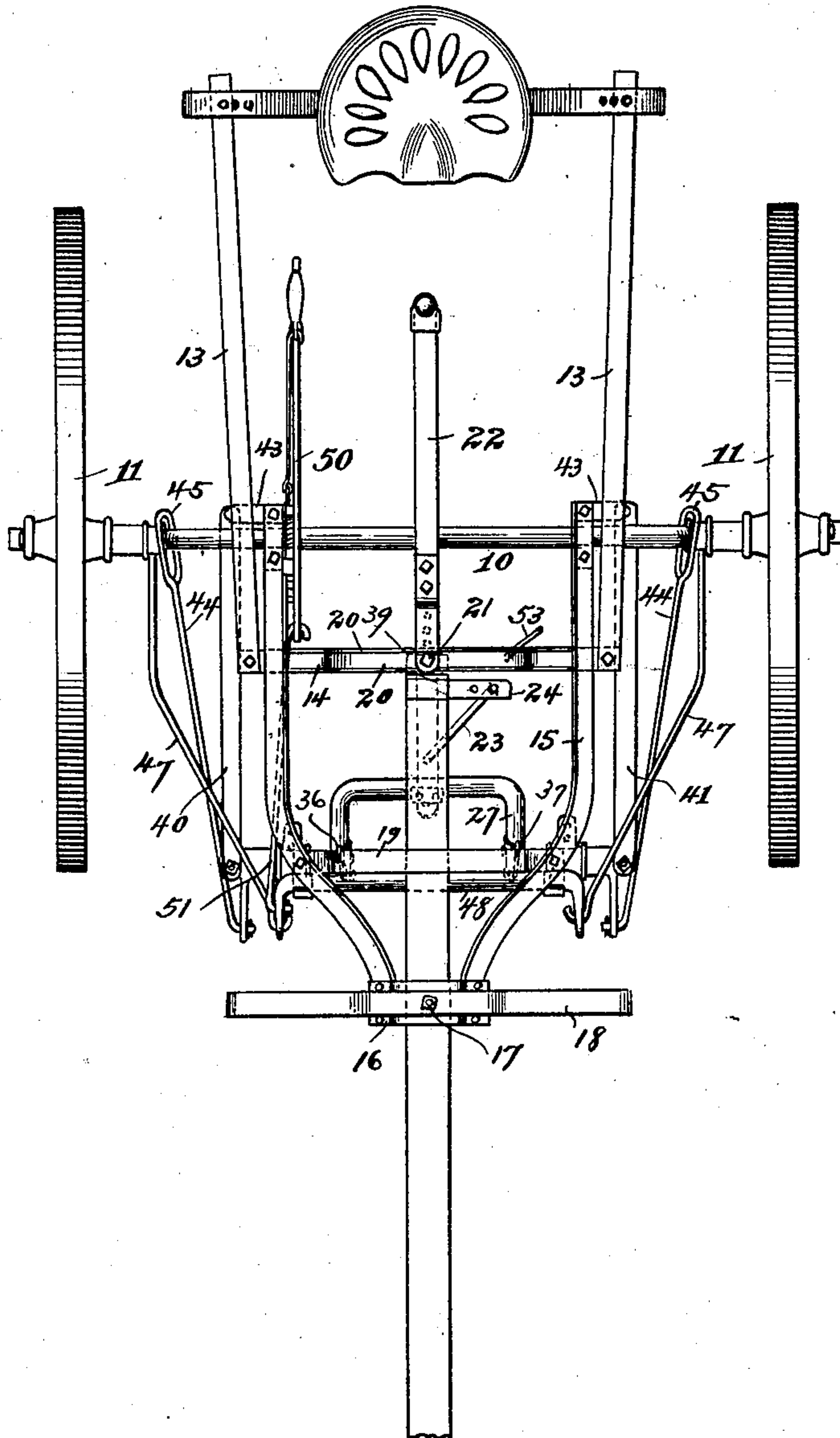
F. E. DAVIS.
CULTIVATOR.

(Application filed June 8, 1900.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 2.



Witnesses,
J. S. Mann,
Frederick F. Gordon

Inventor,
Frank E. Davis
By Offield, Towle & Lathum
Attys.

No. 678,103.

Patented July 9, 1901.

F. E. DAVIS.
CULTIVATOR.

(Application filed June 8, 1900.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 3.

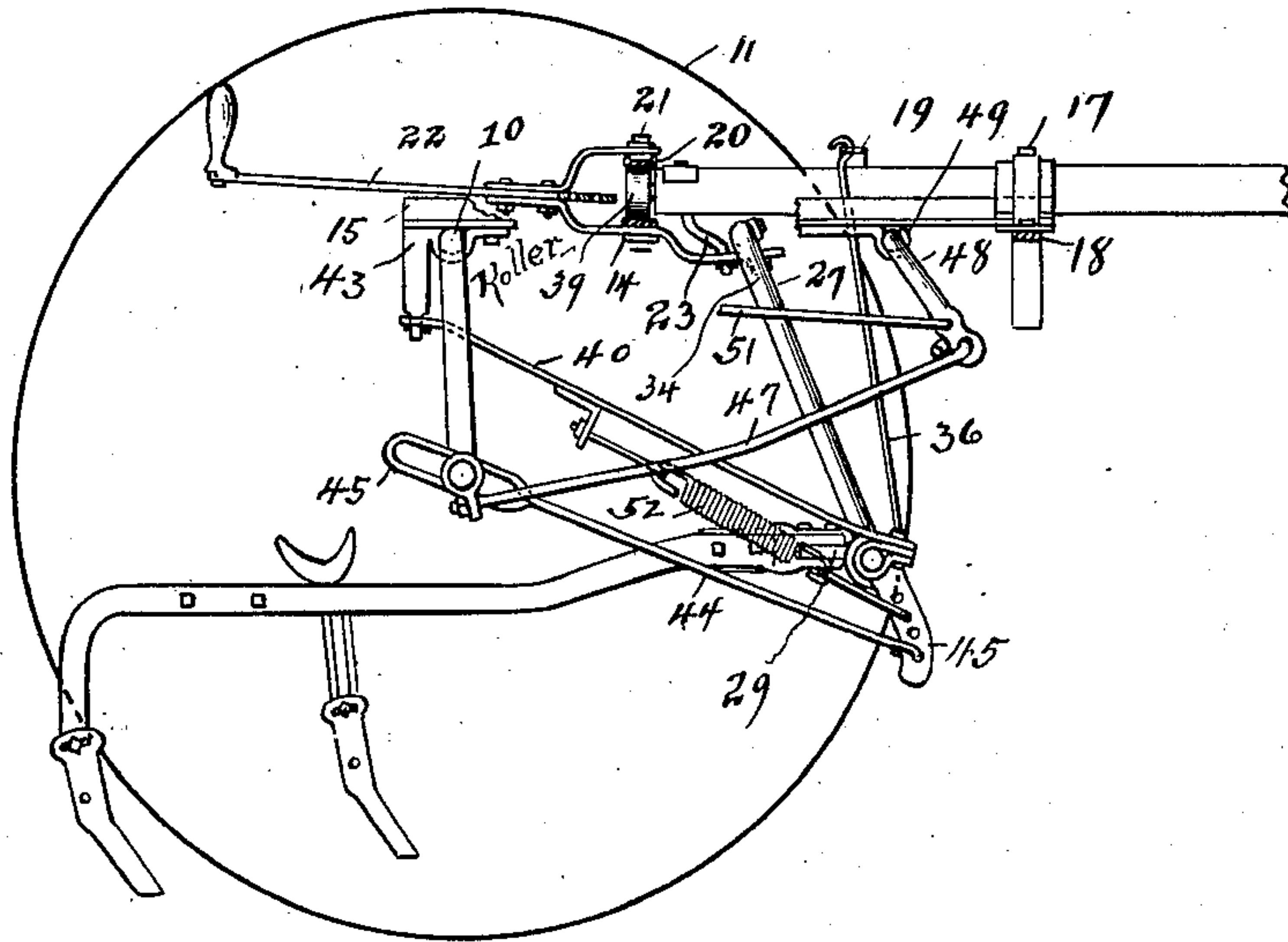


Fig. 5.

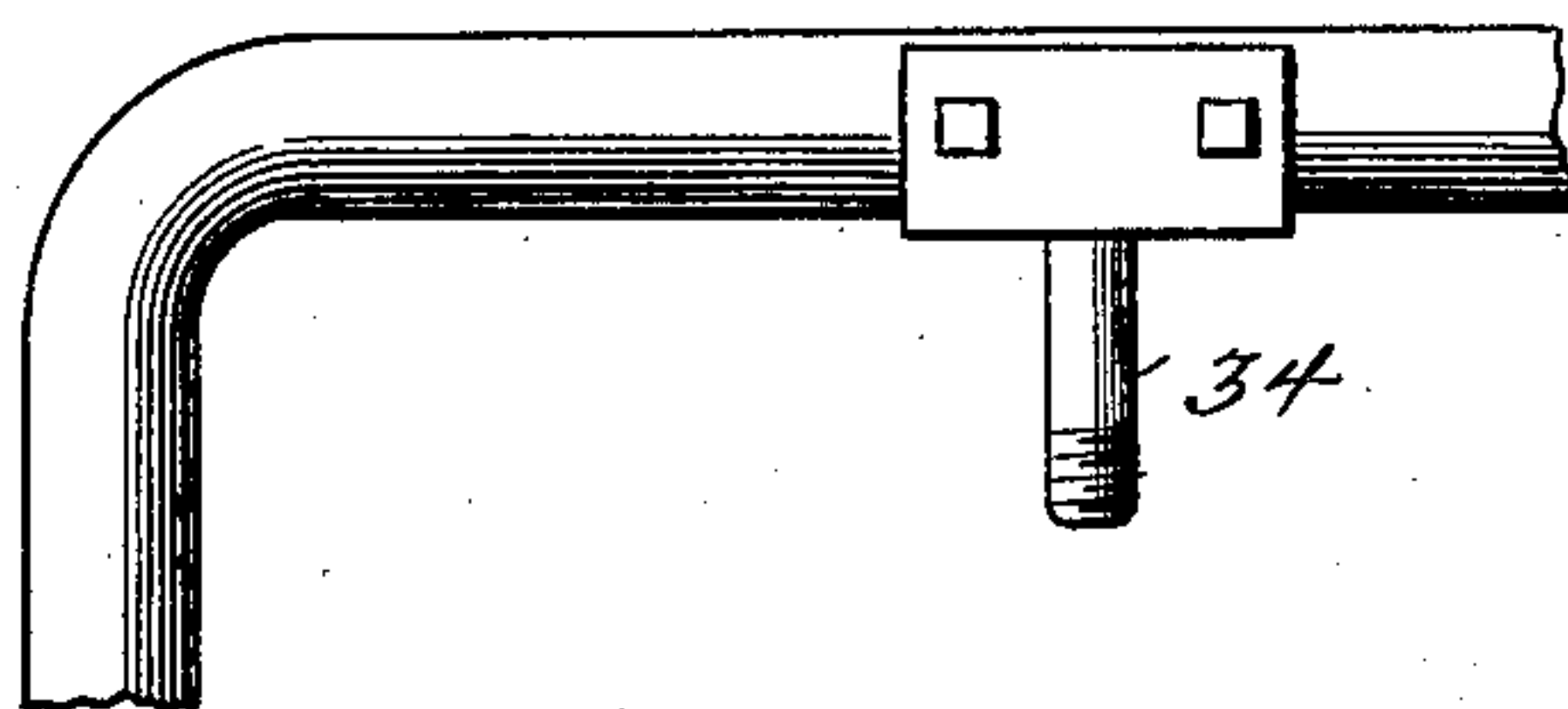


Fig. 6.

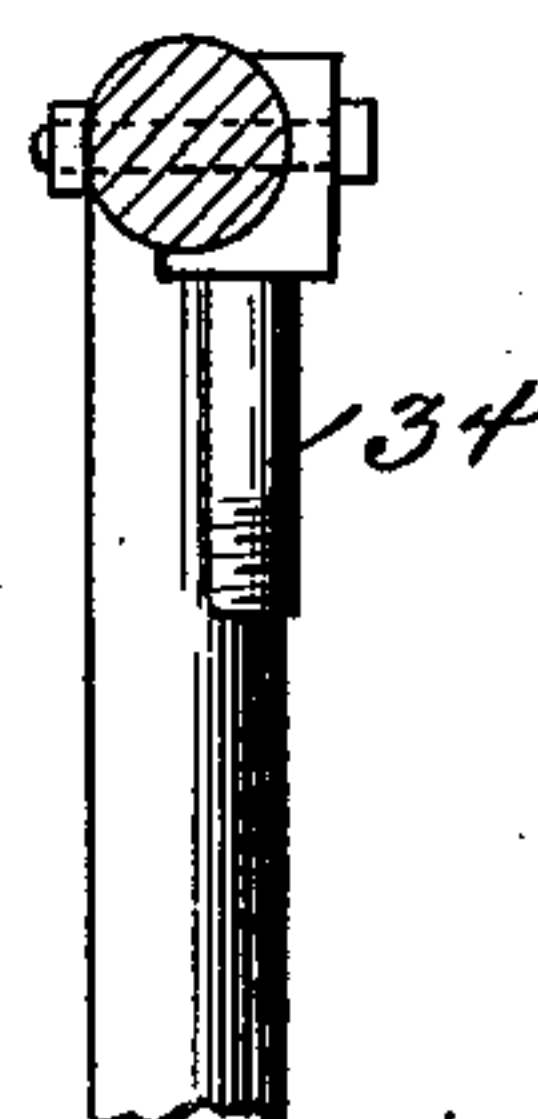
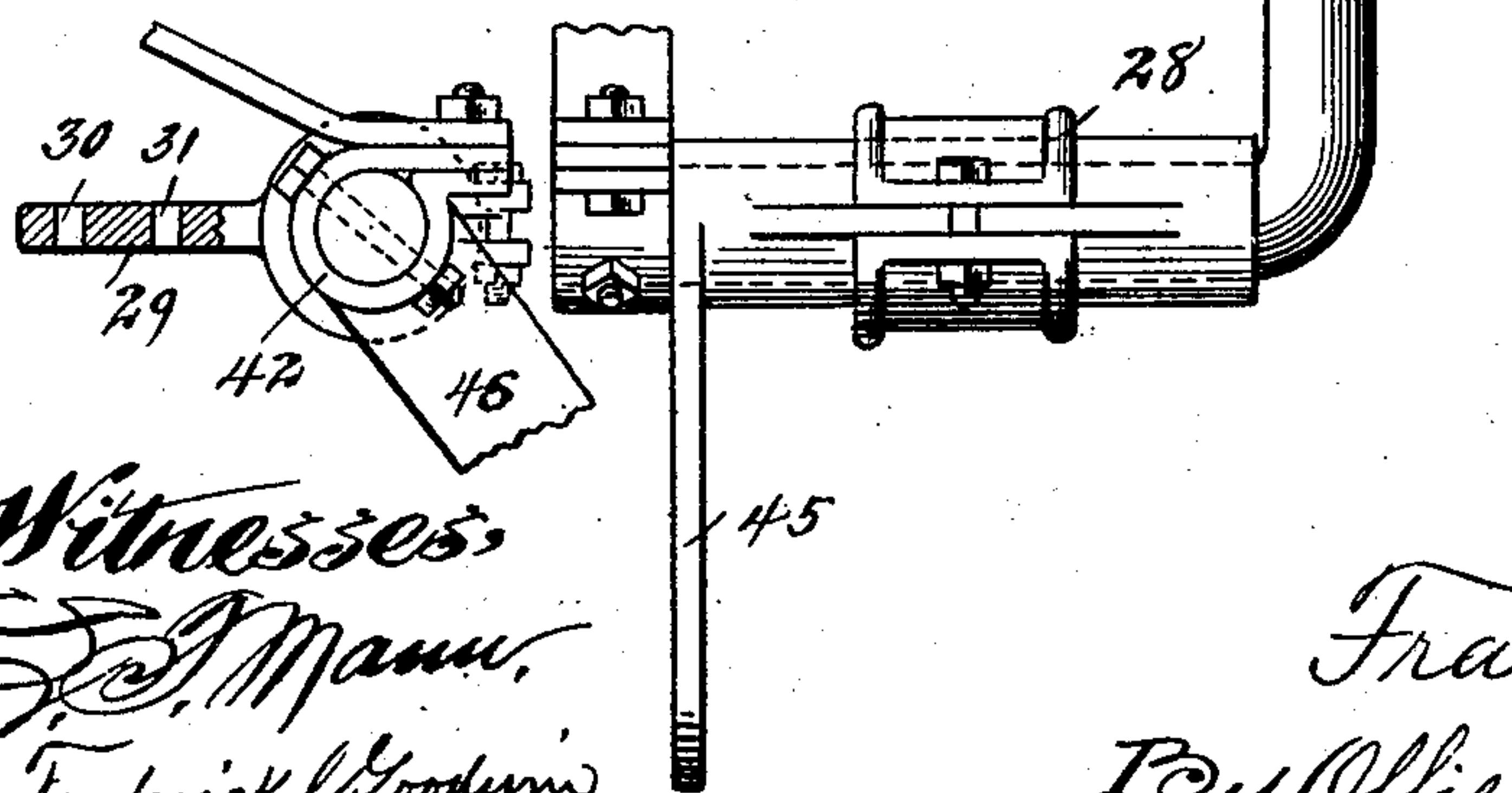


Fig. 7.



Witnesses,
J. A. Mann,
Frederick Goodwin.

Inventor,
Frank E. Davis
By Offield, Towle & Smith
Attys.

UNITED STATES PATENT OFFICE.

FRANK E. DAVIS, OF LA CROSSE, WISCONSIN.

CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 678,103, dated July 9, 1901.

Application filed June 8, 1900. Serial No. 19,540. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. DAVIS, of the city of La Crosse, county of La Crosse, and State of Wisconsin, have invented certain new and useful Improvements in Cultivators, of which the following is a specification.

This invention relates to certain improvements in cultivators, and more particularly to balanced cultivators having a swing shovel-frame. By a "balanced-frame" cultivator I mean one having the frame proper mounted upon a rocking arched axle and provided with means whereby the wheel-journals may be thrown backward and forward, so as to balance the frame of the cultivator in operation and also when the shovels are out of the ground, thus preventing the tongue from flying up under the weight of the driver as in turning. By a "swing-frame" cultivator I mean a cultivator having its shovel-beams connected by an arch at their front ends, said arch being suspended or sustained, so as to be capable of a lateral movement to enable the shovels to be moved laterally to avoid obstacles or the plants under cultivation.

My invention more particularly has in view the following objects: First, to provide a balanced cultivator which is easily adjusted, so as to maintain a perfect balance and in which is provided a rigid brace for the axle under all conditions; second, to provide a laterally swinging or shifting shovel-frame and means for shifting said frame, so as to carry the shovel-beams bodily laterally with slight effort on the part of the operator; third, to combine with such laterally swinging or shifting shovel-frame and its operating-lever a connection to the tongue, so that the wheels are shifted angularly to the line of draft when the shovel-beams are swung or carried laterally; fourth, to combine in a balanced cultivator with the rocking crank-axle and its adjusting mechanism a connection between said axle and the shovel-beam, whereby the rocking of the crank-axle is caused to automatically raise the shovel-beam; fifth, to the combination, with the shovel-beam frame, of braces extending from said frame to the seat or main frame of the cultivator, which braces are independent of the crank-axle, whereby said axle may be adjusted to balance the frame without disturbing the adjustments of the shovel-beam

frame; sixth, to the provision of a lifting-spring which is connected at one end to the shovel frame-brace and at its other end to a crank-arm extended from the sleeve or journal-box to which the shovel-beams are attached, which box is mounted upon journals provided by the arch, so that said lifting-spring, while constantly under tension when the shovels are in the ground, is locked or prevented from exercising its lifting tendency until the shovel-beam starts to rise, when said spring assists in the lifting operation; seventh, to means for locking the shovel-beam frame against lateral swing and to means for changing the connections of the shovel-beams to their frame from a rigid to a pivotal connection to adapt said shovel-beams to be swung laterally upon their pivots, and, eighth, to provisions for locking the pivoted tongue against movement while permitting the shovel-beam frame to be swung laterally.

The accompanying drawings illustrate only so much and such parts of the cultivator as are necessary to the understanding of my improvements therein, and I have omitted the lifting levers and springs, whereby the shovel-beams are raised out of the ground, as such devices are well known and are applied in a great variety of ways.

In the drawings, Figure 1 is a front perspective view of the cultivator the lifting-levers omitted and the draft tongue or pole broken away. Fig. 2 is a plan view with the shovel-beams omitted. Fig. 3 is a sectional elevation taken in a plane parallel to the draft-pole. Fig. 4 is a perspective view of the crank-axle, its adjustable braces, the laterally-swinging arch and the links connecting the horizontal portions of the arch with the axle. Fig. 4^a is a modification. Fig. 5 is a front elevation, partly broken away, of the arch, showing the manner of connecting the shovel-beams, braces, and shifting-lever thereto. Fig. 6 is a sectional elevation of the arch, showing the shifting-lever pivot; and Fig. 7 is an end elevation of the arch, showing the shovel-beam connection partly in section.

In the drawings, 10 represents the crank-axle of usual form, and 11 the ground-wheels, mounted on horizontal journals thereof. This axle is journaled in suitable half-boxes

12, carried by the seat-bars 13, and the latter are connected rigidly by the cross-bar 14 with hounds 15. Said hounds extend forward parallel to each other for a distance in front of the axle and their extremities are converged and rigidly connected together by the U-shaped strap 16. The tongue passes through the opening of this U-shaped strap, and a single pivot-bolt 17 pivotally connects the eveners 18 and tongue to the frame, consisting of the hounds and seat-bars. The tongue extends rearwardly behind its pivot beneath an upwardly-bent strap 19, which is connected to the hounds at its ends and terminates in front of the cross-bar 14. Said cross-bar has thereon an upwardly-arched strap 20, which affords a bearing for the pivot 21 of a shifting-lever 22, which is connected to the tongue through a link 23 and an arm 24, the latter extending at an angle from the tongue and having an aperture to receive the end of the link 23, so that the swinging of the tongue may be caused. By means of the mechanism just described the direction of the travel of the cultivator may be varied by manipulation of the shifting-lever 22. The principal purpose of the shifting-lever is, however, to control the lateral movement of the shovel-beams and said beams. The mode of mounting and controlling them will therefore be next described. The shovel-beams are marked 25 26, and their front ends are connected to an arch-bar 27, preferably by means of the pipe-boxes 28. (See Fig. 5.) These pipe-boxes have rearwardly-extending short arms 29, having bolt-apertures 30 31, and the shovel-beams are secured thereto by two bolts 32 33, when it is desired to have the shovel-beams rigidly connected to the arch-bar. When so connected, it is obvious that the lateral shifting of the arch will carry the shovel-beams laterally. If, however, it be desired to render the shovel-beams independent of the swing of the arch, or, in other words, independently movable in a horizontal plane and around vertical axes, one of said bolts may be removed and the shovel-beam thereupon swung in a horizontal plane as well as vibrated in a vertical plane, turning about the end of the arch-bar as its axis. The arch-bar extends upwardly, and its arms are preferably inclined rearwardly, its central portion carrying a pivot-bolt 34, which receives the forward end of the shifting-lever 22. From the foregoing description it will be understood, the shifting-lever 22 being pivoted at 21 upon a fixed part of the frame, that its vibration or sidewise swing will shift the arch laterally, carrying with it the shovel-beams. The tongue being connected to the same shifting-lever, as above described, will also be swung upon its pivot, and the combined result of these movements will be to carry the shovel-beams and the shovels thereon out of line with an obstruction or the plants under cultivation, and at the same time to change the course or direction of the ground-wheels. These movements

are not novel, however, cultivators having been previously constructed in which a laterally-shifting arch connecting the shovel-beams has been connected to the tongue, and a shifting-lever also pivotally connected to the tongue has been made to swing both the tongue and the arch. My construction, however, possesses certain advantages over that just mentioned. In the first place my shifting-lever is connected directly to the arch-bar, and the tongue is not directly connected with the arch, but is connected with the shifting-lever, and this connection may be removed, so as to leave the tongue free to swing upon its pivot, or the tongue may be locked to the frame, as hereinafter described, and the arch moved independently of the tongue. When both the tongue and the arch are connected to the shifting-lever in the manner shown and described, the tongue does not partake of the full swinging movement of the arch by reason of the arrangement of the pivots, the movement of the rear end of the tongue being considerably less than the side swing of the arch. The arch may be supported in various ways, but I prefer to suspend it by means of the swinging links 36 37, these links being pivotally connected by means of the short arms 38 to the arch at the lower bends thereof. The upper ends of the links are pivotally connected to the strap 19, and thus these links are free to swing laterally while they sustain the arch and the front ends of the shovel-beams. This produces much less friction than the mounting of the arch-bar in a bearing carried by the frame. The friction of the tongue as it swings back and forth may be reduced by providing it with antifriction-roller 39, traveling between the cross-bar 14 and strap 20, as seen in Fig. 3. The thrust-braces 40 41 are pivotally connected at their forward ends to fixed collars 42 on the extremities of the horizontal portions of the arch 27, and at their rear ends upon downwardly-curved carry-irons 43, bolted to the hounds 15. These thrust-braces, it will be observed, are independent of the axle, and hence the adjustment of the axle does not in any way tend to disturb the position of the arch. The axle, however, is connected to the shovel-beams, and I preferably make this a sliding connection. This may be made, as shown in Fig. 4, by means of rods 44, whose rear ends are looped, as shown at 45, to embrace the axle at its lower bend, and their forward ends are turned and enter one of a series of apertures in an arm 46, which is rigidly secured with the pipe-box 28; but I prefer to employ the construction shown in Fig. 4^a, wherein rods 44^a have their rear ends adapted to slide through a perforation in the clip 45^a, connected to the vertical member of the axle and limited by the pin 44^b. In this construction the sliding rod has a greater leverage on the shovel-beam thrown backwardly than when it is connected by means of the looped rods. The leverage may be further

varied by sliding the clip up and down on the axle, and by setting the limit-pin at a different point on the rod the range of movement of the beam may be varied. The exact form of the connection may be further varied, and if instead of the sliding connection the rods were unvarying as to length and were pivoted at their ends to the axle the automatic lifting of the shovel could still be secured, but in such case the shovel-beams would always be affected by the adjustment of the axle.

The crank-axle is adjustable, so as to carry the wheels forward or back with reference to the frame for the purpose of balancing the weight of the frame and of the driver both in use and when the shovels are out of the ground. For this purpose I employ the brace-rods 47, secured to the crank-axle near its lower bend and pivotally connected to the extremities of a rocking crank-shaft 48, carried in suitable bearings 49 on the hounds 15. An adjusting-lever 50 is pivoted on the frame of the machine, and its lower end is connected by a link 51 with one of the arms of the rock-shaft 48. By throwing this lever 50 forward or back the crank-axle is rocked in its bearing, thus carrying the wheels forward or back, and this change of the base with reference to the load balances the cultivator, so as to prevent the tongue from flying up, so as to maintain the draft-tongue and the operative parts in their proper and normal positions.

By connecting the shovel-beams with the crank-axle in the manner described it will be obvious that when the axle is rocked in a direction to carry the wheels backward until the axles strike the closed ends of the loops 45 of the connecting-rods 44 the tendency will be to lift the shovels out of the ground. To further assist in this lifting operation, I connect a spring 52 to the thrust-brace 40 and the arm 46, the series of apertures in said arm enabling the tension of the spring to be varied. When the shovels are in the earth, the spring is practically inactive, although it may be so adjusted as to give a slight cushioning effect to the shovel-beams; but the inactivity of the spring is due to the arrangement of its connections, which are such that it exerts little, if any, leverage upon the shovel-beam when it is at work; but the spring is normally under tension and when through the backward movement of the axle there is a pull upon the connecting-rod 44, and thereby upon the arm 46, thus throwing the forward point of connection of the spring out of line with the pivot of the shovel-beam, said spring immediately becomes effective to assist in raising the shovels out of the ground.

I have shown in Fig. 2 a latch 53, which may be connected to the arm 24 so as to lock the tongue rigidly to the frame, and if the tongue be so locked and also connected through the link 23 to the shifting-lever 22 it is obvious that the tongue and arch-bar become rigidly locked with the frame. When

so locked, the shovel-beams may be pivotally connected to the arch-bar by the removal of one of the bolts, as above described, and handles may be applied to the shovel-beams for controlling them or they may be controlled by the feet of the operator.

It is obvious that the foregoing construction and arrangement of parts enables the carrying out of the objects hereinbefore set forth, and while I prefer to employ each and all of said devices in combination with each other, yet it is obvious that some of them might be used where others are omitted, and it is obvious also that the exact means of mounting or supporting the several operative parts do not constitute essential features of my invention.

I claim—

1. In a balanced cultivator, the combination of an arched wheel-axle provided with ground-wheels, a main frame having pivotal connection with the arched portion of said axle and provided with an operator's seat in rear of said pivotal connection, a transversely-arranged crank-shaft mounted in journals in the main frame at a point in front of the connection of the latter with the arched portion of the axle, a rigid crank-arm upon each end of said crank-shaft, rigid operating-links connecting the free ends of said crank-arms with the wheel-axle at the respective sides of the arched portion thereof, an operating-lever pivotally mounted upon the main frame in rear of said crank-shaft, a rigid operating-rod connected with said operating-lever, and extending thence to one of the arms of the crank-shaft, and means for locking said operating-lever in various positions of adjustment, substantially as described.

2. In a cultivator, the combination with the wheel-frame, of a shovel-beam frame supported from the wheel-frame at a point in front of the wheel-axle by a connection which permits lateral movement of the shovel-beam frame relatively to the wheel-frame at such point of support, and a shifting-lever pivoted on the wheel-frame and directly connected to the shovel-beam frame, whereby the latter frame may be shifted bodily laterally to occupy different parallel positions, substantially as described.

3. In a cultivator, the combination, with a wheel-frame and shovel-beams, of an arched bar connecting the forward ends of said shovel-beams and swinging links whereby the arched bar is suspended from the wheel-frame, and a lever pivoted on the wheel-frame and connected to the arched bar, substantially as described.

4. In a cultivator, the combination, with a wheel-frame and shovel-beams, of an arch-bar connecting the forward ends of the shovel-beams, swinging supports for said arch-bar connected to the wheel-frame in front of the wheel-axle, pivoted braces extending from the shifting frame to the wheel-frame, and a shifting-lever connected directly to the arch-

bar whereby the arch-bar may be shifted laterally independently of the wheel-frame, substantially as described.

5 In a cultivator, the combination, with a wheel-frame having a rocking crank-axle, shovel-beams connected at their forward ends by a shiftable frame, a shifting-lever connected to said frame and braces extending from said shovel-beam frame to the main
10 frame and adapted to hold the shovel-beam frame in position while permitting the crank-axle to be rocked, substantially as described.

6. In a cultivator, the combination, with a wheel-frame and shovel-beams, of an arch-
15 bar connecting the forward ends of the shovel-beams, swinging supports for the arch-bar, a shifting-lever directly connected to said arch-bar, and a pivoted tongue to which the shifting-lever is also connected, substantially as
20 described.

7. In a cultivator, the combination, with a wheel-frame and shovel-beams, of a laterally-shiftable shovel-beam frame, a shifting-lever directly connected to said shovel-beam frame,
25 a pivoted tongue and a link affording a removable connection between said tongue and the shifting-lever, substantially as described.

8. In a cultivator, the combination, with a wheel-frame and shovel-beams, of a laterally-shiftable shovel-beam frame, a shifting-lever directly connected to said shovel-beam frame,
30 whereby it may be shifted independently of the wheel-frame, and a pivoted tongue also connected to the shifting-lever, and means for locking the tongue and thereby the shifting-lever and shiftable frame, substantially
35 as described.

9. In a cultivator, the combination, with a wheel-frame and shovel-beams, of an arched
40 bar connecting the forward ends of said beams, swinging links for suspending said arched bar from the wheel-frame, a pivoted tongue and a shifting-lever directly connected to the arched bar and a link connecting said shifting-lever to the tongue, substantially as de-
45 scribed.

10. In a wheel-cultivator, the combination, with a wheel-frame having a rocking crank-axle, shovel-beams connected at their forward
50 ends and means for laterally shifting said shovel-beams bodily, braces connecting the forward ends of the shovel-beams with the wheel-frame independently of the crank-axle, connections between the crank-axle and the
55 front ends of the shovel-beams, and means for rocking the crank-axle and thereby automatically raising the shovel-beam, substantially as described.

11. In a wheel-cultivator, the combination,
60 with a wheel-frame and its rocking crank-axle, a rock-shaft journaled to the main frame, rigid rods connecting the ends of said rocking shaft with the cranks of the axle, shovel-beams swinging upon a horizontal axis

and links pivotally connected to the axle and
65 to the shovel-beam eccentrically to their pivots, and means for rocking the crank-axle, whereby the shovel-beams are automatically lifted and the frame is balanced, substantially
70 as described.

12. In a cultivator, the combination, with a wheel-frame and shovel-beams, of a laterally-shiftable shovel-beam frame, a shifting-lever connected to said shovel-beam frame,
75 a pivoted tongue, a link whereby said tongue may be also detachably connected to the shifting-lever, and means for locking the tongue rigidly to the wheel-frame to permit the shovel-beam frame to swing laterally inde-
80 pendently of the tongue, substantially as described.

13. In a cultivator, the combination, with a wheel-frame and shovel-beams, of a shovel-beam frame connecting the forward ends of
85 the shovel-beams, and suspended from the wheel-frame, a shifting-lever directly connected to the shovel-beam frame, and a pivoted tongue also connected to the shifting-lever, and means for locking the tongue rigidly and thereby the shifting-lever and shift-
90 able frame, substantially as described.

14. In a cultivator, the combination, with a wheel-frame and shovel-beams, of an arched
95 bar connecting the forward ends of the shovel-beams, and capable of being swung laterally, braces extending from the arched bar to the wheel-frame and springs connected to said braces and eccentrically to the journal-boxes
100 of the shovel-beams, substantially as described.

15. In a cultivator, the combination, with a wheel-frame and shovel-beams, of a shovel-beam frame mounted upon the main frame
105 so as to be shifted laterally thereof, means for shifting said frame laterally and for locking said frame against lateral movement, said shovel-beams being normally rigidly attached
110 to their frame, and means for converting said attachment to a pivotal connection, substantially as described.

16. In a wheel-cultivator, the combination, with a wheel-frame having a rocking crank-axle, shovel-beams, an arched bar having
115 journals upon which the shovel-beams are mounted, swinging links for suspending the arched bar from the wheel-frame, a shifting-lever pivoted upon the main frame and connected directly to the arched bar, a pivoted
120 tongue, and a link connecting the tongue and the shifting-lever, braces extending from the arched bar to the wheel-frame and rods having a sliding connection with the crank-axle and connected to the shovel-beams eccentrically to their pivots, substantially as described.

FRANK E. DAVIS.

Witnesses:

C. C. LINTHICUM,
A. HIRSHHEIMER.