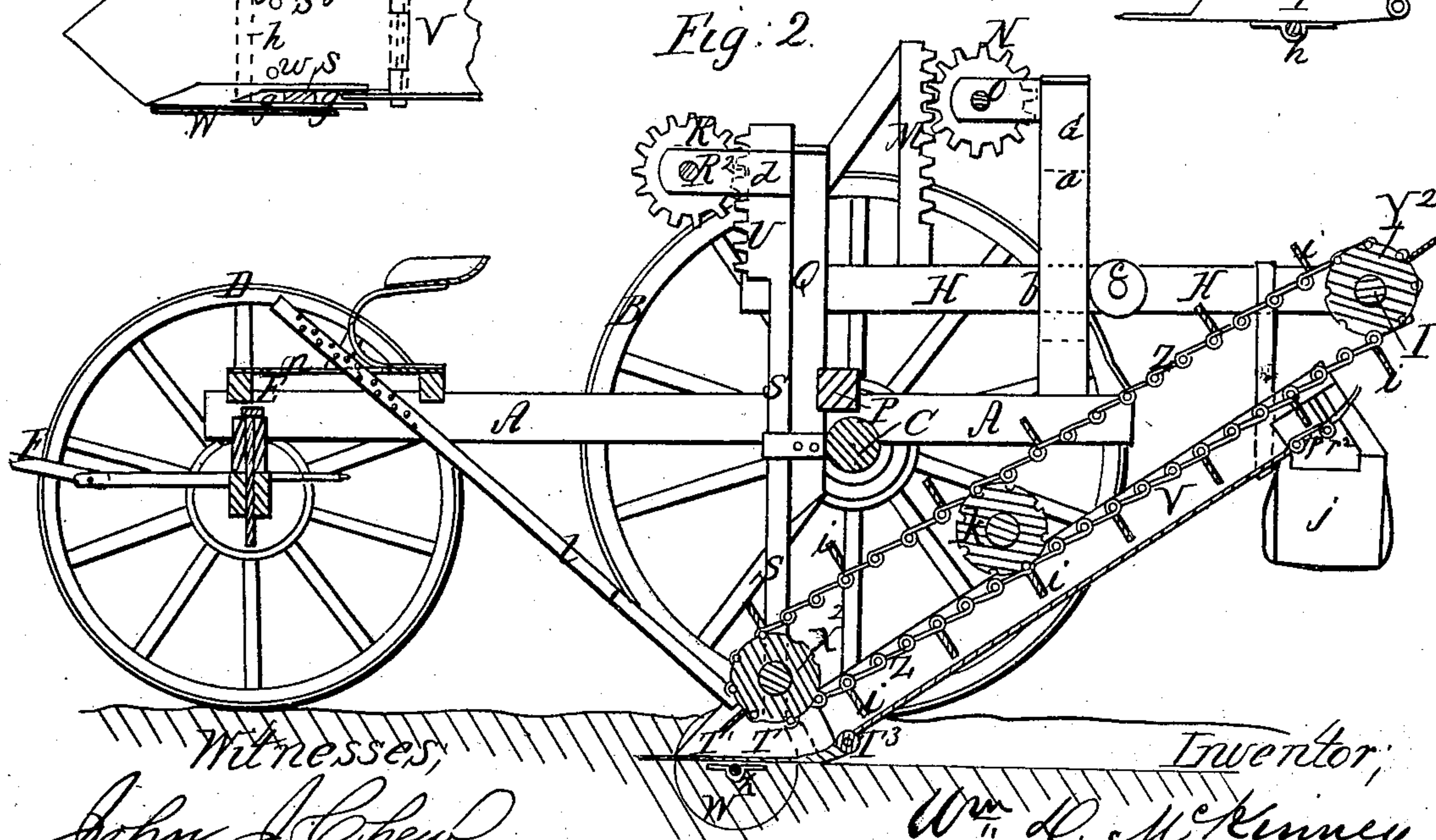
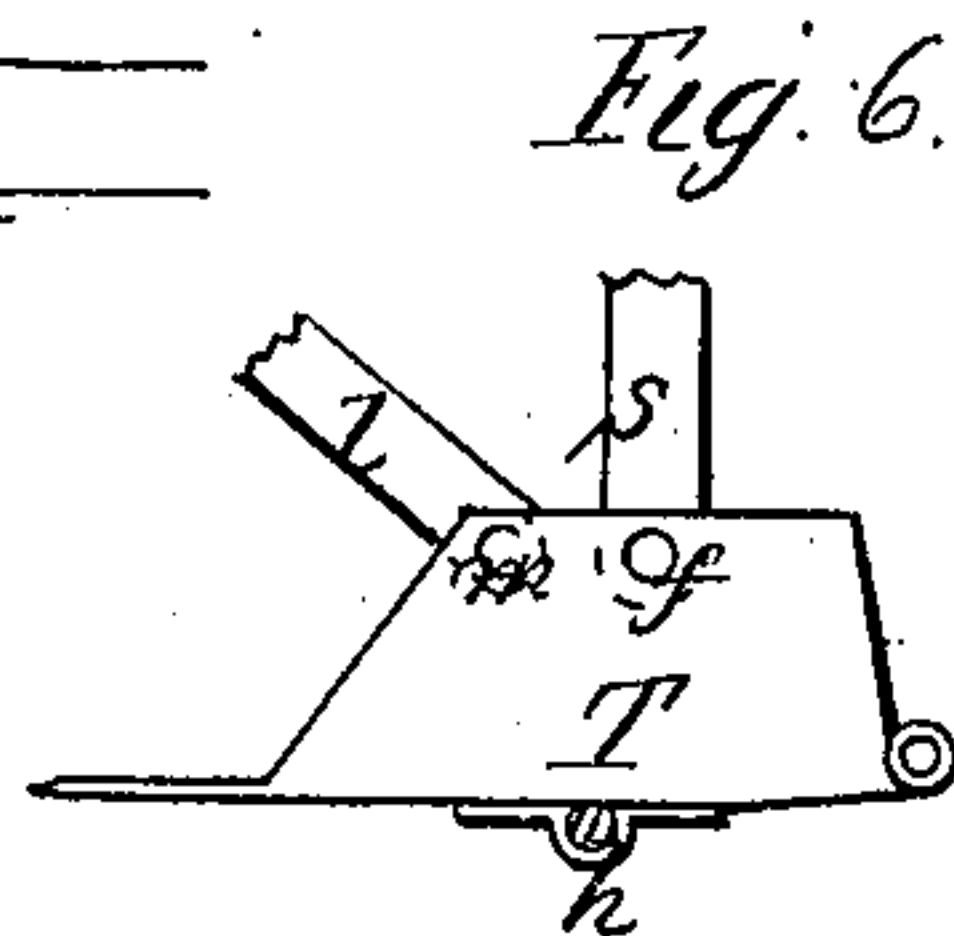
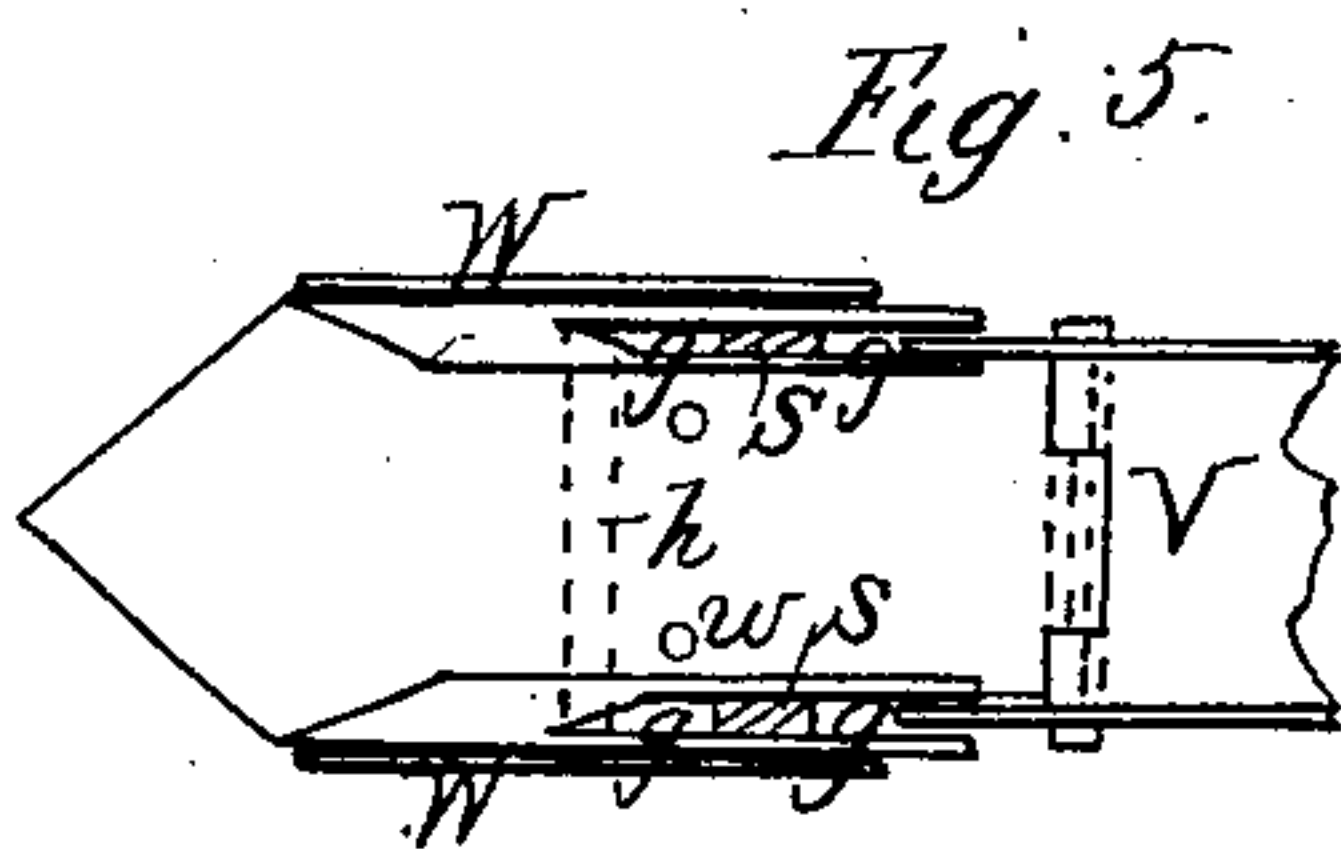
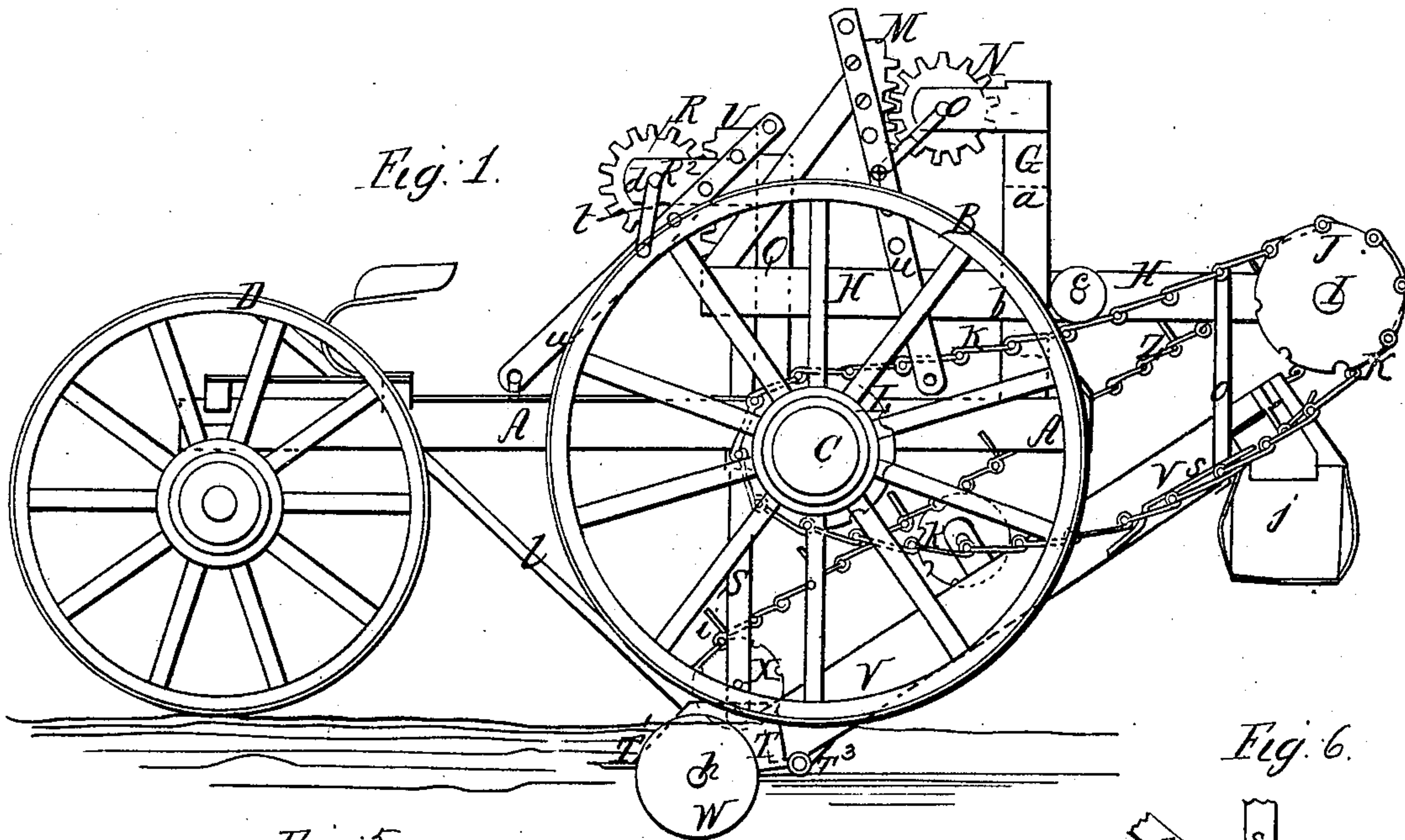


W. D. McKinney.

Ditching Mach.

N^o 89,676.

Patented May 4, 1869.



Witnesses,
John J. Chew.
Battis De Long.

Inventor,
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Sheet 2-2, Sheets.

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Fig. 3.

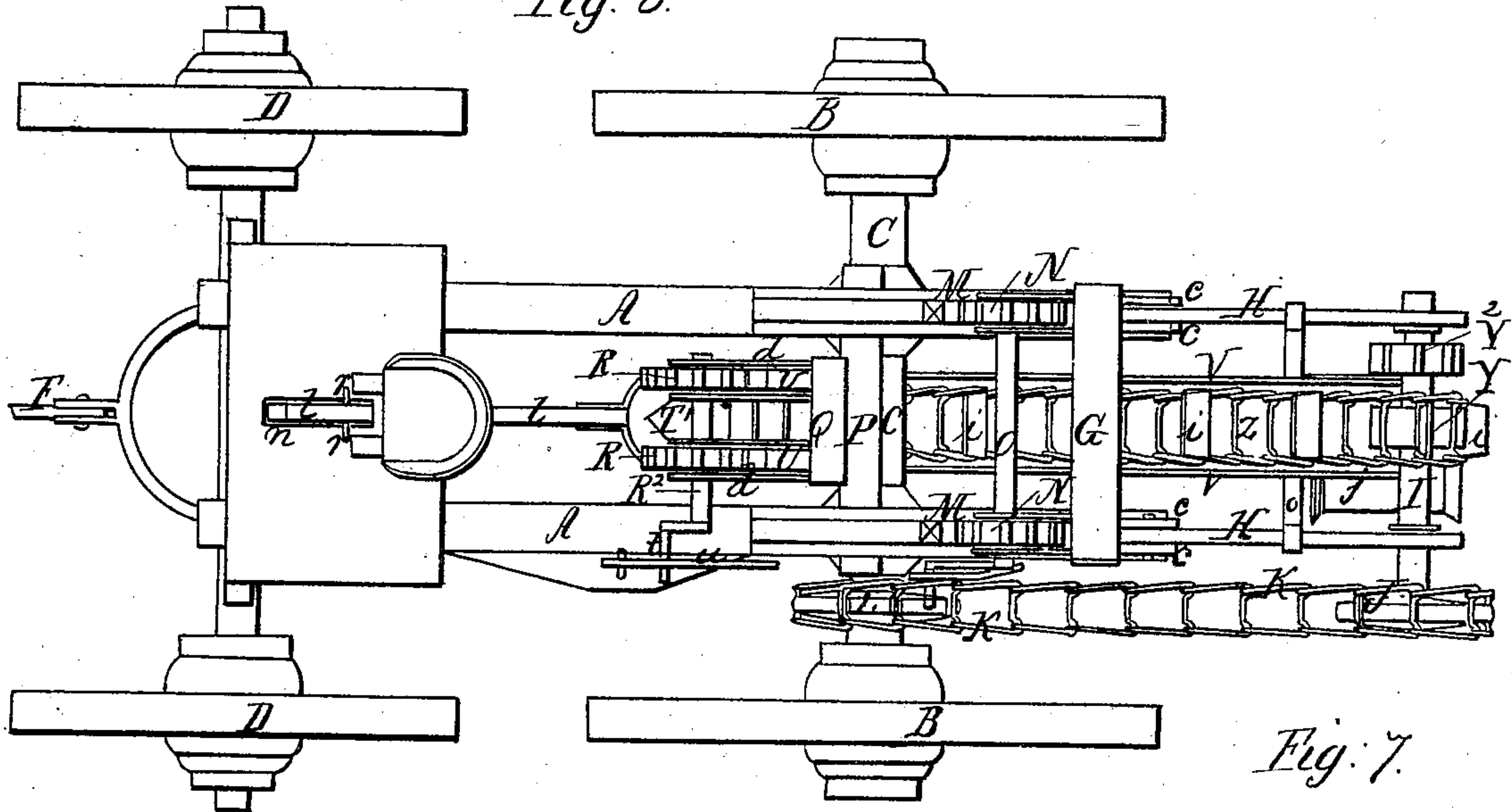
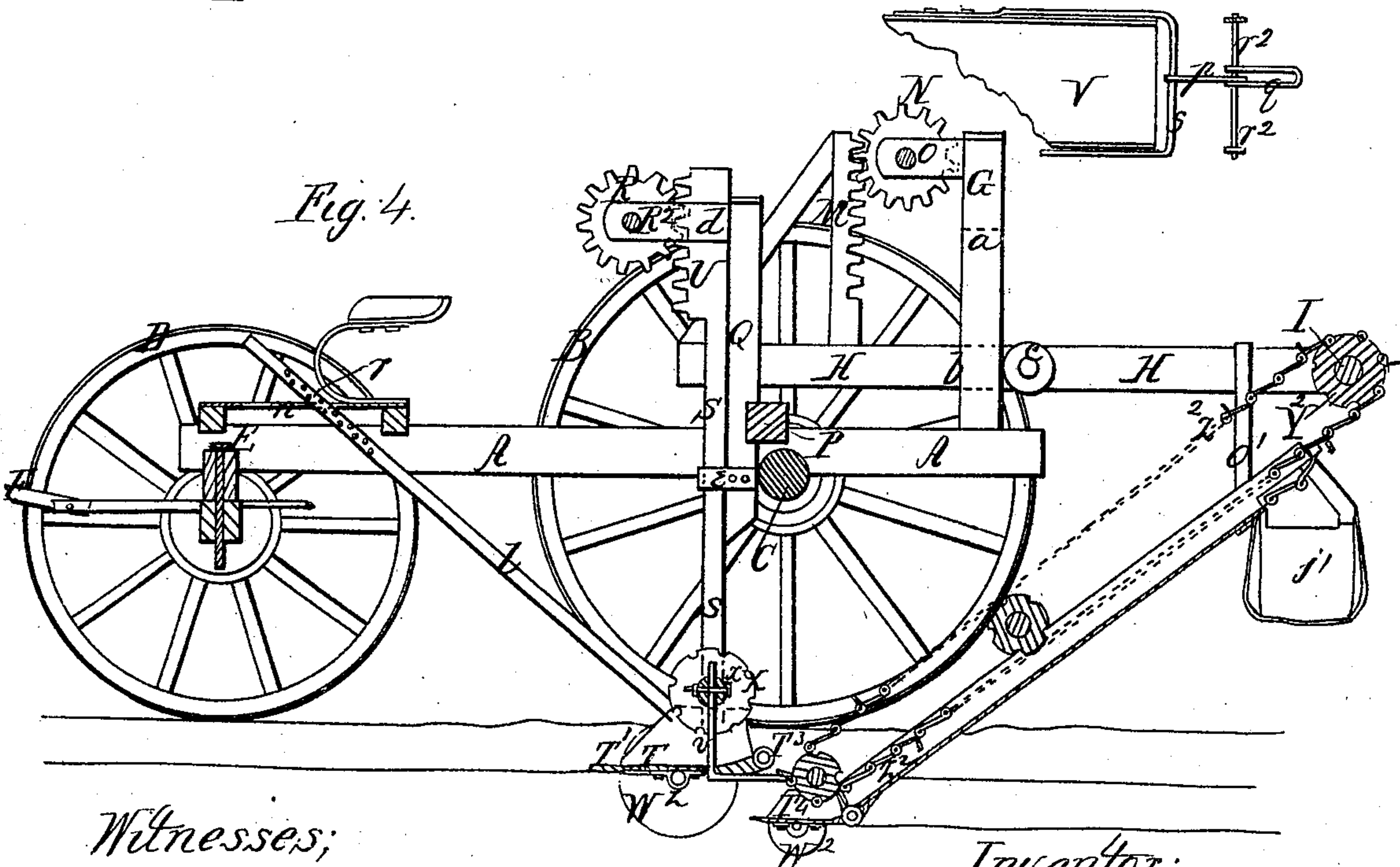


Fig. 7.



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United States Patent Office.

WILLIAM D. McKINNEY, OF MARION, INDIANA.

Letters Patent No. 89,676, dated May 4, 1869.

IMPROVED DITCHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM D. McKINNEY, of Marion, county of Grant, in the State of Indiana, have invented a new and improved machine, being a "Combined Ditcher and Vaulter;" and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which like parts are indicated by like letters in the several figures.

Figure 1 represents a side elevation of a ditching-machine, embracing my improvements;

Figure 2 is a vertical longitudinal section;

Figure 3 is a plan or top view;

Figure 4 is a vertical longitudinal section, with the endless chain of buckets and the conducting-trough removed and the vaulter attached to the machine; and

Figure 5 represents a top view of the plow, showing its double sides, detached from the machine.

My invention consists in a new arrangement and construction of the several parts of a ditching-machine, and the employment therewith of a vaulting-apparatus for forming a vault in the bottom of the main ditch.

In the accompanying drawings—

A represents the frame upon which the several parts of the ditcher and vaulter are arranged and secured.

This frame, and its several parts, are supported and carried by four wheels. The two rear ones, B, are secured to an axle, C, which is fast and turns with the wheels; and the two front ones, D, are like the fore wheels of an ordinary wagon, with the axle connected to the front end of the frame by a king-bolt, E, and provided with a tongue, F, by which the machine is drawn and guided.

The frame consists of two horizontal timbers, extending from the front axle and a suitable distance in the rear of the hind axle, and support on their rear ends a vertical frame, G, which sustains a horizontal adjustable frame, H.

This frame is fitted in slots or guides *a*, in the upright frame G, and carries at its rear end a horizontal shaft, I, upon which are secured three sprocket or notched pulleys, the outer one, J, being driven by an open link-chain, K, leading from a sprocket or notched driving-pulley, L, on the axle C of the driving-wheels B.

The front ends of this frame H sustain a vertical rack, M, on each side, so as to match with two pinions N, secured to a crank-shaft, O, at the top of the vertical frame G, by which the frame H may be raised and lowered.

This frame H is maintained in its horizontal position by shoulders *b* and rollers *c* on the opposite sides of the guide or slot *a*, and by the vertical rack M.

A cross-piece, P, connects the side-timbers of the frame directly above the axle C, and this cross-piece sustains a vertical frame, Q, consisting of two parallel bars placed between the timbers A of the main frame, and extending a short distance below the axle C, and above it a sufficient height to carry the two pinions

R, and to form a guide and support to the bars which carry and support the plow.

These pinions are mounted upon a horizontal crank-shaft, R², having its bearings in arms *d*, at the top of the frame Q, which embrace said pinions.

On the front side of the vertical bars of the frame Q, and adjacent thereto, are arranged two parallel bars S, held securely in position by guides *e* on the lower ends of the bars Q, and by the arms *d* of the pinions R, so that the bars S may rise and fall within these guides.

To the lower ends of these bars S the plow T is pivoted at *f*, fig. 6, while their upper ends are provided with racks U, which match into the pinions R, by which the plow may be raised and lowered and adjusted at pleasure.

The plow consists of a horizontal cutting-plate, T, made in the shape of a V, with the apex foremost, and is hinged at its rear end to a conducting-trough, V, of a width equal to that of the plow, and extending rearward and upward beneath the shaft I.

The sides of the plow extend upward from the base of the triangle of its point, and are made double so as to form a space, *g*, between the inner and outer side, closed at its front end, forming a case which receives the ends of the conducting-trough V and the pivoted ends of the vertical plow-bars S, and thus protects them from being clogged with earth as it is carried into the plow and up the inclined conductor.

Beneath the plow, and near the middle of its length, a transverse axle, *h*, carrying on each end a cutting-disk or wheel, W, is fitted in bearings, so as to turn with the cutters.

These cutters are placed close to the outer sides of the plow, and revolve by contact with the earth, and cut the ground or sod as the plow moves forward.

These cutters are of suitable diameter, extending both above and below the bottom of the plow, and cut the strip of earth or sod vertically while the plow cuts horizontally, and thus loosens the strip of earth to be taken up.

Directly above the plow, and within its sides, a notched pulley, X, is secured to the lower ends of the vertical adjusting plow-bars S, and around this pulley and the notched pulley Y, on the shaft I, passes the endless chain of buckets Z, which consists of open links and projecting strips or wings *i*; the bars of the links fitting into the notches of the pulleys, so as to lock the chain to them and prevent it from slipping, while the wings pass over the front pulley so as to dig into and cut off a section of the earth and carry it between the sides of the plow into and up the conductor, discharging it at the upper end thereof into an inclined spout, *j*, arranged so as to deliver it at the side of the machine.

The wings are of a width slightly less than the conductor, and are held to the bottom thereof by means of an intermediate notched pulley, *k*, which acts as a presser to the chain of buckets.

In this manner each bucket cuts off a section of the sod and earth, and carries it up the conductor, as the plow advances. The buckets are arranged at such distances apart as will properly effect this operation without clogging the machine.

In order to brace the plow firmly against its front pressure, I connect the rear end of a stay or tongue, l , to the top of the sides of the plow by pivots or bolts m . The front end of this stay passes through a slot, n , in the platform of the driver's seat, and is held by pin r , passing through any one of a series of holes in the stay above said platform, so as to brace the plow from the front at whatever height it may be adjusted, and thus relieve the vertical bars of the plow from the undue strain to which they would be exposed were it not for the front brace or stay.

The hinge T^3 , which connects the plow with the conductor, is made so that the bolt may be removed for the purpose of removing the conductor when desired. The rear end of the plow, stay, or brace is made forked, so as to be attached to the opposite sides of the plow.

The rear end of the conductor is suspended by a yoke, o , from the horizontal frame H , in such manner that the yoke may be removed when it is desired to remove the conductor.

In order that the sod and earth may be readily discharged, I arrange a spring-clearer at the end of the conductor, consisting of two arms $p q$, fig. 7, suspended to a centre rod, r^2 , attached to the conductor, so that the two arms will vibrate thereon.

The end of the front arm p is attached to a spring, s , fixed to the conductor so that one end or arm of the spring will extend across the open end of the conductor, nearly on a level with its bottom, and connect with and form part of the clearer; while the rear arm of the clearer curves upward, so that the buckets of the endless chain, in passing over it, will bear it down and raise the front arm, and upon the release of the rear arm, by the passage of the bucket over it, the arm will rise suddenly and cause the front arm and spring to descend, and thus the earth will be loosened from the buckets and the end of the conductor and prevented from clogging.

The cranks t of the pinions R are supported in whatever position they may be adjusted, by means of arms u , hinged to the frame A , and having a series of holes therein to receive the ends of said cranks, and thus lock them when adjusted.

When it is found necessary to make the ditch of a greater depth than that made by the plow, I connect to the machine what I call a vaulter, in which case the inclined conductor and endless chain of buckets are removed from the machine. The vaulter consists of a plow, T^4 , rotating circular cutters, W^2 , inclined conducting-spout and endless chain of buckets Z^2 , but of smaller dimensions than the corresponding parts of the ditching-plow proper, so as to cut a narrow channel or trough in the bottom of the ditch.

This vaulter is connected to the ditching-plow by two L-shaped arms v , the vertical ends of which pass up through holes w , fig. 5, in the bottom of the ditching-plow, and through holes in the axle of the notched pulley, and secured thereto by bolts x passing through the axle and the ends of the arms v , and thus fasten them to the axle.

The vaulting-plow is secured to the horizontal ends of the arms in the rear of the ditching-plow, and is held down by said arms, and in all other respects is like the ditching-plow; and the upper end of the conductor is suspended by the yoke o' .

The third pulley Y^2 , on the horizontal shaft I , is shifted to the place of the pulley Y , so as to be used with the vaulting chain of buckets in connection with a small notched pulley, X^2 , above the vaulting-plow. The rods v , which connect the vaulter to the ditching-machine, may be vertical, so as to bring the vaulting-plow directly beneath the main ditching-plow.

In transporting the machine when not working, the plow and frame H are raised and held up by the crank-arms. The ditch may be cut to the proper depth by passing the plow two or more times therein, at different depths, and the vault cut in the same way.

Having thus described my invention,

I claim—

1. The vaulting-plow T^4 , arranged and operating substantially as described.
2. The vaulting-plow T^4 , connected to the machine by the rods $v v$, in the manner herein described.
3. The spring-clearers $p q r$, at the end of the conductor V , operated by the motion of the endless chain of buckets Z , as described, and for the purpose set forth.

WM. D. MCKINNEY.

Witnesses:

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BENJ. F. WALLACE.