(No Model.) 3 Sheets—Sheet 1.

# O. BOOTH.

## TILE DITCHER.

No. 308,741. Patented Dec. 2, 1884.

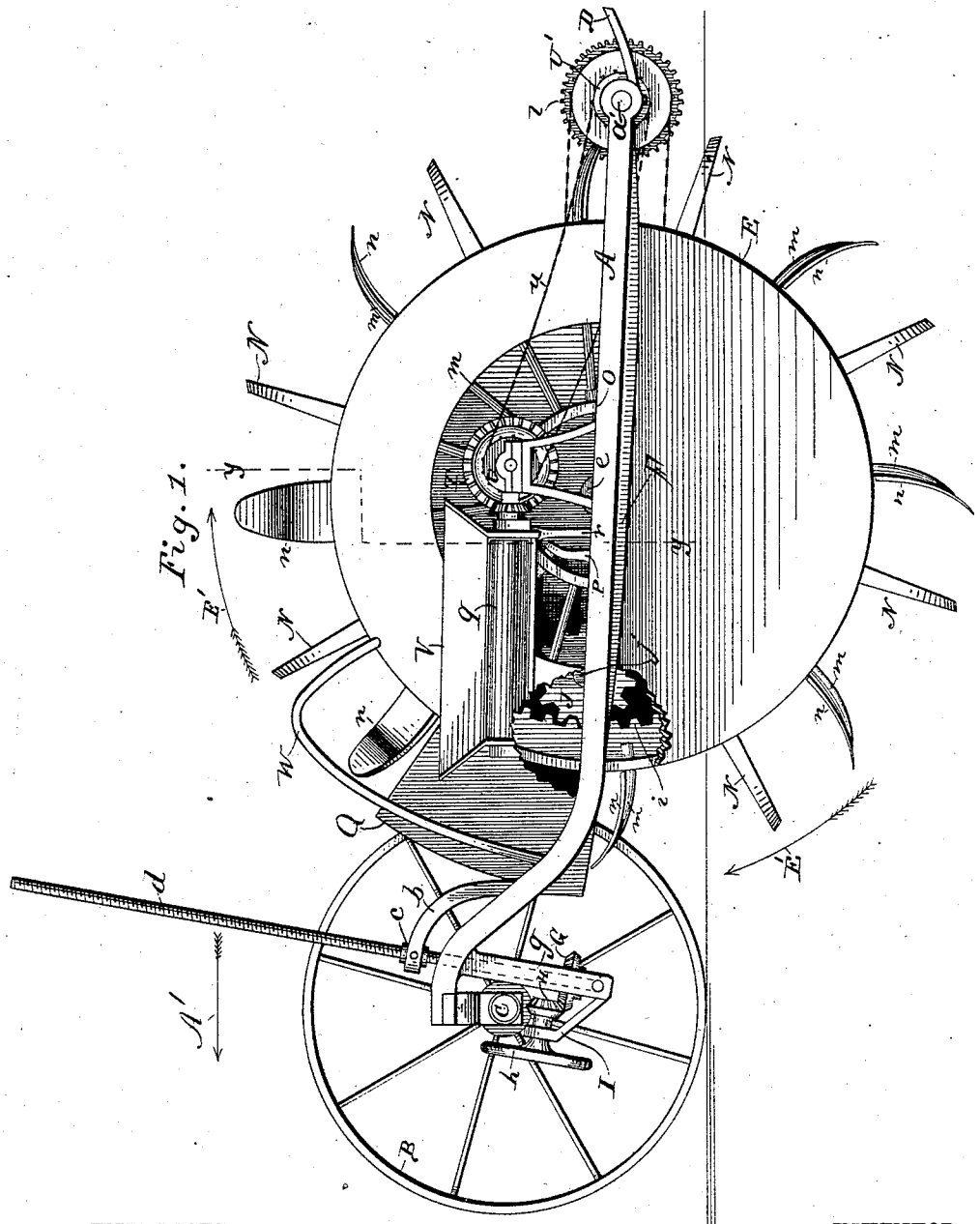


Fig. 1.

WITNESSES:

Thos. Houghton.

W. X. Stevens.

INVENTOR:

Oscar Booth

BY Munn & Co

ATTORNEYS.

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.)

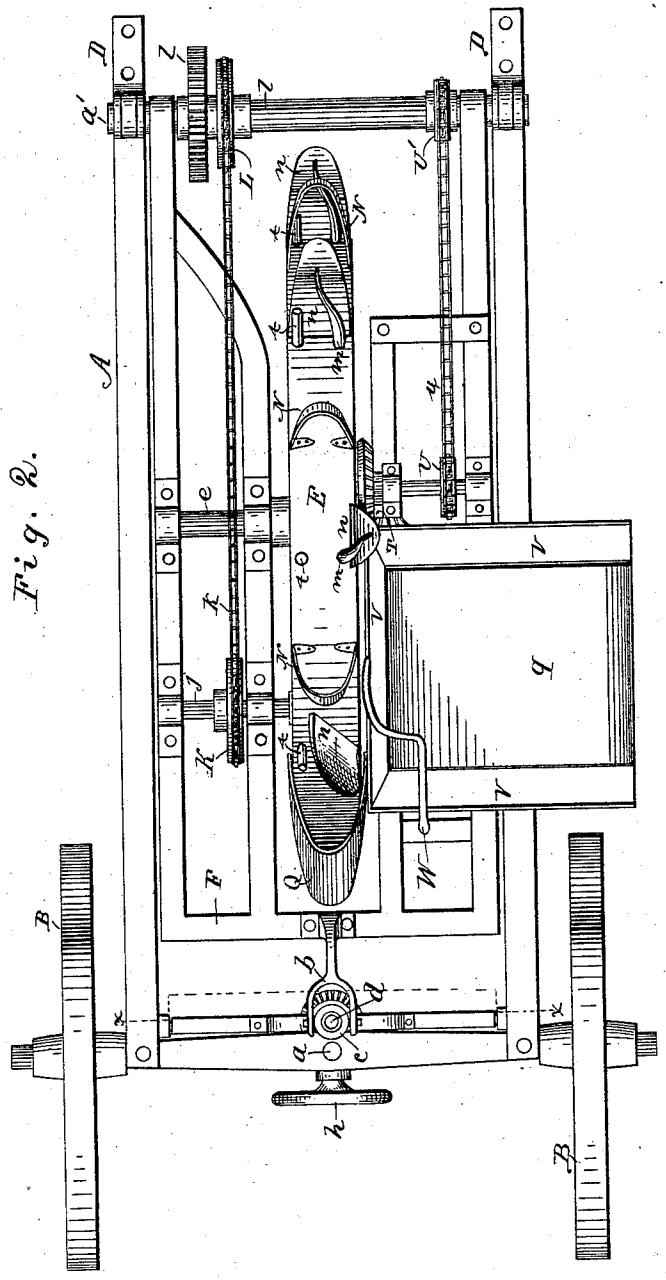
3 Sheets—Sheet 2.

# O. BOOTH.

## TILE DITCHER.

No. 308,741. Patented Dec. 2, 1884.

Fig. 2.



WITNESSES:

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3 Sheets—Sheet 3.

# O. BOOTH.

## TILE DITCHER.

No. 308,741. Patented Dec. 2, 1884.

*Fig. 3.*

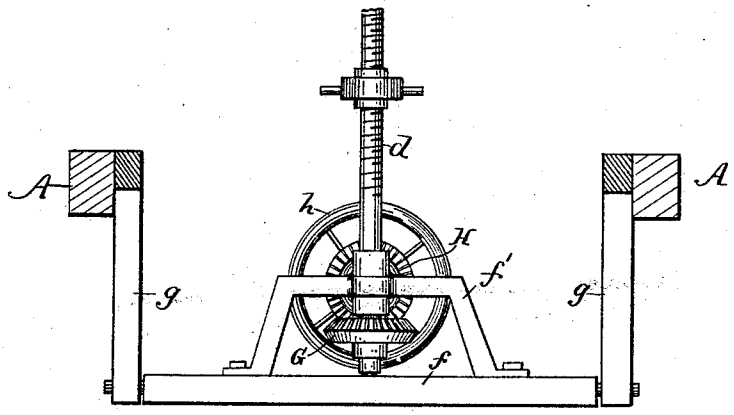



*Fig. 4.*

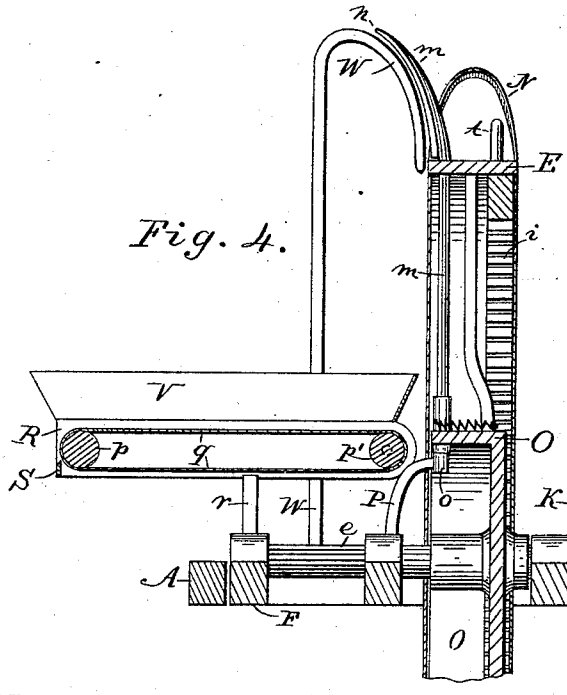
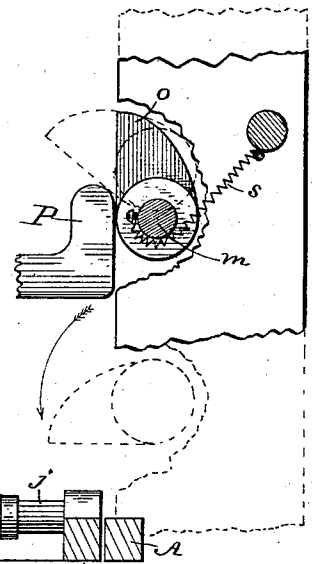



*Fig. 5.*




WITNESSES:

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INVENTOR:

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# UNITED STATES PATENT OFFICE.

OSCAR BOOTH, OF CRESTON, IOWA.

## TILE-DITCHER.

SPECIFICATION forming part of Letters Patent No. 308,741, dated December 2, 1884.

Application filed May 15, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, OSCAR BOOTH, a citizen of the United States, residing at Creston, in the county of Union and State of Iowa, have invented certain new and useful Improvements in Tile-Ditchers, of which the following is a description.

This invention relates to that class of machines which are mounted on wheels to move over the ground to dig trenches for laying tiles or drain-pipes; and its object is to cut a trench to any required depth at one operation, to raise the earth therefrom, and to carry it some distance to one side of the trench.

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

Figure 1 is a side elevation of my ditcher. Fig. 2 is a plan view of the same. Fig. 3 is a section on line *x x* of Fig. 2. Fig. 4 is a section on the line *y y*, and Fig. 5 is a detail view.

A represents the frame of the machine, mounted at its forward end on a pair of wheels, B, and an axle, C, by means of a king-bolt, *a*, which permits the axle to be turned from side to side in steering.

D D are hinges by which the rear end of the machine may be attached to any suitable motor—such as a traction-engine or a pair of wheels, like caster-wheels.

E is the ditching-wheel, mounted on a shaft, *e*, journaled in a frame, F, which is pivoted on a shaft, *a'*, which is fixed rigidly in the side bars of the frame A, as a cross-bar thereof. The forward end of the frame F is provided with a bifurcated arm, *b*, carrying a swivel-hung nut, *c*, to engage the screw *d*, whereby the front end of frame F is lowered or raised to carry the wheel E more or less into the ground. The screw *d* is journaled in a pair of cross-bars, *f f'*, which are joined together and pivoted to rock in vertical arms *g* of the main frame A. This rocking is to permit the screw to assume a tangent position at all times to the arc of motion of the frame F as the latter swings on its pivot *a*.

G is a beveled gear-wheel, fixed on the screw *d* to revolve it, and the wheel G is revolved by means of a beveled pinion, H, and hand-wheel, *h*, journaled in a bracket, I, of the cross-bar *f*. Thus the ditching-wheel E may be raised or lowered at any time by the attendant. The wheel E is provided with internal gear-teeth, *i*, engaged by a pinion, J, which is mounted on a shaft, *j*, journaled in the frame F.

K is a rag-wheel secured on the shaft *j*, and run by a chain, *k*, connecting with another rag-wheel, L, which is secured to a hollow shaft, *l*, journaled on the shaft *a*.

M is a toothed wheel, mounted on shaft *l* to receive power from the engine used to propel the ditcher. Through this wheel power is received to propel and work all parts of the ditcher. The wheel E is armed with a series of cutting-blades, N, curved to the contour of the spades *n*, to loosen the earth to be lifted by the spades. The blades N are rigidly fixed to the wheel. The spades *n* are each mounted on a separate radial spindle, *m*. Each spindle *m* is journaled in the rim of the wheel E, and in a flange, O, thereof at some distance from the hub, and is provided with an arm, *o*, which in the revolution of the wheel is intercepted by a stationary stud, P, (see Fig. 5,) causing each spade to turn toward one side of the wheel to throw off the dirt which it has raised. The stud P is so located as to discharge the dirt above the hood Q onto an endless belt or apron, *q*. This belt is mounted to revolve on two cylinders, *p p'*, which are journaled in a frame, R, whose outer end is supported on brackets *r*, and whose inner end is pivoted concentric with the cylinder *p'*, so that the frame may be raised for convenience in examining the machinery.

W is a scraper fixed beside the path of the spades, and so curved as to clean the inner faces of the spades from any sticky earth while the spades, turned sidewise, pass it, and to drop the earth so scraped off onto the belt *q*. When each spade-spindle *m* passes the stud P, a spring, *s*, returns the spade to its normal position across the path of the wheel, where it rests against a stud, *t*, fixed to wheel E. The belt *q* is revolved by a pair of beveled gears, T, driven by rag-wheels U U' and a chain, *u*. The rag-wheel U' is fixed on the hollow shaft *l*, to be revolved therewith. The machine advances over the ground in the direction of the arrow A', while the ditcher-wheel revolves in the direction of the arrows E', thus raising the

dirt on the front of the wheel through the hood and throwing it onto the belt. Around three sides of the belt I place a hopper, V, and below the fourth or delivery side I place a scraper, S, to clean the belt of sticky earth. This belt will be as long as may be required to deliver the earth to as great a distance to one side of the trench as may be required. Different cutters and different spades may be used correspondingly to the size of different tiles to be laid. Each spade is attached near one edge to its spindle *n*, so that when swung to one side the face of the spade is flush with the side of the wheel, and the studs *t* support the other edges of the spades when in use.

I am aware that wheels having curved spades attached radially to their circumference, said wheels being journaled in vertically-adjustable frames, are not new, and I do not claim the same, broadly, as my invention.

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

1. The combination, with the frame A, having the fixed shaft *a'*, of the ditcher-wheel carrying-frame F, pivoted on the shaft *a'*, and provided with the bifurcated arm *b*, the screw-nut *c*, swiveling in said arm *b*, the screw *d*, provided with the gear-wheel G, the cross-bars *f f'*, serving as journals to the screw, and joined together and pivoted in the arms *g*, and the hand-wheel *h* and gear-wheel H, engaging the wheel G, as shown and described.

2. The combination, with the pivot-hung vertically-adjustable frame F, of the wheel E, journaled therein, the curved blades N, secured rigidly to the wheel, the spades *n*, having edges curved, as described, and the hood Q, substantially as shown and described.

3. The combination, with the wheel E, mounted to rotate in a frame F, the spades *n*, journaled radially in the said wheel, the arms *o*, and the stud P, of the scraper W, fixed beside the path of the side-turned spades, substantially as shown and described.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

OSCAR BOOTH.

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