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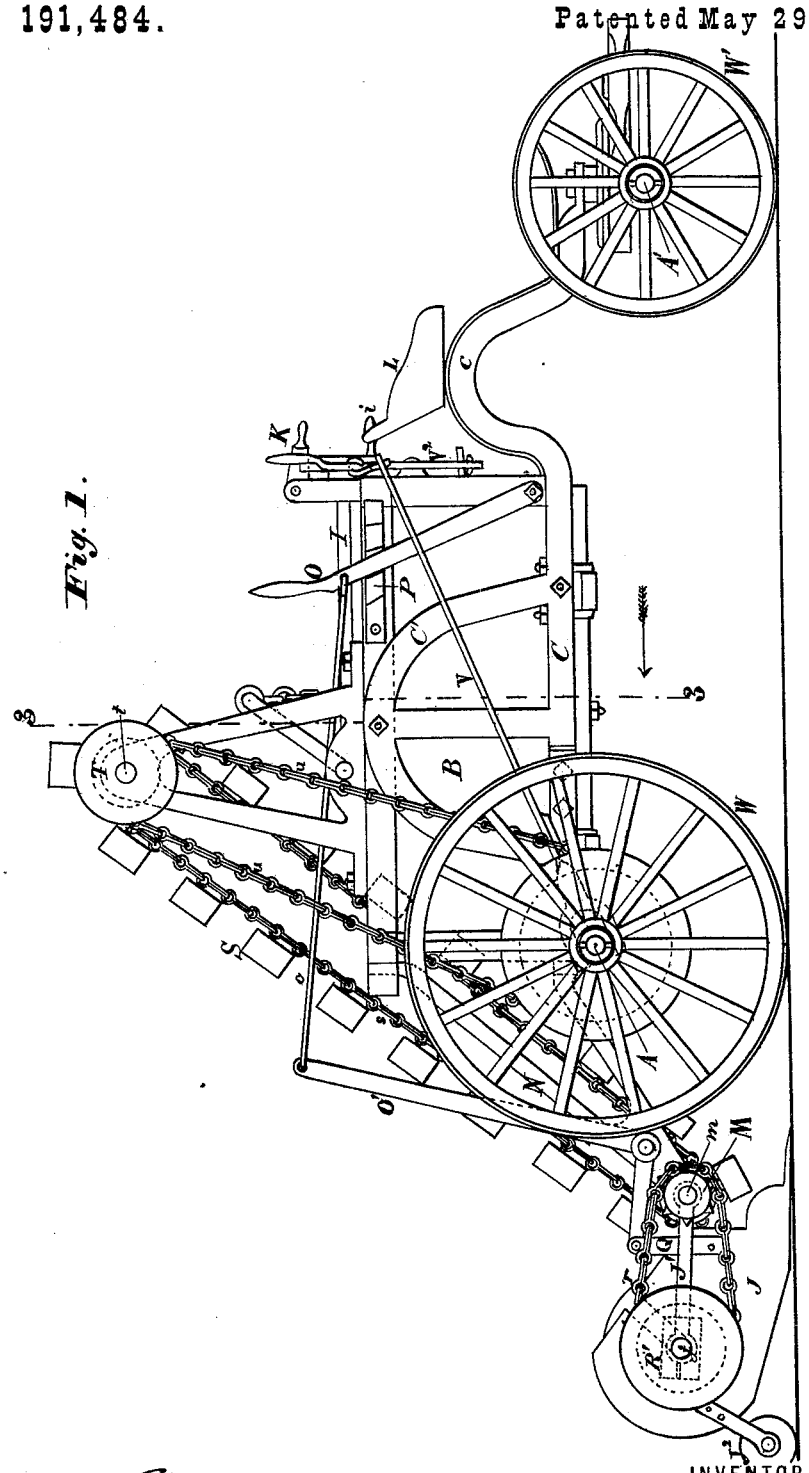
J. G. STAFFORD.

EXCAVATOR.

No. 191,484. Patented May 29, 1877.

Fig. 1.



WITNESSES

Chas. J. Cook

LeBlond Burdett

INVENTOR

John G. Stafford

By Knight Bros. Attorneys

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J. G. STAFFORD.

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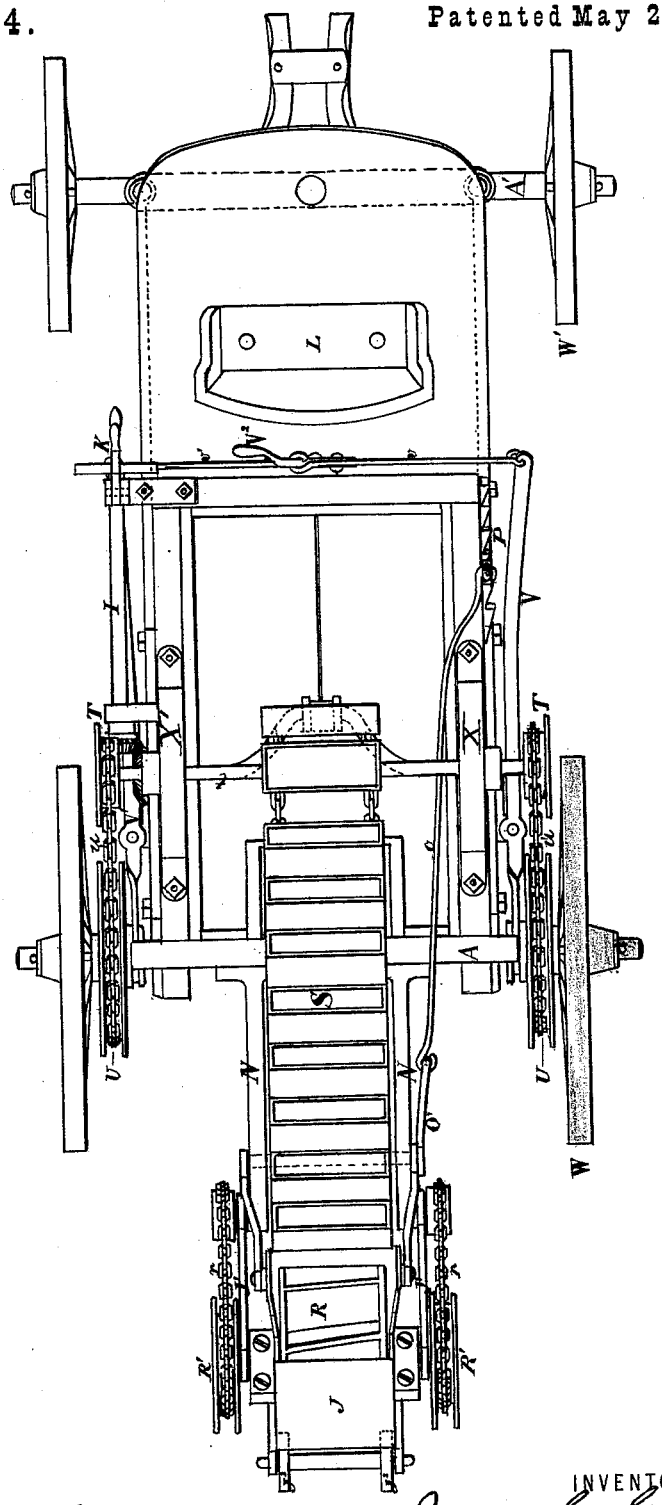

Fig. 2.

WITNESSES
Chas. J. Gooch
Le Blond Burdett.

INVENTOR
John G. Stafford
By Knight Bros. Attorneys

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J. G. STAFFORD.

EXCAVATOR.

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Fig. 3.

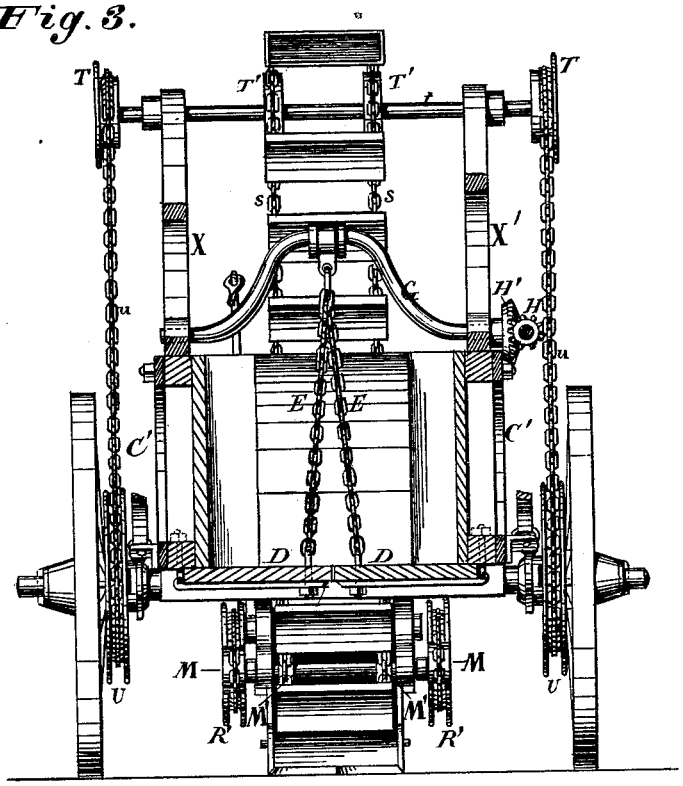


Fig. 4.

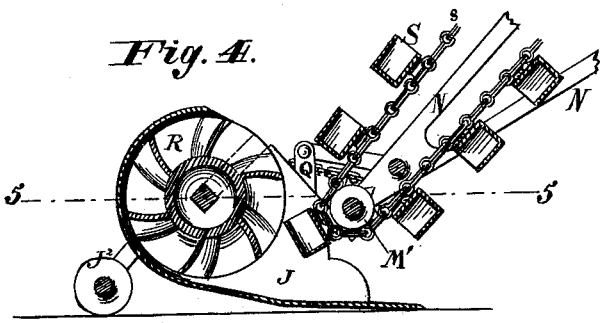
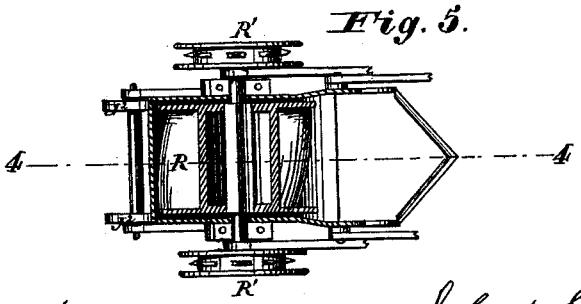


Fig. 5.



WITNESSES

Chas. J. Cook

C. Blond Burdett

INVENTOR

John G. Stafford

By Knight Bros. Attorneys

UNITED STATES PATENT OFFICE.

JOHN G. STAFFORD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN EXCAVATORS.

Specification forming part of Letters Patent No. **191,484**, dated May 29, 1877; application filed April 12, 1877.

To all whom it may concern:

Be it known that I, JOHN G. STAFFORD, of the city and county of Washington, in the District of Columbia, have invented a certain new and Improved Excavator, of which the following is a specification:

My invention relates to an apparatus which is adapted to automatically excavate the earth, elevate and load it into a dumping-wagon, and discharge it at any point to which it may be conveyed. The excavating apparatus consists of a convex bottom scoop, adjustable to determine the depth of penetration, and a chambered cylinder working within said scoop and delivering the earth into an elevating-apron by which it is deposited in a dumping-wagon.

The invention further relates to the construction of frames for supporting the upper part of the elevator and the lower part of the elevator and the scoop and cylinder, to devices for adjusting the penetration of the scoop for throwing the excavating apparatus in and out of gear, and for sustaining the scoop while moving the apparatus from place to place.

In the accompanying drawing, Figure 1 is a side elevation of the apparatus. Fig. 2 is a plan of the same. Fig. 3 is a vertical transverse section on the line 3 3, Fig. 1. Fig. 4 is a vertical longitudinal section of the excavating devices or rear part of the apparatus on the line 4 4, Fig. 5. Fig. 5 is a horizontal section of the same on the line 5 5, Fig. 4.

The dumping-wagon which forms a part of this combined apparatus is made the subject of a separate application. The said dumping-wagon consists of axles A A′ and wheels W W′, supporting a bed or body, B, which latter is constructed and strengthened with side or sill beams C, formed with D-shaped bridge or bracing pieces C′ and with the customary bows *c*, to permit the passage of the front wheels W′ in turning. Hinged bottom boards D D, supported by chains E E, which are drawn up by a transverse crank, G, operated by a longitudinal winch-shaft, I, through the medium of bevel pinions H H′, a catch or stop, K, being provided to lock the winch-shaft I, and so sustain the bottom boards D D in their upper position, to close the bottom and sustain the load or contents of the wagon. The driver sits on a seat, L, within convenient reach of the handle *i* of the winch-shaft and of the levers employed to throw the excavating apparatus in and out of gear, and to raise the excavating-scoop or regulate its depth of penetration, as hereinafter described. J is a scoop pivoted at *j* to a frame, J^1, which latter rises and falls freely on a shaft, *m*, having its bearings in a rigid frame, N, which projects outward and backward from the rear of the wagon-body B. The scoop is constructed with a convex bottom, and is supported at back by wheels J^2, so that its point when depressed will penetrate the ground after the manner of a plow-share, but may be raised clear of the ground when desired. The point of the scoop is raised clear of the ground or its depth of penetration regulated by means of levers O O′ connected by a rod, *o*. O is a hand-lever fulcrumed at its lower end to the wagon-body B, and held in any position to which it may be set by means of a rack, P. O′ is a bell-crank lever, the horizontal shorter arm of which is pivoted to links or lugs Q, which latter are attached to the forward part of the scoop J.

Within the scoop J is a chambered cylinder, R, to which rotary motion is imparted by sprocket-wheels R′ on the shaft of the cylinder R, connected by chains *r* with sprocket-wheels M on the outer ends of the shaft *m*. M′ M′ are sprocket-wheels, located on the shaft *m*, between its bearings, and causing the said shaft to derive rotation by means of chains *s* running over sprocket-wheels T′ on a shaft, *t*, on the outer ends of which are sprocket-wheels T, connected by chains *u* with sprocket-pulleys U, fitted to turn freely on the axle-arms of the wheels W, and provided on their outer faces with clutch-lugs, by which they are made to engage with the said wheels at will when the excavating and elevating apparatus are to be driven. The clutch-pulleys U are slid on the axle-arms by means of levers V V^1, connected by rods *v v′* to a hand-lever, V^2, within reach of the driver.

The chains *s* carry buckets S, in which the earth is deposited from the chambers of the cylinder R as each bucket reaches its lowermost position. As each bucket reaches its highest position and turns from the upper

carrying-shaft *t*, it deposits its contents in the wagon. The mode of supporting the scoop J and its contained cylinder R on carrying-wheels J^2 at back, and connecting the shaft *j* by arms J^1 to the shaft *m*, leaves the scoop and its accessories free to fill undulations or inequalities in the surface of the ground, while, at the same time, the shafts *m* and *j* are maintained at an unvarying equidistance, so as to permit motion to be transmitted from one to the other without difficulty.

The operation is as follows:

The bottom D D of the wagon-bed being closed, as shown in Fig. 3, and the point of the scoop J lowered, as shown in Figs. 1 and 4, or set at any required depth so as to regulate the penetration, the progress of the machine will cause the earth to be scooped up and constantly supplied to the cylinder-chambers R, from which it is delivered to the elevator and deposited in the wagon, as before stated. When a load is obtained, the point of the scoop J is raised by drawing forward the lever O, and the clutch-pulleys U are thrown inward from the wheels W by means of the lever V^2 so as to throw the excavating apparatus out of gear. The loaded wagon is then drawn to any distance, and the load deposited at any point required by simply raising the stop K, which releases the crank-shaft G and permits the load of earth to fall by its own gravity, completely emptying the wagon. The bottom bars D are then restored to the position shown in Fig. 3, in readiness for the reception of another load.

The standards X X′, in the upper ends of which the shaft *t* has its bearings, are formed at bottom to receive the journals of the crank G, and the base of one of them, X′, also affords a bearing for the pinion-shaft I, thus constituting a jack, by which the geared wheels H H′ are kept constantly in gear.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent—

1. The combination of the scoop J and the recessed cylinder R, working within it, constructed and operating substantially as set forth.

2. The frame N, constructed as described, for carrying the scoop and cylinder and the lower end of the apron.

3. The cylinder R, scoop J, and frame J^1 carried on wheels, substantially as and for the purposes set forth.

4. The combination of the scoop J, cylinder R, and elevating-apron S *s*, substantially as and for the purposes set forth.

5. The convex-bottomed scoop J, hinged links J^1, carrying-wheels J^2, and elevating-levers O O′, constructed and combined to operate as described.

6. The combination of the driving-wheels W, clutch-pulleys U, chains *u u*, sprocket-wheels T T′ M M′ R′, shafts *t m*, bucket-apron S *s*, cylinder R, and scoop J, with clutch-operating mechanism to impart a simultaneous movement to the excavating and loading apparatus, or throw them out of gear, at the will of the operator.

7. The construction of the frame X′, constituting a standard for the support of the upper end of the elevating-apron and its operating mechanism, and a jack to connect the bearings of geared shafts G I, as explained.

JOHN G. STAFFORD.

Witnesses:
OCTAVIUS KNIGHT,
LE BLOND BURDETT.