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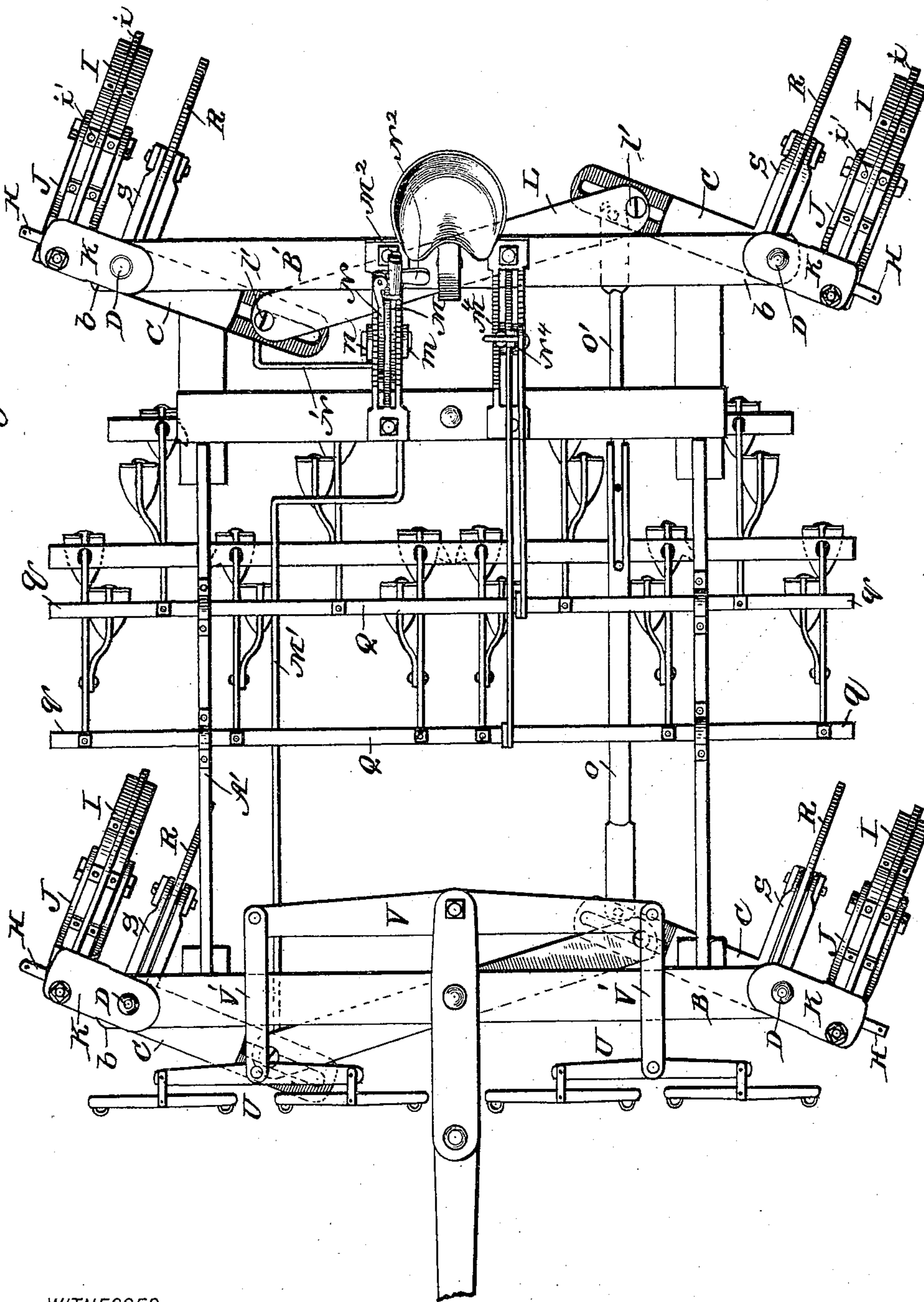
5 Sheets—Sheet 1.

J. S. HICKMAN.
COMBINED CULTIVATOR AND HARROW.

No. 467,100.

Patented Jan. 12, 1892.

Fig. 1.



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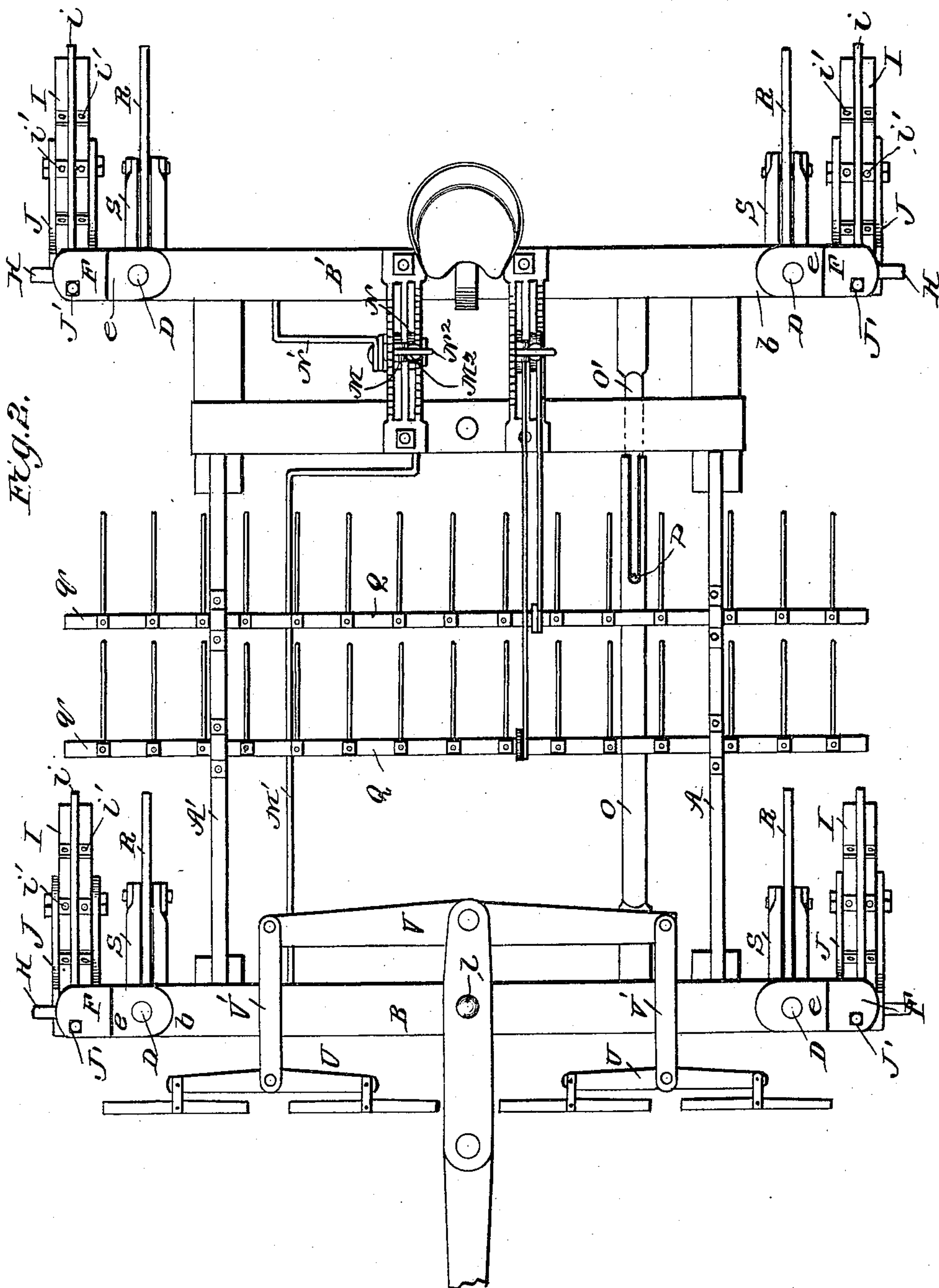
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5 Sheets—Sheet 3.

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Fig. 5

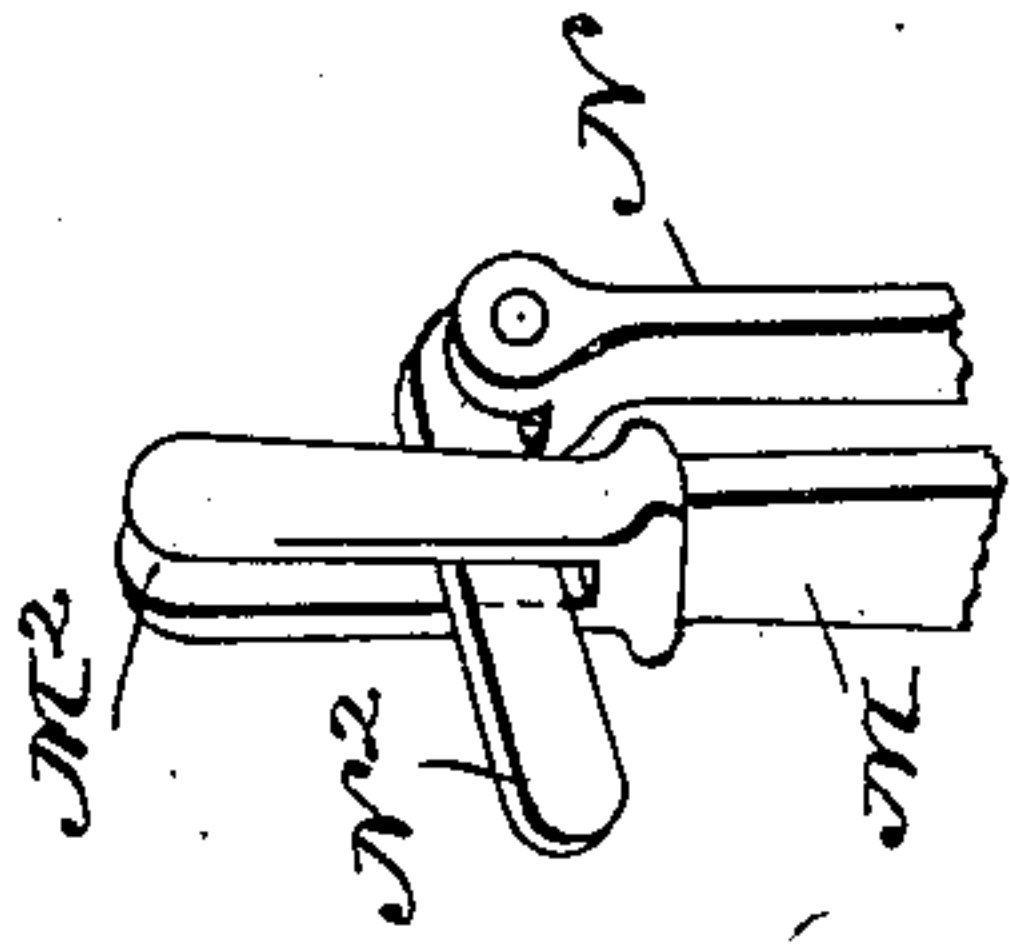


Fig. 3.

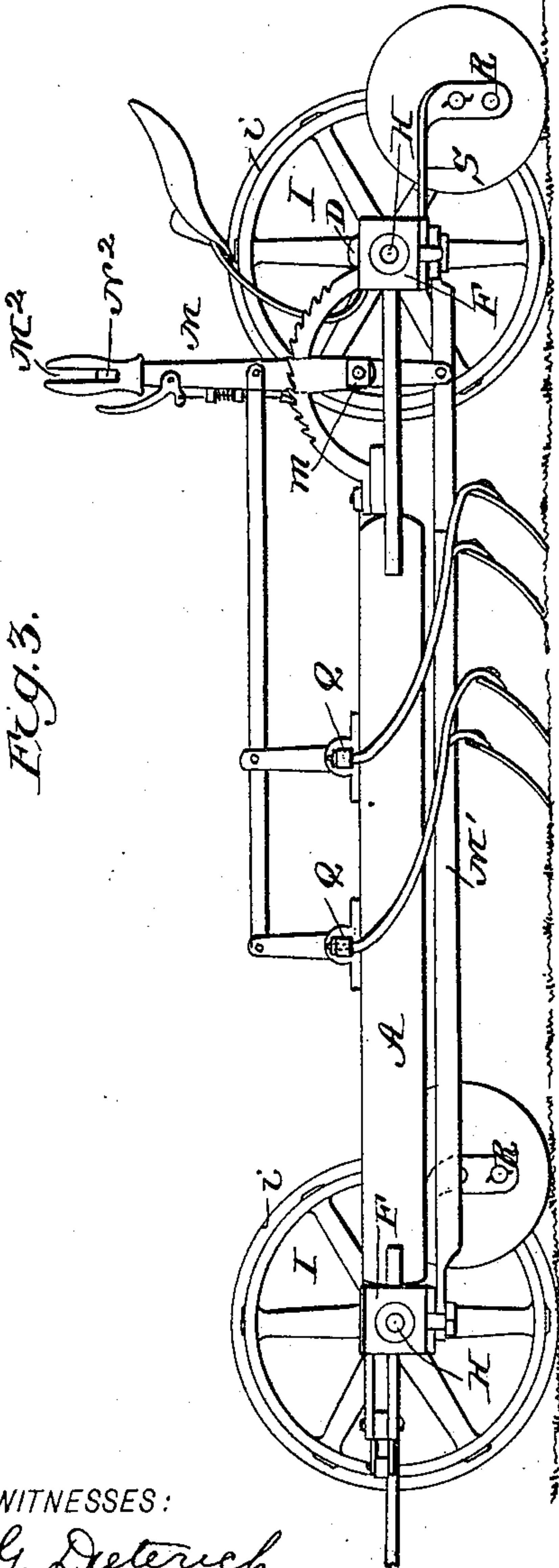


Fig. 11

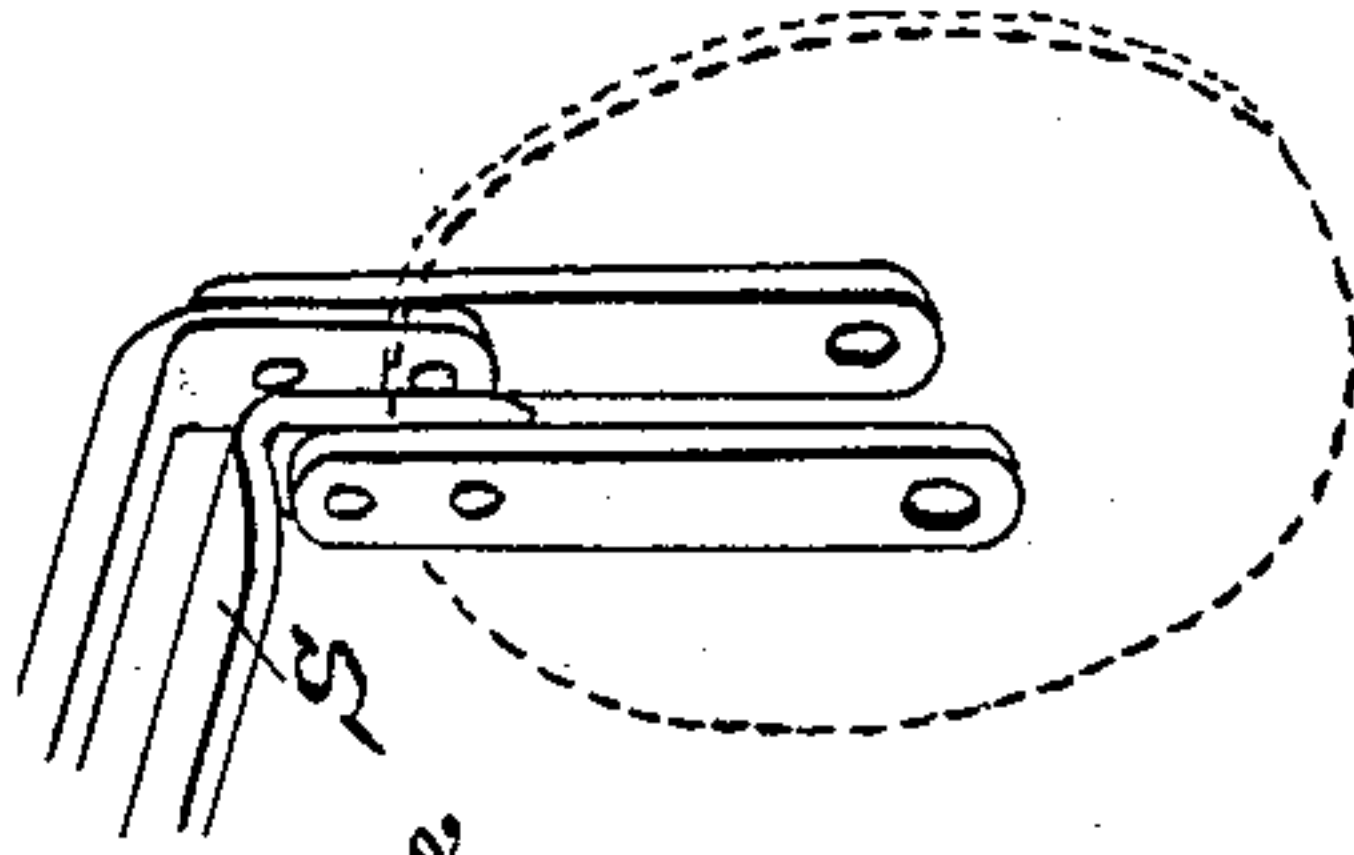


Fig. 9.



Fig. 7.

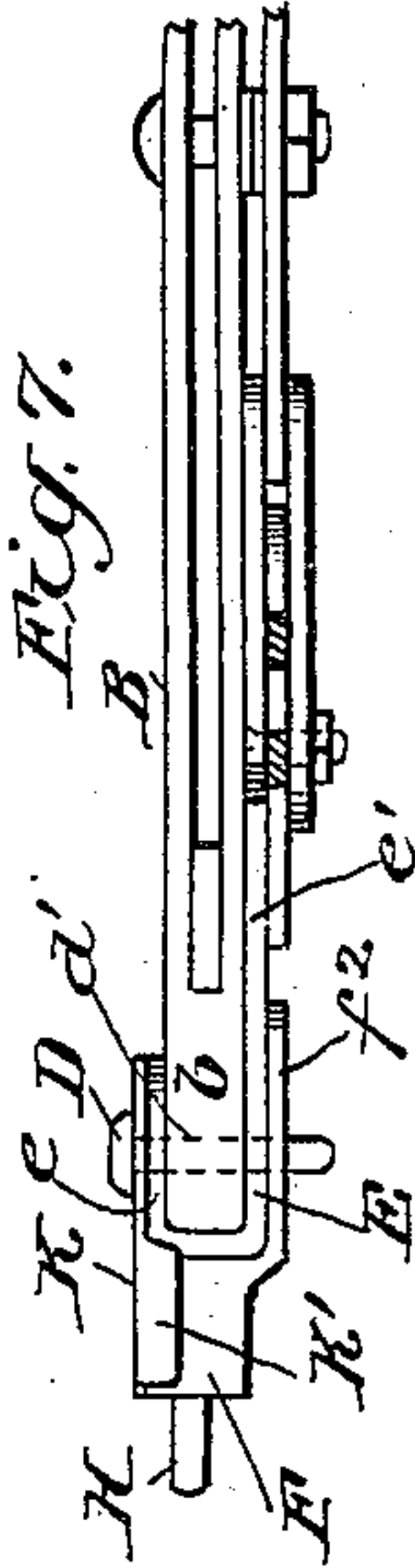


Fig. 8.

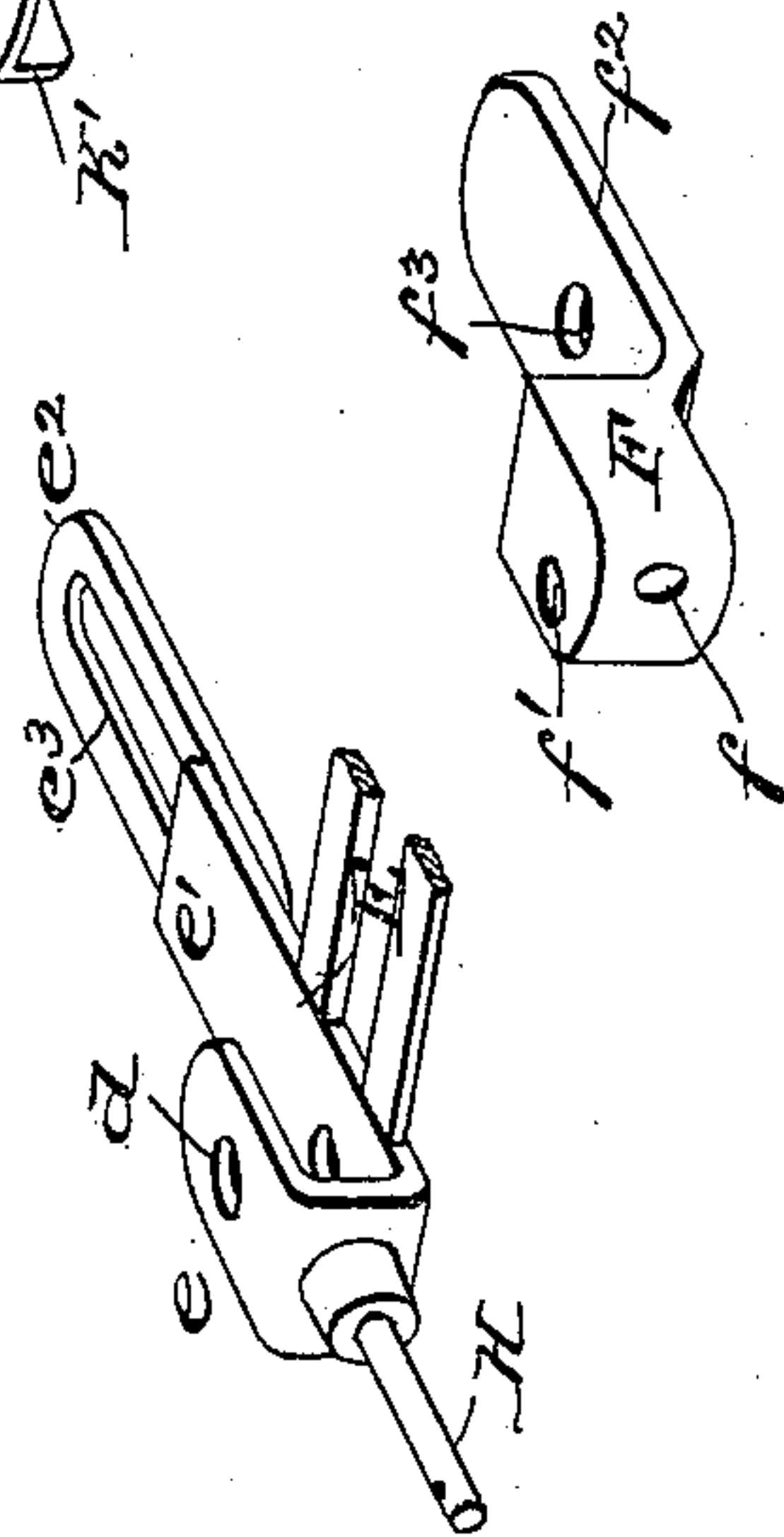
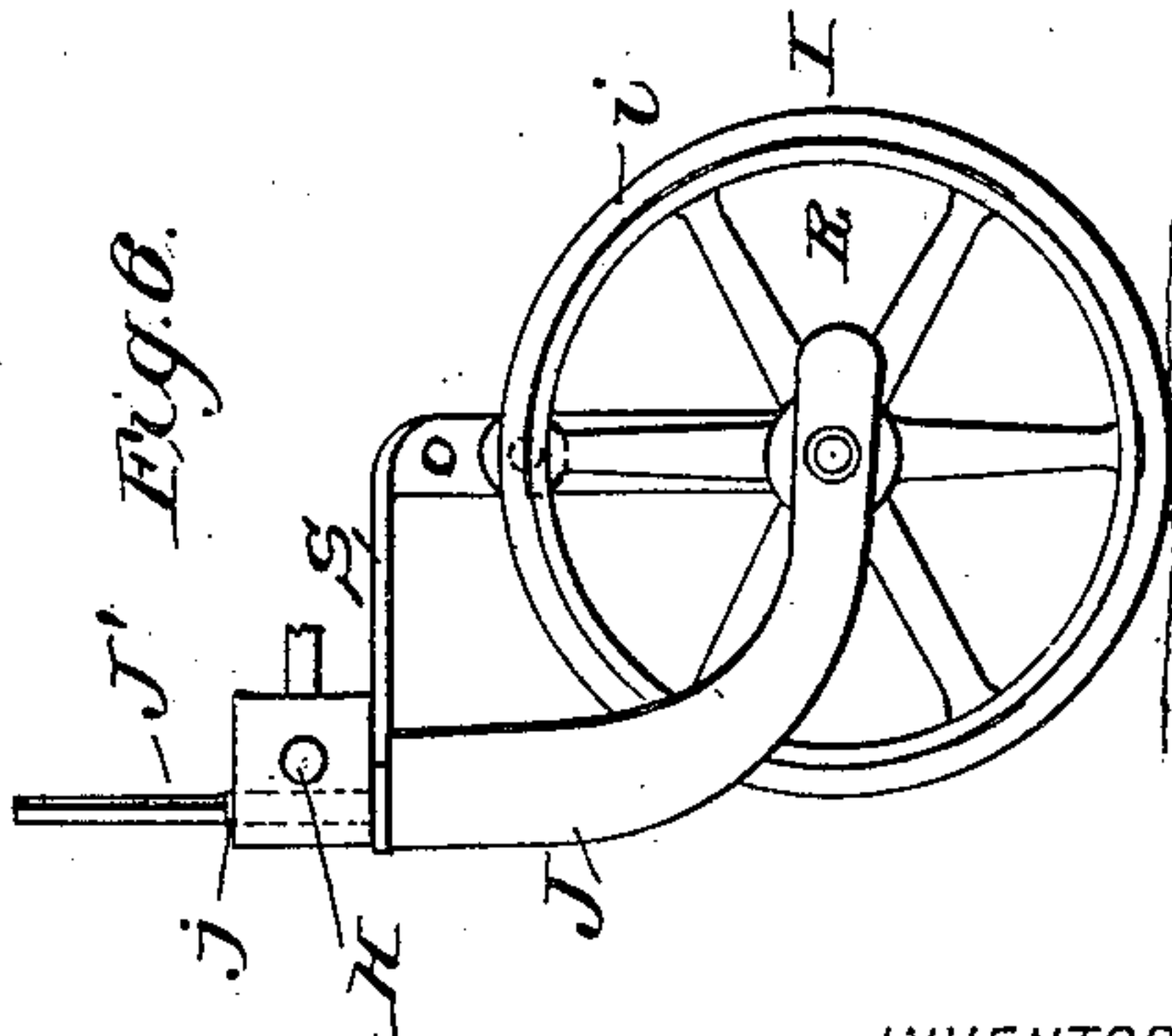


Fig. 6.



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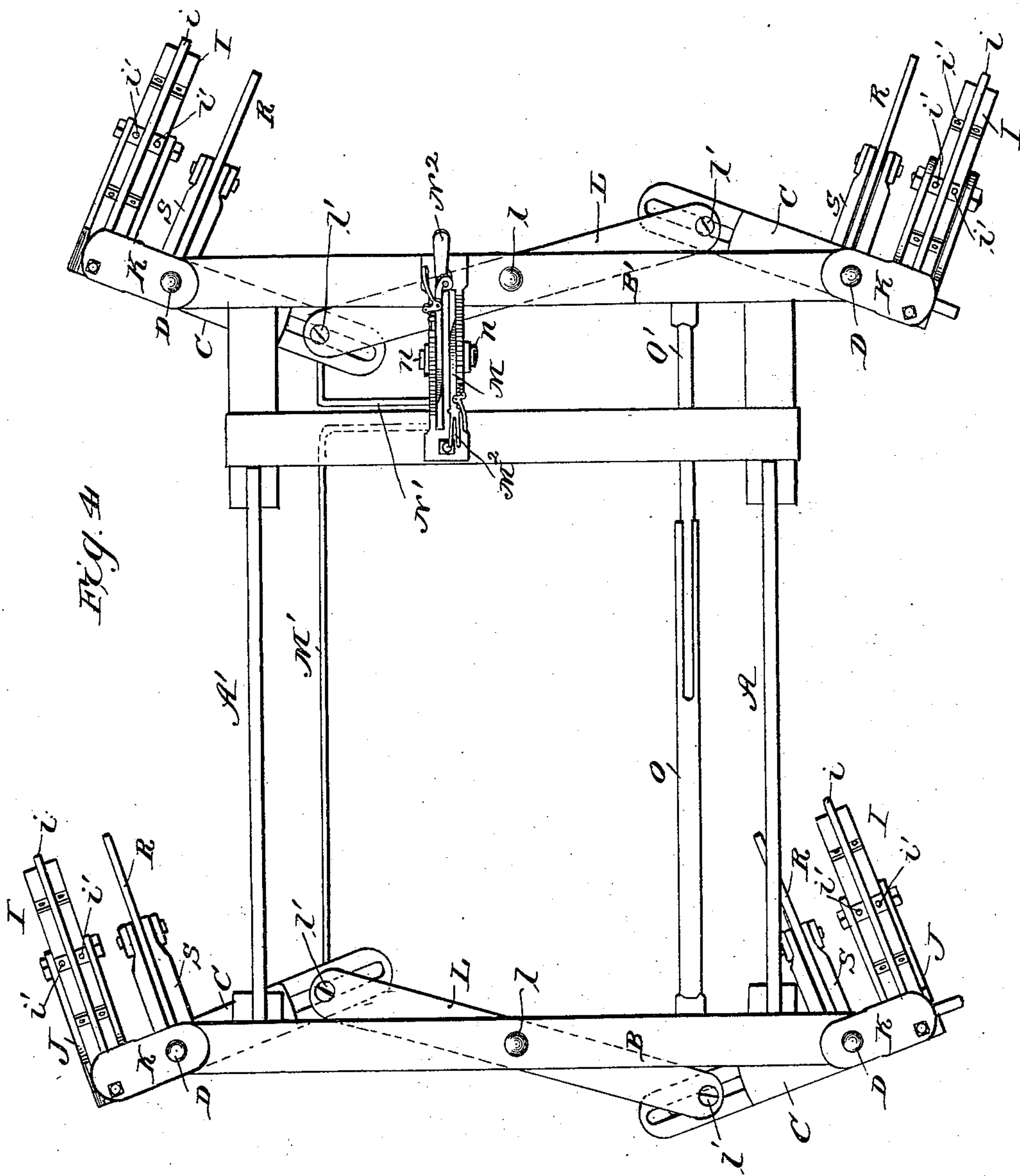


Fig. 4

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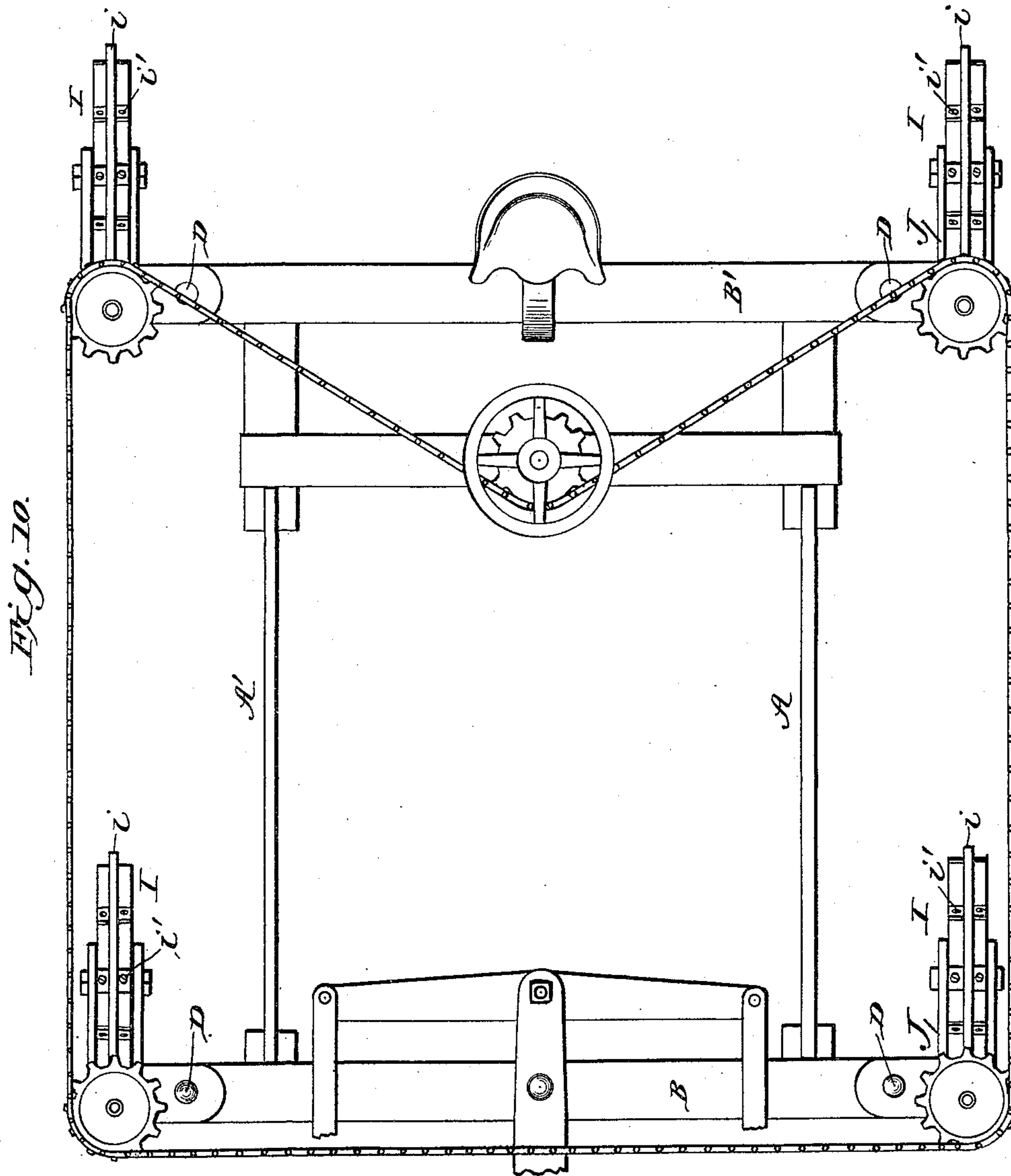
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J. S. HICKMAN.
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Patented Jan. 12, 1892.



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UNITED STATES PATENT OFFICE.

JAMES S. HICKMAN, OF HICKMAN, ILLINOIS.

COMBINED CULTIVATOR AND HARROW.

SPECIFICATION forming part of Letters Patent No. 467,100, dated January 12, 1892.

Application filed March 4, 1891. Serial No. 383,796. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. HICKMAN, of Hickman, in the county of Iroquois and State of Illinois, have invented a new and useful
5 Improvement in a Combined Cultivator and Harrow, of which the following is a specification.

My invention is a combined cultivator and harrow, and seeks, among other improve-
10 ments, to provide a simple, novel, and easily-operated construction of supporting and guiding devices and parts adapted to be removed and replaced to convert the machine into a harrow or cultivator frame.

15 The invention also seeks to provide adjustable front and rear axle-sections, devices for operating the front axle-sections, devices for operating the rear axle-sections, and locking devices for connecting such operating devices,
20 whereby the front and rear axle-sections may be operated independently or in unison.

The invention consists in certain features of construction and novel combinations of parts, as will be hereinafter described, and
25 pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of the improvements in a cultivator, showing the trailing-wheel supports as keyed to the axle-sections. Fig. 2 is a
30 similar view of the improvements in a harrow, the trailing-wheel supports being journaled to the axle-sections. Fig. 3 is a side view of the improvements in a low cultivator, the supporting-wheels being journaled on
35 spindles on the axle-sections. Fig. 4 is a plan view of the frame, illustrating the manner in which the front and rear axle-sections may be adjusted independently. Fig. 5 is a detail
40 view illustrating the locking device for connecting together the operating devices of the front and rear axle-sections. Figs. 6, 7, 8, and 9 are detail views of one of the axle-sections and its attached parts. Fig. 10 shows a somewhat
45 different construction for adjusting the wheels. Fig. 11 shows an adjustable wheel-bracket.

50 The main frame is shown as formed with the side bars A A' and the front and rear bars B B', the bars B B' being extended at b laterally beyond the side bars A A'. To the main frame, and preferably to the extensions

b, are connected the axle-sections C by means of vertical pivots or bolts D, arranged between their ends, so that the said axle-sections can be set at different angles. These axles
55 are composed of the main portions E and the bearing-blocks F. The portion E is formed with a box e, having upper and lower plates to embrace the end of the bar B or B', and has its lower plate formed at e' with an offset and hav-
60 ing the extension e² arranged in a lower plane than the outer portion of said lower plate and formed with a slot e³. The upper and lower plates of the box e are perforated at d for the pivot-bolt D, which also passes through the
65 opening d' in the extension b of the main frame-bar. The box connection e serves to form a firm strong connection between the axle-sections and the main frame. A spindle H projects outwardly from the box e.
70

The bearing-blocks F are provided with a horizontal opening f to fit on the spindle H, a vertical opening f' to receive the vertical shaft of the wheel-bracket, and with an in-
75 ward extension f², which is perforated at f³ for the pivot-bolt D, the said bolt and the spindle serving to secure the block in position.

The wheels I may be journaled in the brackets J, which have shafts j, which fit in the vertical bearing f' of the bearing-block of the
80 axle-section. This shaft j may be keyed from turning by the lock K, having a non-circular opening k, fitting a non-circular part J' of the shaft j. I make this lock-plate K with ears or flanges K' to project down along the edges
85 of the bearing-block and so hold the plate K from turning. The plate also has an opening K², through which the pivot-bolt D passes. Manifestly either the ears K' or the fitting of the plate on the bolt D will serve to hold the
90 lock K from turning; but I prefer to employ both such means of preventing the turning of the lock.

When the brackets J are used, the blocks F are applied and secured to the main por-
95 tion of the axle-sections, as shown in Figs. 1 and 2, and the lock-plates may be employed when the improvements are used in a cultivator, as shown in Fig. 1, or, when used in a harrow, the locks may be omitted, as shown
100 in Fig. 2, the wheel-brackets being then permitted to revolve freely, as will be understood

from Fig. 2. In a low cultivator the brackets J may be removed and the wheels I be journaled directly to the axle-sections. This is shown in Fig. 3, and it will be noticed that in such figure the blocks F are removed and the wheels I fitted directly on the spindles H. The opposite axle-sections of each pair, front and rear, are connected by means of levers L, each of which levers is pivoted centrally at l , and connected at its opposite ends with the inner ends of the axle-sections, preferably, by passing the connecting-bolt l' into the slot e^3 of the axle-section, as shown. By these levers L the axle-sections of each pair are so connected that they will be preserved either in alignment, as when the machine is moving straight forward, or in parallelism, as when the machine is moving at an oblique to one side or the other. I also provide operating devices for adjusting both the front axle-sections and the rear axle-sections, the operating devices of the front and rear sections being capable of operating independently of each other, so that the machine may be guided by either the front or rear wheels when the rows being cultivated are comparatively straight. At the same time I provide locking devices for connecting the said operating devices, so that the front and rear axle-sections may be adjusted in unison and similarly to enable a better and prompter guiding of the machine, as may be desired, when the rows are crooked. These operating devices for the front pair of axle-sections consist of a hand-lever M, pivoted at m and connected by a pitman M' with the front axle, the said pitman M' connecting at its front end with the bolt l' , so that the operating force is exerted directly against one of the front axle-sections and is transmitted by the lever connection L to the other axle-section. The lever M moves adjacent to a rack-arch and has a pawl or portion to engage the same, so that the lever may be held to secure the axle-sections in any desired adjustment.

To operate the rear axle-sections, I provide the hand-lever N, pivoted at n and connected by a pitman N' with the rear axle, so that the lever may be operated to adjust the axle-sections to any desired position, and the lever and axle-sections may be held in any suitable adjustment by the rack-arch and the pawl or portion of lever N arranged to engage the same. Now it will be seen that the front axle may be adjusted by the lever M independently of the rear axle-sections and the latter be likewise adjusted independently of the front sections, enabling the guiding of the machine by either the front or rear wheels; but in order to enable the similar and simultaneous adjustment of both the front and rear wheels I provide locking devices for connecting the operating devices of both pairs of wheels. In the construction shown this locking device consists of a latch-bar N², pivoted to one of the hand-levers and arranged to adjust into a slot M², formed in the other lever. This construction

locks the two levers together, so that they will be moved together and adjust the front and rear axles alike. In such joint adjustment of the axle-sections the pitmen M' N' form a connection between one of the front axle-sections and the rear axle-section on the same side. Now to brace the other two axle-sections on the opposite side I connect them by a bracing connection, which may form a rigid connection between such sections when the machine is being guided through a row and be released in turning the machine at the end of a row. This bracing connection is arranged at the side of the main frame opposite the operating devices and is shown as composed of two sections O O', telescopically jointed at their inner ends and secured at their opposite or outer ends to the front and rear axle-sections. Now when the sections O O' are released and free to slide one in the other the front and rear axles may be adjusted independently to quickly turn the machine; but used as a bracing connection the sections O O' are secured rigidly together by a pin or fastening P, so that they form a rigid bracing connection between the front and rear axle-sections at the side opposite the operating devices.

In turning at the end of a row the lever M may be thrown forward and the lever N back, or vice versa, to turn the machine easily and quickly to the right or left. Manifestly, instead of adjusting the wheels by the axles, sprocket-wheels may be provided on upwardly-projected extensions of the shafts j and geared by a sprocket-belt arranged to be operated by a suitable hand-wheel, as shown in Fig. 10; but I prefer the construction shown in the other figures and before described.

The wheels I are provided with ribs i , which ribs prevent them from slipping sidewise on the ground. I make these ribs removable, securing them by bolts i' , so they may be conveniently applied and removed.

The cultivator attachment and the harrow attachment are shown, respectively, in Figs. 1 and 2. Each of these attachments comprises two similar cross-bars or shaft-like portions Q Q, journaled at their ends to the main frame and arranged one in rear of the other. These shafts are shown in Fig. 1 as provided with cultivator drag-bars and in Fig. 2 as provided with hollow teeth. The drag-bars and teeth are fixed to the shafts, so that they may be inserted in or withdrawn from the ground by properly turning the shafts. To effect this turning of the shafts, I provide levers M⁴ N⁴, similar to the levers M N, and having lock devices and rack-arches and pawls, so that the levers can be operated independently or together. These levers are connected by pitmen with crank-arms on the shafts, so that the said cross-bars or shafts may be turned independently or together.

It is my purpose to arrange the cultivator shovels or teeth supported on the front bar or shaft to run close to the row and those on the

rear bar or shaft to run centrally between the rows. The harrow-teeth may be suitably arranged, and it is my purpose in cultivating small corn and the like to use the harrow-teeth, removing such teeth as would interfere with the growing rows.

The shafts Q are extended at q beyond the side bars, so that the machine can be used to cultivate the rows outside of its frame. It will be seen that I provide a frame, together with devices for guiding such frame to the right or left, and in connection therewith I arrange the cultivating and harrowing teeth so that they may be raised or lowered, but are rigid against lateral movement, except with the frame.

Disks R may be used in connection with the wheels I, such disks being supported in brackets S, extended rearwardly from the axle-sections.

It will be understood that two sizes of guiding-disks should be provided, one for use in the construction shown in Fig. 1 and a smaller size for use in the construction shown in Fig.

3. These disks serve to prevent sidewise movement of the implement, and when the disks are used the ribs i on the wheels I may be removed. In the construction shown in Fig. 3 the arrangement of the wheels and disks may, if desired, be reversed and the disks be supported on the spindles and the wheels in the disk-brackets.

It will be seen that the horses are hitched to the singletrees connected with the double-trees U, which are in turn connected with the evener V, arranged in rear of the front cross-bar, the doubletrees being each connected with the evener by two bars V', one extending above the cross-bar and the other between the upper and lower bars thereof, the tongue being suitably arranged between the doubletrees and pivoted to swing laterally but rigid against up-and-down movement. When two or three horses are used instead of four, the evener devices should be adjusted to suit.

It is obvious that the machine may be used to cultivate one, two, three, four, or more rows.

It is manifest that the disks R may be supported nearer the inner ends of the axle-sections, if desired. It will also be understood that where desired the guiding of the machine may be effected by the disks, the shafts of the supporting-wheel brackets being arranged to turn freely. In making the main frame it is preferred to arrange the side bars A A' vertically edgewise, as thereby any sagging of the frame is prevented and its strength and rigidity are greatly increased.

Having thus described my invention, what I claim as new is—

1. In a machine substantially as described, the combination of the framing, the wheels at the four corners thereof, and operating devices connecting the supports of said wheels, whereby the said wheels may be relatively

adjusted, substantially as described, and whereby the main frame may be positively moved in a lateral direction at both ends, all substantially as described, and for the purposes set forth.

2. In a machine substantially as described, the combination of the main frame, the front and rear pivoted axle-sections, devices whereby to adjust the front axle-sections, devices for adjusting the rear axle-sections, and connections between the said devices whereby the front and rear wheels may be adjusted relatively, substantially as set forth.

3. In a machine substantially as described, the combination of the main frame, the pivoted front axle-sections, operating devices for adjusting such sections, the pivoted rear axle-sections, operating devices for adjusting such sections, such operating devices being capable of independent operation, and devices for connecting such operating devices together, substantially as and for the purposes set forth.

4. In a machine substantially as described, the combination of the main frame, the adjustable front and rear axle-sections, the levers connected with such sections and supported to move independently, and a latch or connection for uniting such levers, substantially as set forth.

5. In a machine substantially as described, a pair of operating hand-levers arranged adjacent to each other and movable independently, one of such levers being provided with a slot and the other with a pivoted latch movable into and out of such slot, whereby the levers may be locked together, all substantially as and for the purposes set forth.

6. In a machine substantially as described, the combination of the main frame, adjustable guide devices whereby the said frame may be moved bodily in an oblique direction to one side or the other, and the teeth supported by the said frame and held rigid as to lateral movement independently of the frame and movable in a vertical plane, all substantially as and for the purposes set forth.

7. The improved machine herein described, comprising the main frame, the pivoted axle-sections, operating devices for adjusting such axle-sections, the cross-bars or shafts journaled to said frame and supporting the teeth, and means for turning such shafts or cross-bars, all substantially as and for the purposes set forth.

8. In a machine substantially as described, the combination of the main frame, the pivoted axle-sections arranged in front and rear pairs, the levers pivoted between their ends and connected to the axle-sections of each pair, the operating devices for adjusting such axle-sections and arranged at one side of the machine, and a bracing connection extended between the axle-sections at the opposite side of the machine, substantially as set forth.

9. In a machine substantially as described, the combination of the main frame, the front pair of axle-sections, the rear pair of axle-

sections, the levers connecting the sections of each pair, the operating devices for adjusting such sections, said devices forming a connection between the front and rear axle-sections on the same side, and a bracing connection adapted to form a rigid connection between the axle-sections at the opposite side and adapted to be released to permit such sections to move independently, as when turning at the end of a row, substantially as set forth.

10. In a machine substantially as described, the combination of the main frame, the front pair of axle-sections, the rear pair of axle-sections, the operating devices forming a connection between the front and rear axle-sections on the same side, and the bracing connection extended between the axle-sections on the opposite side, such connection being formed of sections jointed at their meeting ends to slide upon each other and provided with a fastening by which the sections may be held from sliding, substantially as set forth.

11. In a machine substantially as described, the combination of a frame-bar, axle-sections pivoted to said bar near its ends and provided with inwardly-projected portions below such frame-bar and having their inner portions e^2 depressed below the plane of said frame-bar, and the connecting-lever pivoted centrally between its ends and fitting at its ends above the portions e^2 of the axle-sections and secured thereto, all substantially as and for the purposes set forth.

12. In a machine substantially as described, the combination of the main frame, the pivoted axle-sections adapted to support the wheels, and the brackets secured to and projecting rearwardly from said axle-sections and adapted to support the disks, all substantially as described, whereby the adjustment of the pivoted axle-section to vary the angle of the wheel will also similarly vary the angle of the disk, as set forth.

13. In a machine substantially as described, the combination of the frame-bar and the axle-section pivoted to and having a box-like portion embracing the frame-bar and provided at its outer end with a spindle and having an inward extension, substantially as set forth.

14. In a machine substantially as described, the combination of the main frame, the axle-

section having a spindle, and the bearing-block applied to said axle-section and having a bearing f' for the shaft of the wheel-bracket, substantially as set forth.

15. The combination, in a machine substantially as described, of the axle-spindle adapted to receive a wheel, the bearing-block having an opening f fitted to said spindle, and a bearing f' for the shaft of the wheel-bracket, substantially as described.

16. The combination, in a machine substantially as described, of the axle, the bearing-block having a bearing for the wheel-bracket shaft, such shaft having a non-circular portion, and a locking device adapted for application to such non-circular portion, whereby the shaft may be keyed from turning or left free to turn, substantially as set forth.

17. In a machine substantially as described, the combination of the framing, the axle-section having spindle H, the bearing-block F, having opening f to fit on the spindle and a bearing f' and provided with an extension f^2 , and the pivot-bolt D, passed through the axle-section and the extension f^2 of the block, all substantially as set forth.

18. In a machine substantially as described, the combination of the frame, the axle-section having a spindle H, the block F, having openings $f f'$ and extension f^2 , the pivot-bolt D, the wheel-bracket shaft journaled in opening f' and having a non-circular portion, the lock-plate having an opening formed to fit such non-circular portion and provided with flanges or ears K' , and an extension provided with an opening for the bolt D, all substantially as set forth.

19. In a machine substantially as described, a supporting-wheel I, provided with a circumferential flange or rib i , provided with lateral lugs or ears lapped against the circumference of the wheel and removably secured thereto, substantially as shown and described.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

JAMES S. HICKMAN.

Witnesses:

P. B. TURPIN,

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