(No Model.) 2 Sheets—Sheet 1.

C. HOWARD.

EXCAVATOR.

No. 306,755. Patented Oct. 21, 1884.

Fig. 1.

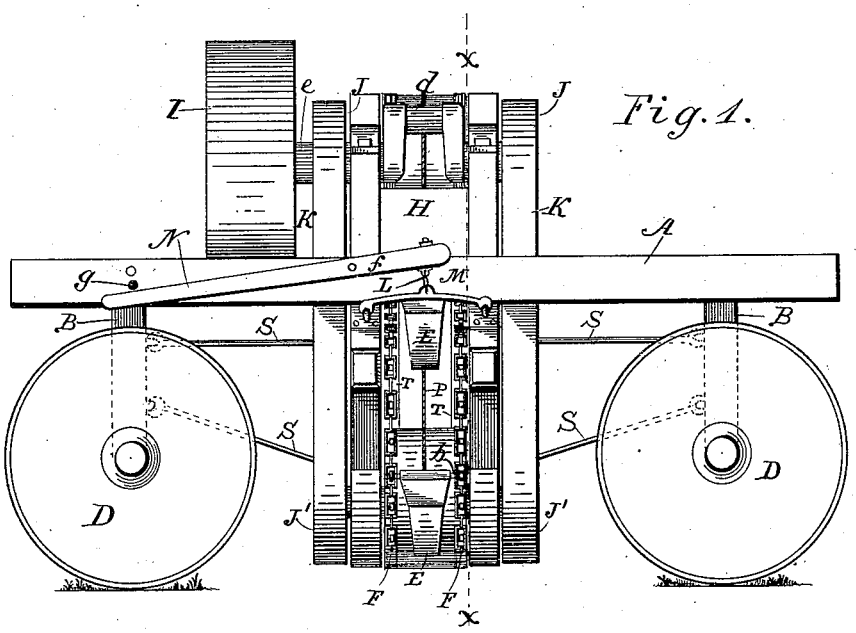
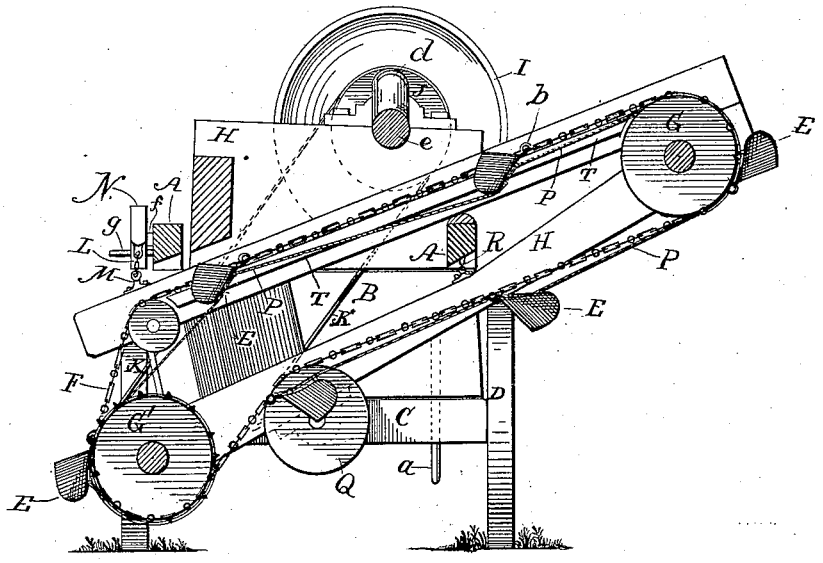


Fig. 3.



WITNESSES:

Thos. Houghton

W. K. Stevens.

INVENTOR:

Cyrus Howard

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

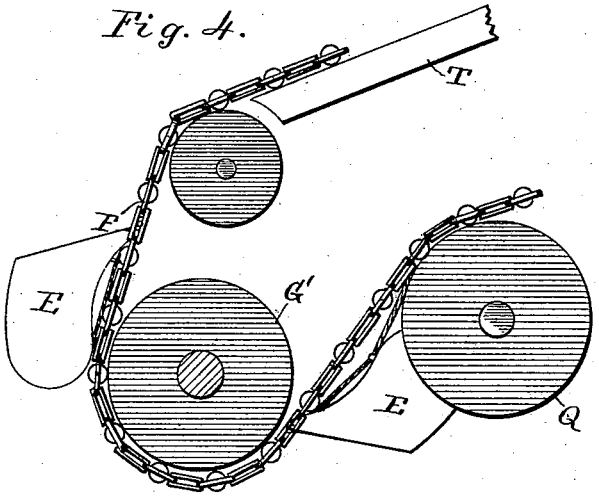


Fig. 5.

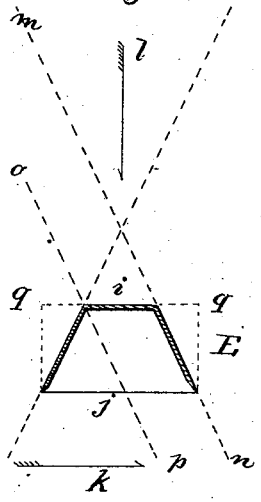
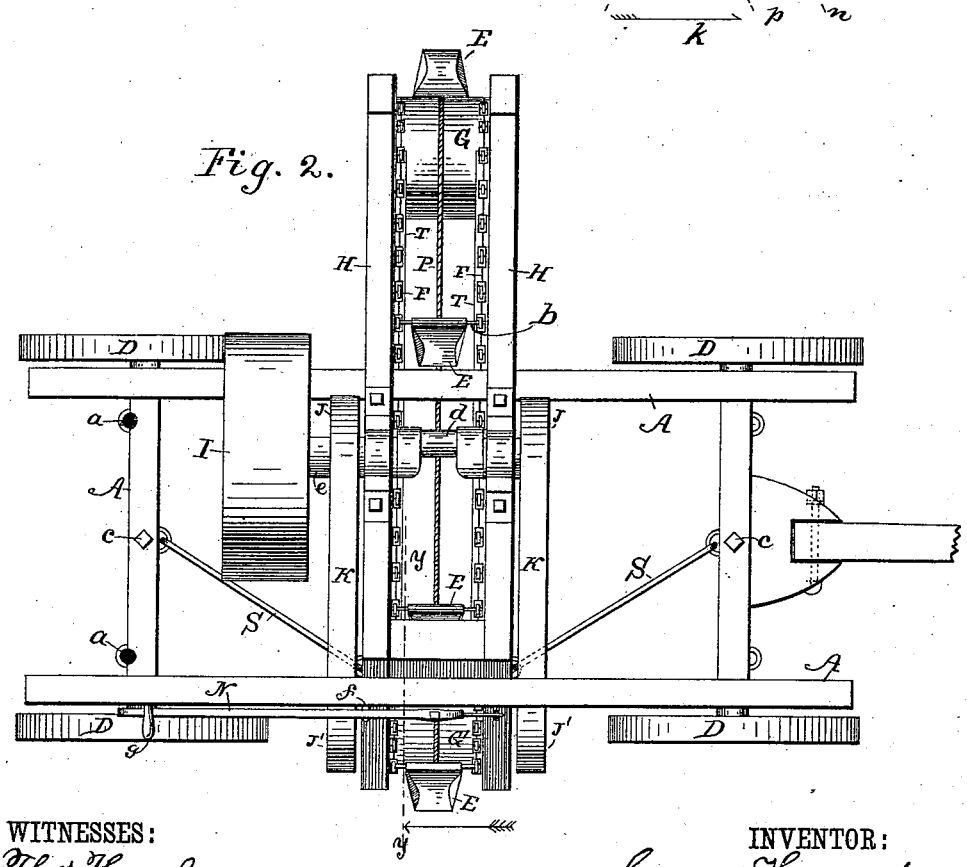


Fig. 2.



WITNESSES:
Thos Houghton.
W. X. Stevens

INVENTOR:
Cyrus Howard
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ATTORNEYS.

UNITED STATES PATENT OFFICE.

CYRUS HOWARD, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO WILLIAM WALLACE PATRICK, OF SAME PLACE.

EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 306,755, dated October 21, 1884.

Application filed February 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, CYRUS HOWARD, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Excavators, of which the following is a description.

This invention relates to that class of excavators which are mounted on trucks to be drawn over the line of excavation for the purpose of digging ditches, building roads, &c.; and its object is to dig out and take up earth from the line of excavation, and to carry and deposit it at any practicable distance to one side thereof, or to deposit the earth in a wagon alongside the excavator.

To this end my invention consists in the construction and combination of parts forming an excavator, hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my invention. Fig. 2 is a plan view of the same. Fig. 3 is a transverse vertical section at *x x*, Fig. 1. Fig. 4 is a transverse vertical section at *y y*, Fig. 2; and Fig. 5 is a sectional plan of one scoop, showing its conformation to the line of travel.

A represents the frame of the truck, consisting of two side timbers secured upon two bolsters, B, which are in all respects alike. Each bolster is mounted on an axle, C, by means of a king-bolt, *c*, permitting the usual swivel motion of the axle and wheels D common to wagons. *a a* represent bolts sliding vertically through staples in the bolsters B and in the axles C. These bolts are used in connection with whichever axle is the hind one, to keep it from turning from side to side, while the axle which is forward will be left free to swivel by removing these bolts. By this means the machine may be run either end first, the team-pole being changeable from end to end of the machine. E represents a series of excavating-scoops mounted on a pair of chain-belts, F, by means of cross-bars *b*. The belts F are revolved upon pulleys G G′, journaled in a frame, H, and driven by an engine. (Not shown.) The engine will be mounted on the frame H and connect directly with the crank *d* on the shaft *e*, which carries the fly-wheel I and two drive-wheels, J. The belts K connect the drive-wheels J with the wheels J′ on the shaft of the pulley G′, to run the excavator-scoops. These belts may be chains, if necessary. The excavator-frame H is hung at its lower end to the truck A by a bail, M, and a short chain, L, connecting with an adjusting-lever, N. This lever is pivoted at *f* to the truck A, and retained by a pin, *g*, stuck into the truck over it at any hole required to give the scoops of the excavator the right depth of cut in the ground. The upper portion of frame H is supported by a chain, R, connecting the lower pair of timbers thereof with the truck A. The scoops E are of peculiar form. The front edges of the sides and bottom are sharp, to act like a plowshare. The sides *h* converge to the rear, the back *i* being very much narrower than the mouth *j* of the scoop. Suppose the truck to be advancing at the rate of four feet per second in the direction *k*, and the excavator-scoops E to be moving at the rate of nine feet per second in the direction *l*, at right angles to the direction *k*; then the actual path on the ground of the scoop will be in the direction *o p*; therefore, in order that the scoop may cut its way clear, I slant its side to a line, *m n*, parallel to the said line of travel *o p*. By this means I prepare the scoop to clear its own track, its front side following the land like the land-side of a plow. If the scoop were as wide at its rear end as at its front or cutting edge, the corners *q* would find no path cut for them, and would quickly crowd the scoops out of the ground sidewise. Each succeeding scoop strikes into the ground a little in advance of the furrow made by its predecessor and cuts off a slice of earth, which it takes up and carries over the upper pulley, G, there dropping it either upon the ground or into a wagon.

P is a rope or chain connecting the under sides of the scoops together, being attached to each scoop near its front and rear end, to keep them right side up while being carried back, and to prevent their turning over and still holding their load, instead of dumping the load over pulley G.

Q represents a pair of guide-pulleys, over

which the scoop-supporting belts F run, to give the scoops a sudden pitch into the ground. At this point the rope P acts to keep the rear end of the scoop raised, so that its forward end pitches edge foremost into the ground. The excavator-frame H is steadied from too much longitudinal motion in the machine by means of braces S, which allow it some freedom of motion, so that it might give back or rise up if a scoop were to strike an immovable stone or root. The relative speed of the engine and team will be regulated by the ease or difficulty with which the ground may be excavated, and the sides of the scoops will represent the angle due to the maximum advance of the machine, so that the scoops will clear paths for themselves at all speeds. The motion of the excavator is lateral to the line of travel of the truck; but it is not necessarily exactly at right angles thereto. The back of each scoop is concave, to fit the curve of the pulleys G G'. The chain-belts F are provided with rollers to run upon side rails, T, while the scoops are loaded; or the chain may be a series of planes, and the rails T be a series of rollers.

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

1. The combination, with an excavator-truck body, of two sets of wheels and an axle for each set, a king-bolt connecting each axle with the truck, and means, substantially as described, for rigidly fixing either axle from turning under the truck, as and for the purpose specified.

2. The combination, with a truck mounted on wheels, of a frame hung transversely thereto by means of bails and chains attached to said frame and to the side beams of the truck, pulleys or drums journaled in said frame at each side of the truck, chains or belts on the said drums, and scoops hung to the chains, as shown and described.

3. The combination, with two chains, pulleys, a frame, and a truck for carrying the chains in two directions at once, of scoops sharp at their front edges and slanted back therefrom at their sides, substantially as described, whereby their sides are adapted to fit the land side of their furrows in a direction resulting from the aforesaid two motions.

4. The combination, with the chains F, the pulleys G and G', the scoops E, and the cross-bars *b*, pivoting the forward ends of the scoops to the chains, of the rope P, attached to the back of each scoop near the front and rear ends thereof, substantially as shown and described.

CYRUS HOWARD.

Witnesses:
W. X. STEVENS,
SOLON C. KEMON.