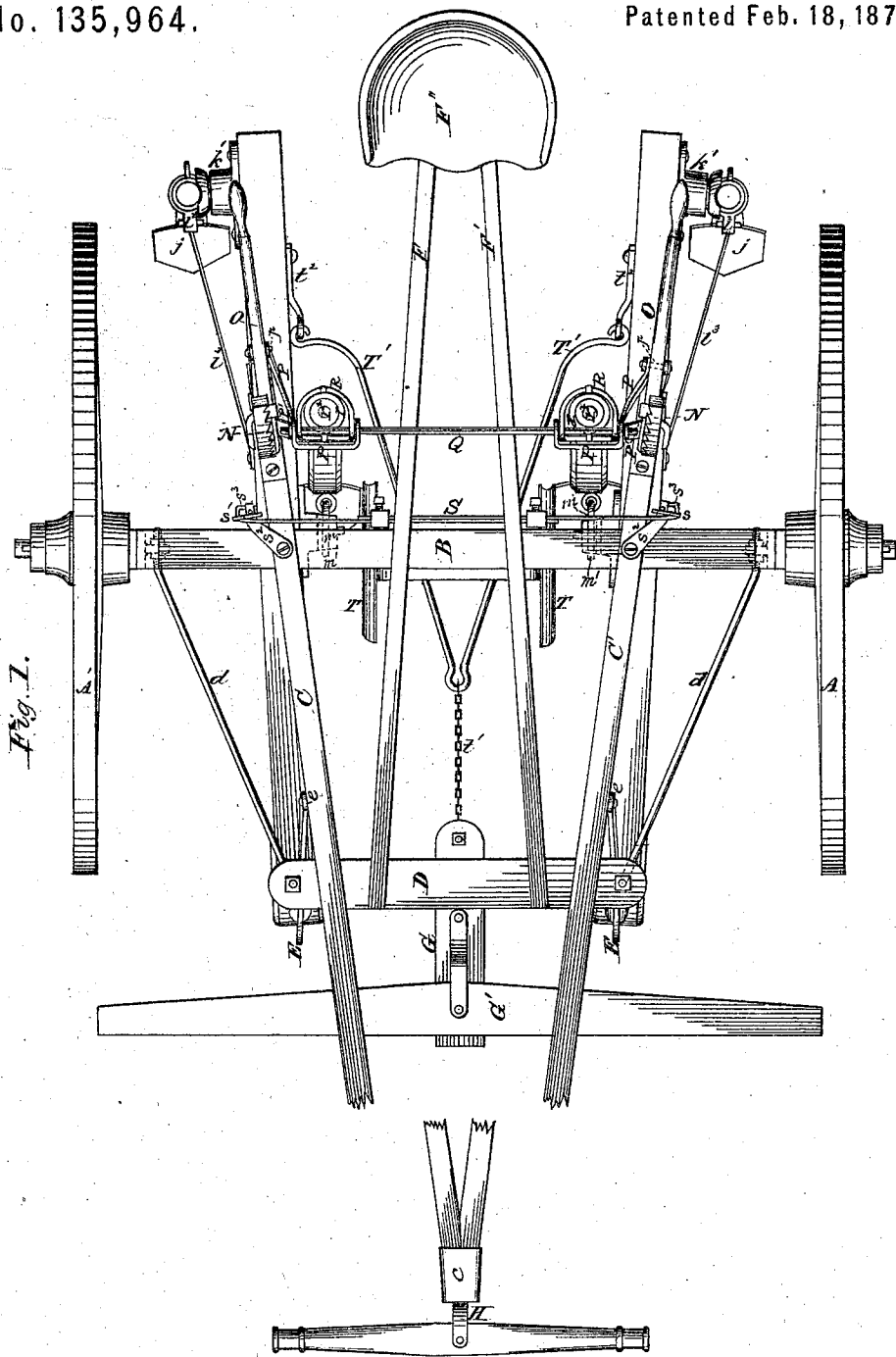


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Cultivators.

No. 135,964.

Patented Feb. 18, 1873.



Witnesses:

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J. R. T. Ton

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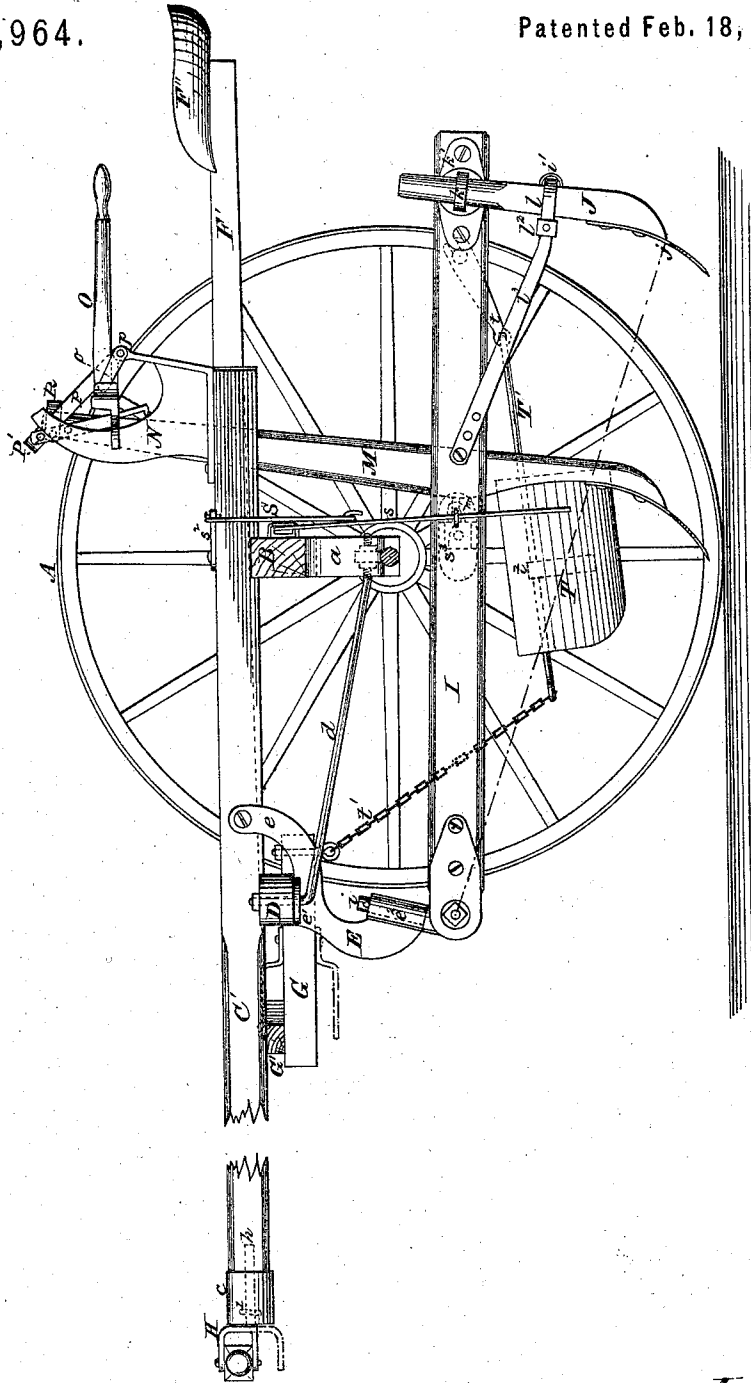
Jacob Behel
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Fig. 2.



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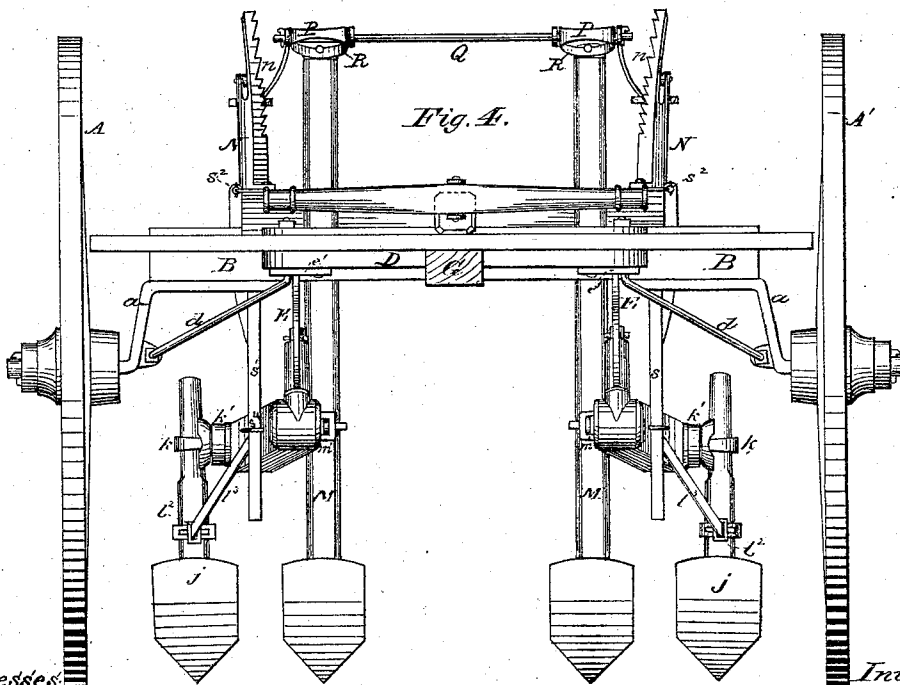
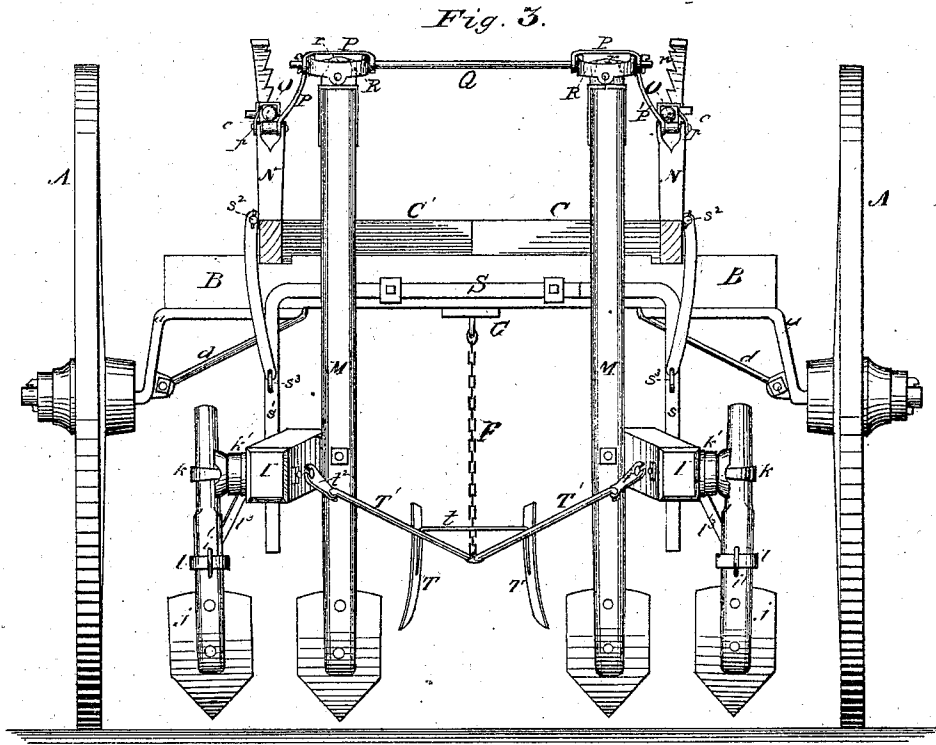
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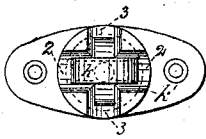


Fig. 5.

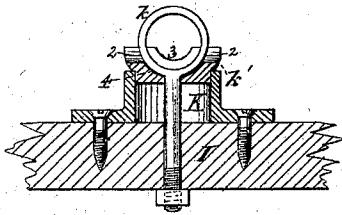


Fig. 6.

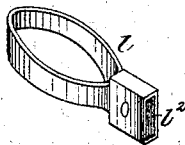


Fig. 7.

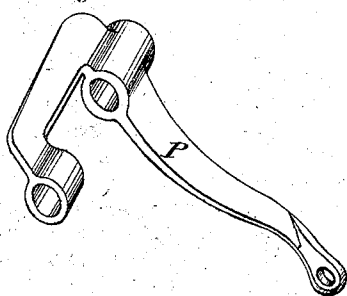


Fig. 8.

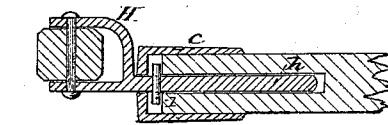


Fig. 9.

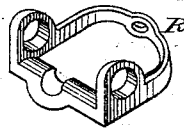


Fig. 10.

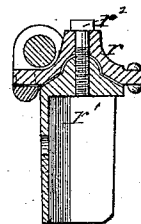
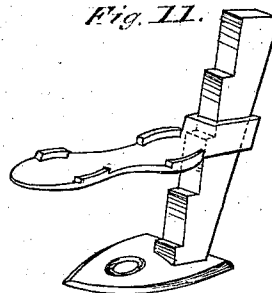


Fig. 11.



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UNITED STATES PATENT OFFICE.

JACOB BEHEL, OF ROCKFORD, ASSIGNOR TO HIMSELF AND GEORGE R. RICHARDSON, OF EARLVILLE, ILLINOIS.

IMPROVEMENT IN CULTIVATORS.

Specification forming part of Letters Patent No. 135,964, dated February 18, 1873.

To all whom it may concern:

Be it known that I, JACOB BEHEL, of Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Cultivators, of which the following is a specification:

My invention relates to that class of machines known as "wheel," "sulky," or "straddle-row" cultivators; its object is to secure an effective machine for working crops planted in rows or drills, and the subject-matter claimed is hereinafter particularly specified.

The accompanying drawing represents all the improvements herein claimed as embodied in one machine; obviously, however, some of said improvements may be used without the others, and in machines differing somewhat in construction from the one represented.

Figure 1 represents a plan or top view of my improved machine. Fig. 2 represents a view in elevation of the machine as seen from one side, with the rear wheel omitted to show the remaining portions more clearly. Fig. 3 represents a view in elevation of the machine as seen from the rear, the driver's seat being omitted. Fig. 4 represents a similar view of the same as seen from the front, the driver's seat and shields being omitted. Figs. 5 to 11 represent detail views of various portions of the mechanism, hereinafter specified.

Two wheels A A' are mounted on crank-axes *a*, secured to an axle-tree, B. Two beams, C C', united at their forward ends to form a tongue, as common in this class of machines, diverge as they extend backward toward the axle-tree, upon which they are secured, and behind which they project, for purposes hereinafter explained. A cross-brace, D, is securely bolted underneath these beams about the line of the front edge of the wheels. This cross-brace projects at each end beyond the beams to which it is secured, and these projecting ends are connected with the bent axes *a* by straining-rods *d*, which can be tightened up by suitable nuts strongly to brace the frame. Pendants or brackets E of the peculiar form shown in the drawing have their rear prongs *e* bolted to the beams C C', while their flanged parts *e'* are secured to the under side of the cross-brace D. The brace-rods *d*, it will be observed, pass through the cross-

brace and flange both. By means of the construction above described I secure a strong light frame. Two converging beams F F' extend rearward from the cross-brace D, to which they are firmly secured, and project behind the axle B. A seat, F'', for the driver, is mounted on the rear end of these beams. These beams may also be bolted to the axle at their intersection, and thus strengthen the frame additionally. A short arm or draft-bar, G, is bolted on the under side of the cross-brace D parallel to the line of draft. An evener, G', is pivoted in the usual way to the forward end of this draft-bar. Ordinarily the evener plays between the draft-bar and tongue-frame and underneath the latter; but when it is desired to lower the line of draft the evener and hammer-strap are reversed, so as to bring them below the draft-bar, as shown in dotted lines in Fig. 2. The front end of the tongue-frame is provided with a thimble, *c*, and is perforated to receive the shank *h* of a neck-yoke, H. The forks of the shank, it will be observed, are both on one side of its center. To insert the shank in its socket the neck-yoke is turned up vertically, so that pins *l* on the shank may enter an elongated slot in the face of the thimble *c*, and is then turned down again into a horizontal position to lock the parts together. As the yoke is on one side of the shank, as above explained, the line of draft may be raised or lowered by turning the yoke so as to come either above or below its axis of rotation. (See Figs. 2 and 4.) By this mode of construction the yoke can readily be attached, detached, or adjusted, and yet be securely held when in position.

The pendants or brackets E above described carry sockets *e''*, vertical in a plane parallel with the line of draft, but inclined downward and forward at a slight angle, as shown in Fig. 2—say at about a right angle with a line drawn from the rear shovel to the forward end of the drag-bar, as shown in dotted lines in Fig. 2. Eyebolts *i*, turning in these sockets, are pin-jointed to drag-bars I, thus permitting them the usual vertical and lateral vibrations common to the most approved cultivators of the present day. By inclining the sockets forward, as above described, the strain of the plows in working is brought more nearly at

right angle to the axis of the socket, and the eyebolts are less cramped than would be the case with a vertical socket. The drag-bars are prevented from turning axially by the pin-joint. Another and still more important advantage resulting from this inclination of the sockets e^2 is this: When the drag-bars are parallel with the faces of the driving-wheels, the eyebolts i and plow-standards J are both in the same vertical plane. As the plows are moved laterally outward (swinging around their pivots) the eyebolt and standard will still maintain their relative arrangement—that is, their axes will be intersected by a common plane; but, owing to the inclination of the socket above mentioned, the lower end of the standards will be inclined outward in proportion to the inclination of the socket, the effect being to cause the shovels to describe a greater arc than the plow-beams, or, in other words, to be thrown further outward than would be the case were the sockets not inclined. As the same result follows the inward swing of the plows, I am enabled to diminish the amount of lateral vibration heretofore necessary to be given in avoiding the plants or cultivating close to the rows.

The rear or outer plows or shovels j are secured to standards J , rounded at their upper ends and inserted in eyebolts k , which permit of the usual axial adjustment of the shovel to throw the earth toward or from the plants. These eyebolts pass through perforated washers k' , through cylindrical thimbles K , and through the drag-bars, and are secured by the usual tightening-nuts. The thimbles have flanged bases to give a firm support on the drag-bar to which they are bolted. The washer k' is made plug-shaped to fit and turn freely in the thimbles; its outer surface is provided with two sets of semicircular recesses, 2 3, in its walls, transverse to each other, in which the rounded part of the standard fits. One set of these recesses is parallel to the drag-bar, the other slightly inclined, so that with one set the shovel-standard is held upright and with the other it is inclined inward or outward from this line, as desired, to set the shovels nearer to or further from the plants. The interior of the washer is likewise provided with deeper recesses 4, in which the eyebolt takes, and thus locks the washer when screwed up.

By this mode of construction, when a rigid obstacle is encountered, the washer turns in the thimble, and thus avoids breaking the shovel or the connections between the thimble and drag-bar. The standard can be turned on the eyebolts to set the plows at any desired elevation.

Rings l on the standards pass through an eye, l' , which keeps them from falling. These rings are formed with a socket, l^2 , into which the rear end of a stiff draw-rod, l^3 , is inserted and held by a wooden break-pin. The pin breaks under strain, and thus releases the plow, as is well understood.

The object of using a stiff draw-rod insert-

ed in a socket in the ring is to prevent the bending or yielding of the connection by accidental back pressure, as often happens with the yielding connections heretofore used.

The inner or forward shovels are secured to long standards M connected to the drag-bars by means of a link, m , pin-jointed in a socket, m' , on the drag-bar. A wooden break-pin is used to allow the standard to yield.

The plows are supported in the following manner: Sector-rack frames N are mounted on the rear projecting ends of the main beams C , and have rack n on their inner faces. Detent-levers O are pivoted on this frame, their forward ends being forked to embrace the rack and act as detents. A small plate-spring, o , tends to keep the detent and rack engaged. Radius-yokes P , pivoted on the fulcrum p of the levers, support a rod, Q , extending across the machine. Radius-links P' , pivoted on the rod Q , pass down through eyes in the detent-levers, and are provided with hooks or stops for the purpose of limiting the play of the rod. Yoke-rings R , pivoted on the rod Q , support a cap, r , pivoted therein at right angles to said rod, thus forming a gimbal-joint. A thimble or collar, r^1 , on the standard M is provided with a circular boss fitting in a corresponding socket in the cap. A screw, r^2 , connects the two, thus forming a swivel-joint for the standard. The drag-bars and plows can, by the devices above described, be raised or lowered all together, or each set independently of the others.

A yoke, S , composed of two right-angular arms, s s^1 , sliding past each other in suitable sockets to admit of the requisite lateral adjustment, is suspended from the frame by pivoted radius-links s^2 , which permit it to vibrate freely laterally. The upright arms of this yoke descend through eyes s^4 on the drag-bars. The latter can move freely vertically independently of the yoke, but must conform to its lateral movements. This device secures the simultaneous lateral movement of all the plows. This yoke may be removed, when desired, to allow the plows to work independently of each other.

Shields T are rigidly secured to a cross-bar, t , mounted on a swinging frame, T' , of triangular shape, attached at its forward end to the draw-bar D by a chain, t^1 , and pivoted at its rear end to radius-arms t^2 , turning on pins on the drag-bar. By this construction the shields can be raised or lowered relatively to the plows, and partake of their lateral movements.

The operations and advantages of my invention will be obvious from the foregoing description.

I do not broadly claim the results produced, or the modes of operation hereinbefore described, but limit my claims to the devices and combinations hereinafter specified.

I claim as my invention—

1. The combination of the axle-tree B , the converging tongue-timbers C , the cross-brace

D, the bracing-pendants E, and the brace-rods d , all these members being constructed and operating as set forth.

2. The combination of the perforated tongue, the elongated slot in the thimble c , the forked turning-shank h , the transverse locking-pins 1, and the neck-yoke H pivoted on one side of the axis of the shank, all these members being constructed and operating as set forth, to raise or lower the neck-yoke and tongue.

3. The combination of the pendants E, the sockets inclined downward and forward, the eyebolts i turning in the sockets, the drag-bar, and the plow-standards, all these members being constructed and operating as set forth, to cause the shovels to traverse a greater arc than the drag-bars, as set forth.

4. The combination of the drag-bar I, the long shovel-standard M swiveled thereto, the radius-yoke P swiveled to the standard, the radius-link P', and the detent-lever O and rack N, all these members being constructed and operating substantially as set forth.

5. The combination of the long standards

M, their swivel-yokes R, and radius-links P' with the rod Q, all these members being constructed and operating substantially as set forth, to maintain the proper relation between the standards, while allowing them free adjustment in all directions.

6. The combination of the long standards M, the drag-bars I, the rigidly-connected shields T, the draft-chain t , the link-rods t^1 , and the pivoted arms t^2 connecting the shield and drag-bars, all these members being constructed and operating substantially as set forth.

7. The combination of the socketed rings l on the standards with the rigid draw-rods l^3 inserted therein and secured by a frangible pin, these members being constructed and operating as set forth, to prevent bending or yielding of the draft-connections by back pressure on the standard.

JACOB BEHEL.

Witnesses:

E. N. J. BEHEL,
JAMES FERGUSON.