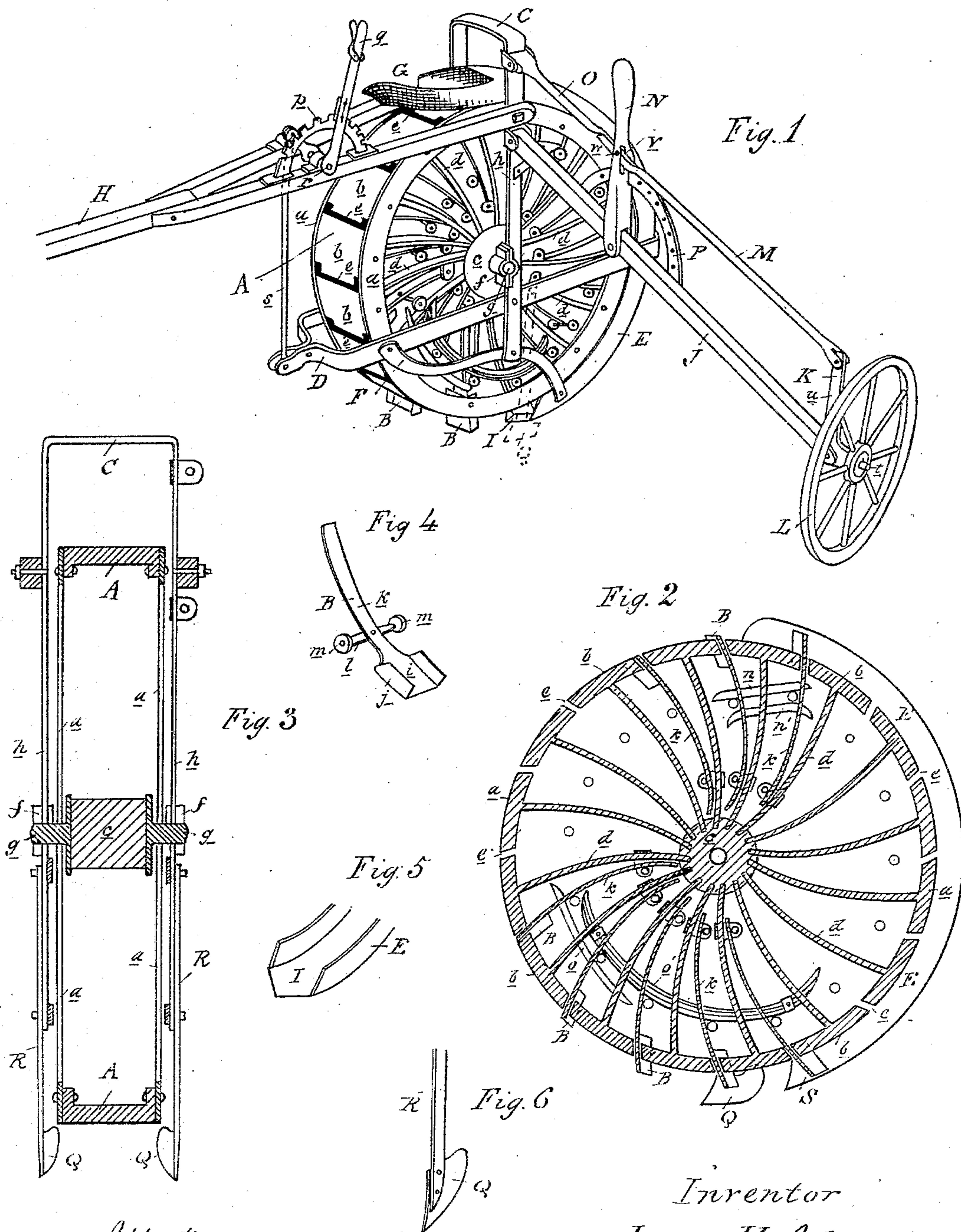


(No Model.)

J. U. ADAMS.
DITCHING MACHINE.

No. 304,056.

Patented Aug. 26, 1884.



Attest
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[Signature]

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UNITED STATES PATENT OFFICE.

JAMES U. ADAMS, OF CARO, MICHIGAN.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 304,056, dated August 26, 1884.

Application filed January 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES U. ADAMS, of Caro, in the county of Tuscola and State of Michigan, have invented new and useful Improvements in Ditching-Machines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

10 This invention relates to certain new and useful improvements in the construction and operation of ditching-machines of that class which are usually employed in preparing excavations in which to lay tile drain-pipe.

15 The invention consists in the peculiar construction of the various parts and in their combination and operation, as more fully hereinafter described.

Figure 1 is a perspective view of my improved machine. Fig. 2 is a sectional elevation. Fig. 3 is a vertical central section, with the interior parts removed. Fig. 4 is a detached perspective of the shovel. Fig. 5 is a like view of the scoop. Fig. 6 is a like view of one of the plows.

25 In the accompanying drawings, which form a part of this specification, A represents a hollow wheel, consisting of two rims, *a*, suitably secured together by means of ties *b*, each rim being connected to a central hub, *c*, by means of spokes *d*. I do not desire, however, to confine myself to this construction of wheel, as any hollow wheel adapted to conceal and carry the interior parts may be employed. The ties or sections *b*, which separate and connect the two rims, are themselves separated by the passages *e*, through which the shovels are projected and retracted, as hereinafter described. This wheel is suitably hung

40 in boxes *f* at each end of the axle *g*; such boxes being supported by the vertical bars *h* of the frame. B represents a series of shovels, the blades of which, *i*, are provided with flanges *j*, the shovel and its flanges being designed to loosely fit the passages *e*. Each of these shovels is secured to a handle, *k*, across which is secured the arm *l*, carrying at each end the friction rollers or wheels *m*, suitably journaled on

50 such arms.

Bolted on the inside of each set of spokes is the cam-bar *n*, and immediately below the same is bolted the guide-bar *n'*, the distance between the guide-bar and cam-bar being sufficient to allow the wheels *m* on the shovels to pass through. A similar cam-bar, *o*, is secured on the inner face of each set of spokes, about in the relative position shown in Fig. 2, and above it is secured the spring-guide *o'*, the distance between the two being sufficient to allow said wheels *m* to pass. This spring-guide *o'* is made of a series of spring-leaves, in order to secure a certain elasticity at this point, so that if in the projection of the shovels they should strike a sudden or other obstruction that might otherwise cause injury the impingement of the shovel through its arms and friction-wheels against these spring-guides would compel the latter to give to such pressure, whereby injury to the machinery would be prevented. This wheel A is supported in a frame consisting of two yokes, C being a vertical yoke to which said wheel is journaled, and D a horizontal yoke, secured at its intersection with the vertical yoke at a point below the axle.

To the rear end of the horizontal yoke is secured the curved shield E, following the periphery of the wheel in about half its circumference, and the lower portion of said shield (which in cross-section resembles a cross-section through the shovel-blade and its flanges) is secured to a brace, F, which curves upwardly and forwardly, and is secured to both the yokes, as shown in Fig. 1. The upper end of this shield terminates in a mouth or chute, G, which throws the earth to one side of the ditch.

A tongue, H, is suitably secured for draft purposes to the vertical yoke, and to this tongue is secured a notched segment, *p*. A spring-latch lever, *q*, is secured to a crank-shaft, *r*, suitably journaled to the tongue, and a connecting-rod, *s*, one end of which is secured to the crank of the shaft *r* and the other to the forward end of the horizontal yoke D, enables the operator to raise and lower the wheel and change the pitch of the scoop I, which forms the lower front terminal of the shield E.

J is an outrigger-arm pivotally secured at

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one end to the vertical yoke near the point of connection of the latter with the tongue, and to the outer end of this arm J is pivotally secured the bell-crank K, the shorter arm *t* of which is formed to furnish the journal or axle upon which the wheel L rotates. To the longer arm *u* of this bell-crank is pivotally secured the rod M, which passes into and through the slot *v* in the lever N; and O is another rod, one end of which is pivotally secured to the yoke C, as shown in Fig. 1, and its free end passes through said slot *v* in the handle N by the side of and overlapping the corresponding end of the rod M, and through the lever N and the coincident overlapping ends of the rods O M, a pin, *w*, secures the parts together.

P is a quadrant secured to the arm J, and the lever N, by the usual means, is adapted to engage at any desired point with said quadrant. This outrigger, consisting of the arm J, bell-crank K, wheel L, rods M O, handle N, quadrant P, and necessary engaging-pins, provides a means, said wheel L running upon the land and being adjustable, as described, to support the operating parts of the device in cutting its ditch.

Q are two plowshares, (see Fig. 3,) each being provided with a standard, R, by means of which it is secured to the frame on each side of the device and just in advance of the scoop I, and so arranged that in cutting the furrows such furrows will turn inward to be taken up by the scoop in the progress of the machine, and such plows, being attached outside the wheel A, cut a path a little wider than such wheel, whereby a change of direction in the travel of such wheel is more easily obtained.

In practice the device, as shown in Fig. 1, is ready for operation, and being drawn forward by the team attached to the tongue the plows perform their functions, turning the earth toward the center. The scoop passes under such earth and it enters the shield E, and is thence carried upward and around the rear periphery of the wheel and delivered through the mouth G by means of the shovels B. In Fig. 2 it will be noticed that in the forward rotation of the wheel the shovels are gradually projected through the apertures *e*, so that they perform two functions—first, that of spurs upon the periphery of the wheel to prevent its slipping, and, secondly, as shown at S, to carry the earth taken up by the scoop into the shield, and in the further rotation of

the wheel around the periphery to the mouth; and then the shovels, by means of the cam-bar *n* and guide *n'*, are retracted until the outer ends of such shovel are in line with the periphery of the wheel until in its further rotation the small wheels upon the shovel-arms enter the space between the cam-bar *o* and guide-springs *o'*, and are gradually projected, as shown. The position of the outrigger by the means described, as the ditch is continually made deeper, is changed, so that the bearing upon the firm earth will always keep the operating parts of the ditcher in a vertical position.

What I claim as my invention is—

1. In a ditching-machine constructed substantially as described, the frame thereof, consisting of a vertical yoke embracing and supporting the wheel, and secured to a horizontal yoke, and provided with means, substantially as described, for elevating and lowering the wheel and changing the pitch of the scoop, as set forth.

2. In combination with a ditching-machine constructed substantially as described, two plows attached to the frame outside and on each side of the path of the scoop or spade in advance of and below the cutting-edge of the said spade, and arranged to turn the furrows inward, substantially as and for the purposes specified.

3. In combination with a ditching-machine constructed substantially as described, an outrigger pivotally connected to the said machine and carrying upon its outer end a wheel, such outrigger being provided with means, substantially as described, for adjusting the same to different grades, substantially as and for the purposes set forth.

4. A ditching-machine consisting of a wheel, through the periphery of which the shovels are projected and retracted by means of cam bars and guides, a shield secured to said machine, one end thereof terminating in a scoop and the other in a mouth, two plows situated outside the path of the scoop and in advance thereof, and an outrigger, the parts being constructed, arranged, and operating substantially as and for the purposes described.

JAMES U. ADAMS.

Witnesses:

JOHN F. SEELEY,
JOHN C. RILEY.