

L. J. CHATEAU.

Steam-Plow.

No. { 2,873,
33,877. }

Patented Dec 10, 1861.

Fig. 1.

Fig. 4.

Fig. 5.

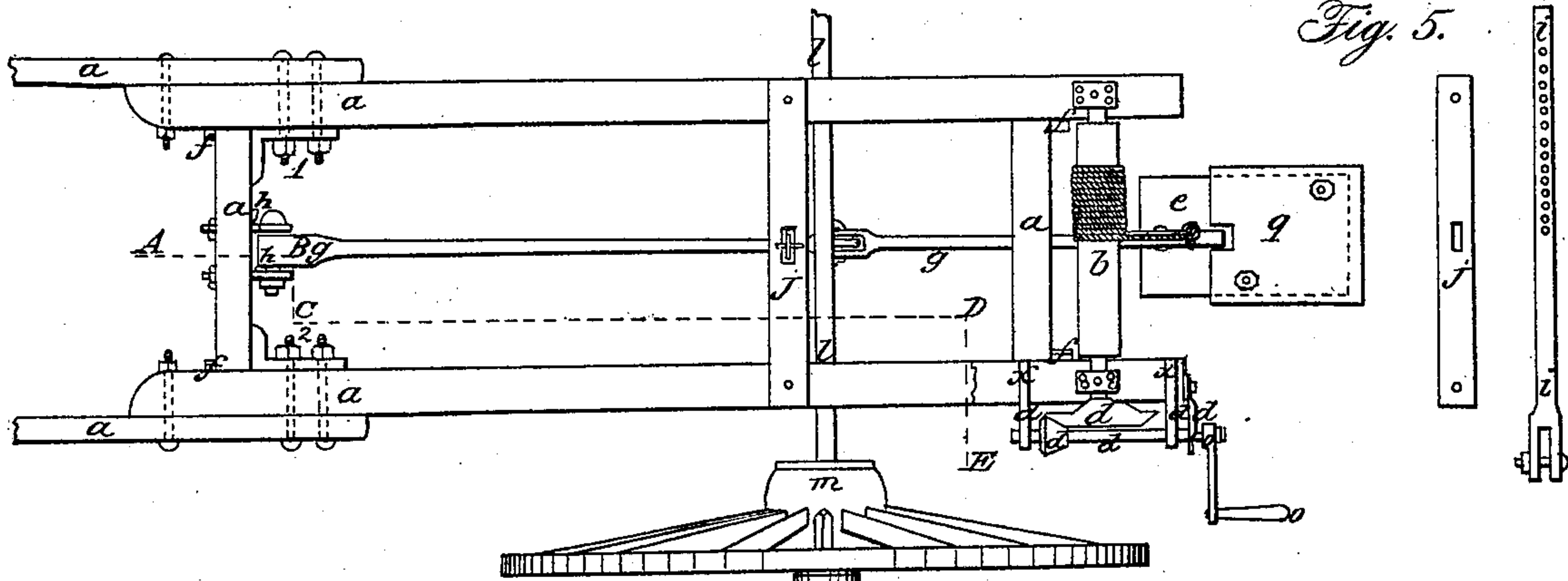


Fig. 2.

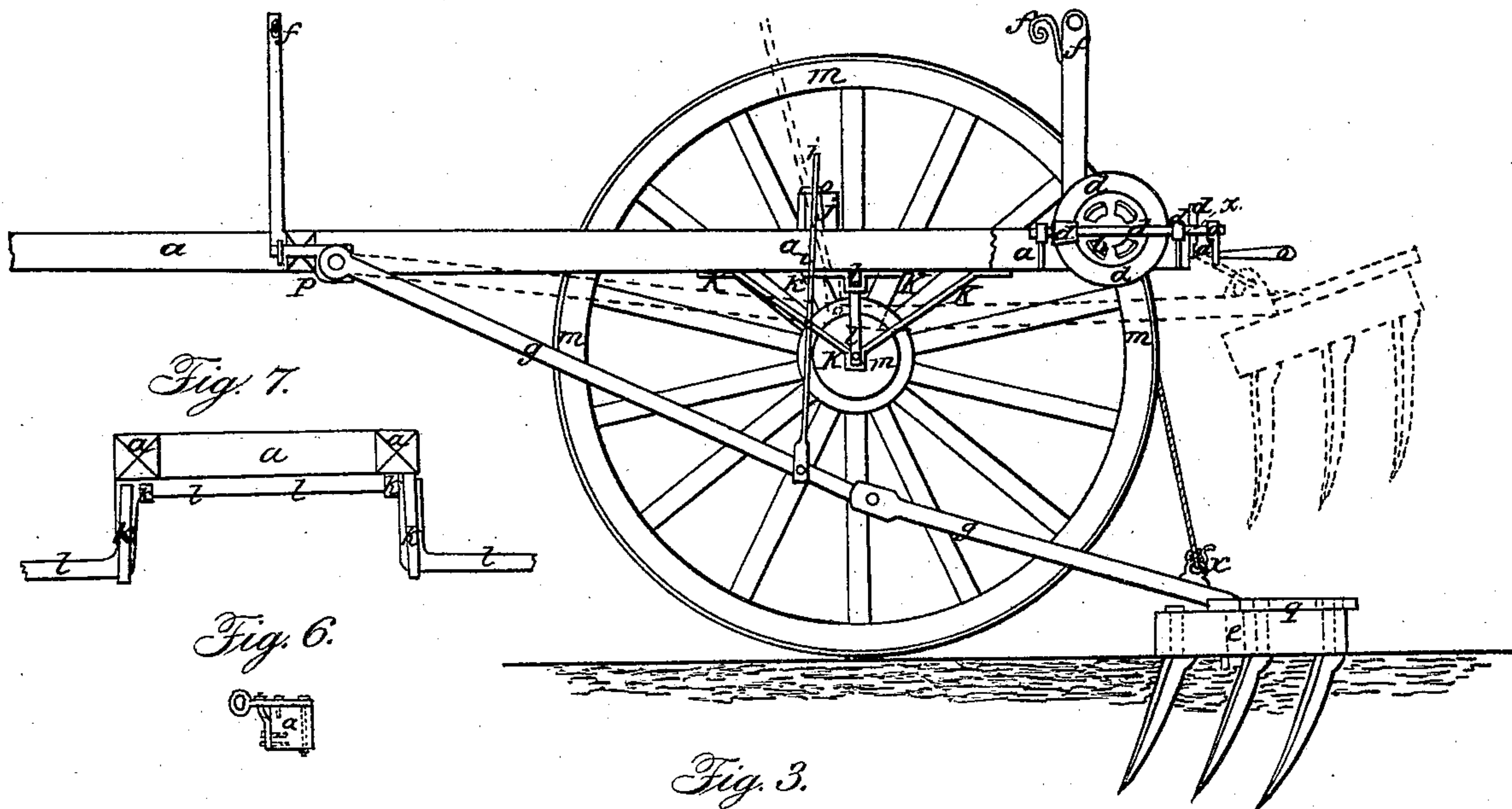


Fig. 7.

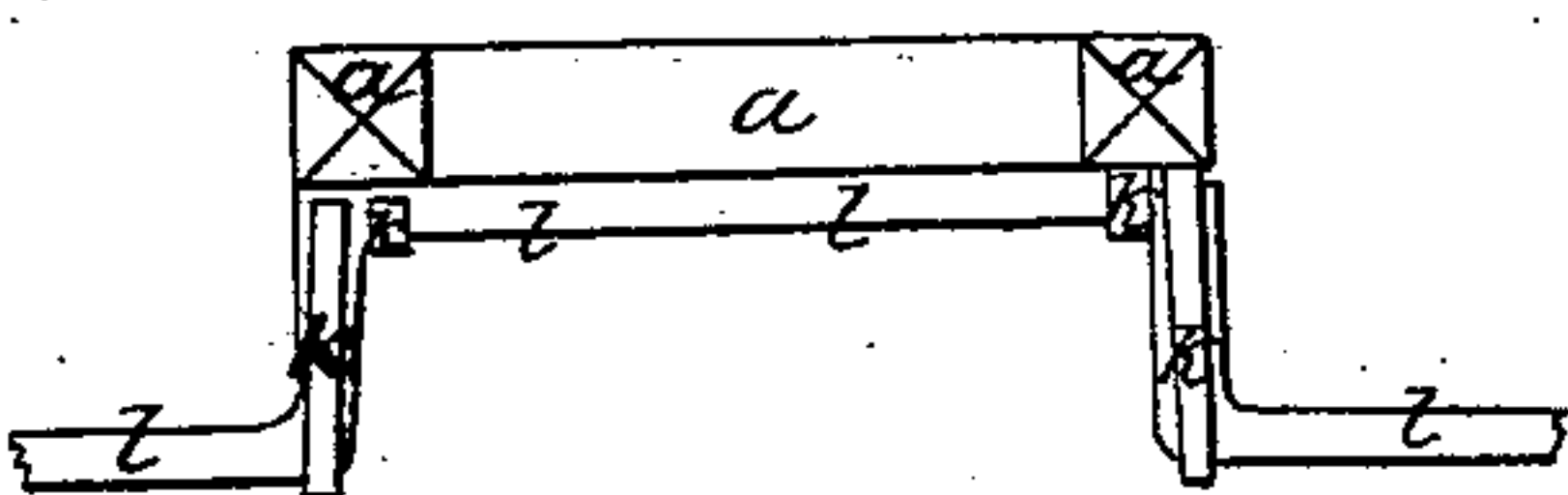
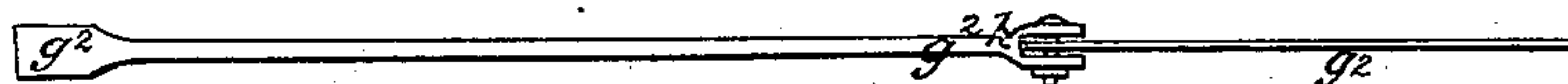


Fig. 6.



Fig. 3.



Witnesses:

Wm
Geo. Sutton

Inventor:

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UNITED STATES PATENT OFFICE.

LOUIS JACQUES CHATEAU, OF PARIS, FRANCE.

IMPROVED MACHINE FOR BREAKING THE SUBSOIL.

Specification forming part of Letters Patent No. 33,877, dated December 10, 1861.

To all whom it may concern:

Be it known that I, LOUIS JACQUES CHATEAU, of the city of Paris, in the Empire of France, have invented an Improved Machine for Breaking the Subsoil; and I do hereby describe and ascertain my said invention as follows:

This machine is employed in breaking up the under surface of the soil—that is to say, that part on which the layer of arable land rests. It consists of two principle parts—viz., the breaking instrument and the car or frame on wheels.

The breaking instrument is formed of a rectangular block of cast-iron about ten inches wide by eighteen long and four thick. This block is pierced with square holes, in which are fixed three teeth or picks of steel, shouldered to prevent them from bending backward. It is also pierced near its middle with another hole of rectangular form, the sides of which are parallel with those of the cast-iron block. This opening is destined for the introduction of a pole or shaft by which the apparatus is drawn. The foremost and upper edge of this opening should be sloped about half an inch, in order to give greater solidity to the pole, by giving it a bend slightly rounded below the point of its introduction to the cast-iron block. The three teeth or picks may be of pentagonal or other form, and present one of their edges or angles in the direction in which the instrument moves. Their position is clearly shown in the drawings. A line drawn from the head of these teeth or picks to the points would form an angle of about twenty degrees with the face of the block inclined towards the front thereof. Whatever form is given to these picks their lower part must have a direction nearly perpendicular to the line of traction beginning at the head (*chape*) of the regulator. The lower part of the picks must terminate in a point, which is sharpened when required.

The block of cast-iron is covered with a small board pierced with holes, in order that the heads of the picks or teeth may enter these holes. Between the board and the cast-iron block is a piece of sheet-iron pierced with similar holes, and raised at the sides the thickness of the board. This piece of sheet-iron is

pressed against the block by means of the nut screws of the heads of the picks. The nut-screws are only screwed up after the piece of sheet-iron has been put into position.

The traction-pole is constructed in two pieces connected by a bolted joint, and is attached directly to the foremost cross-piece of the frame by means of an axle-bolt passing horizontally into the head of the pole, and in two iron cheeks fixed to the cross-piece by screw-bolts. The pole should be strengthened from its point of insertion in the block to a distance of about fifteen inches, at which part it should be about an inch and a half thick horizontally and two and a half inches vertically. The part entering the cast-iron block should terminate in a screw, in order to receive beneath the block a nut-screw which fixes it.

The supplementary pieces of the machine are the regulator, the hoist or axle, the pinion with small toothed wheel, the winch, the catch, and the cord with ring.

A flat iron shaft or rod, called the "regulator," transmits to the axle of the car a part of the tractive power, which would otherwise be thrown on the shaft-horse in the course of operation. As regulator, on account of its variable length, this rod allows the quantity which the instrument may incline or rise from the front to be determined according to the depth required to be given to the working of the instrument, and according as the cast-iron block is raised or lowered by the variable length of the picks or the depth of the furrow opened by plow. This rod passes through the wooden cross-piece fixed on the frame near the axle, and is pierced with holes, in one of which a pin or peg is placed, supported crosswise on the wooden cross-piece. Finally, the rod is terminated at its lower part by a head with bolt (*chape à bouton*) embracing the tractive pole as near as possible in front of the point.

The hoist or axle, the angle-pinion with its toothed wheel, the winch, the catch with its rack, and the cord with its ring, are represented in detail in the annexed drawings, together with the buttresses or props.

The use of these parts is, first, to raise the block from the ground at the end of the furrow before turning the car in another direction, or to maintain it at the desired height by

means of the catch; secondly, to raise the instrument up to the frame of the car when proceeding on roads.

The car.—The frame bears immediately on the axle above the bend, shaft-cushions placed beneath fix it on the axle, and buttresses, also fixed beneath, fix it on the axle beneath the frame, and embracing the lower bend of the axle maintain the latter in a fixed position. The axle is bent at right angles on each side, at the point where it comes from beneath the frame. The bend descends vertically about eight inches, according to the diameter of the wheels, and another bend gives a horizontal direction to the spindles of the axle. The front cross-beam of the frame must be firmly tenoned, for it is the tenons of this cross-piece which have to sustain the most severe strain in working. It is advisable to sustain the tenons by means of angle-irons placed at the two front angles of the frame. Each angle-iron is fixed against one of the side pieces of the frame. The shafts are made separate from the side pieces, and are attached to them by bolts with screw-nuts. On the frame, and as near as possible to the axle, a wooden cross-piece is fixed by means of two screw-bolts. This cross-piece is pierced in the middle with a rectangular opening to allow the regulator to pass through. The hoisting-axle rests in a round notch in the upper surface of the frame. This notch must not be longer than the portion of the axle-tree it is to receive, in order that the latter may find a support against the action of angle-pinion. The wheels may be according to taste. Those in the drawings are about four feet six inches in diameter.

In the drawings, Figure 1 is a plan. Fig. 2 is an elevation and section following the line marked by red letters A B C D E of the plan.

The same letters refer to the same pieces in both figures.

a represents the frame, shafts, and cross-pieces of the machine; *b*, hoist or axle, about four inches in diameter, around which is rolled a cord, which is attached to the hook or ring *c* of the tractive pole, and serves to raise the block. The ring, instead of being fixed to the pole, may embrace it, being arrested by notches in the angles of the pole. On the axle of this hoist the toothed wheel *d* is fixed.

System of gearing.—*d* is the toothed wheel with angle-pinion *d'*, catch *d''* with rack, winch *o* for working the hoist. The axle bearing the angle-pinion *d'*, the rack *d''*, and the winch *o* rests in two supports fixed against the frame. The catch is fixed at the end of the frame by means of a thick square-headed wooden screw, or it may be fixed in another way on the frame itself. Fig. 6 shows the side view of the two supports of the axle of the winch *o*; *e*, cast-iron block covered with a wooden cap (*salier*) covered with sheet-iron; *f*, guide-bearers for supporting the reins; *g*, traction-pole jointed at *h*, and turning freely on an axle-bolt passing through the head of the pole, and two iron cheeks, *p*, which are fixed to the front cross-

piece of the car by the screw-bolts; *g*², Fig. 3, same pole jointed at the point *h*, (seen separately;) *i*, Fig. 4, thick iron rod or pole pierced with holes for receiving a bolt or peg and terminated by a head (*chape*) with bolt and nut-screw; *j*, Fig. 5, cross-beam with rectangular opening in the middle, fixed with bolts on the sides of the frame. The cross-beam *j* being placed in position, together with the traction-pole, the thick rod *i* is passed through the opening of the cross-beam *j*. The head (*chape*) of this rod or regulator embraces the traction-pole, and sustains it by the bolt of the head. According to the height desired the peg is placed in one of the holes in the thick rod above the cross-piece *j*, on which the peg then rests crosswise as to the opening by which the upper end of the regulator should pass; it is beveled, so that the latter may embrace with its head or fork the traction-pole of the block perpendicularly with the pole in front of the shoulder of the head, and at a point situated, or nearly so, on the vertical plane passing by the axis of the shaft or axle of the car, (the terms in "front" and "behind" refer to the direction in which the machine proceeds;) *K*, brackets and buttresses or clamps embracing the upper and lower bands of the axle, Figs. 1, 2, and 7. The height between the bends of the axle varies according to the height of the wheels employed. Fig. 7 is a front elevation of the axle fixed beneath the car.

This machine breaks the under soil, pulverizing the earth disturbed. No part of the under soil is brought to the surface—on the contrary, it remains horizontally at the bottom of the trench. The progress of the instrument is not checked by stones, they being removed by the picks, and the working is always equal and regular, as it depends but little on the skill or attention of the laborer conducting it.

When drawn by two or three horses, and following an ordinary plow, the machine breaks the earth to a depth of from twelve to twenty inches (including the depth of the furrow made by the plow) without mixing the under soil with that of the surface. By this operation the culture of the layer of arable soil is considerably increased and the vegetative power of the earth acquires new force. Two superposed layers of earth are thus cultivated in a distinct manner without confusion—one, the upper layer, according to ordinary custom, without being acted upon injuriously by the breaking instrument, but, on the contrary, receiving therefrom an amelioration, and the other, the under layer, almost without expense, producing an immediate improvement in the arable layer, as above stated, and producing an effect which at the end of a few years will prove of great value.

Having thus fully described my invention and the advantages thereof, what I claim as new, and for which I desire to secure Letters Patent, is—

1. The breaking instrument constructed and arranged as herein specified.

2. Connecting the breaking instrument with the carriage by means of a compound reach-pole, as described.

3. In combination therewith, the regulator *i*, in the manner and for the purposes set forth.

4. In combination with the apparatus herein specified, the hoist for elevating the breaking apparatus, as described.

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Witnesses:

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