

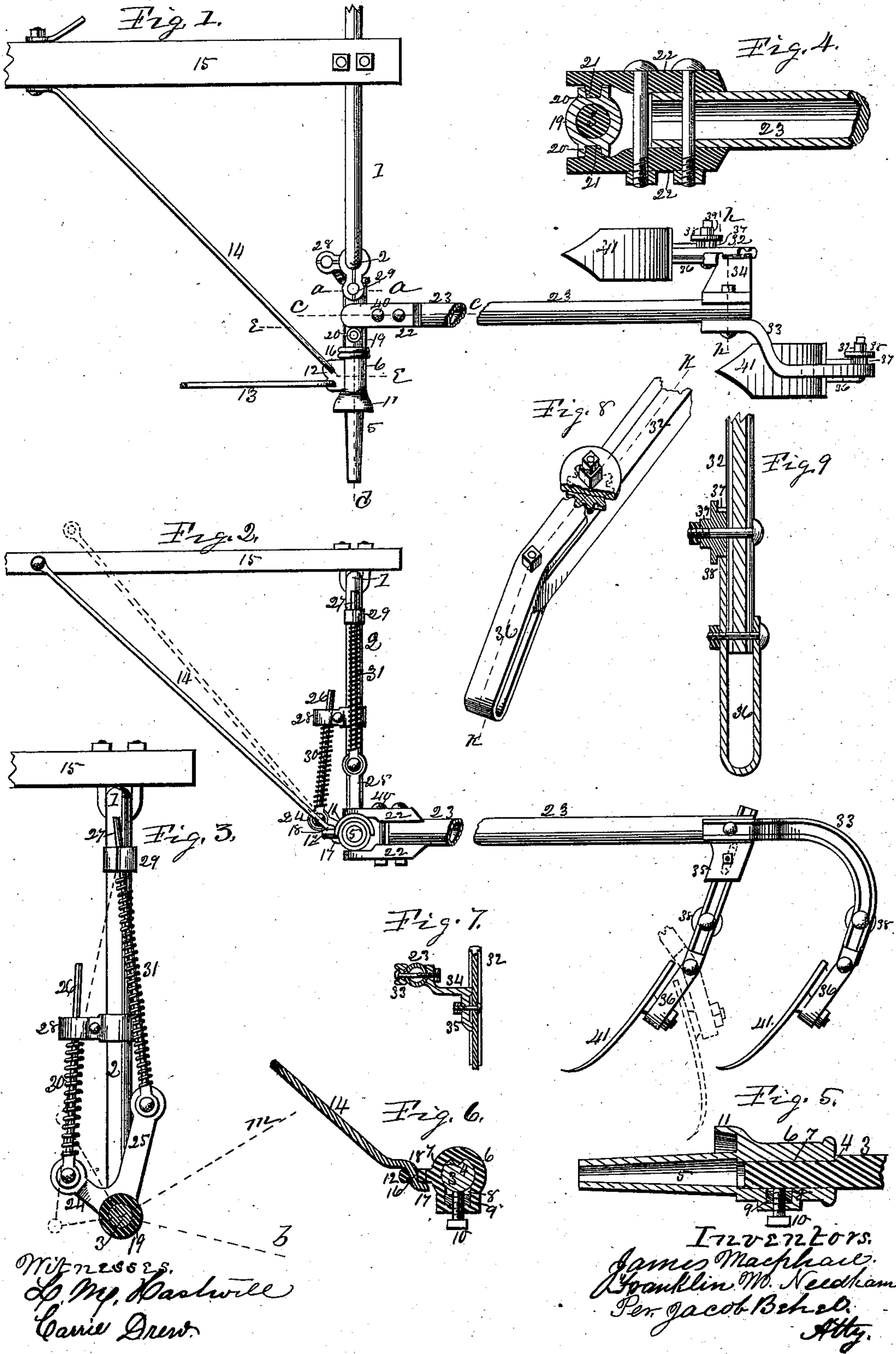
(No Model.)

J. MACPHAIL & F. M. NEEDHAM.

CULTIVATOR.

No. 376,747.

Patented Jan. 24, 1888.



UNITED STATES PATENT OFFICE.

JAMES MACPHAIL AND FRANKLIN M. NEEDHAM, OF ROCKFORD, ILLINOIS.

CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 376,747, dated January 24, 1888.

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To all whom it may concern:

Be it known that we, JAMES MACPHAIL and FRANKLIN M. NEEDHAM, citizens of the United States, residing in the city of Rockford, in the county of Winnebago and State of Illinois, have invented new and useful Improvements in Cultivators, of which the following is a specification.

This invention relates to a class of farm implements known as the "straddle-row walking-cultivator." Its object is to improve this class of farm implements; and it consists, mainly, of detail improvements extending to nearly all parts of the machine, all of which, in connection with the drawings, will be hereinafter more fully described.

In the accompanying drawings, Figure 1 is a plan view of a portion of the axle, tongue, and a drag-bar with shovels attached. Fig. 2 is a side elevation of the parts shown in plan. Fig. 3 is also a side elevation on dotted line *a* on Fig. 1, in which the dotted line *b* represents the axial center of the drag-bar depressed below a right angle relatively with the vertical arm of the axle. Fig. 4 is a transverse vertical section of the axle on the vertical axial center of the drag-bar on dotted line *c*, Fig. 1. Fig. 5 is a vertical central section of the spindle on dotted line *d* on Fig. 1. Fig. 6 is a transverse vertical section on dotted line *e*, Fig. 1. Fig. 7 is a transverse vertical section on dotted line *h*, Fig. 1. Fig. 8 is an isometrical representation of a portion of a shovel-standard and safety attachment of the shovel-support, and Fig. 9 is a lengthwise central section of a portion of the shovel-standard and its attachments on dotted line *k* on Fig. 8.

The several figures of the drawings, which are but fragmentary portions of a complete machine, embody our inventions and are believed to be sufficient to clearly illustrate our improvements.

The several parts necessary to a complete machine, not shown in the drawings nor hereinafter described, and not duplicate of the parts shown, nor of a reverse construction thereof to produce the parts in pairs to face in opposite direction, may be any of the known varieties of such omitted parts as are capable of use in connection with our improvements.

In the figures the axle is of the usual crank or arching form, consisting of a central horizontal portion, 1, like vertical portions 2 depending from the ends of the central horizontal portion, and like draft-arms 3, one on each side, extending from the lower end of the vertical portions laterally outward. A groove, 4, of V form in section, is produced lengthwise in the outer end portion of the draft-arms of the axle. A tubular spindle, 5, to secure the carrying-wheels in the usual manner, is made with a sleeve portion, 6, to receive the outer end portion of the draft-arm of the axle, and its inner surface is made with a feather, 7, of V form in section, to enter the groove formed in the outer end portion of the draft-arm. A recess, 8, formed in the inner face of the sleeve 6, receives a screw-nut, 9, and a screw-bolt, 10, in connection with the screw-nut, and the groove-and-feather connection of the parts serve to fix the spindle securely in place in a removable manner.

The spindle is made with a sand-band, 11, to overlap the inner end of the wheel-hub, and it is also provided with an ear, 12, projecting from its forward side, which is perforated to receive a draft-link, 13, and a brace, 14.

A tongue, 15, of the usual construction, is fixed centrally to the arching portion of the axle in the usual manner.

The brace 14, employed to connect the spindle to the tongue in its connection with the spindle, is made self-locking and detachable, as clearly shown in Fig. 6 in section, and consists of an arm, 16, to enter the perforation in the ear, an arm, 17, bent to engage the rear under face of the ear, and a bent portion, 18, to engage its upper face forward portion.

The conformation of the parts employed in the connection of the brace with the spindle are such as to permit the brace to be readily put in place, and as readily removed, and when put in place and pressed from its dotted-line position shown in Fig. 2 to its solid-line position, therein shown, to connect with the tongue at its upper end forms a secure cramping self-locking connection, and, by reason of the feather-connection of the spindle with the axle, which resists the cramping force of the brace, its connection with the spindle is made more secure.

A draft-sleeve, 19, of proper dimensions, is placed on the draft-arm of the axle in a manner to permit of an oscillatory movement thereon.

The draft-sleeve is formed with a series of conic holes, 20, on its upper and lower opposite sides, and these holes receive conic stud-pins 21, formed on the forward end inner face of joint-plates 22. The rear end portions of the joint-plates are formed on their inner face to receive the forward end of a tubular drag-bar, 23, to which they are securely fixed by means of a screw-bolt passed through the parts.

A screw-bolt, 40, is passed through the joint-plates between the draft-sleeve and the forward end of the drag-bar, and, in connection with the screw-bolt passed through the joint-plates and drag-bar, serves to adjust the joint-plates to the draft-sleeve, and also to fix the plates to the drag-bar. These several parts, consisting of the sleeve mounted on the draft-arm of the axle and the draft-plates connecting the drag-bar with the draft-sleeve, form a connection of the drag-bar with the axle to permit a free lateral and vertical movement of its rear free end and prevent axial or rolling movement of the bar to maintain the vertical position of the shovels fixed thereto in its lateral movements, and the series of holes formed in the sleeve in connection with the stud-pins of the joint-plates furnish the means for the lateral adjustment of the drag-bars toward or from each other to cultivate closer to or farther from the plants.

The draft-sleeve 19 is formed at its inner end with a short arm, 24, and a longer arm, 25, projecting at a right angle to the sleeve in bell-crank form with the short arm extending forward of the axle.

Rods 26 and 27 are pivoted at their lower ends to the outer end of their respective arms of the draft-sleeve, from which they rise through their respective guide-eyes in the two-part clips 28 and 29, clamped in place on the vertical arm of the axle, on which they are capable of vertical adjustment.

A supporting-spring, 31, and a counterbalance-spring, 30, are placed on their respective rod-supports 26 and 27 between their hinged connections with their respective arms of the draft-sleeve and their respective guide-eyes.

The supporting-spring 31 in its connections by means of the guide eye support to its supporting-rod is made adjustable to support the drag-bar and its attachments in an elevated position, as indicated by the dotted line *m* in Fig. 3, in which instance the movable parts will be in their dotted-line position, as therein shown. When the drag-bar is in its horizontal position, as shown in Fig. 2, the supporting-spring 31 and the arm 25 of the joint-sleeve will be in line, and the spring cannot exert any influence to either elevate or depress the rear end of the drag-bar. With the drag-bar in its horizontal position, as shown in Fig. 2, the counterbalance-spring 30,

by means of the guide-eye clip-support to its rod-support, is capable of adjustment as a counterbalance to the drag-bar to nearly support it in a horizontal position, but preferably with a downward tendency of its rear end. This adjustment of the springs will operate to equalize the force of the downward movement of the drag-bar from its horizontal position to its greatest working depth, as indicated by the dotted line *b* in Fig. 3, in which instance the movable parts will be in the position represented therein in solid lines.

From the foregoing it will be seen that it is within the capability of the springs 30 and 31 to vary the downward tendency of the rear end of the drag-bar to a greater or less extent, and that throughout its range of movement downward from a horizontal position its downward tendency shall be substantially uniform.

The shovel-standards 32 and 33 are made from channel **H** or **I** formed metal bars, and the rear shovel-standard, 33, is bent edgewise of the bar in a vertical curve, as shown in Fig. 2, and laterally in the reverse curves or ogee curved form shown in Fig. 1, to place its upper forward end in position to engage the rear end outside of the drag-bar, and its depending shovel-bearing end in proper position relatively with the drag-bar.

A shovel-standard supporting-bracket, 34, of the curved depending form shown is made to engage the inner face of the rear end of the drag-bar opposite the forward end of the rear shovel-standard, 33, and a screw-bolt passed transversely through the bracket drag-bar and shovel-standard serves to fix the several parts in place.

The depending arm 35 of the bracket-support to the shovel-standard is grooved on its outer face to receive the shovel-standard 32, which is fixed in place therein by a suitable screw-bolt passed through the parts; and a series of holes or a slot, as indicated by dotted lines and solid lines in Fig. 2, in either or both the parts, furnish the means for the vertical adjustment of the standard in its connection with the bracket.

A shovel-supporting sleeve, 36, made from bar material bent in loop form, with parallel arms to embrace the lower end portion of the standard, is pivoted thereto at its lower end by means of a bolt or rivet passed transversely through the parts in a manner to permit its lower free end to turn on its pivotal connection rearward.

One arm of the shovel-supporting sleeve extends upon the side of the shovel-standard, and its free end is made in gear-tooth form to engage the teeth of a gear-wheel, 37, placed on the side of the standard, and a screw-bolt passed through the standard and through the axial center of the gear-wheel serves to fix it in place thereon in gear-tooth connection with the gear-teeth of the sleeve.

Instead of the gear-wheel to engage the toothed end of the sleeve, it is evident that a

friction mechanism notched to receive the tooth-formed end of the sleeve may be employed; or a reverse construction of these parts may be employed and still be within the scope of our invention.

The gear-wheel is preferably made with a flange, 38, projecting on its outer face over its teeth to overlap the gear-toothed end of the sleeve to hold it in place. The gear-wheel is made with a nut-formed portion, 39, rising from its outer face axial center to receive a wrench to adjust the wheel.

A shovel, 41, of the usual construction, is fixed to the depending end portion of the sleeve in the usual manner.

The several parts, consisting of the sleeve 36 in its pivotal connection with the standard, the gear-wheel in its gear-toothed connection with the sleeve, and its pivotal connection with the standard, furnish the safety-friction apparatus to the shovel fixed to the sleeve.

In use, by means of a wrench applied to the nut-formed projection 39 of the gear-wheel, it may be turned on its pivot-support in one or the other direction, which movement, by means of its gear-toothed connection with the shovel-supporting sleeve, will vary its angle, and consequently the angle of the shovel fixed thereto, relatively with the shovel standard in the lengthwise direction of the drag-bar, to adjust it to enter the ground at a proper working angle, and when so adjusted the gear-wheel, by means of its pivot-screw bolt, is clamped to the shovel-standard with a force to create friction between the parts sufficient to hold the shovel in its adjusted position for the purposes of cultivation; but when subjected to a strain that might cause injury to the parts will cause the gear wheel to turn on its pivotal center, liberate the sleeve, and permit it to turn on its pivotal support, and the shovel fixed thereto to swing back, as shown in dotted lines in Fig. 2, to prevent breaking parts, after which it can be readily returned to its working position and again fixed for the purposes of cultivation.

We claim as our invention—

1. The herein-described tubular spindle, consisting of an axle-arm support to a carrying-wheel, a feathered sleeve to receive the axle, a recess in the sleeve to receive the screw-nut, a sand-band, and a perforated ear projecting from its forward side, substantially as and for the purpose set forth.

2. The combination, with an axle, of a tubular spindle to receive a carrying-wheel,

said spindle having a feather-connection of its sleeve portion with the axle to prevent rotary displacement and a recess to receive a screw-nut, a screw-nut within the recess in the sleeve, and a screw-bolt in connection with the screw-nut to fix the spindle in place against longitudinal displacement, substantially as and for the purpose set forth.

3. The combination, with a spindle detachably secured to an axle and provided with a laterally-extending perforated ear fixed rigidly thereto, and the tongue, of a brace extending from the tongue to the spindle and having a self-locking connection with the ear on the spindle, whereby the spindle is held firmly in position and readily detached at pleasure, substantially as set forth.

4. The combination of an axle, a draft-sleeve with bell-crank arms radiating from its inner end, a supporting-spring, and a counterbalance-spring in connection with their respective radial bell-crank arms of the draft-sleeve and with adjustable attachments to the axle, substantially as and for the purpose set forth.

5. The combination of a joint-sleeve with bell-crank arms radiating from its inner end, an axle-support to the joint-sleeve, a shovel-supporting drag-bar hinge-jointed to the sleeve, a supporting-spring and a counterbalance-spring and their rod-supports connecting their respective arms of the joint-sleeve with the axle, said springs made adjustable in their connection with the axle, substantially as and for the purpose set forth.

6. The combination of a drag-bar, an outer shovel-standard, a bracket-support to the inner shovel-standard, a bolt to fix the shovel-standard and bracket in place on opposite sides of the drag-bar, and an inner shovel-standard fixed to its bracket-support, substantially as and for the purpose set forth.

7. The combination, with the shovel-standard, of a shovel-carrying sleeve pivotally secured to the lower end of the standard and having a branch extending upwardly along the side of the standard and terminating in a toothed end, a toothed wheel provided with a guard-flange, and a pivotal bolt to clamp the toothed wheel to the side of the shovel-standard in a position to engage the toothed end of the carrying-sleeve, substantially as and for the purpose set forth.

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Witnesses:

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