2 Sheets—Sheet 1

G. W NEVILL.

Ditching Machines.

No. 196,922. Patented Nov. 6, 1877.

Fig. 1.

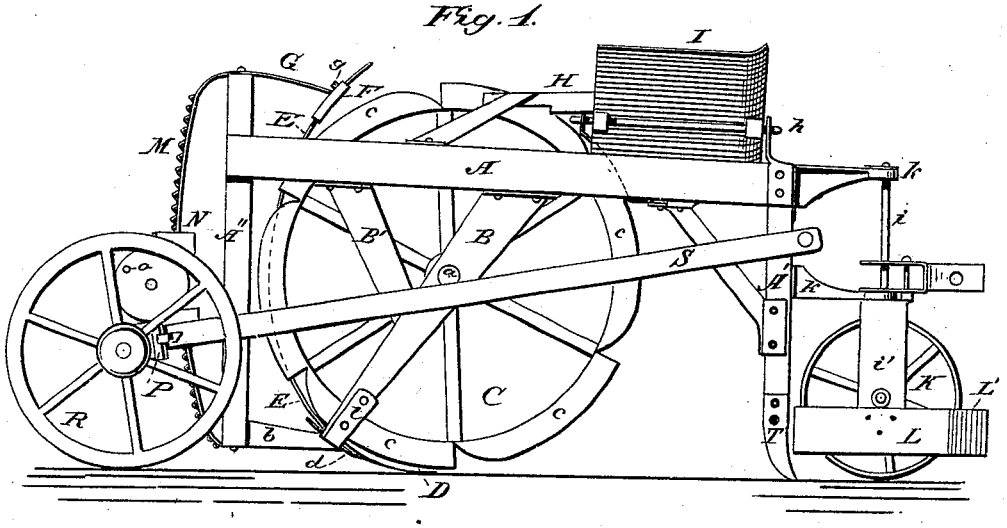
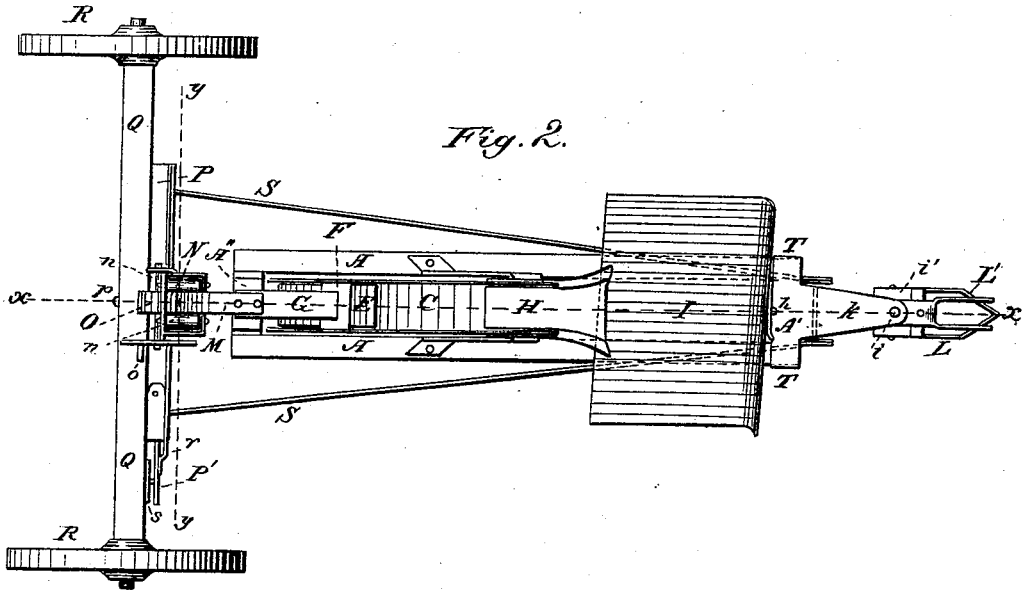


Fig. 2.



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Augustus Peterson

Inventor:
George W. Nevill
by Louis Bagger & Co
his Attorneys

2 Sheets—Sheet 2

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Fig. 3.

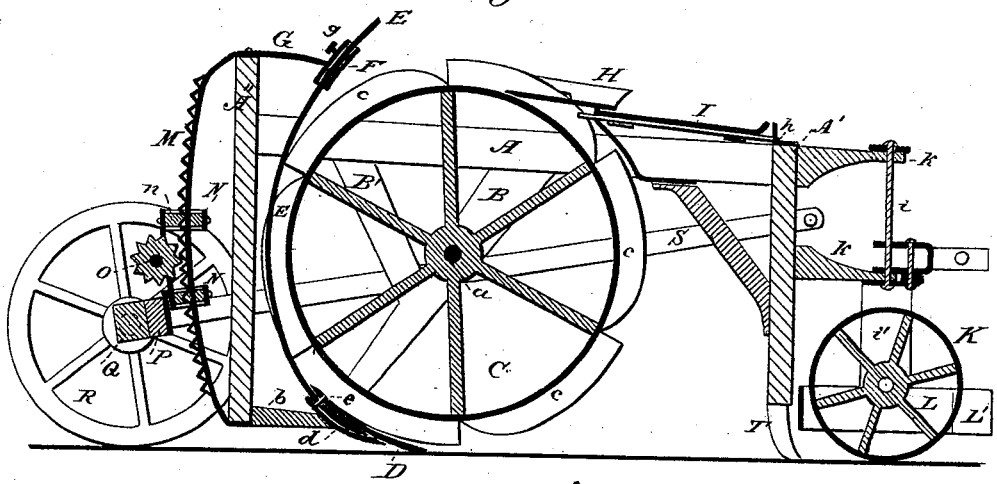


Fig. 4.

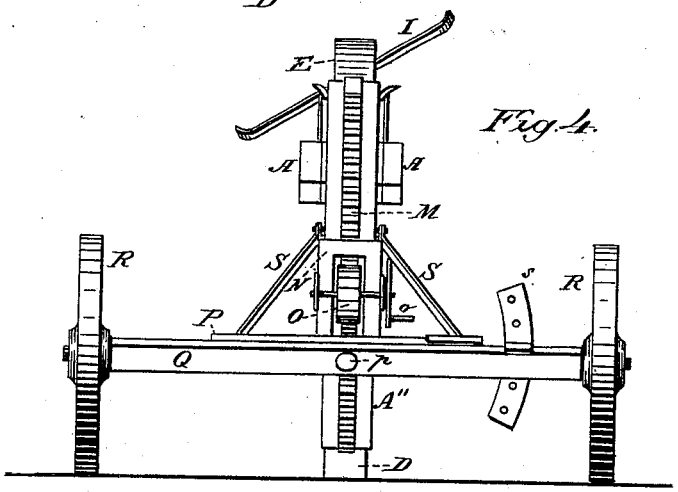
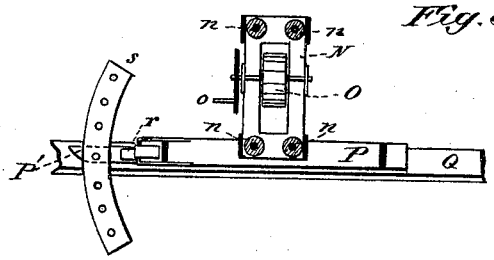


Fig. 5.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

GEORGE W. NEVILL, OF CAVERNA, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO JOHN B. McKAY, OF SAME PLACE, AND WILLIAM BEARD, OF MUNFORDSVILLE, KENTUCKY.

IMPROVEMENT IN DITCHING-MACHINES.

Specification forming part of Letters Patent No. **196,922**, dated November 6, 1877; application filed July 18, 1877.

To all whom it may concern:

Be it known that I, GEORGE W. NEVILL, of Caverna, in the county of Hart and State of Kentucky, have invented certain new and useful Improvements in Ditching-Machines and Excavators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation. Fig. 2 is a top plan. Fig. 3 is a longitudinal vertical section on the line *x x* in Fig. 2. Fig. 4 is a rear elevation, and Fig. 5 is a cross-section after the line *y y* in Fig. 2.

Similar letters of reference indicate corresponding parts in all the figures.

My invention relates to excavators or ditching-machines; and it consists in an improved construction and combination of parts, simplifying the machine and rendering it certain and easy of operation.

In machines of this class it is desirable to avoid complication, and make the operative parts as few in number and simple in construction as possible; and by my several improvements, hereinafter described, and pointed out in the claims, I obtain a machine which will do its work satisfactorily in all kinds of soil, will not clog, will readily adjust itself vertically, turns easily, and which may be so adjusted as to make a perpendicular ditch or cut, without regard to what the pitch of the axle and wheels may be.

In the drawings, A is the upper part of the frame, consisting of two stout beams, between which, at each end, is secured another beam or upright, denoted by A′ and A″, respectively, at right angles. Bolted to the under side of beams A A are two castings, each of which consists of a slanting front piece, B, and a brace, B′. Above the point of unison of the pieces B and B′ are the boxes or bearings for the axle *a* of the earth or dirt wheel C, which projects up through the open space between the beams A A, and consists of a heavy metal wheel with a smooth rim or periphery from five to fifteen inches in width, according to the capacity of the machine, having two slightly-diverging flanges, one at each edge. Each of these flanges consists of a series of segmental teeth, *c*, curved backward, which may either be cast in one piece with the wheel, or they may be made separately, or in segmental sections, (of fine iron or steel), and screwed or bolted onto the rim of the wheel, so as to present one continuous toothed or serrated flange on each side. To the lower end of rear beam A″ is bolted a casting, which consists of a piece, *b*, reaching forward in under the earth-wheel C, where it terminates in a slanting shoe, *d*. D is the plow, which is firmly bolted to the face of shoe *d*, and is prevented from being forced downward from the wheel by the braces *l l*, which extend downward from the ends of the castings B, one on each side, and are bolted to the front end of shoe *d*.

It is indispensable to the successful working of machines of this class that the plow-point should not "give" or bend, but remain stationary at a certain distance from the smooth face of the earth-wheel, the point being a little closer to the wheel than the heel, because if the plow-point should bend downward during the operation of the machine, (as it invariably will unless braced and supported in the manner described,) it will take in more dirt at the point than can be discharged at the heel, and the result will be that the machine will clog and stop working.

The wheel, during the operation of the machine, having a tendency to rise, and the plow a tendency in the opposite direction, it follows that the casting B and braces *l* will bind or tie the two together firmly, so as to absolutely prevent deviation. The braces *l* serve, besides, as scrapers for the wheel-flanges, keeping them clear of dirt, so that they will at all times present a clean and smooth cutting-edge.

E is a flexible and adjustable spring-back, made of steel, which fits loosely in between the flanges *c c* of the wheel C. The lower end of spring-back E is inserted between the shoe *d* and plow D, where it is kept in place by countersunk screws or bolts *e*, and the upper end passes through a flat sleeve, F, secured

upon the end of a bracket, G, made of spring-steel, which is bolted onto the top of the rear beam or post A″. Spring-back E may be adjusted within its sleeve F, and held firmly in any given position, by means of a set-screw, *g*.

H is the scraper, which receives the earth from the earth-wheel C, and deposits it upon a tilting platform or table, I. The latter is hung on an axle, *h*, parallel to the machine, and has, consequently, a motion transverse to that of the machine. By tilting the board I either to the right or to the left, the excavated earth is deposited either on the right or on the left side of the machine and ditch.

K is the steering-wheel, which is hung in a forked shaft, *i*, pivoted in brackets *k k* projecting from the front post A′. Bolted to the lower end of the fork *i*′ is a shield, L, which surrounds the lower part of wheel K, and has a wedge-shaped point, L′.

M is a segmental rack, bolted to and projecting backward from the rear post A″. This rack passes through a sleeve, N, the inner faces of which are provided with friction-rollers *n*, so as to allow rack M to slide easily up or down. This rack engages with a pinion, O, which may be turned by a crank, *o*, as shown in the drawing, or by a lever, or in any other suitable manner, so that by turning pinion O the rack may be raised. It may be retained in its elevated position, (in which position the lowermost rim of the earth-wheel is above, and does not touch, the ground) by a spring pawl or pin, in the usual manner.

The sleeve N, through which rack M slides, is secured upon a beam, P, which is pivoted on a bolt, *p*, passing through the middle of the rear axle Q, which carries the wheels R R. To one end of the beam P is secured a lever, P′, which is provided with a spring-catch, *r*, so that it may be secured in any given position in a segmental rack, *s*, bolted onto the axle.

By this combination of beam P and axle Q the machine may be kept in a perpendicular position when used on hill-sides or slanting ground, as hereinafter set forth.

S S are braces, which reach from the ends of beam P (one on each side) forward to the front beam A′, so as to give strength and stability to the machine; and T T are cutters or clearers, which are secured, one on each side, at the bottom of the front post A′, to clear away rubbish and prepare the ground for the advance of the wheel C.

Having thus described the construction and combination of the several parts of my machine, I shall now proceed to explain the manner of operating it.

When not in use, or while on the way to where it is to be used, the earth-wheel is elevated, as described, by means of the rack M and pinion O, so as not to touch the ground, and in this position the machine may be easily transported, resting solely on its front or steering wheel K and the rear wheels R R. The place having been reached, the pawl or pin which retains rack M is released, and the wheel allowed to drop upon the ground, where its weight will force the flanges *c c* down into the earth. The team is then started, and the machine, as it advances, will cut and raise the soil, forming a ditch corresponding to the width of the wheel, the loosened earth being pressed firmly between the flanges of the wheel, and carried up by it until the scraper H is reached, which scrapes it off and delivers it upon the tilting table I, as already described. If, during the advance of the machine, the earth-wheel should "stick," and slide in the ground instead of revolve, the teeth or notches *c*, catching into the soil, will start it again, so that it will be kept continually rotating and cutting as the machine advances. The steel-spring back E will prevent any of the dirt from falling out while being raised perpendicularly by the wheel, and being made of spring-steel, and therefore flexible, it will yield to the pressure of the earth carried up by the wheel, being aided in thus yielding by the steel-spring bracket G, in which its upper end is secured. When, in this manner, the end of the ditch has been reached, the wheel is raised and the machine is turned and started back again over the same track, the earth-wheel sinking of its own weight into the cut made on the way out, while the steering-wheel K, which runs in the cut, will guide the advance of the machine, the shield L, which surrounds it, preventing its edges from cutting into the sides of the first cut, in which the machine now travels. In this way the machine is started forward and backward in the same cut until a sufficient depth has been reached, the earth-wheel always adjusting itself to the proper depth within the ditch.

If the ground is uneven or slanting, so that one of the wheels R is higher than the other, the pivoted beam P is so adjusted by its lever P′ and rack *s* upon the axle Q that all the parts of the machine except the axle with its wheels shall be in a perpendicular position.

The advantages of my machine will, from the foregoing, be obvious to all who have had practical experience in the art of excavating or ditch-cutting by machine. The earth-wheel cannot stick or bind; it uses no apron or endless band (which are always objectionable, as they soon wear out, and are apt to get out of order) to carry up the dirt; it will adjust itself in the cut, and requires no lowering by screws or other complicated mechanism for that purpose, and may be adjusted laterally, so as to make a perpendicular cut on sloping or uneven ground; the dirt may be delivered on either side of the ditch; and its parts are few and strong, and their combination simple and effective.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In an excavator or ditching-machine, an earth cutting and carrying wheel, C, provided with segmental notched or serrated curved

flanges *c c*, having square front edges, substantially as and for the purpose herein shown and described.

2. As an improvement in excavators or ditching-machines, the combination of an earth cutting and carrying wheel, C, having side flanges *c c*, with a flexible spring-back, E, and elastic bracket G, substantially as and for the purpose herein shown and described.

3. The combination of the flexible spring-back E with the flexible spring-bracket G and sleeve F, substantially as and for the purpose herein shown and described.

4. The combination of the flanged wheel C, plow D, flexible spring-back E, sleeve F, and spring-bracket G, substantially as and for the purpose herein shown and described.

5. The combination of the flanged wheel C, castings B B′, having the combined scrapers and braces *l l*, and plow D, whereby the wheel and plow are prevented from diverging from each other, substantially as and for the purpose herein shown and described.

6. The combination of the flanged wheel C, scraper H, and hinged tilting board I, substantially as and for the purpose herein shown and described.

7. In an excavator or ditching-machine, the steering or guide wheel K having a shield or guard, L, to prevent its edges from cutting into the sides of the ditch, substantially as and for the purpose herein shown and described.

8. As an improvement in excavators or ditching-machines, the frame A A′ A″, which carries the cutting and carrying wheel C, plow D, and segmental rack M, in combination with a rear or supporting axle, Q, provided with a sleeve, N, having friction-rollers *n*, so that the frame may adjust itself vertically by the rack M sliding through said sleeve, substantially as and for the purpose herein shown and described.

9. The combination of the sleeve N, having anti-friction-rollers *n*, pinion O, and segmental rack M, substantially as and for the purpose herein shown and described.

10. The combination of the axle Q, having segmental rack *s*, with the pivoted beam P, having lever P′ and spring-catch *r*, substantially as and for the purpose herein shown and described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

GEORGE W. NEVILL.

Witnesses:
GEO. F. GRAHAM,
AUGUST PETERSOHN.