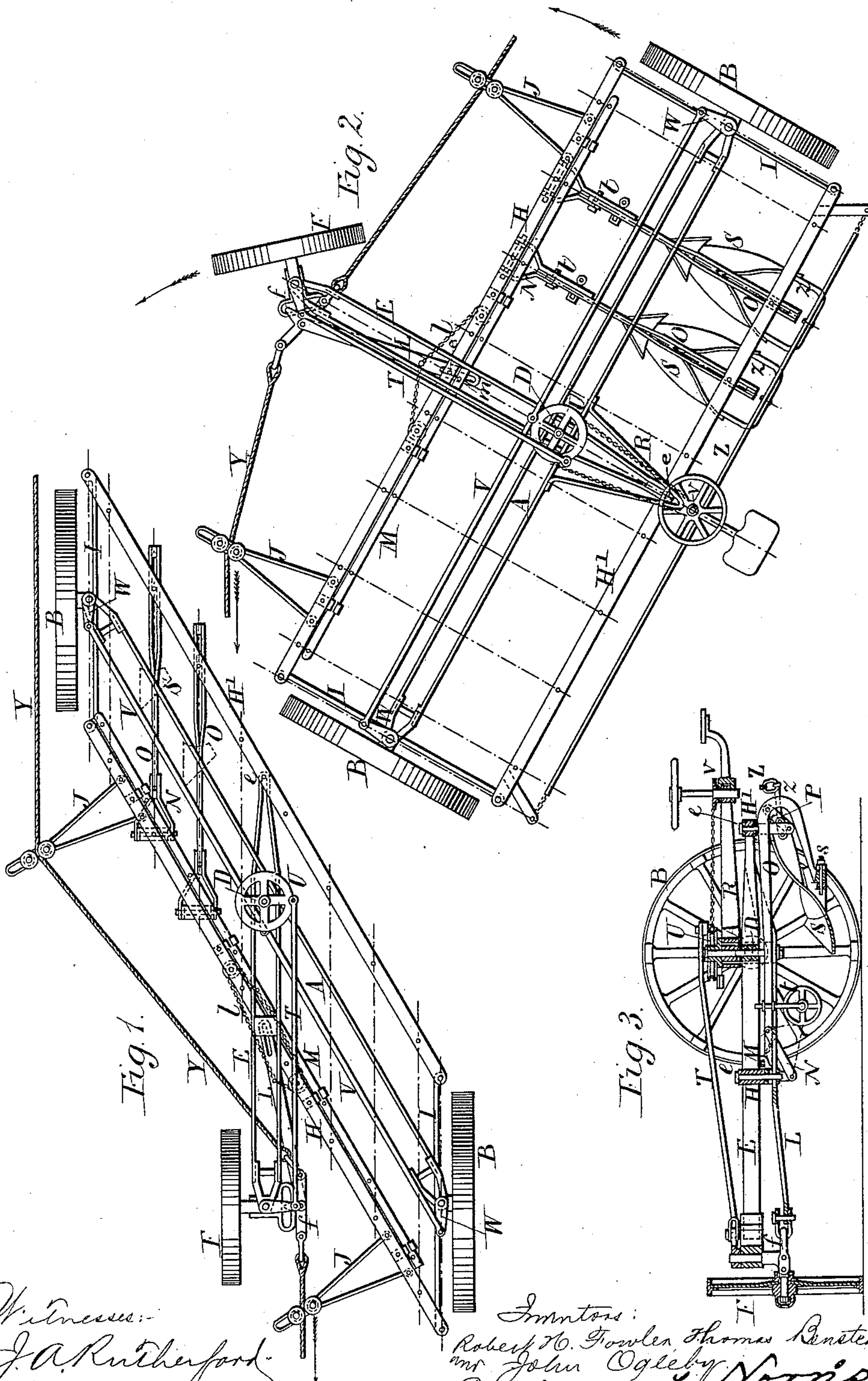


(No Model.)

R. H. FOWLER, T. BENSTEAD & J. OGLEBY.  
APPARATUS FOR STEAM CULTIVATION.

No. 463,502.

Patented Nov. 17, 1891.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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ENGLAND.

## APPARATUS FOR STEAM CULTIVATION.

SPECIFICATION forming part of Letters Patent No. 463,502, dated November 17, 1891.

Application filed June 16, 1891. Serial No. 396,413. (No model.) Patented in England June 16, 1890, No. 9,299.

*To all whom it may concern:*

Be it known that we, ROBERT HENRY FOWLER, THOMAS BENSTEAD, and JOHN OGLEBY, citizens of England, all residing at the Steam Plough Works, Leeds, in the county of York, England, have invented new and useful Improved Apparatus for Steam Cultivation, (for which we have applied for a patent in Great Britain, which patent when granted will bear date June 16, 1890, No. 9,299,) of which the following is a specification.

This invention relates to apparatus suitable for being drawn to and fro by traction-ropes for effecting plowing or other like operations on the soil, the chief object being such a construction of the apparatus that the pull of the traction-rope automatically determines the attitude of the shares or other cultivating-tools.

Figure 1 of the accompanying drawings is a plan of apparatus according to this invention in the position in which it operates when it is being pulled in the direction of the arrow. Fig. 2 is a plan showing the apparatus in the act of turning toward the position shown in Fig. 1. Fig. 3 is a transverse section of the apparatus.

A is a central longitudinal frame, at each end of which there is a traveling wheel B, mounted on a perch-pin. On each perch-pin there is fixed a crank W, and the two cranks are connected by rods V, jointed together at the middle. At the middle of the frame A is pivoted on a vertical axis or perch-pin D a horizontal lever E, which has mounted on a perch-pin at its outer end a traveling wheel F. At *e e*, equally distant on each side of the perch-pin D, there are pivoted horizontal bars H and H', and the two ends of these bars are connected by cross-levers I I, which are pivoted at their middles on the perch-pins at each end of the middle frame A. The two bars H H', with their end connecting-levers I I and their middle lever E, form a parallel motion, and as the pin connecting the two rods V V is engaged in a slot of the lever E this parallel motion governs the position of the wheels B and also of the shares or cultivating-tools S, a number of which are carried, as will hereinafter be described, one behind another by the bars H H'. Arms J J, projecting

from the bar H, carry guide-pulleys, between which passes the traction-rope Y, which is attached with certain freedom of movement to a crank *f* on the perch-pin of the wheel F. When the traction-rope Y is pulled in the one direction, it turns the wheel F on its perch-pin and moves the lever E so as to turn also the wheels B upon their perch-pins, and moving at the same time the bars H H' it directs the fronts of the cultivating-tools S in one way. When the rope is pulled in the other direction, the parts arrange themselves so as to present the fronts of the cultivating-tools S in the opposite direction. The wheels B B have on their naves ratchets engaged by pawls pivoted on their perch-pin cranks, so that the wheels can turn only in the forward direction. Consequently when the direction of the pull of the rope Y is changed, as shown in Fig. 2, the left-hand wheel B, as it cannot turn backward, forms a pivot, on which the whole apparatus sweeps round to its reverse attitude. A bracket R, projecting from the middle frame A, carries a steering-wheel and seat. The axis *v* of the steering-wheel is connected by chain-gear to a wheel V, a pin on which is connected by a rod T to a crank on the perch-pin of the wheel F, so that the operator can within certain limits alter and direct the course of the apparatus.

It is of advantage to provide on the middle frame A stops to prevent the lever E from oscillating beyond a certain distance each way, and to make such stops adjustable, so as to determine, as required, the angle which the lever E and the parallel-motion bars I I make with the center line, thus determining the spacing of the furrows formed by the cultivating-tools S. These tools are made symmetrical, and are pivoted on horizontal axes at *s* on bent frames O, so that they can turn over through a quarter of a revolution. When they are moving in the one direction, one side stands vertically as a colter, while the other acts horizontally as a share. When the direction of movement is reversed, the colter becomes the share and the share becomes the colter. Also, the frames O, which carry the tools, are so mounted that they raise the tools off the ground while the apparatus is in the act of turning, as shown in Fig. 2, and that



when the apparatus is turned they cause the tools S to descend into the soil as deep as is permitted by wheels *t*, which are mounted on the frames O. These frames are jointed by  
 5 radius-levers N and P to brackets projecting down from the bars II II'. The radius-levers N are each connected by a few chain-links to a horizontal bar M, which slides in guide-brackets projecting from the bar II. By a  
 10 pin at *m* the bar M is connected to a chain *l*, which passes round two guide-pulleys on II and is pinned to a lever L, one end of which has a slotted hole working on a pin on II, and the other end is jointed to the rope-link  
 15 at the crank *f*. When in the act of turning the apparatus, the lever L has to move partly round, it moves the chain *l* and so moves the bar M, thereby raising the radius-levers N to the position shown in Fig. 3, the cultivating-  
 20 tools S being thus raised above the ground. When the apparatus is fully turned, the bar M is so far moved as to slacken the chains that carry the levers N, thus allowing the frames O and the cultivating-tools S to descend. In  
 25 order to turn the tools on their pivots *s* over from the one attitude to the other, each of them has a yoke *z* attached at each side to the tool and linked at its middle to a horizontal bar Z, which is linked at each end to the  
 30 bar II' and moves with it. As the apparatus turns, this bar Z, moving lengthwise, cants each of the yokes *z*, thus canting the tools S over on their pivots *s*.

Having thus described the nature of this invention and the best means we know for carrying the same into practical effect, we claim—

1. In a plow or cultivator, the combination of the central frame, the two side bars carrying cultivating-tools, the middle lever, the end

levers, the two end traveling wheels, a wheel 40 on the middle lever, and a traction-rope so arranged with relation to said wheels that on changing the direction of traction the whole apparatus will be turned around one of the end wheels as a pivot and the cultivating-tools 45 thus put automatically into position for reverse action in fresh soil, substantially as described.

2. In a plow or cultivator, the combination of the central frame, the side bars, the cultivating-tools pivoted to frames mounted on said side bars, and self-acting mechanism for connecting said frames and tools, whereby in the act of turning the apparatus the tools will be raised above the soil and lowered and 55 canted over, substantially as described.

3. In a plow or cultivator, the combination of the central frame, a system of bars and levers forming a parallel motion and comprising a central lever, traveling wheels at the 60 ends of the central frame, a traveling wheel at the forward end of the central lever, and a traction-rope arranged in such relation to said wheels that on changing the direction of traction the apparatus will be turned around on 65 one of the end wheels as a pivot, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 30th day of 70 May, A. D. 1891.

R. H. FOWLER.  
 THOMAS BENSTEAD.  
 JOHN OGLEBY.

Witnesses:

J. W. THACKERAY,

J. W. HEY,

*Both of Steam Plough Works, Leeds.*