J. H. COON.

Rotary Cultivator.

No. 164,428. Patented June 15, 1875.

*Fig. 1.*

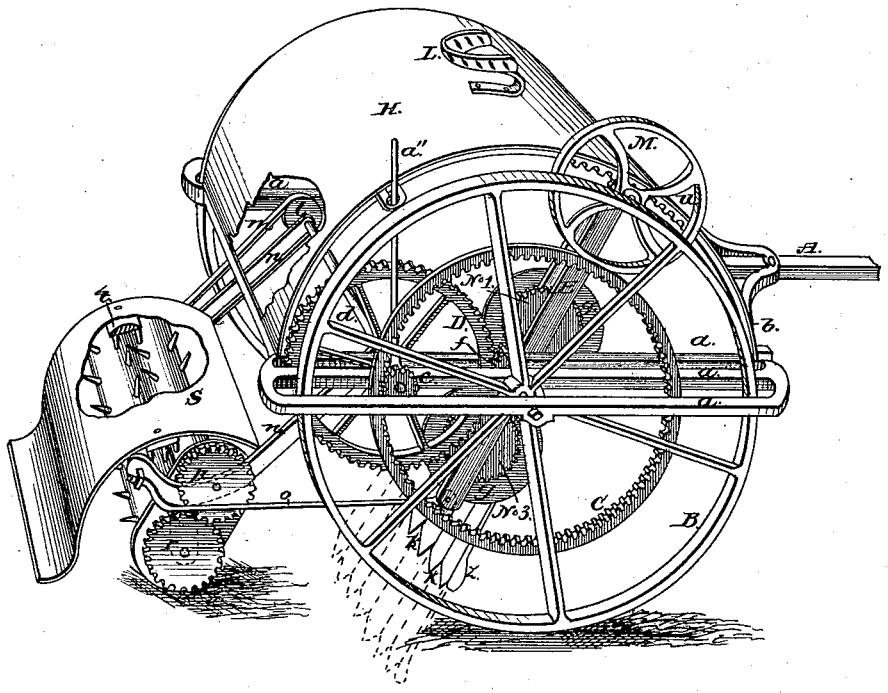



*Fig. 3.*

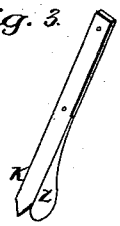
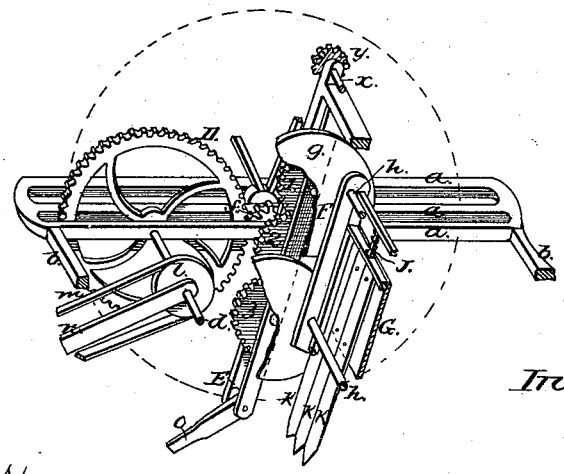



*Fig. 2.*

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# UNITED STATES PATENT OFFICE.

JAMES H. COON, OF DES MOINES, IOWA.

## IMPROVEMENT IN ROTARY CULTIVATORS.

Specification forming part of Letters Patent No. **164,428**, dated June 15, 1875; application filed August 6, 1874.

*To all whom it may concern:*

Be it known that I, JAMES H. COON, of Des Moines, Iowa, have invented a Spading-Machine, of which the following is a specification:

My invention is a combined automatic spading and pulverizing machine, designed to take the place of plows and harrows, to loosen, pulverize, and prepare the soil for planting and seeding. It consists in mounting and combining a series of spades or chisels and a series of cutters, with gearing, upon a carriage, in such a manner that the spades will be actuated by power transmitted from a driving-wheel, to penetrate, loosen, and lift the soil and deposit it upon rotary cutters to be pulverized, all as hereinafter fully set forth.

Figure 1 of my drawing is a perspective view from the right side, illustrating the construction and operation of my invention. Fig. 2 is a perspective view of a section, showing the mechanism of the left side uncovered, and aids in illustrating more fully the manner of constructing and operating my machine.

*a a a* are three distinct bars, forming the horizontal sides of a solid carriage-frame. *b b* are the end cross-pieces of the same frame. A is a pole connected with the front end of the carriage-frame in any suitable way. B is one of the carriage-wheels, mounted upon a short axle, which has its bearings in the two outside bars *a*. It is converted into a driving-wheel by rigidly connecting therewith, on its inside, the internally-toothed spur-wheel C. *c* is a loose pinion between the two outside bars *a*, mounted upon the end of the shaft *d*, which extends across the carriage-frame, and has its bearings in the inside bars *a a*. D D are cog-wheels between the two inside bars *a*, rigidly attached to the shaft *d*, and engage the pinions *f f*, mounted upon the same short shafts that support the frame in which the spades are operated. E E are the vertical side pieces of an auxiliary frame suspended within the carriage-frame. This auxiliary frame is open below and connected at the top by a cross-piece. (The carriage-frame and also the auxiliary frame may be formed in parts and rigidly joined together or cast complete in solid single pieces.) The two sides E are slotted longitudinally to receive trains of spur-gearing. Nos. 1 2 3 are small cog-wheels, mounted in and carried by the slotted uprights E. No. 2 is rigidly attached to the same shaft that carries the pinions *f* and suspends the uprights E, and engages and operates Nos. 1 and 3. *g g* are crank-wheels inside of the uprights E, and rigidly attached to the axles of the wheels Nos. 1 and 3. To the insides of these cranks *g* is rigidly attached the case which carries and operates the series of spades. F is one of the side pieces of the spade-carrying case attached to the cranks *g*. *h h* are the crank-wrists of the wheels *g*, extending through the spade-case F, to rigidly connect the crank-wheels *g* on the opposite sides of the case. G is a frame fitted to slide up and down within the case F in suitable side grooves or bearings. Springs J on the top prevent it from bumping and jarring when the spades strike unyielding objects. *k k k* represent a series of spades or chisels, bolted, keyed, or otherwise rigidly locked to the sliding frame G. They should have sharp cutting steel points. They may vary in number, size, and shape, as desired. *l* is a belt-wheel, rigidly attached to the left end of the shaft *d*, carrying the wheels D. *m* is an endless belt, running from the pulley *l* to a corresponding pulley attached to the shaft of one of the rotary cutting-cylinders linked to the shaft *d*. *n n* are bars pivoted to the shaft *d* at their upper ends, and forked at their lower ends to form frames for mounting and carrying the rotary cutting-cylinders. *o o* are rods or braces pivoted to the lower and forked ends of the bars *n*, and pivoted at their front ends to the bottoms of the uprights E. *p* is a small cog-wheel rigidly attached to the upper rotary cylinder, and is operated by power communicated through the belt *m* to a pulley rigidly attached to the left end of the same cylinder. *r* is a wheel matching the wheel *p* and operated thereby, and rigidly attached to the lower and rear rotary cutting-cylinder. The two cylinders, armed with projecting knives, are thus made to revolve together and in reverse directions. *s* is an arched cover, which protects the knives in the cylinders, and retains the loose soil deposited upon the cylinders by the series of spades *k*. *t* is a plate, with cutting-knives projecting downward, attached to the under side of the cover *s*. H is an arched

cover, made of wood or sheet metal, supported by a suitable frame resting upon and rigidly attached to the carriage-frame *a b*. L is a driver's seat attached to the cover H. *u* is a rack on the under side and front portion of the frame which supports the arched cover H. M is a hand-wheel, mounted upon a shaft, *x*, extending through the top of the auxiliary frame E. *y y* are pinions upon the same shaft *x*, and engage the racks *u*.

By turning the hand-wheel M the pinions *y* are caused to travel in the racks *u* and raise and lower the top of the auxiliary frame E. By this means the spades *k* can be adjusted to enter the ground at various angles and to different depths. The rotary cutting and pulverizing cylinders are raised and lowered by the same means. When the hand-wheel M is turned to change the angle and raise or lower the spades *k*, the rods *o*, pivoted to the lower ends of the uprights E and the bars or frames *n*, carry the rotary cylinders along, so that their positions relative to the spades *k* are always the same. A ratchet or other suitable device may be used to lock the wheel M and hold the spades and cutting-cylinders in the positions desired.

Fig. 3 is a perspective view, showing the form of the outside spades, designed to cut forward in the line of travel. *k* is a spade or chisel similar to the series used, but has an additional blade or cutter, *z*, standing at a right angle from the outside edge.

In the practical operation of my machine the wheels B C, moved by friction upon the ground, communicate power through the spur-gear C *c* to the cog-wheels D, and from thence to the pinions *f* and the small No. 2 cog-wheels on the same shafts. The No. 2 wheels will distribute the power to wheels Nos. 1 and 3 and the crank-wheels *g* on the same shafts. Every revolution of the crank-wheels *g* thrusts the spades *k* into the ground, and raises them again to deposit the soil they have loosened upon the rotary cutting-cylinders following in the rear. The belt-wheel *l* on the shaft *d* at the same time transmits power through the belt *m* to operate the cutting and pulverizing cylinders.

By means of the lever *a''*, connected with a clutch on the shaft *d*, that engages the movable pinion *c*, the spur-gear C *c* may be thrown in and out of gear and the machine made inoperative whenever desired. A driving-wheel, operated by steam or any other suitable motor, may be substituted for the spur-wheel C, attached to the carriage-wheel B.

I claim as my invention—

1. The auxiliary frame E, carrying the cog-wheels Nos. 1 and 3, and the crank-wheels *g*, in combination with the cog-wheels No. 2 and pinions *f*, substantially as described, to suspend and operate a series of spades.

2. The combination of the spade-carrying case F with the crank-wheels *g*, substantially as described, to alternately thrust down and raise up a series of spades.

3. The sliding frame G, carrying the series of spades *k*, in combination with the suspended case F, substantially as described.

4. The frame or forked bars *n n*, when pivoted to the fixed shaft *d* at their upper and front ends, and connected with pitmen or rods *o o*, extending from their lower and rear ends to the adjustable auxiliary frame E, for the purpose of carrying rotary cutting-cylinders and adjusting them relative to the series of spades *k*, substantially as and for the purposes specified.

5. The combination of the hand-wheel M, pinions *y*, shaft *x*, auxiliary frame E, and rack *u*, substantially as described, and for the purposes specified.

JAMES H. COON.

Witnesses:
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