

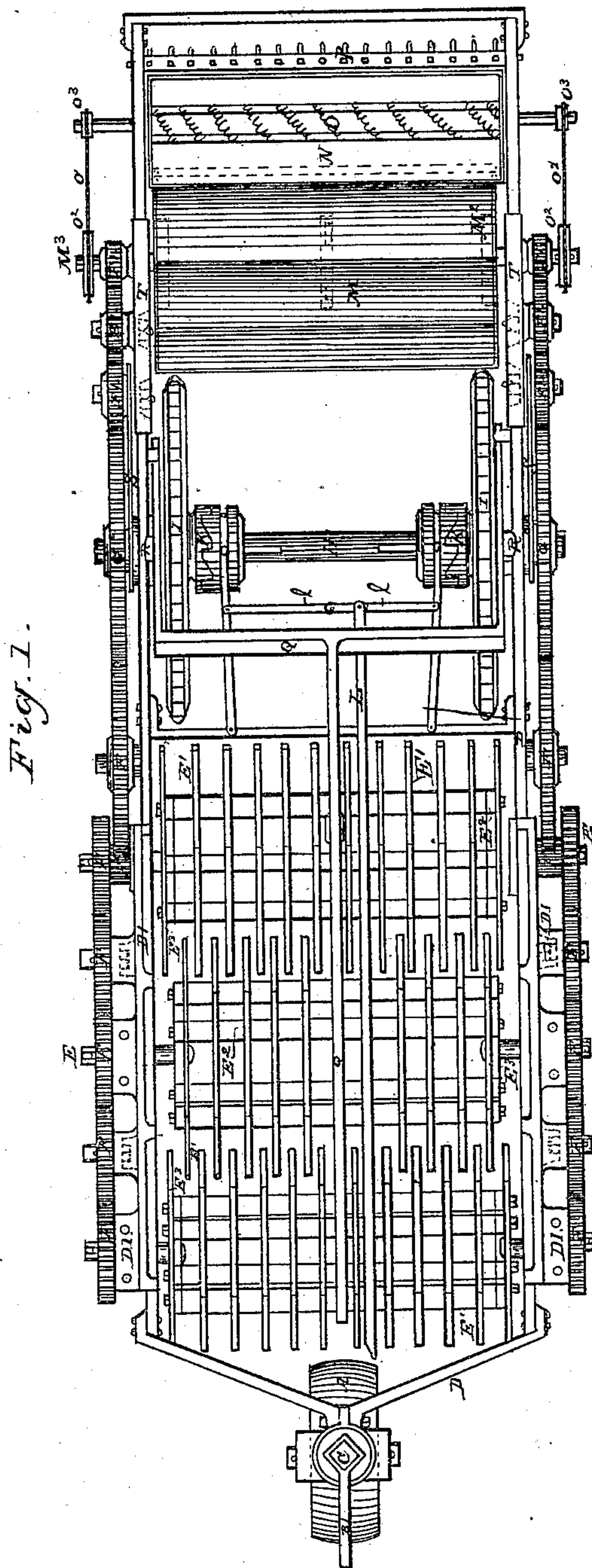
(No Model.)

3 Sheets—Sheet 1.

J. A. KAY.  
CULTIVATING MACHINE.

No. 273,101.

Patented Feb. 27, 1883.



Witnesses:

J. W. Reynolds, Jr.  
W. V. Smith

Inventor:  
Joshua A. Kay  
By his Attor  
R. D. Smith

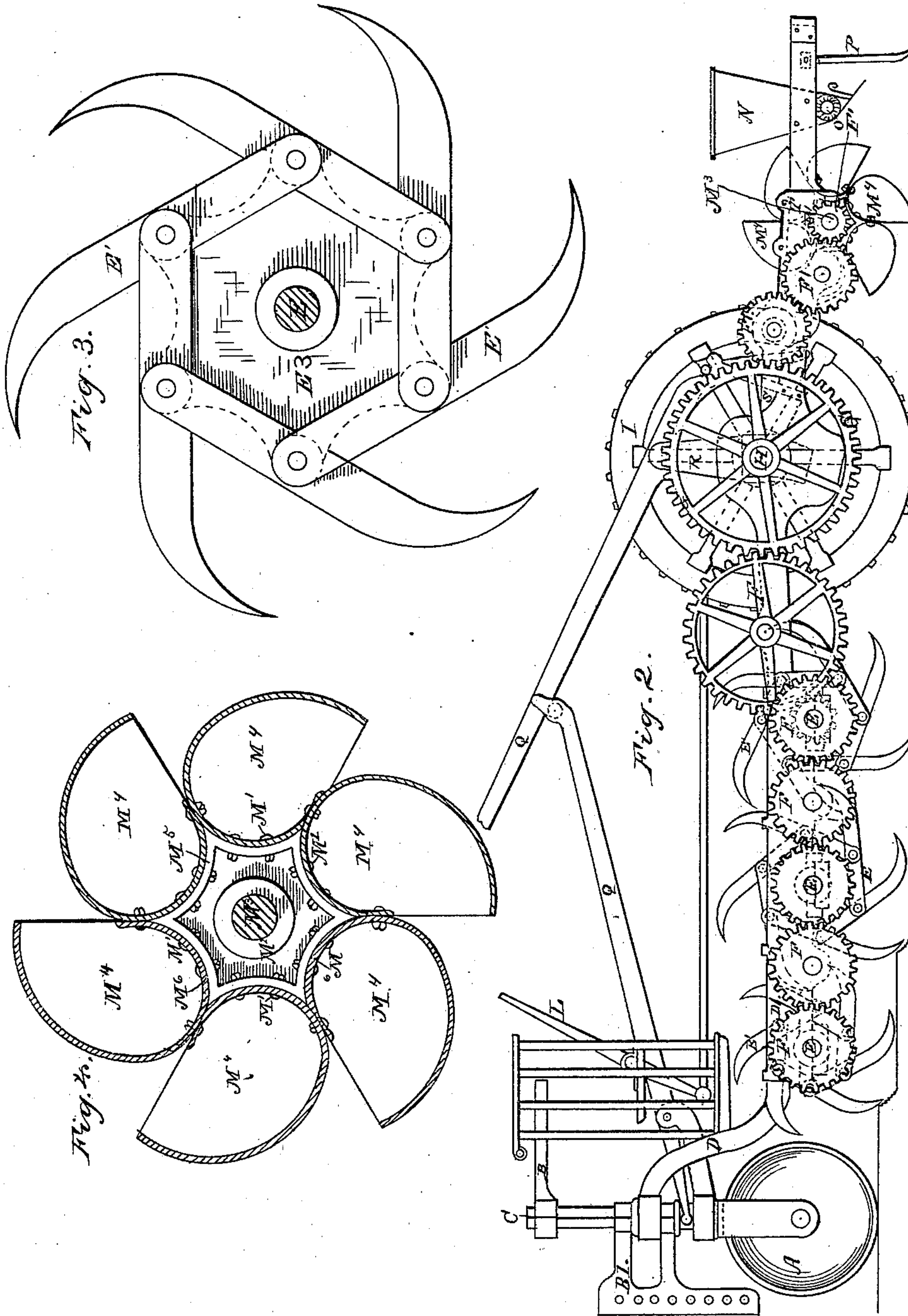
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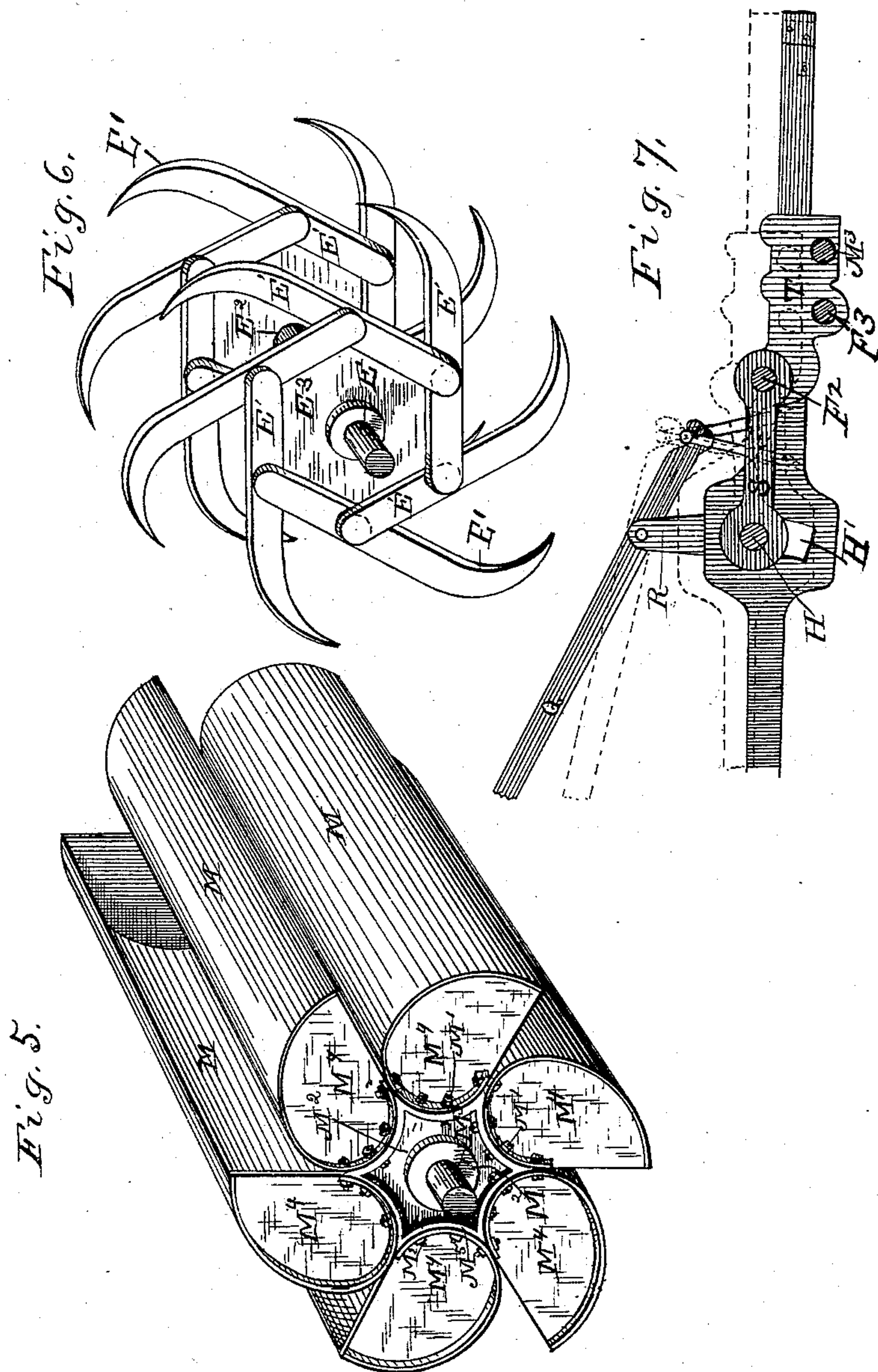
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J. A. KAY.  
CULTIVATING MACHINE.

No. 273,101.

Patented Feb. 27, 1883.



Witnesses:  
J. C. Turner  
M. N. Smith

Inventor  
Joshua A. Kay  
By his atty  
W. D. Smith



# UNITED STATES PATENT OFFICE.

JOSHUA A. KAY, OF MELBOURNE, VICTORIA.

## CULTIVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 273,101, dated February 27, 1883.

Application filed August 25, 1882. (No model.) Patented in Victoria November 15, 1881, No. 3,125.

*To all whom it may concern:*

Be it known that I, JOSHUA ALEXANDER KAY, a subject of the Queen of Great Britain, residing at Flinders Lane East, in the city of Melbourne and British colony of Victoria, mechanical engineer, have invented Improvements in Machinery for Breaking up and Tilling the Ground, (for which I have obtained Victorian Letters Patent dated the 15th day of November, 1881, No. 3,125,) of which the following is a specification.

My invention consists in an improved construction and arrangement of machinery for plowing or digging or breaking up the earth prior to its undergoing the subsequent operations of turning over, sowing, and harrowing when the land is to be tilled, and prior to its being lifted and removed when the object is simply that of excavation, as in the forming of dams, &c. In the former case I add the contrivances for turning over, sowing, and harrowing to those for plowing, digging, or breaking up, so as to enable one machine to perform all these operations at one and the same time, but in due succession so far as the order of their procedure is concerned, and in the latter case I may add or omit the elevators for lifting the broken-up earth into a vehicle or conducting it to any required point.

The plowing, digging, or breaking-up portion of my machinery consists essentially of a succession of revolving horizontal shafts, one behind the other, each imparting motion to a series of multiple picks or breaking-up tools, each such multiple pick consisting of a number of points or single picks, which enter the ground in the same line in succession. I prefer to make such multiple picks and to connect them to the shaft in the manner hereinafter described, and shown in my drawings, it being necessary that the picks on each shaft should not travel in the same line as those immediately before it, and that the second one should be lower than the first, so as to dig to a greater depth, and thus divide the work and lessen the strain. Two of such shafts might be sufficient, but I prefer to have three, and in this case the third one is on the same level as the second, and is only used to insure more perfect work. The whole of these shafts are supported in bearings attached to a main framing, which is

raised and lowered by suitable leverage, and are driven by spur-wheels on the main shaft, as hereinafter described.

The machine, as a whole, has three wheels, one being a leading or steering wheel in front, and the two others being draft-wheels, one at either side, immediately behind the plowing, digging, or breaking-up portion of it. Immediately behind the draft-wheels is my turning-over machinery, consisting of a series of scoops or shovels the whole width of the machine, which revolve with a shaft to which they are connected, and which is itself driven from said spur-wheels on the main shaft, in the manner hereinafter described. Immediately behind this turning-over contrivance I attach a seed-sower of the same width as the machine, which is worked from the scoop-shaft, also as hereinafter described. In this seed-sower there is of itself no novelty. Immediately behind this seed-sower I also suspend a row of teeth or tines reaching to the ground, so as to act as a harrow. This is supported by gudgeons working in bearings in the frame, so as to admit its swinging to and fro, and thus allowing the teeth to pass over the weeds or other obstruction.

Referring now to my drawings, Figure 1 shows a plan, and Fig. 2 a side elevation, of my machine as a whole. Fig. 3 shows a side view of one of my multiple picks, and Fig. 4 a similar view of my revolving scoops or shovels, both on a larger scale than the other views. Fig. 5 is a perspective view of the scoops and the end disks and shaft by means of which they are secured. Fig. 6 is a perspective view of two disks mounted on a shaft, said disks being provided with multiple picks. Fig. 7 is a detail of the mechanism back of the main wheel for keeping the spur-wheels in gear when the machine is raised and lowered.

A is the front or guide wheel, worked by the steering-handle B and bridle B' on vertical spindle C, as is well understood.

D is the main framing of the digger, one end of which is supported on spindle C and the other on the axle of the draft-wheels. Bolted to this framing are cheek-plates D', in which are the bearings for shafts E, each shaft carrying a series of multiple picks, E', kept a proper distance apart by sleeves or washers E<sup>2</sup>, and



bolted to disks  $E^3$ , as shown. On either end of each of these shafts are pinions or toothed gearing  $F$ , the whole of which are set in motion by spur-wheels  $G$ , fixed on the axle  $H$  of the draft-wheels  $I$ . These draft-wheels revolve freely upon their axle, except when the clutches  $K$  are closed by hand-lever  $L$ .

$H'$  is a slot in the frame to admit of a vertical movement of the axle  $H$ .

$F^2$  is an axle, around which the rear end of link  $S$  is secured.  $F^3$  is a shaft provided with a gear-wheel.  $F F F$  are a chain of gear-wheels receiving motion from the main gear-wheel  $G$ .

Behind the draft-wheels are the scoops or shovels  $M$ , which are fastened by bolts  $M'$  to disks  $M^2$ , fitted on shaft  $M^3$ , at either end of which are pinions  $F'$ , driven by toothed wheels, also marked  $F'$ , and all receiving motion from spur-wheels  $G$  on axle  $H$ .

$M^4$  are the end plates on scoops  $M$ .  $M^6$  are flanges on plates  $M^4$ , and  $M^5$  are flanges on disks  $M^2$ . The plates  $M^4$  are secured to scoops  $M$ . The bolts  $M'$  pass through flanges  $M^5 M^6$ , and also through the edges of the scoops, whereby the disks, plates, and scoops are rigidly united. The disks being fixed to the shaft  $M^3$ , the scoops are of course revolved with said shaft.

Behind the revolving scoops or shovels is a seed-sower,  $N$ , of common construction, and whose brush  $O$  is driven by a cord,  $O'$ , gearing over pulleys  $O^2$  and  $O^3$ , the latter of which is on the end of shaft  $M^3$ , from which it receives it motion. Behind the sower is the light swinging harrow-rake, consisting of one or more rows of teeth across the hinder end of the machine.

$Q$  is a double lever for raising and lowering the machine at pleasure. It works on fulcrum  $R$ , which also acts as an axle-bush.

$S$  is a strong flat connecting rod or link, one end of which is around said axle-bush and the other end around the collar of the intermediate wheel-stud, so as to move the hind cheek-plates,  $T$ , back and forth to keep wheels  $G$  and  $F'$  always in gear as the machine is raised or lowered.

$l l$  are jointed bars, to one of which the lever  $L$  is pivoted.

The shafts for the picks and the shovels may be substituted by gudgeons formed on the disks, to which they are bolted.

The action of the machine is as follows:

When the horse, steam, or other power is applied to drag the machine over the ground to be operated upon, the framing which carries the picks is lowered to the required depth by means of lever  $Q$  and the clutches thrown into gear by means of handle  $L$ . As the machine is then drawn forward, the main or driving wheels  $I$  are set in motion, and the spur-wheels  $G$  propel the driving-gear of the picks, scoops, and sower when the two latter are attached. The picks as they revolve enter the soil and dig or break it up, as before described, and for

some purposes of agriculture their operation alone would be sufficient for the requirements of the soil, in which case the hinder part of the machine would be dispensed with; but as in wheat or cereal growing it is of great importance to completely turn over the soil, so as to destroy weeds, larvæ of insects, and other vermin, I apply the revolving shovels or scoops, which lift the pulverized soil right up and discharge it again behind in the wake of the machine comparatively smooth and regular in the depth. The seed is supplied to the hopper, and the brush is so set and constructed that its interstices just allow the proper proportion of seed to pass out onto the surface of the land, when it is covered in to the required depth by the light harrow-rake.

The pick-points may either be hardened or covered with shields, which can easily be renewed when worn. By reversing their motion the machine might be used for potato-digging. It may be set to work shallow for grass or other seed sowing, or lowered to any required depth for plowing or excavating or other purposes.

When my machine is used for excavating for roads, dams, canals, and so on, an elevator might be attached in lieu of the seed-sower, so as to carry up the soil to an inclined chute for depositing it at a distance; or the machine might be constructed with pickers revolving, to which fixed mold-boards might be attached, like plows; or stationary tines might be fixed to tear up the soil, followed by my revolving shovels or scoops. As these devices would use much more labor or power to do the same work, I prefer to use contrivances shown in my drawings.

Having thus described the nature of my invention and the manner of performing same, I would have it understood that I do not confine myself to the precise shape or number of my picks and shovels, or to the construction of the sower or harrow, as they may be altered or varied without departing from the nature and principle of my invention; but

What I believe to be new, and therefore claim as my improvements in machinery for breaking up and tilling the ground, is—

1. The curved scoops  $M$ , having end plates,  $M^4$ , the disks  $M^2$ , secured to shaft  $M^3$ , said disks and plates being provided with flanges, and secured in the manner and for the purposes set forth.

2. The combination of the driving-wheels  $I$ , the clutch  $K$ , lever  $L$ , and jointed connecting-lever  $l$  with the compound lever  $Q$ , link  $S$ , and cheek-plates  $T$ , substantially as described, and for the purpose set forth.

3. The disks  $E^3$ , provided with multiple picks  $E'$ , said disks being mounted on shafts  $E$ , said shafts being provided with sleeves  $E^2$ , and having a bearing in cheek-plates  $D'$ , substantially as described, and for the purposes set forth.

4. A series of pulverizing-teeth or multiple



picks secured to the sides of a series of disks,  
the butt-end of each of said teeth being piv-  
oted to the side, near the center of the tooth  
immediately following it, thereby forming a  
5 circular array of projecting joints, all equidis-  
tant from a common center, the whole of the  
series of disks being secured to a series of car-

rying-shafts, said shafts being vertically ad-  
justable, substantially as described, and for the  
purposes set forth.

JOSHUA A. KAY.

Witnesses:

EDWD. WATERS,  
W. S. BAYSTON.