

W. C. WILLIAMS.
GRADING AND DITCHING MACHINE.

No. 422,870.

Patented Mar. 4, 1890.

Fig. 1.

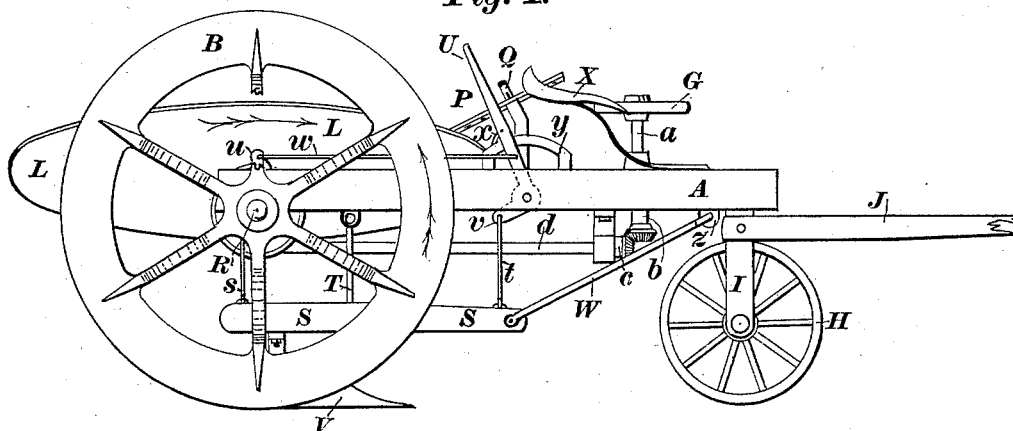
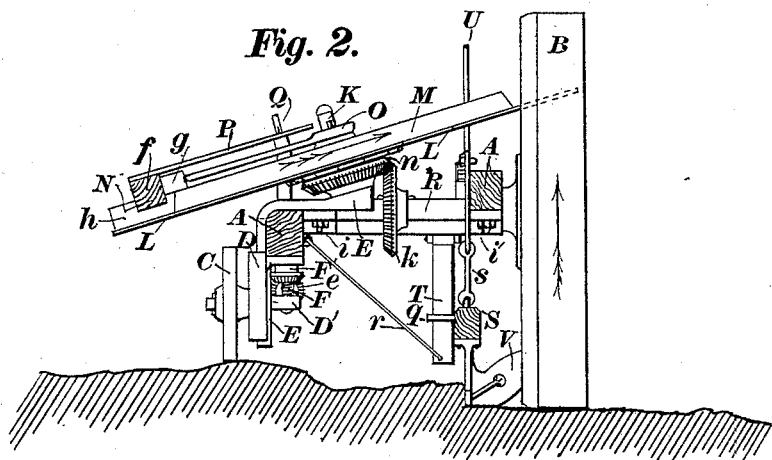


Fig. 2.



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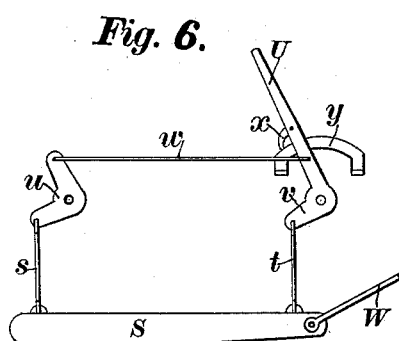
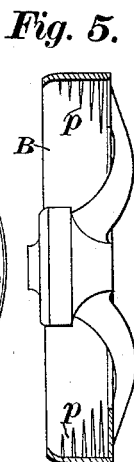
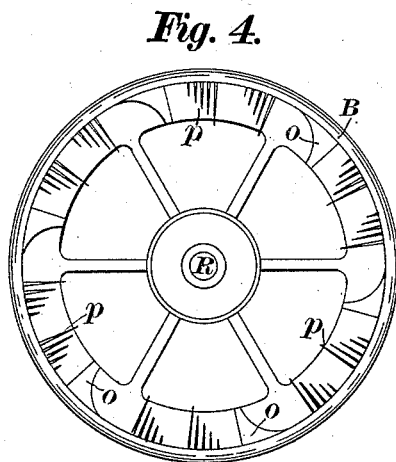
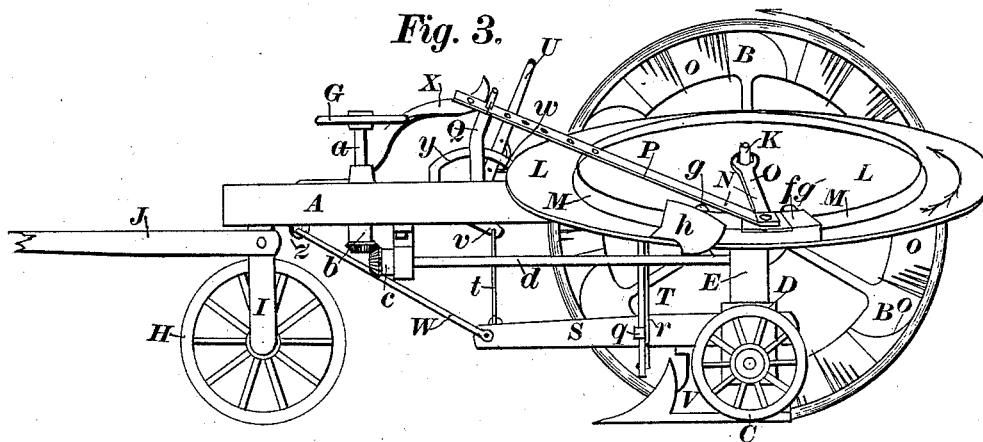
(No Model.)

2 Sheets—Sheet 2.

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GRADING AND DITCHING MACHINE.

No. 422,870.

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UNITED STATES PATENT OFFICE.

WILLIAM C. WILLIAMS, OF WILLIAMSBURG, OHIO.

GRADING AND DITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 422,870, dated March 4, 1890.

Application filed November 27, 1889. Serial No. 331,826. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. WILLIAMS, a citizen of the United States, residing at Williamsburg, in the county of Clermont and State of Ohio, have invented a new and useful Improvement in Ditching and Grading Machines, of which the following is a specification.

My improvement relates to a kind of ditching and grading machine by which the earth to be removed is loosened from its bed by means of a plow which throws it into the rim of a large elevating-wheel, this wheel also acting as one of the supporting-wheels of the machine, and is provided with a series of buckets on the inside of its rim which elevate the earth by the rotation of the wheel above the level of an inclined circular rotary table. This table revolving carries the earth as it is dropped from the elevating-wheel to the opposite side of the machine, where it is scraped off by suitable means and allowed to fall to the ground from two to ten feet from where it was first raised by the plow.

The object of this invention is to provide a machine for ditching and grading whose construction is simple, and as light as is compatible with the necessary strength to do the work intended.

A further object is to reduce the cost to a minimum, and at the same time make it so perfectly efficient that it can be easily managed by any ordinary unskilled help, so that it can be introduced into a much wider field of usefulness than has been heretofore attained by other machines for a similar purpose. I attain these objects by the mechanism illustrated in the accompanying drawings.

Figure 1 is a view of the right-hand side of the machine. Fig. 2 is a view of the rear end of the machine, showing also a section of the surface to be graded or ditched. Fig. 3 is a left-hand side view of the machine, showing several parts that are hidden in view, Fig. 1. Fig. 4 is a view of the main supporting-wheel; and Fig. 5, a section of the main supporting-wheel, showing form of rim and shape of spokes. Fig. 6 is a view of the means for raising and lowering the plow, showing the parts as they appear when detached from the machine.

Similar letters and figures refer to similar parts throughout the several views.

A is the frame, which consists of four timbers secured together in a rectangular form. The rear of the machine is supported upon two wheels. The large wheel B supports the right hand and the wheel C the left hand side of the rear end of the machine. This wheel C is journaled to a pin which projects outward from a sliding block D, the block D being movably dovetailed to a vertical casting E, and is held at any required height by means of a screw F, which is firmly attached to a lug of the block D at D'. The screw F is provided with a nut F', which is threaded to fit the screw, and the exterior of the nut is fashioned into a miter-bevel cog-gearing, as shown in Fig. 2.

The bevel cog-nut F' is operated by means of a hand-wheel G near the driver's seat, Figs. 1 and 3. This hand-wheel is firmly attached to a vertical shaft *a*, which is journaled to the frame A. Bevel cog-gearing *b* and *c* connect it with a long horizontal shaft *d*, which shaft is journaled to hangers under the frame A. At the rear end of the horizontal shaft *d* is a bevel-gearing *e*, which gears with the cogged nut F'.

The front of the machine is supported upon a caster H, to the post I of which the tongue J is attached. In place of this caster-wheel an axle and two wheels can be used if it should prove necessary.

Journaled to a pin K, which is firmly secured at its lower end to the casting E, is the off-bearing table L. This table is circular in form and ordinarily from eight to ten feet in diameter. As shown in the drawings, this table is set on an incline toward the left-hand side of the machine, and its right-hand edge projects up under the rim of the large supporting-wheel B, as shown by the dotted lines in Fig. 1.

About eighteen inches from the edge of the off-bearing table L and entirely around it is a ring M, which stands up above the table several inches.

On the left-hand side of the off-bearing table L in Fig. 2 is shown a rear view of the parts of the scraper N, which is also shown in Fig. 3. This scraper consists of a piece of

wood *f*, which is provided with two small rollers *g* and *g'*, which travel along on the top of the ring *M*, and thus support the weight of the scraper and prevent it dragging upon the table *L*. Secured to the piece of wood *f*, at the front end, is a plow-shaped piece of steel *h*, that fits close to the top of the off-bearing table *L* and the outside of the ring *M*. This scraper is held in position, first, by means of the rod *O*, which is firmly secured at one end to the piece of wood *f* and at the other end to the top of the pin *K*, which is the journal upon which the table *L* revolves. The scraper may be held in different positions relative to the circumference of the table *L* by means of a stay-rod *P*, which is attached at one end to the scraper-block *f* and is attached at the other end to a post *Q*, which is firmly secured to the frame *A* at the left-hand side of the machine. The stay-rod *P* is provided with a series of holes which fit the top of the post *Q*, and the distance between the scraper and the post can thus be lengthened or shortened, and thus change the relative position of the scraper on the off-bearing table and cause it to scrape off the earth deposited on the table at any distance desired from the center of the machine, as will be hereinafter more fully described.

The large wheel *B* is secured to the axle *R* by means of an ordinary ratchet-and-pawl clutch, so that it will turn the axle *R* only when the machine is moving forward. The axle *R* is journaled in the boxes *i* and *i'*. Firmly secured to this axle is a bevel cog-wheel *k*, which engages with a bevel cog-wheel *n*, which is attached to the under side of the off-bearing table *L*, so that any motion of the axle will cause the table *L* to revolve.

In Fig. 4 is shown the construction of the rim of the large supporting-wheel *B*, so that it acts also as an elevator. There are a number of buckets *o* built on the inside of the rim. These buckets have rounded corners, and are screwed into the bottom of each bucket are two rows of pointed rods *p*, which vary in length, as shown. These rods are for the purpose of assisting in holding the earth in the buckets until the earth is carried up to almost the highest point in the revolution of the wheel *B*. The rods, being screwed in, can be removed easily when necessary, for repairs or when the kind of earth to be removed does not require them. The spokes of the wheel *B* are bent outward beyond the outer rim, as shown in Fig. 5. This is to permit the edge of the off-bearing table *L* to project under almost the entire width of the rim or tire of the wheel *B*.

S is the plow-beam, which has secured to the side a slotted piece *q*.

Hinged to the under side of the rear cross-piece of the frame *A* is suspended a flat piece of steel *T*. At the lower end of this piece is movably attached a rod *r*, which rod is movably attached at its upper end to the left side of the frame *A* and acts as a lateral brace to

the piece *T*. The piece *T* fits loosely in the slot of the piece *q*, so that the plow-beam can rise and fall, but is held from any movement laterally.

The plow is raised and lowered so as to cut the ground at different depths, or is raised entirely clear of the ground by means of two suspension-rods *s* and *t*, which are attached one to each end of the plow-beam, Figs. 1, 2, 3, and 6. These rods *s* and *t* are each movably attached to the lower arm of elbow-levers *u* and *v*. The elbow-levers are pivotally attached to the inside of the right-hand timber of the frame *A*, as shown in Fig. 2. The top arms of these elbow-levers are connected together by means of the rod *w*. The top arm of lever *v* is prolonged upward and forms the plow-elevating hand-lever *U*, and is provided with a pawl *x*, which engages the sunken notches in a ratchet-segment *y*.

V is the mold-board of the plow, which is held close to the inside edge of the rim of the large elevating-wheel *B* and throws the earth into the buckets to be elevated when the machine is in operation.

W is a rod attached to the front end of the plow-beam and to a staple *z* in the frame *A*. This is the draft-rod for hitching the plow to the machine.

X is the driver's seat, which is placed so that he is within easy reach of the plow elevating and lowering lever *U*.

The operation of the machine is as follows: Horses being hitched to the tongue *J* in front of the machine in the ordinary way, the driver takes his place on the seat *X*. He now lowers the plow to the ground by grasping the lever *U* and lifting the pawl *x* out of the ratchet-segment *y*, when the lever *U* will instantly move backward, caused by the weight of the plow acting through the suspension-rods *s* and *t*, which are attached to the lower arms of the levers *u* and *v*. (Shown in dotted lines, Fig. 1, and plainly shown in Fig. 6.) Now, by starting the horses, the machine will move forward and the plow enter the earth and the mold-board *V* throw it in a loosened state into the buckets of the wheel *B*. This wheel, revolving in the direction of the arrow, Fig. 2, will carry the earth to nearly the highest point of its revolution, when it will fall out upon the rim of the off-bearing table *L*. The axle *R* of the wheel *B* revolves, and the cog-gearing *k* and *n* cause the circular table *L* to revolve in the direction of the arrow, Fig. 2. This causes the earth on the top of the table to be carried around toward the left-hand side of the machine, where it contacts with the stationary scraper-blade *h* and is scraped off and falls to the ground from two to ten feet from where it was first lifted by the plow, as has been hereinbefore stated.

The stay-rod *P* can be quickly adjusted by the driver from his seat, so as to cause the scraper to throw the earth on the table to the ground at different distances from the center

of the machine, as has been hereinbefore described.

The driver can easily and quickly adjust the level of the machine by means of the hand-wheel G, which, acting through the shafts *a* and *d* and cog-gearing *b*, *c*, and *e*, causes the nut-cog wheel F' to revolve through the medium of the screw F, and thus raise or lower block D, and consequently the wheel C, to a greater or less height, in proportion to the depth the plow is running, or to the side incline of the roadway or surface upon which the machine is operating.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A grading and ditching machine provided with a circular revolving table L, which is caused to revolve by being geared to the main axle R by means of cog-wheels *k* and *n*, when said revolving table is used in combination with a dirt-lifting wheel B, whose revolution drives said cog-wheels *k* and *n* through the medium of the main axle R, said dirt-lifting wheel B being provided with buckets *o*, built solidly into the inside of

its rim, said buckets being provided with pointed rods *p*, which are secured to the inside of the rim of said wheel B and project toward the center of said wheel, for the purpose described.

2. In a ditching and grading machine, the adjustable scraper, and stay-rod P, provided with a series of holes, as shown and described, by which its length from the post Q to the scraper N can be shortened or lengthened for the purpose of changing the relative position of the scraper N on the revolving table L.

3. The wheel B, provided with buckets *o* inside of its rim, these buckets being provided with one or more rows of rods *p*, that are secured to the rim of the wheel B and project toward the center of the wheel, for the purpose of assisting in retaining the loose earth in the buckets until said buckets reach almost their highest point in the revolution of wheel B.

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Witnesses:

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