

A. A. GARVER.

Steam-Plow.

No. 28,359.

Patented May 22, 1860.

Fig. 1.

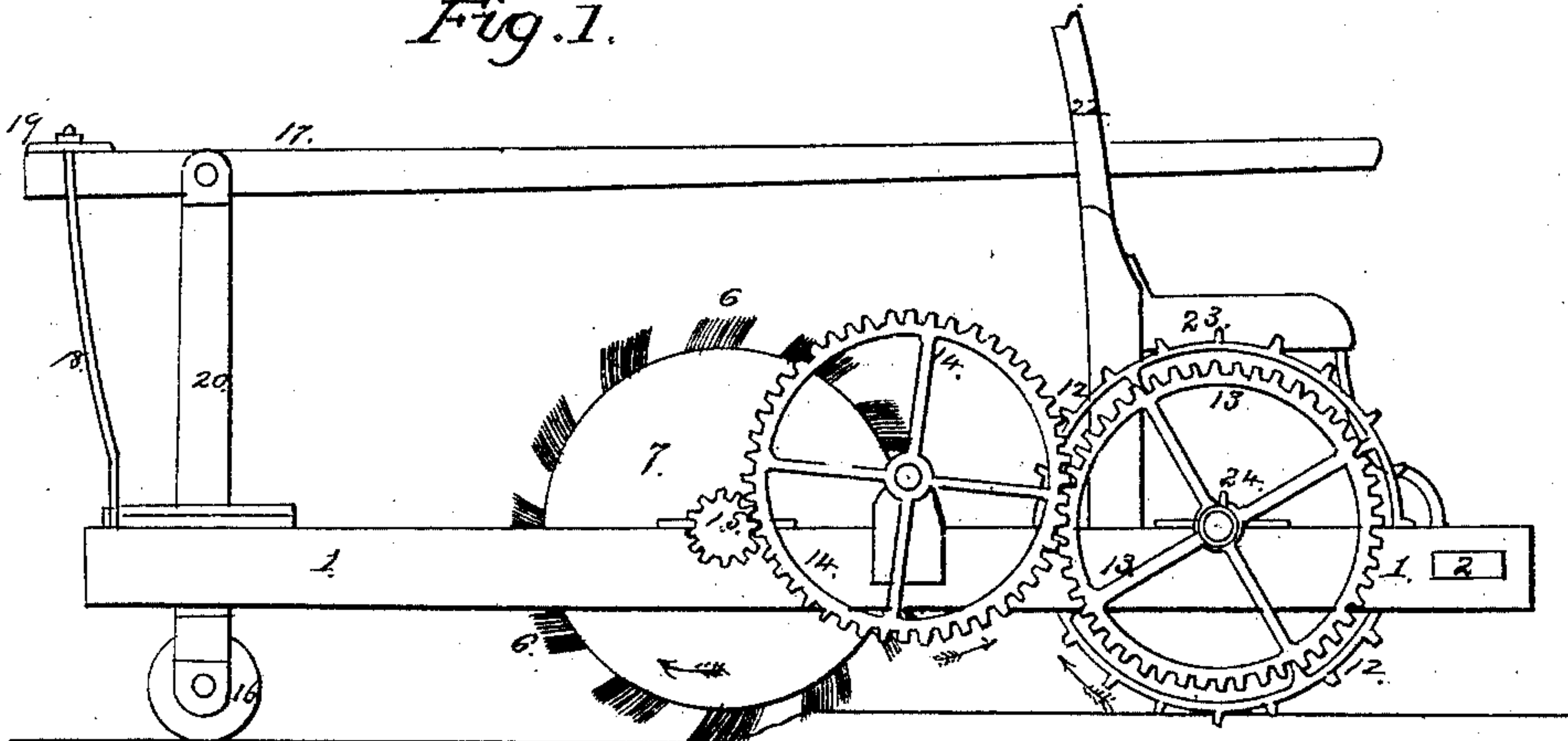


Fig. 3.

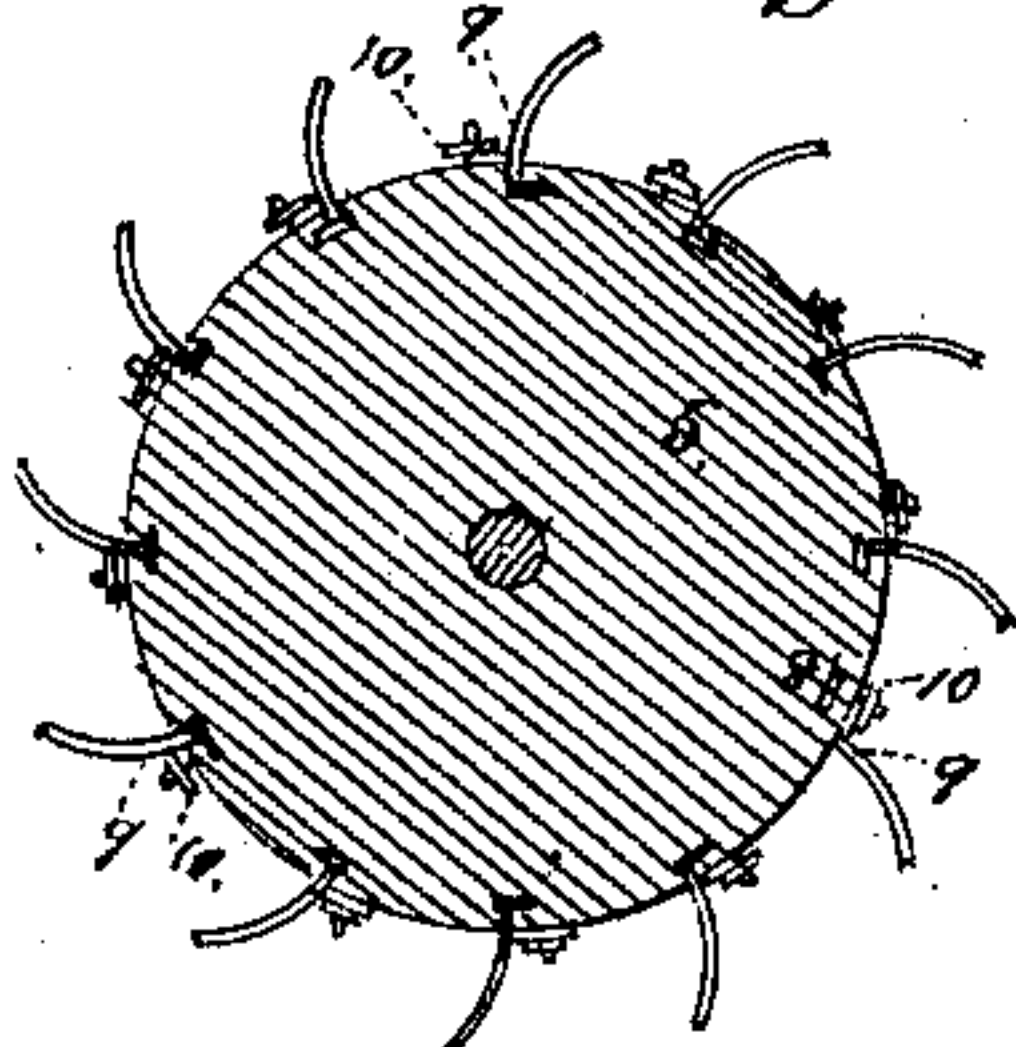


Fig. 4.

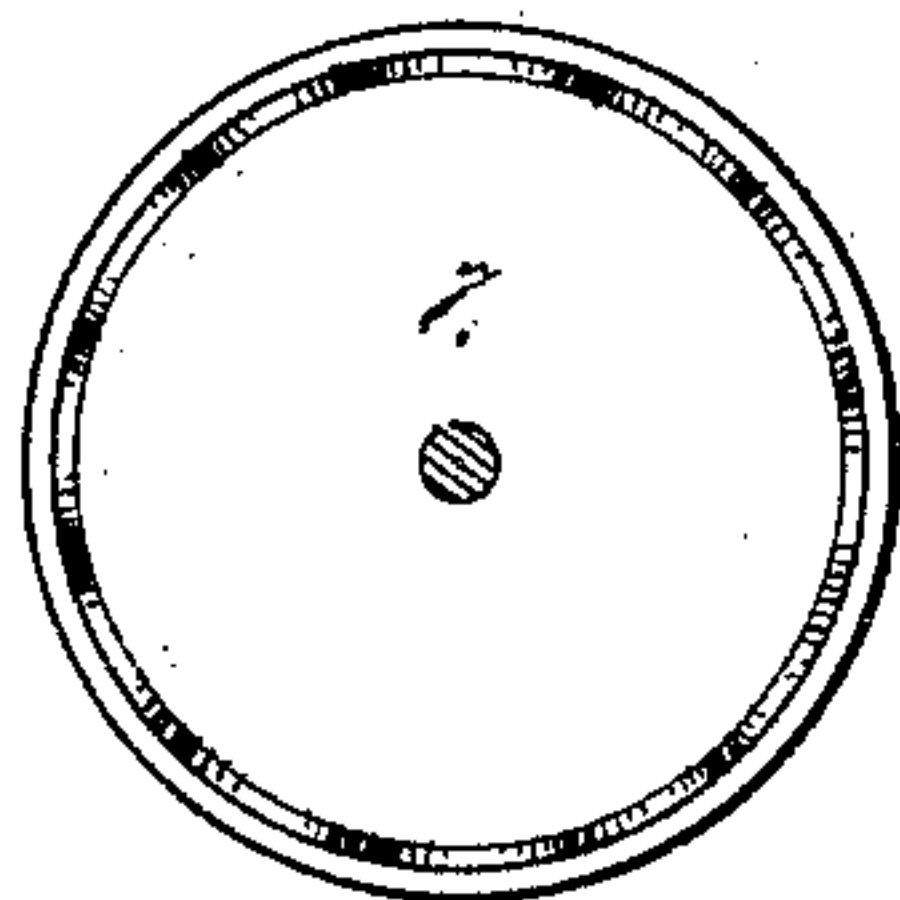


Fig. 5.

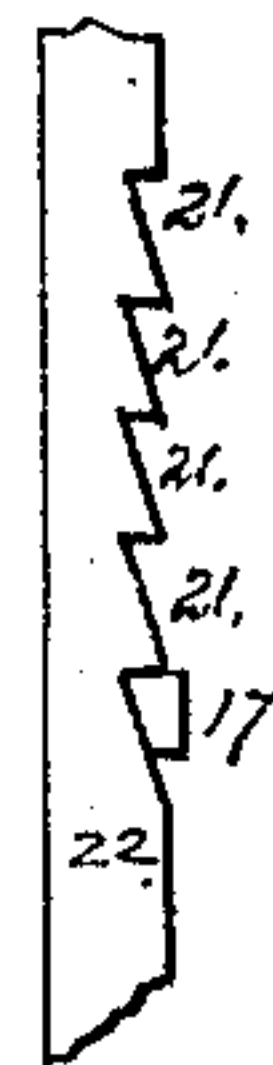
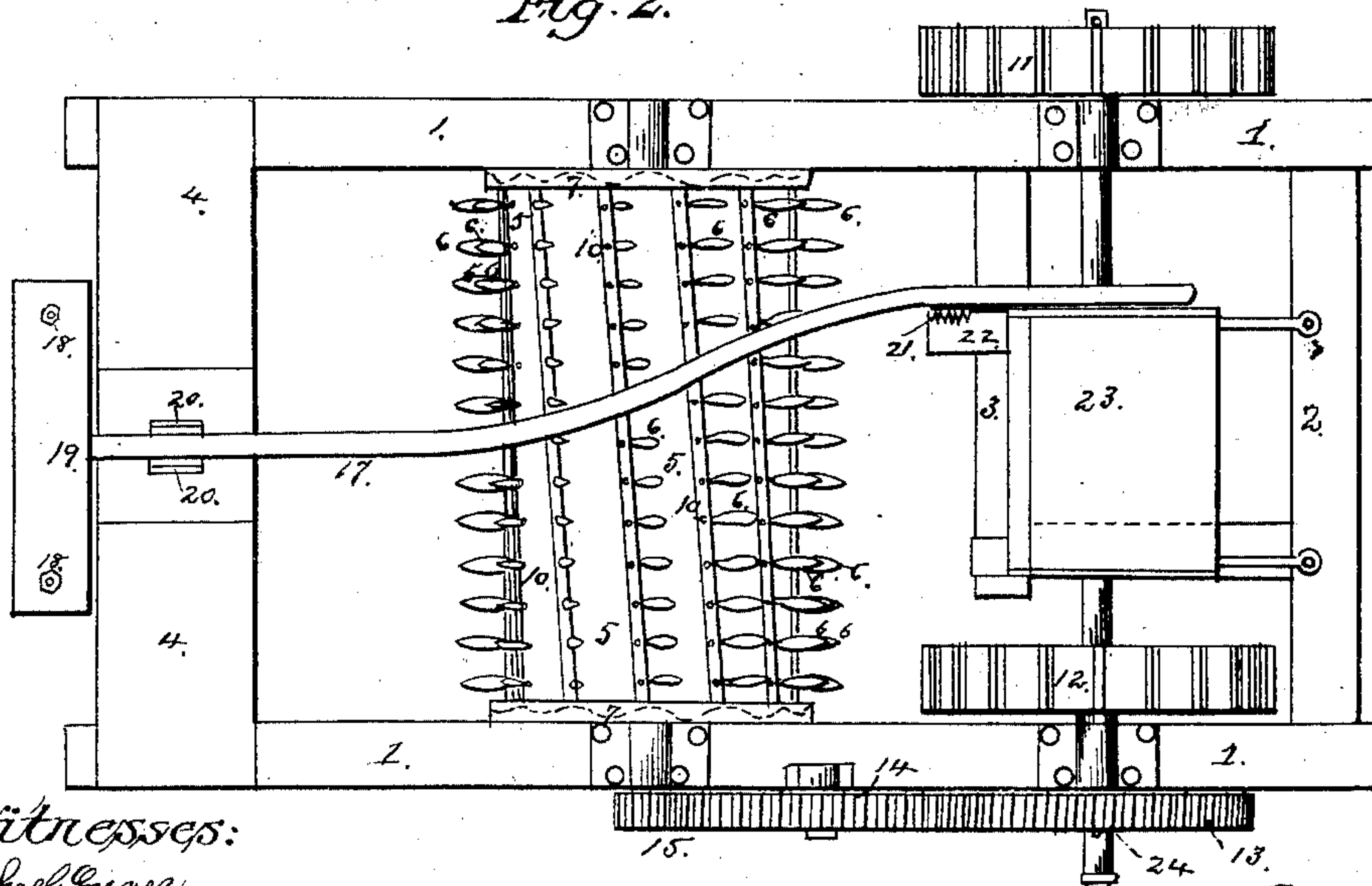


Fig. 2.



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UNITED STATES PATENT OFFICE.

ANDREW A. GARVER, OF MECHANICSBURG, PENNSYLVANIA.

IMPROVEMENT IN DIGGING-MACHINES.

Specification forming part of Letters Patent No. 28,359, dated May 22, 1860.

To all whom it may concern:

Be it known that I, ANDREW A. GARVER, of Mechanicsburg, in the county of Cumberland and State of Pennsylvania, have invented certain Improvements in Digging-Machines, the construction and operation of which I have described in the following specification and illustrated in its accompanying drawings with sufficient clearness to enable competent and skillful workmen in the arts to which it pertains or is most nearly allied to make and use my invention.

My said invention consists in, first, the combination, with a cylinder or roller, of spades so hung in said cylinder as to be capable of being vibrated as the roller revolves to relieve them in their operation, as hereinafter more fully set forth; second, the combination, with a cylinder or roller having vibrating spades, as described, of a detachable connection which connects the roller and the traction-wheels, by which the machine is made capable of acting as a pulverizer, at the same time by its action scattering the earth in various directions, by which a more intimate incorporation of the particles is accomplished, thus adapting it to more efficiently mix the manure or compost with the soil, as hereinafter more fully set forth.

My invention is represented in the accompanying drawings as follows:

Figure 1 is a side elevation of my machine. Fig. 2 is a plan of it. Fig. 3 is a vertical sectional view of the roller or cylinder which carries the spades with the spades and the slides for operating them attached. Fig. 4 is an inside elevation of one of the cams by which the spades are vibrated. Fig. 5 is a detail view, showing the manner of adjusting the lever by which the depth of action of the teeth is regulated.

1 1 are the side pieces, and 2 3 4 are the cross-beams, of the frame of the machine. The cylinder 5, which contains the digging-teeth or spades 6, is hung to the top side pieces, 1 1, as shown, the shaft or axle of this wheel passing through the disks 7, as indicated in the drawings. The disks 7 are so attached to the sides as to be stationary when in use, and also removable to allow the cylinder 5 to be taken out of the machine, should it be desirable to remove it for repair or for other purposes. The cylinder 5 is represented as being hung in bearing-

boxes on the top of the pieces 1 1, but other modes of hanging it may be adopted should they under the circumstances be found preferable. As before intimated, the spades are so hung to the cylinder as to be capable of vibration on an axis, which axis in the construction I have adopted is formed of the shank of the spade or tooth, as shown at 8. An arm, 9, projects from each spade near its root, and, being turned at right angles, as shown, extends through one of the slides 10, forming a journal or axis at their junction.

The teeth or spades 6 are set diagonally upon the face of the cylinder, instead of parallel with its axis, so as to give the machine a more equal action, and the slides 10, which are placed parallel to the rows of teeth or spades, extend the whole length of the cylinder, and carry friction-rollers at their ends to receive the action of the cams 7, each of these slides 10 giving, by means of the motion received by them from the cams 7, an alternating vibration to the row of spades alongside of which it is placed. The cams 7 are disks formed with undulations on their inner surfaces, which give the necessary alternating motion to the slides for the purposes above stated. These undulations are shown by dotted line in Fig. 2 and by the shading in Fig. 3.

The forward end of the machine is supported on traction-wheels 11 and 12, and these, or at least one of them, are connected by gearing consisting of the wheels 13, 14, and 15 to the shaft of the cylinder 5. This connection is intended to provide the means of converting the machine into a pulverizer or mixer when desired, the vibratory motion of the spades fitting the machine admirably for that purpose. The effect of this gearing is to give the cylinder a much higher speed of rotation than would be incident to its action of rolling upon the ground. It is obvious that in this case the teeth cannot take a very deep hold upon the soil, or else the traction-wheels would not have sufficient adhesion to give rotation to the cylinder 5.

To regulate the depth which the teeth shall penetrate the ground, the rear end of the frame is supported upon a roller or wheel, 16, upon which the frame is made adjustable by means of the lever 17. The standards 18 18 support a cross-bar, 19, which serves as a fulcrum for the lever 17, and a connection is formed between the roller or wheel 16 and the lever 17 by the

upright 20, which slides in a mortise in the beam or cross-bar 4. The lever 17 is adjusted so as to bring the rear end of the frame at the desired height from the ground by hooking this lever into the notches 21 in the standard 22. By this means any depth of operation of the spades that may be desired may be secured.

23 is a seat for the driver. The tongue or other attachment for drawing the machine is made fast to the forward beam, 2, in a manner well known to any competent mechanic employed in constructing such machines.

When the machine is used as a digger instead of a pulverizer, the gearing is disconnected from the traction-wheel by which it is propelled, which is done by drawing the pin 24, which acts as a key to keep the shaft of the traction-wheels from revolving without at the same time operating the gearing. A clutch or any other mode of connection and disconnection may be employed for the same purpose, if desired.

I am aware that vibrating spades have been used before, and I am also aware that spades hung in a cylinder have also been employed without vibration, or only with such vibration as would allow them to be easily lifted from the ground without any torsional movement. These

do not, however, combine the advantages which are found in my invention or the easy action of which my machine is capable.

I am also aware that machines have been constructed in which toothed rollers have been revolved by means of traction-wheels. In the case, however, of my invention the torsional vibration of the spades, when combined with this revolving motion of the cylinder, fits the machine admirably for incorporating different ingredients of soil or some foreign substances with the soil—as, for instance, manures of various kinds, plaster, guano, &c.

Having fully described my invention, I claim as the improvements which constitute it—

1. The combination, with the cylinder 5, of the spades 6, so arranged in connection with the other parts as to have a torsional vibration, as described, for the purposes set forth.

2. The combination of the cylinder 5 and the torsionally-vibrating spades 6 with the traction-wheels 11 and 12, or one of them, by means of detachable gearing, substantially as and for the purposes stated.

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