(No Model.) 3 Sheets—Sheet 1.

W. L. NIEMAN & W. HIERONYMUS.

CULTIVATOR.

No. 510,812. Patented Dec. 12, 1893.

Fig. I.

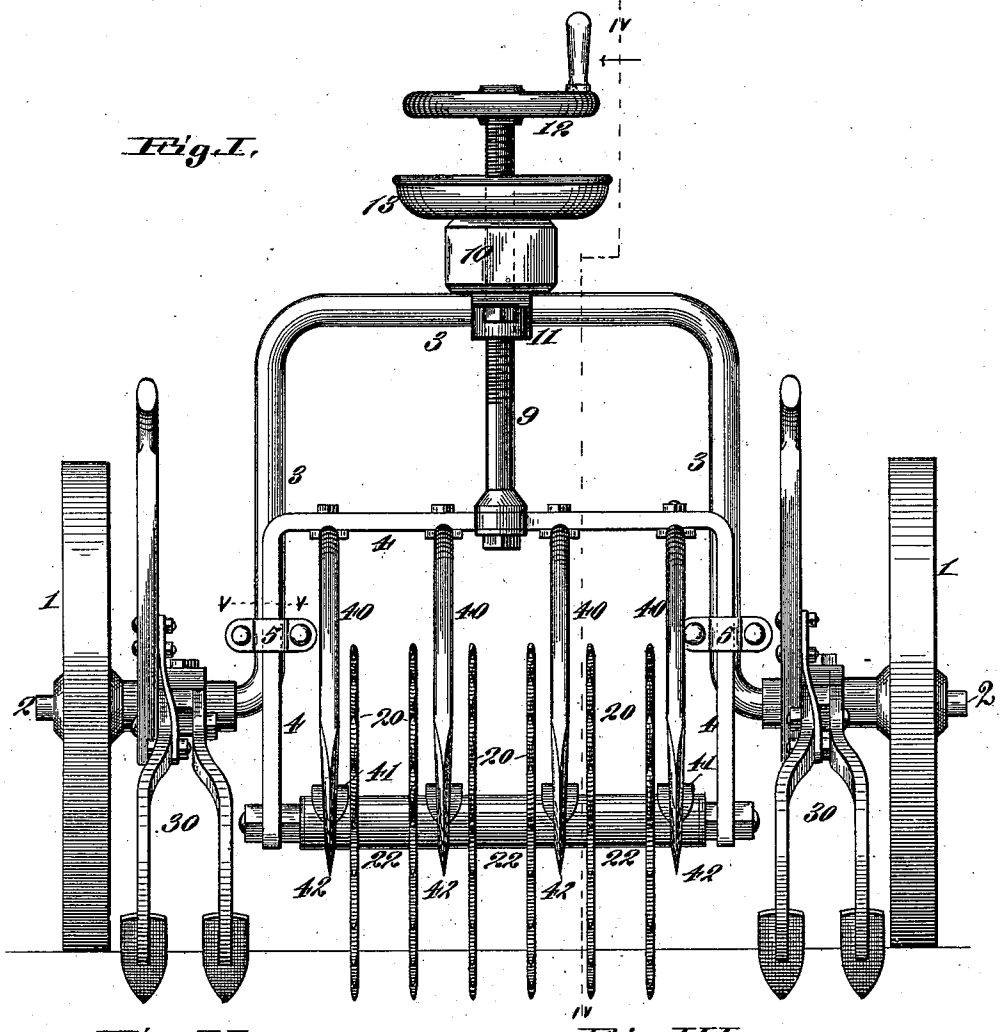

Fig. II.

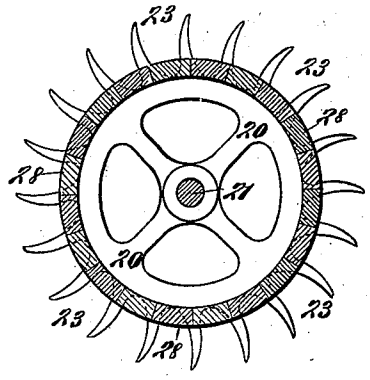

Fig. III

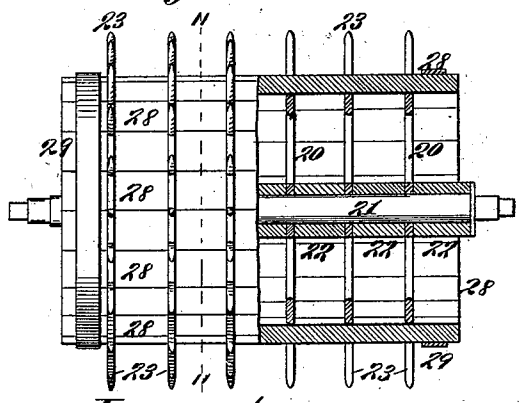

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Fig. IV.

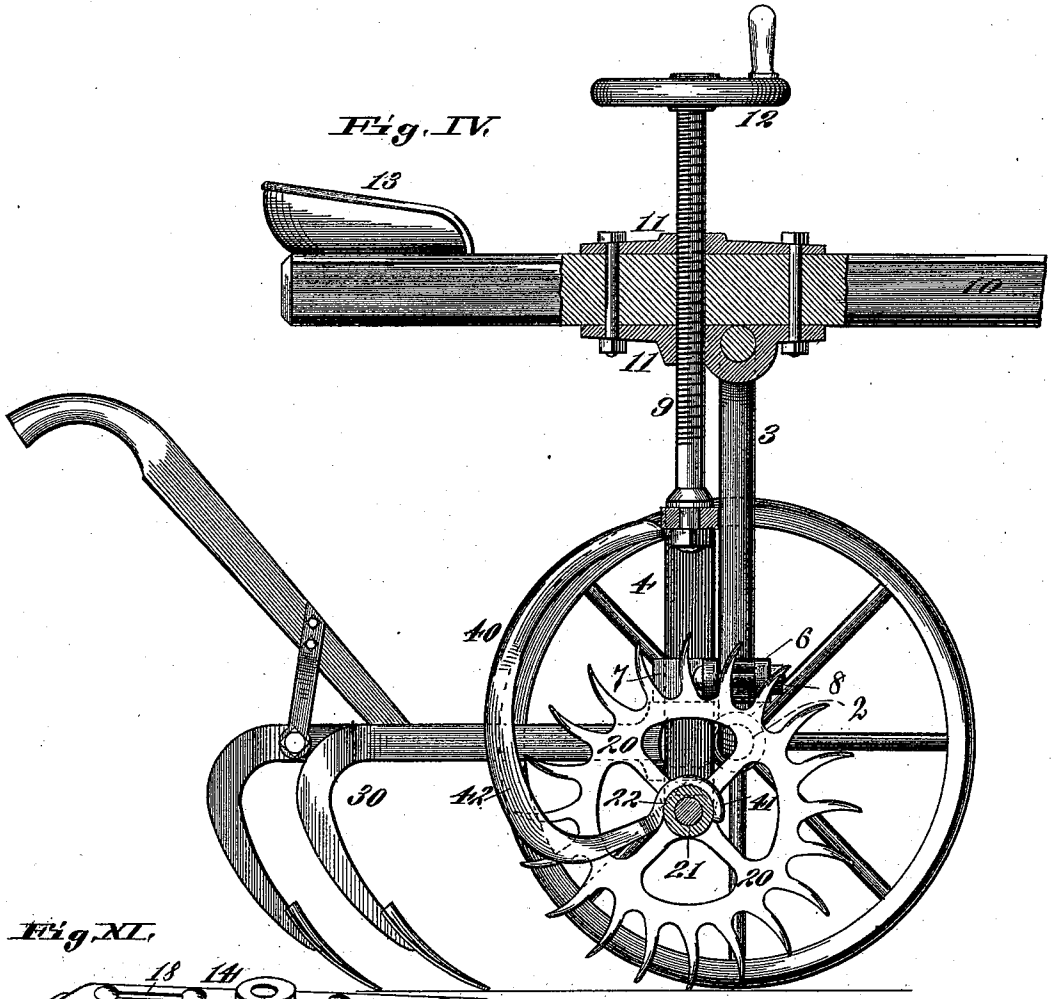

Fig. XI.

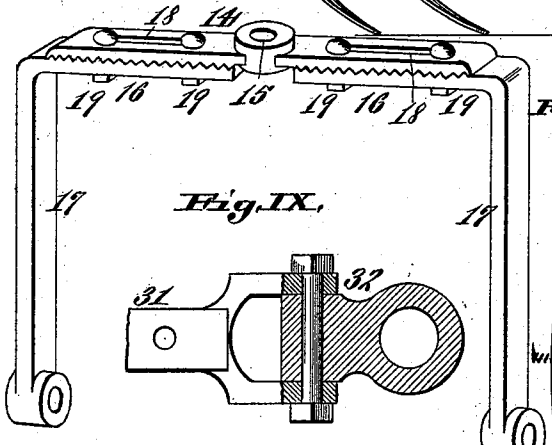

Fig. IX.

Fig. V.

Fig VI. Fig. VII.

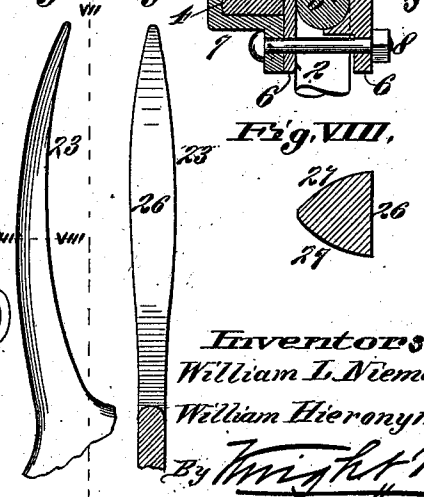

Fig. VIII.

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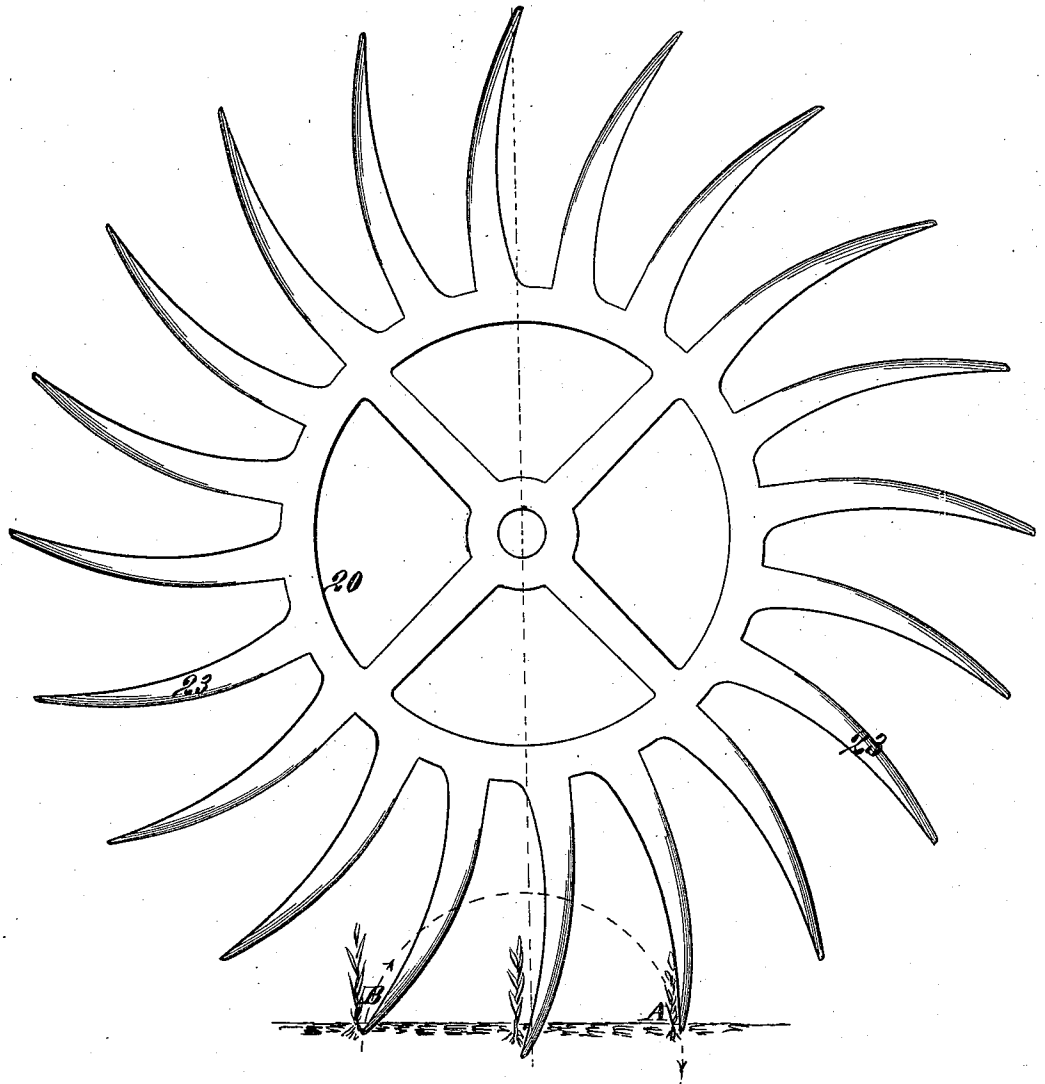
Fig. X



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UNITED STATES PATENT OFFICE.

WILLIAM L. NIEMAN AND WILLIAM HIERONYMUS, OF MOUNT OLIVE, ILLINOIS.

CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 510,812, dated December 12, 1893.

Application filed September 13, 1892. Serial No. 445,783. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM L. NIEMAN and WILLIAM HIERONYMUS, both of Mount Olive, in the county of Macoupin and State of Illinois, have invented a certain new and useful Improvement in Cultivators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our invention relates to certain improvements in machines for cultivating, loosening, and pulverizing the earth about small plants; and our invention consists in features of novelty hereinafter fully described and pointed out in the claims.

Figure I is a rear elevation, illustrative of our invention. Fig. II is a transverse section, taken on line II—II, Fig. III. Fig. III is a view of the toothed disks and their spindles, and showing the disks filled in with strips of wood, thus forming a combined roller and rotary harrow, or earth loosener. Fig. IV is a section taken on line IV—IV, Fig. I. Fig. V is an enlarged section, taken on line V—V, Fig. I. Fig. VI is an enlarged, detail view, showing one of the teeth of the rotary disks in edge view. Fig. VII is a section taken on line VII—VII, Fig. VI. Fig. VIII is a transverse section, taken on line VIII—VIII, Fig. VI. Fig. IX is a detail view, illustrating the manner of securing the shovel-plows to the axle of the machine. Fig. X is a diagram illustrating the operation of the rotary toothed disks with relation to the manner in which they enter and leave the ground. Fig. XI is a perspective view of the disk carrying frame or yoke.

Referring to the drawings, 1 represents the ground-wheels, journaled on an axle 2 having a central arch or bridge portion 3, to the vertical arms of which a frame 4 is movably held by straps or brackets 5, (see Figs. I and V,) each bracket consisting of plates 6 and a channel plate 7, which are connected together by bolts 8. The frame 4 can be raised and lowered by a threaded bolt or shaft 9, which connects with the center of the frame, and which passes up through a threaded socket in the draft tongue 10 and tongue-plates 11. (See Fig. IV.) The shaft has a hand-wheel 12 on its upper end by which it is turned to adjust the frame 4 vertically.

13 is the operator's seat secured to the tongue 10. The tongue is secured to the arch of the axle by means of the lower plate 11.

In Fig. XI we have shown a modification of the frame 4, which consists of a bar 14 having a central perforation 15 to receive the shaft 9, and which is serrated on its lower surface to receive the serrated ends 16 of the vertical arms 17 of the frame; the bar 14 and the ends 16 are slotted, as shown at 18, and are connected by bolts 19. The frame can thus be lengthened out or shortened up, as desired. The frame is designed to carry rotary disks 20, which are mounted on a shaft or rod 21, which fits in the lower ends of the frame 4. The disks are held the proper distance apart by means of blocks 22 placed between them on the rod. As stated, the disks are mounted on the rod 21, and they turn by coming in contact with the ground. Each disk has a series of teeth 23, and these teeth are so shaped and curved that their points advance rearwardly but a short distance after touching the ground, and then withdraw from the ground in a forwardly direction. This is illustrated in Fig. X, where the dotted line and arrow at A illustrate the direction in which the teeth enter the ground, and the dotted line and arrow at B illustrate how the teeth leave the ground. The result of thus mounting the disks so that they are only turned by their contact with the ground, and of so forming the teeth that they will be withdrawn from the ground in a forwardly direction; and will move rearwardly but a very slight distance after striking the ground, is that young corn and plants can be cultivated and the dirt thoroughly loosened around them without fear of tearing them from the ground or uprooting them, for should the teeth strike directly upon a plant the result would be the simply loosening up of the earth in and about the plant, and the plant will not be uprooted, while at the same time any very small weeds, which have surface roots only, will be destroyed. Practical experience in the field has demonstrated these facts. The curve of the teeth is such that a line drawn through

the center of the disk, past the base of the teeth, passes slightly back of the point of the teeth. (See dotted line, Fig. X.) The face of each tooth is made flat, as shown at 26, Figs. VII and VIII, while the sides are tapered to the back of the tooth, as shown at 27, Fig. VIII.

The specified construction and arrangement of the teeth, clearly distinguish this part of our invention from rotary cultivators in the prior art, such as seen for example in Patents Nos. 265,917, 312,338, 367,989 and 416,982, in which the teeth are designed to excavate or dig up the ground as much as possible in the rotary movement, as in digging stubble and like operations, and are commonly formed with a cutting edge on the front or inner side of the curve, to facilitate their passage horizontally through the ground.

Sometimes it is desired to crush or pulverize the ground, at the same time loosening it up, and for this purpose our machine is admirably adapted, by securing strips 28 of wood between the teeth, as shown in Figs. II and III, the strips being held by means of rings 29, or by other suitable means. These strips can be very quickly added, and removed, and when the ground is lumpy they are very desirable for the purpose of forming a roller to crush the lumps, while at the same time the projecting teeth loosen up the earth.

40 represents stalk and weed cutters or cleaners secured at their upper ends to the top of the frame 4, and the lower ends 41 of which are concave and fit on the distance blocks 22 between the disks. These cutters are curved as shown in the drawings, and their lower, rear ends form curved, sharp surfaces 42 for cutting stalks and weeds.

30 represents shovel-plows, the beams 31 of which are connected through means of clevises 32 to the axles 2 of the machine. We thus combine with the pulverizer and rotary harrow, which we have described, a pair of shovels which may be used outside of the disks of the pulverizer, when desired.

We claim as our invention—

1. The combination of an axle having an arch or bridged central portion, a frame movably secured to the axle, a threaded rod or shaft secured to said frame, and by which the frame is moved, a draft-tongue to which said axle is secured, and through which said threaded rod or shaft passes, a hand-wheel on said rod or shaft by which it is turned to move said frame, rotary disks mounted in said frame on a rod fitting in the lower ends of the frame, distance blocks located between the disks, and stalk cutters secured by their upper ends to said frame, and resting at their lower ends upon said distance blocks, substantially as set forth.

2. The combination of a suitable axle, having an arch or bridged portion, ground wheels journaled on the axle, a frame secured to the vertical arms of said axle, toothed disks supported by said frame, and shovel-plows secured to said axles between said ground-wheels and the vertical portions of the axles, substantially as set forth.

3. The combination of an axle having an arch or bridged portion, ground wheels journaled on the axle, a frame secured to the vertical arms of the arch portion of the axle, toothed disks supported in the frame, and curved cleaners secured to the upper part of the frame, and resting at their lower ends upon the disk support, substantially as shown and described.

4. The combination of a suitable frame, toothed disks supported in the frame, and cleaners consisting of curved bars having convex, lower, sharp edges, and having concave, lower ends resting upon the disk support, substantially as and for the purpose set forth.

5. The combination of a suitable frame and a toothed disk mounted in said frame, so as to turn freely by contact with the ground, the teeth being formed with flat faces and with angular or convex backs, and so curved that a radial line from the center of the disk in front of the tooth and close to its base will pass slightly back of the point, whereby in passing from vertical position and maximum penetration, the angular back of the tooth is pressed into the ground, and the point caused to pass vertically out of the ground.

6. In a cultivator, a disk frame 4 made in three pieces 14, 17, the pieces 17 being right-angled, slotted and serrated on the upper side, and the parts 16 being slotted and serrated and provided with a central hole to receive an adjusting rod; substantially as set forth.

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WILLIAM HIERONYMUS.

In presence of—
ALBERT M. EBERSOLE,
ED. S. KNIGHT.