

No. 746,633.

PATENTED DEC. 8, 1903.

O. E. JOHNSTON.  
LISTER CULTIVATOR.  
APPLICATION FILED JUNE 8, 1903.

NO MODEL.

5 SHEETS—SHEET 1.

Fig. 1.

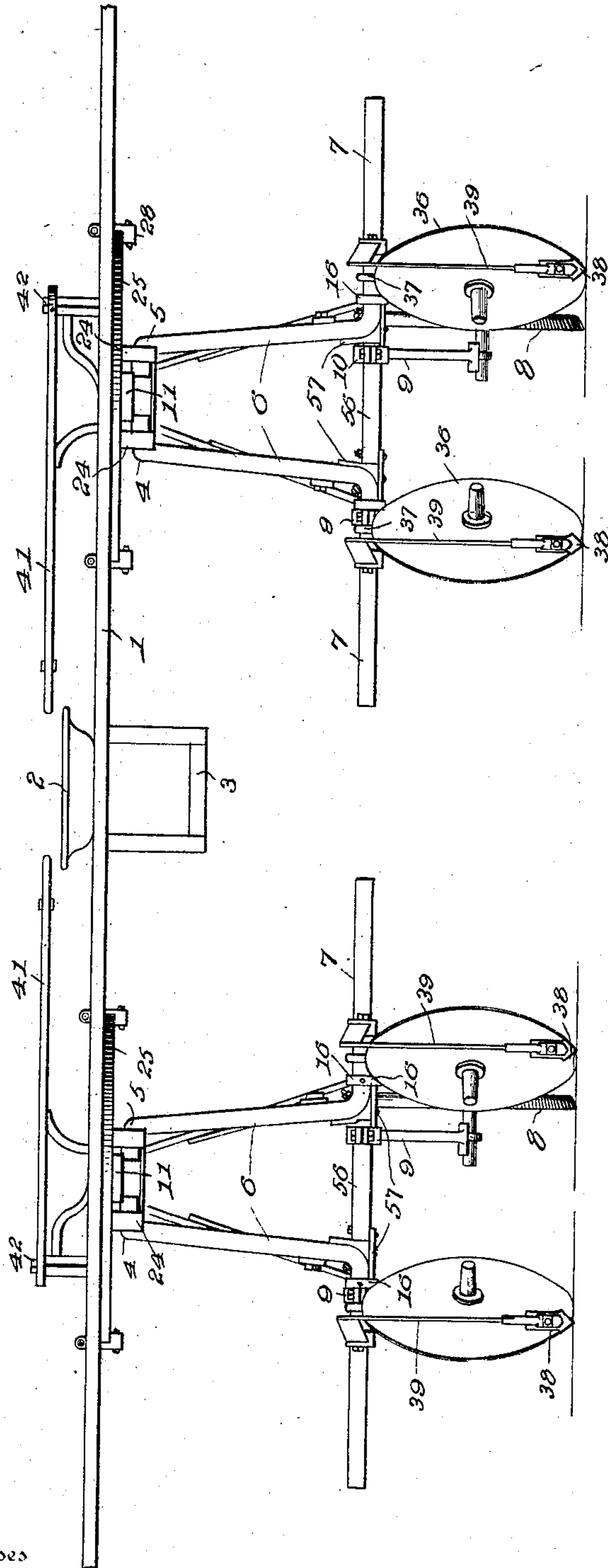
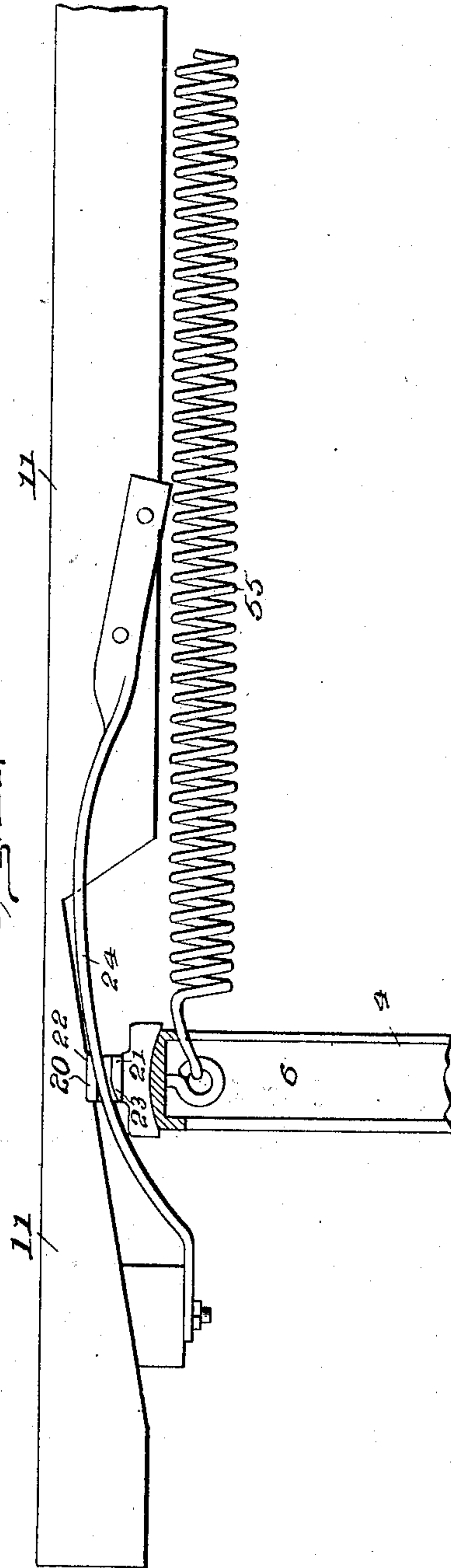


Fig. 12.



Witnesses

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334

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5 SHEETS—SHEET 2.

Fig. 10.

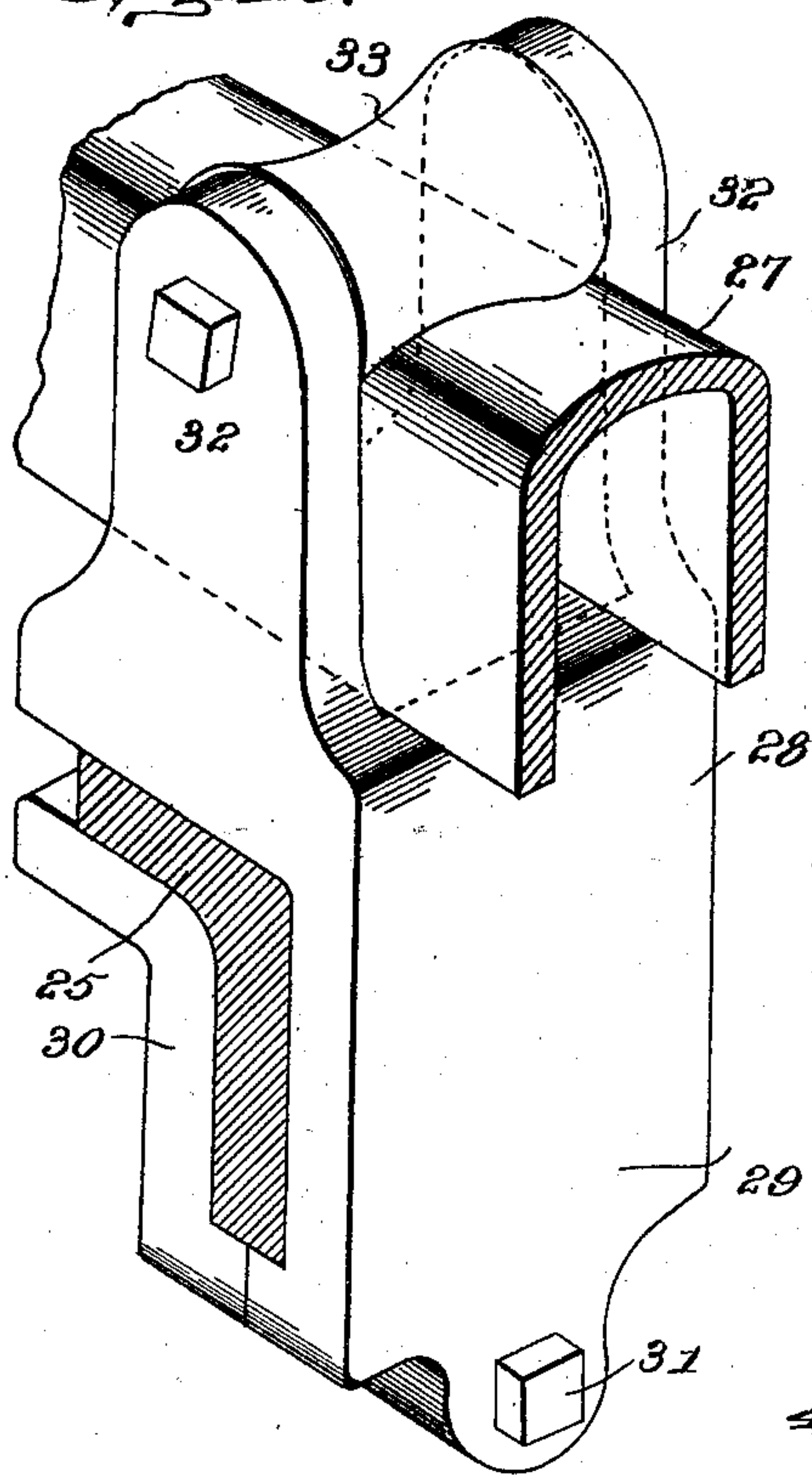


Fig. 9.

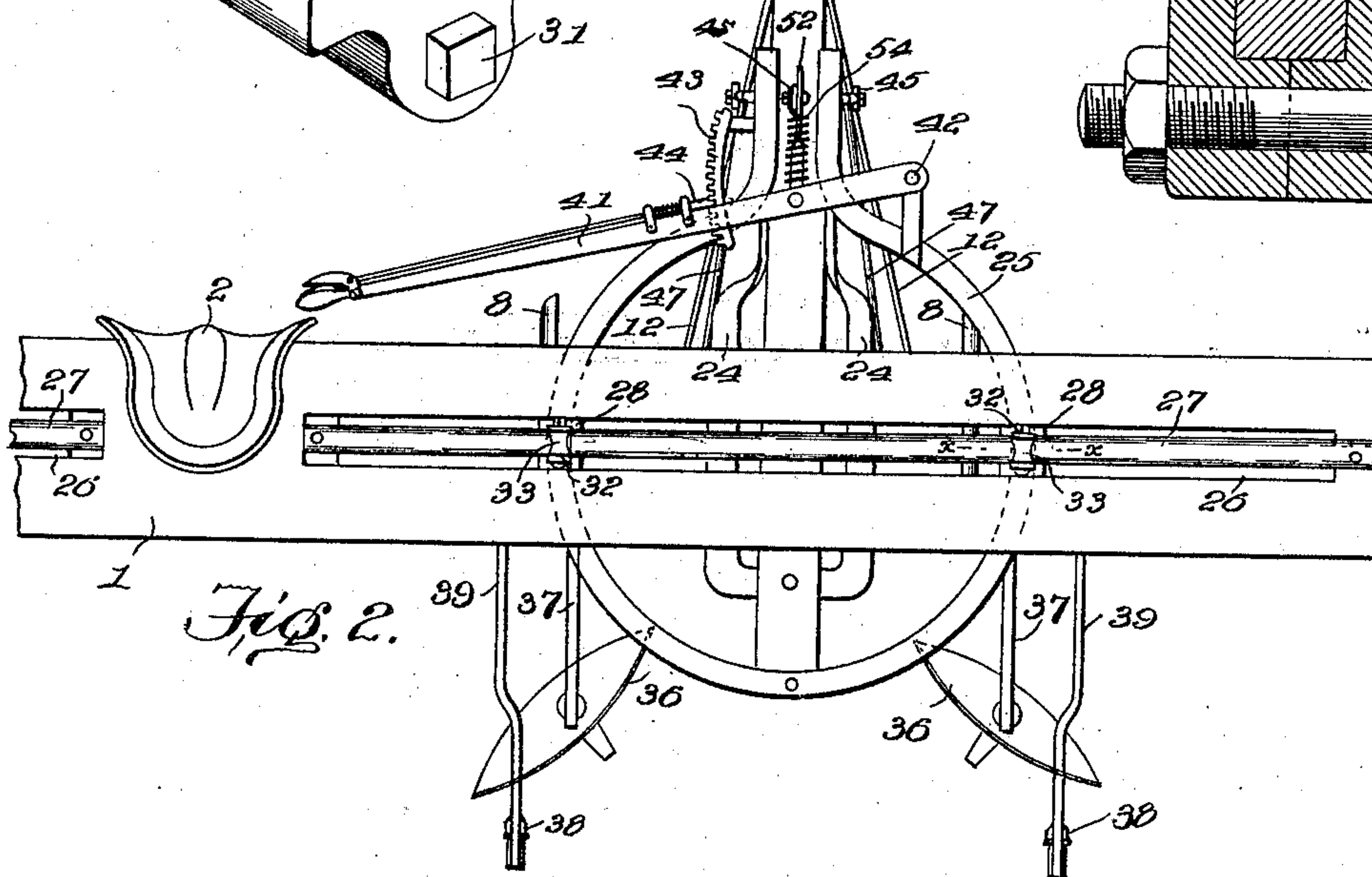
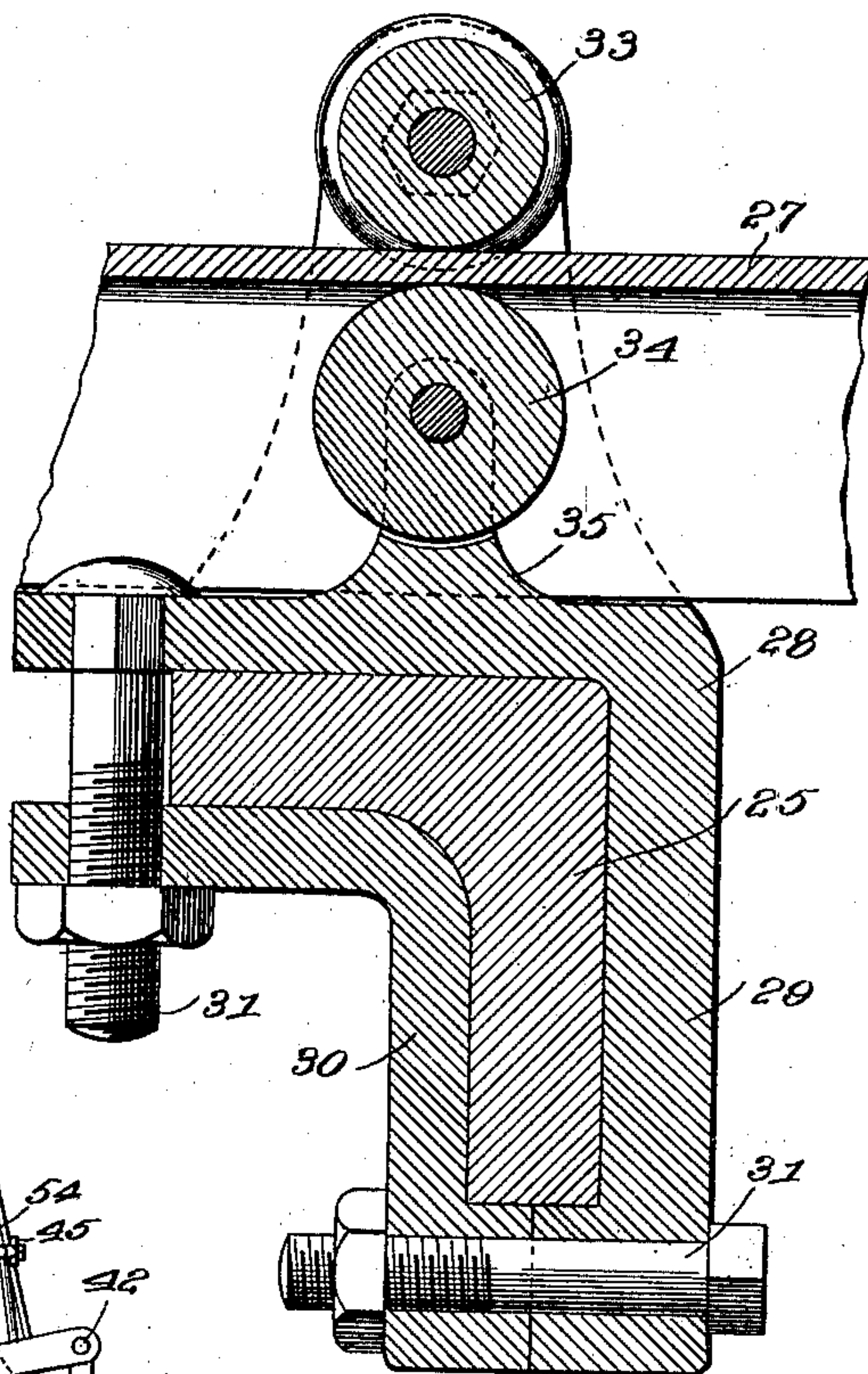


Fig. 2.

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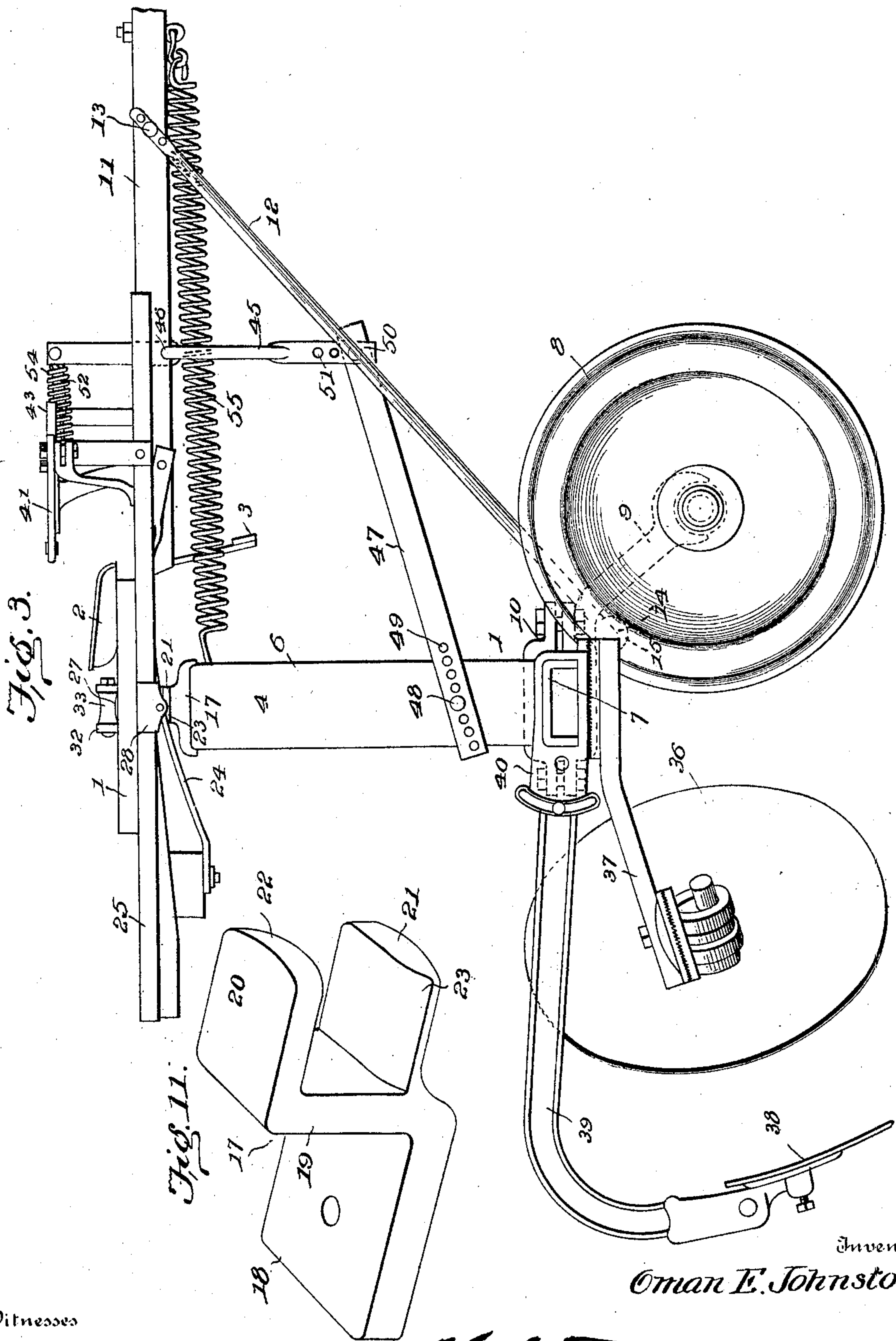
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

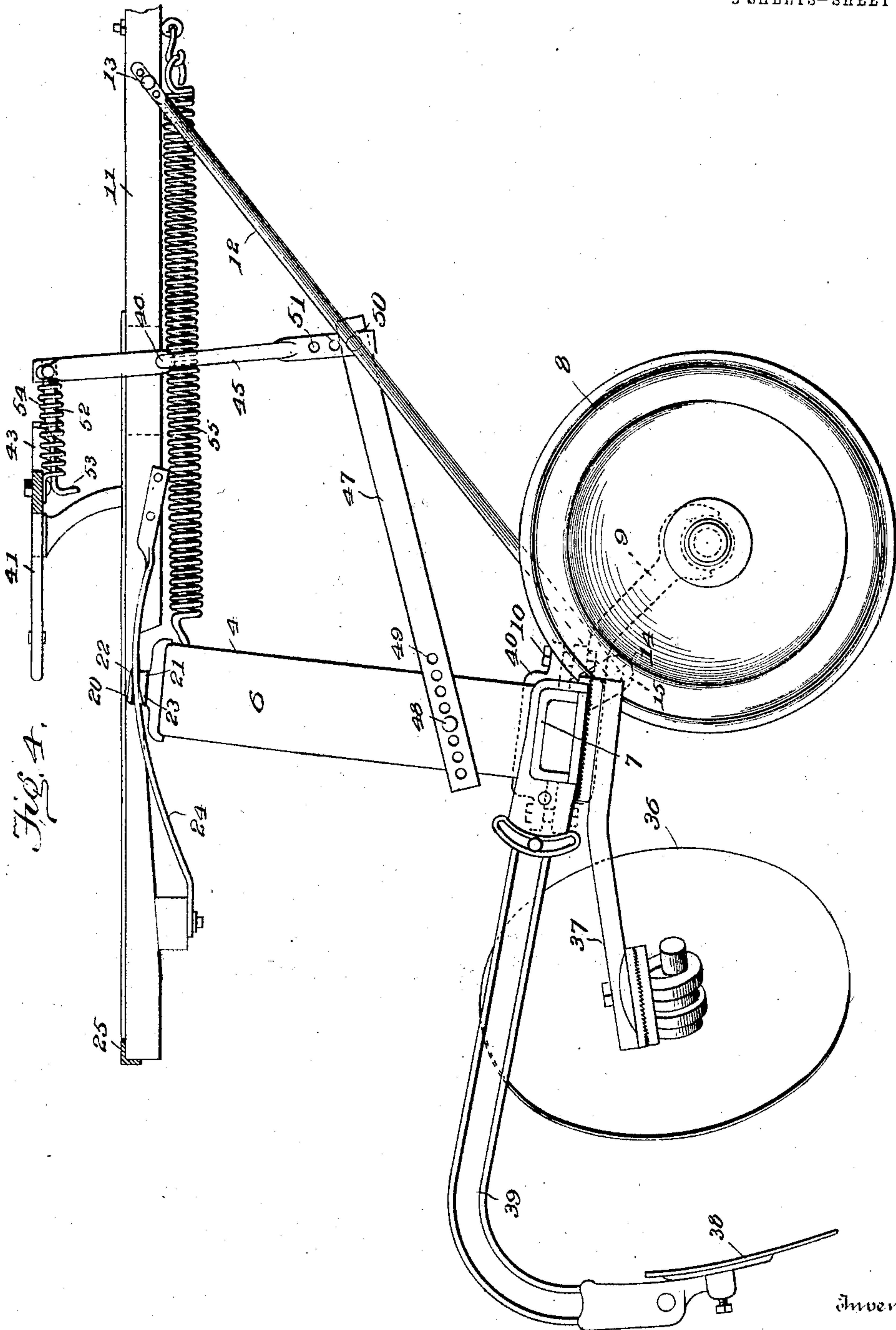


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## LISTER-CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 746,633, dated December 8, 1903.

Application filed June 8, 1903. Serial No. 160,505. (No model.)

*To all whom it may concern:*

Be it known that I, OMAN E. JOHNSTON, a citizen of the United States, residing at Bellevue, in the county of Huron and State of Ohio, have invented certain new and useful Improvements in Lister-Cultivators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to lister-cultivators, and more particularly to that class known as "two-row" cultivators, and has for its object to provide a cultivator of this class adapted for the cultivation of corn, not only at the beginning of its growth, but also after it has reached a height where cultivators of this class as usually constructed cannot be used.

A further object of the invention is to effect a firm connection between the cultivator-sections, which will permit the desired play between them, while at the same time maintaining them in an upright position.

A still further object is to provide an efficient and readily-operated mechanism for raising and lowering the cultivating devices. To these and other ends my invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a rear elevation of a construction embodying my invention in one form. Fig. 2 is a plan view of one-half of the same. Fig. 3 is a side elevation showing the cultivating devices in a lowered position. Fig. 4 is a view similar to Fig. 3, showing the cultivating devices raised. Fig. 5 is a rear elevation of one of the arches arranged for cultivating high corn. Fig. 6 is a detail view of a portion of one of the arches arranged for cultivating low corn. Fig. 7 is a detail view of a portion of Fig. 6 in vertical section. Fig. 8 is a perspective view of one of the saddle-blocks. Fig. 9 is an enlarged vertical sectional view taken on the line  $x-x$  of Fig. 2. Fig. 10 is a detail perspective view of the portion of the machine shown in Fig. 9. Fig. 11 is a detail perspective view of one of the guiding-yokes detached, and Fig. 12 is a detail sectional elevation illustrating the guiding connections between the arch and tongue.

In a general way the structure consists, like

most of its type, of two independently-movable cultivator-sections having separate draft connections and themselves connected by a seat-bar resting on and supported by them, said cultivator-sections being laterally and longitudinally movable relatively to said seat-bar and to each other.

In the present instance 1 indicates the seat-bar, which is centrally provided with a driver's seat 2 and with a stirrup-frame 3 or other suitable support for the driver's feet. It will be noted that this seat-bar is supported at a distance above the surface of the soil very much greater than, and, in fact, about twice as great as, the distance heretofore employed in practice. The seat therefore need not be raised on high supports above the seat-bar, but may rest directly thereon, as shown.

The two cultivator-sections being identical in construction, I will describe the construction of only one of them, it being understood that the same description is applicable to the other section. The main frame of said section (indicated as a whole by means of the reference-numeral 4) comprises an arch-shaped body portion consisting of a transverse top member 5 and inclined downwardly-diverging legs or lateral members 6. The lower ends of these lateral members 6 of the arch are extended horizontally outward in opposite directions, forming supporting-arms 7, to which the supporting-wheels or other supporting devices and the cultivating devices may be attached. The frame 4 is preferably constructed of a single piece of metal in the form of a channel-bar U-shaped in cross-section, as shown. Each section-frame 4 is carried by supporting-wheels 8, which are connected with the supporting-arms 7 by means of standards 9, removably and adjustably connected with said arms at their upper ends by suitable clamps 10. The cultivator-section is provided with a tongue 11, to which the draft-animals are attached, and the frame 4 is connected to said tongue on each side thereof by means of a bar 12, having its upper forward end connected to the tongue, as indicated at 13, while its lower rear end is pivotally connected at 14, between lugs 15, projecting from a box or coupling 16, secured to the supporting-arm 7. The bolts which form



the connections between the bars 12 and the frame 4 constitute pivots upon which said frame may turn, thus permitting the top of the arch to be swung forward and back in the manner hereinafter described. In order to guide the top of the arch during this movement there are mounted on the top member 5 of the arch two guide-yokes 17, between which the rear end of the tongue passes. One of these guide-yokes is shown in detail in Fig. 11, and it will be seen that it comprises a base 18, by means of which it is secured to the top of the arch, and a vertical portion 19, from which guiding-jaws 20 and 21 extend horizontally outward. The under surface of the upper guide-jaw 20 is beveled or cut away at the forward portion thereof, as indicated at 22, while the upper surface of the lower jaw 21 is similarly beveled or cut away at the rear, as shown at 23. The tongue 11 is provided on each side thereof with a curved guide-bar 24, passing between the jaws 20 and 21 of the corresponding guide-yoke, said guide-yokes lying between the guide-bars and tongue, so that the upper end of the arch is properly guided and supported relatively to the tongue throughout its range of movement. The beveling or cutting away of the respective front and rear bearing-surface of the jaws prevents any binding of the parts at the limits of motion.

The tongue is supported relatively to the seat-bar 1 by means of a turning circle or annular support 25, secured to the tongue and having its upper or bearing surface in a horizontal plane. The seat-bar rests upon and is supported by this turning circle with which it is connected by the following devices: The seat-bar is provided with a longitudinal slot 26, above which is located a guide-bar 27, which extends the entire length of the slot longitudinally thereof. This guide-bar is preferably of inverted-U shape in cross-section, as indicated in Fig. 10. The turning circle 25 has mounted to slide freely thereon two slides 28, located at diametrically opposite points. These slides are preferably constructed as shown in detail in Figs. 9 and 10, in which figures it will be noted that the turning circle 25 is L shape in cross-section while the slide 28 is constructed of two separable parts 29 and 30, united by bolts 31. Each slide 28 is provided with two bearing-lugs 32, which extend upward in the spaces between the guide-bar 27 and the side walls of the slot 26, the guide-bar 27 passing between said lugs. A guide-roller 33 is mounted between the upper ends of the lugs 32, the guide-bar 27 passing under said bearing-roller and being restrained from upward motion thereby. The two bearing-rollers located at opposite sides of the turning circle thus maintain said circle in parallelism with the seat-bar 1, and thereby keep the tongue 11 and the frame 4 in proper relation with the seat-bar, preventing the frame from tilting laterally with respect thereto. It will be seen that each cul-

tivator-section is nevertheless free to move longitudinally with respect to the seat-bar and to assume different angular relations in a horizontal plane relatively thereto, these movements being necessary in a cultivator of this type.

Ordinarily there will not be sufficient friction between the meeting surfaces of the seat-bar and turning circle to be objectionable; but, if it be deemed desirable, this friction may be relieved by providing each slide 28 with a supporting-roller 34, mounted on the slide so as to bear on the under side of the guide-rail 27. Where the guide-rail is of the inverted-U shape in cross-section shown, this supporting-roller 34 is mounted on lugs 35 on the upper surface of the member 29 of the slide and is inclosed between the vertical flanges or members of the guide-rail, as shown in Fig. 9.

The construction hereinbefore described is such that I am enabled to employ high arches for the frames of the cultivator-sections, thus permitting the use of the machine when the corn has grown to a considerable height without exposing the machine to the danger of collapse by reason of lateral yielding of the cultivator-section. This is due to the fact that the construction described is adapted to withstand the severe lateral strains exerted on the cultivator-sections by reason of the height above the ground of their connection with the seat-bar.

The tilting of the arch of each cultivator-section forward and back is for the purpose of raising and lowering the cultivating devices, which are connected to the supporting-arms 7 or an extension thereof (hereinafter referred to) in such a manner that the rotation of the arms 7 caused by this tilting will raise or lower the cultivating devices. In the present instance I have shown cultivating-disks 36, connected to the arms 7 by drag-bars or beams 37, and cultivating-teeth 38, connected to the arms 7 by beams or drag-bars 39. The connection at the forward end of these beams is by means of clips or clamping devices 40, which are adjustable on and detachable from the supporting-arms, and the cultivating devices may be of any approved description and may be provided with any of the approved means for varying their relations to each other and to the supporting-arms 7. The forward and rearward tilting of the frame 4 is effected by means of a hand-lever 41, having a suitable fixed fulcrum 42, supported in fixed relation to the tongue or turning circle, said lever being provided with the usual locking-segment 43 and pawl 44. The lever 41 is horizontally arranged, so as to extend to a point within easy reach of the driver's seat and is yieldingly connected with the upper end of a vertical lever 45, pivoted to the tongue at 46 and having its lower end connected by links 47 with the frame 4 at a point above the pivotal axis 14. This latter connection is preferably effected by means of



a pivot-bolt 48, passing through one of the members 6 of the frame 4 and through any one of a number of holes 49 in the rear end of the link 47, so that the connection may be adjusted at this point as desired. Similarly the connection between the forward end of said link and the lever 45 is preferably by means of a pivot-bolt 50, passing through the link and through any one of a series of holes 51 in the lower end of the lever 45. By means of these adjustments the connection between the operating-lever 41 and the frame 4 may be properly adjusted. In order to permit the necessary amount of play of the frame 4, I employ a sliding connection between the levers 41 and 45, and I prefer for this purpose the construction shown, in which 52 indicates a link pivoted to the upper end of the lever 45 and provided with a terminal abutment 53. Around this link is coiled a spring 54, the ends of which are respectively connected to the levers 41 and 45, so that a certain amount of freedom of movement is permitted to the lever 45 without affecting the lever 41, while this latter may when unlocked be used to actuate the lever 45 as desired.

In order to counterbalance the weight of the parts to be lifted to an extent sufficient to facilitate the working of the lever 41, I employ a lifting-spring 55, the forward end of which is connected to the tongue 11, while its rear end is connected to the top of the arch of the frame 4. This spring serves to relieve the lever 41 of a portion of the weight of the cultivating devices during the operation of lifting the same from the ground. It will thus be seen that the driver, seated at the middle of the seat-bar, has within easy reach the two levers 41, by means of which the cultivating devices may be readily raised, lowered, or adjusted, as desired. In Fig. 3 the cultivating devices are shown as lowered, although not to the limit of their downward motion, while in Fig. 4 said cultivating devices are shown as raised above the soil in inoperative position. It will be observed that the tilting of the arch by which this raising and lowering is effected takes place around the pivotal axis 14, the supporting-wheels 8 moving slightly to the rear as the top of the arch moves forward.

During the later stages of cultivation it is required that the arches shall be unobstructed in order to permit the standing corn to pass through them. During the earlier cultivations, however, when the corn is low, this necessity does not exist, and it is desirable at the same time to bring the supporting-wheels and cultivating devices closer together at this time. To accomplish this and at the same time strengthen the frame 4, I employ a detachable bar 56, which is secured to the lower ends of the leg portions 6 of each arch-frame in line with the supporting-arms 7, of which it forms practically an extension. This bar is preferably of the same U shape in cross-section as the arch-frame and is se-

cured in position at each end by means of a saddle-block 57. (Shown in detail in Figs. 7 and 8.) Each saddle-block 57 is provided with a projection 58 and seat 59 to fit the adjacent part of the frame 4 and with a similar projection 60 and seat 61 to receive the end of the bar 56. A bolt 62 secures the saddle-block to the frame 4, and a bolt 63 secures said block to the bar 56. By reason of this construction when the arch is not needed on account of the height of the corn the arch is strengthened by the bar 56, and said bar forms a means for the attachment thereto of the supporting and cultivating devices or any portion of them in such a way as to enable them to be brought more closely together.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as the same may be obviously modified without departing from the principle of my invention. For instance, those portions of the circular tracks or ways 25 over which the slides and seat-bar do not in practice travel may be omitted.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a two-row lister-cultivator, the combination, with two cultivator-sections, each provided with a circular track or way, and with slides engaging with said way on opposite sides thereof, of a seat-bar, each end of which rests on one of the sections and is provided with a longitudinal guide-bar having positive sliding engagement with the slides of its supporting-section, whereby the seat-bar is free to move longitudinally of itself and transversely of the machine independently of the slides at each end, the slides moving in unison with the seat-bar laterally of said seat-bar, substantially as described.

2. In a two-row lister-cultivator, the combination, with two cultivator-sections, each provided with a circular track or way, and with slides engaging with said way on opposite sides thereof, of a seat-bar, each end of which is supported on one of said tracks or ways and is provided with a longitudinal guide-bar having positive sliding engagement with the slides of its supporting-section, whereby the seat-bar is free to move longitudinally of itself and transversely of the machine independently of the slides at each end, the slides moving in unison with the seat-bar laterally of said seat-bar, substantially as described.

3. In a two-row lister-cultivator, the combination, with two cultivator-sections, each provided with a circular track or way, and with slides engaged with said way on opposite sides thereof, and each provided with a guiding-roller, of a seat-bar, each end of which rests on one of the sections and is provided with a longitudinal guide-bar having a sliding engagement with the slides of its supporting-section, the guiding-rollers bear-



ing on the top of the guide-bars, substantially as described.

4. In a two-row lister-cultivator, the combination, with two cultivator-sections, each provided with a circular track or way, and with slides engaged with said way on opposite sides thereof, and each provided with an upper guiding-roller and a lower supporting-roller, of a seat-bar, each end of which is provided with a longitudinal guide-bar passing between the rollers of the slides of its supporting-section, substantially as described.

5. In a two-row lister-cultivator, the combination, with two cultivator-sections, each provided with a circular track or way, and with slides engaged with said way on opposite sides thereof, of a seat-bar, each end of which is supported by one of the sections and is provided with a longitudinal slot through which the slides of the supporting-section extend, and with a longitudinal guide-bar having sliding engagement with said slides, substantially as described.

6. In a two-row lister-cultivator, the combination, with two cultivator-sections, each comprising a tongue provided with a circular track or way having slides engaged therewith, and an arched frame connected with said tongue and provided with supporting and cultivating devices, of an elevated seat-bar, each end of which rests on one of the sections and is provided with a longitudinal guide-bar having a sliding engagement with the slides of its supporting-section, substantially as described.

7. In a two-row lister-cultivator, the combination, with two cultivator-sections, each comprising a tongue provided with a circular track or way having slides engaged therewith, and an arched frame provided with supporting and cultivating devices, and connected with said tongue so as to tilt longitudinally to raise and lower the cultivating devices, of an elevated seat-bar, each end of which rests on one of the sections and is provided with a longitudinal guide-bar having sliding engagement with the slides of its supporting-section, substantially as described.

8. In a two-row lister-cultivator, the combination, with two cultivator-sections, each comprising a tongue provided with a circular track or way having slides engaged therewith, an arched frame provided with supporting and cultivating devices and connected with said tongue so as to tilt longitudinally to raise and lower the cultivating devices, and an operating-lever extending toward the center of the seat-bar and operatively connected with the cultivating devices, of an elevated seat-bar, each end of which rests on one of the sections and is provided with a longitudinal guide-bar having sliding engagement with the slides of its supporting-section, said seat-bar being provided with a central seat adjacent to which the operating-levers terminate, substantially as described.

9. A cultivator-section for a two-row lister-cultivator, comprising a tongue provided with vertically-curved longitudinally-arranged guide-bars on each side thereof, an arched frame provided with guiding-yokes located between said guide-bars and the tongue and having guiding-jaws between which the guide-bars pass, and bars extending from the tongue to a pivotal connection with the lower portion of the arched frame, substantially as described.

10. A cultivator-section for a two-row lister-cultivator, comprising a tongue provided with vertically-curved longitudinally-arranged guide-bars on each side thereof, an arched frame provided with guiding-yokes located between said guide-bars and tongue and having guiding-jaws between which the guide-bars pass, bars extending from the tongue to a pivotal connection with the lower portion of the arched frame, a lever operatively connected with the arched frame to tilt the same longitudinally, and a lift-spring connecting the arched frame and the tongue, substantially as described.

11. A cultivator-section for a two-row lister-cultivator, comprising a tongue provided with means for guiding the upper ends of the arched frame, an arched frame guided thereby at its upper end, bars extending from the tongue to a pivotal connection with the lower portion of the arched frame, a horizontal hand-lever mounted on the tongue, a vertical lever also mounted on the tongue and connected at its upper end with the horizontal lever, and a link connecting the lower end of the vertical lever with the arched frame, substantially as described.

12. A cultivator-section for a two-row lister-cultivator, comprising a tongue provided with guiding devices, an arched frame having its upper end guided thereby, bars extending from the tongue to a pivotal connection with the lower portion of the arched frame, a horizontal operating-lever provided with locking devices, a vertical lever having its upper end yieldingly connected with the horizontal lever, and a link connecting the lower end of the vertical lever with the arched frame, substantially as described.

13. In a cultivator-section for a two-row lister-cultivator, an arched frame provided with horizontal aligned supporting-arms diverging from its lower ends, in combination with a removable bar connecting said lower ends and forming an extension or continuation of said supporting-arms, substantially as described.

14. In a cultivator-section for a two-row lister-cultivator, the combination, with an arched frame having horizontal supporting-arms diverging from its lower ends, of saddle-blocks fitted and removably secured to said lower ends, and a connecting-bar fitted and removably secured to said saddle-blocks and forming an extension or continuation of the supporting-arms, substantially as described.



15. In a two-row lister-cultivator, the combination, with two cultivator-sections, each provided with a circular track or way, of a seat-bar, each end of which rests on one of  
5 the sections, said seat-bar being provided at each end with two slides engaged therewith so as to move freely longitudinally of the bar only, the slides at each end of the bar engag-

ing with the circular track on opposite sides thereof, substantially as described. 10

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

OMAN E. JOHNSTON.

Witnesses:

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D. V. BOOHER.