(No Model.)

2 Sheets—Sheet 1.

H. B. HALL.

EXCAVATOR.

No. 260,865. Patented July 11, 1882.

Fig. 1.

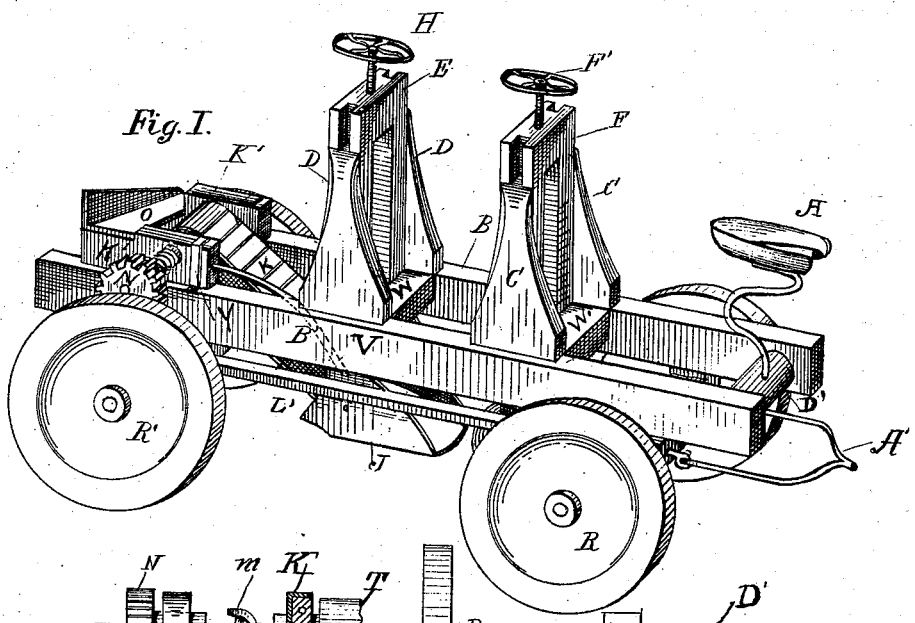


Fig. 3.

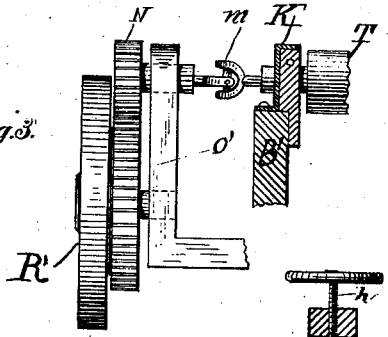


Fig. 4.

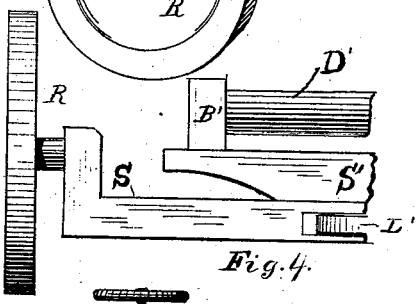
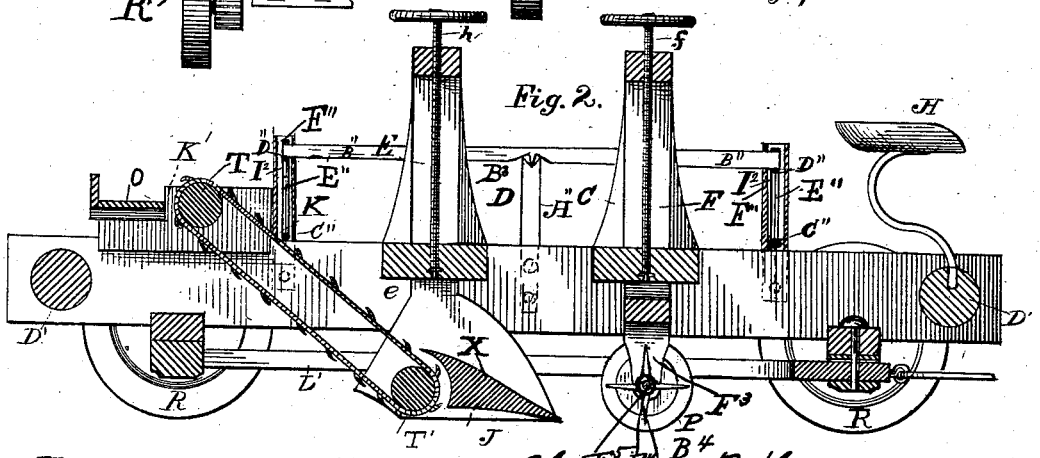


Fig. 2.



Attest:
Keugh O'Neil
Abigail Hall

Harvey B. Hall Inventor:

By Frank A. Fouts Atty

(No Model.) 2 Sheets—Sheet 2.

H. B. HALL.

EXCAVATOR.

No. 260,865. Patented July 11, 1882.

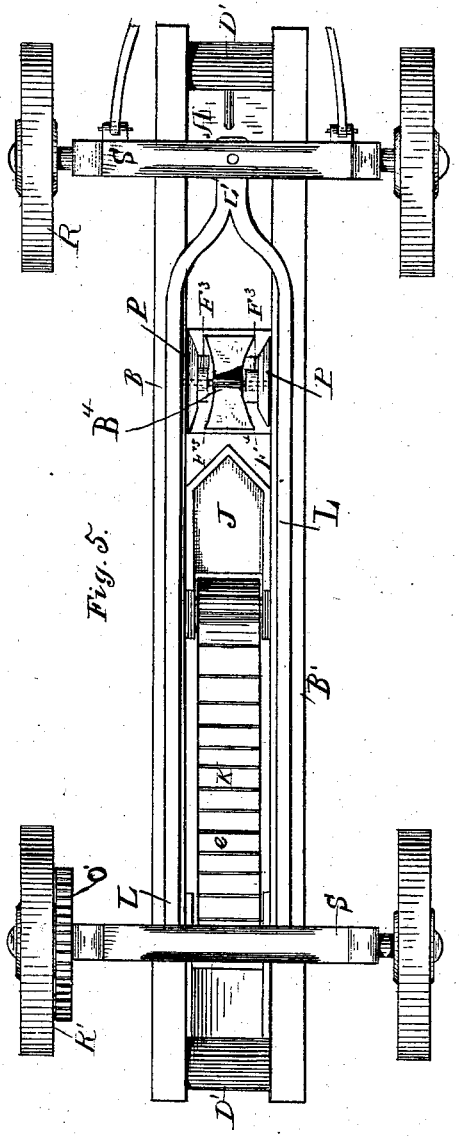


Fig. 5.

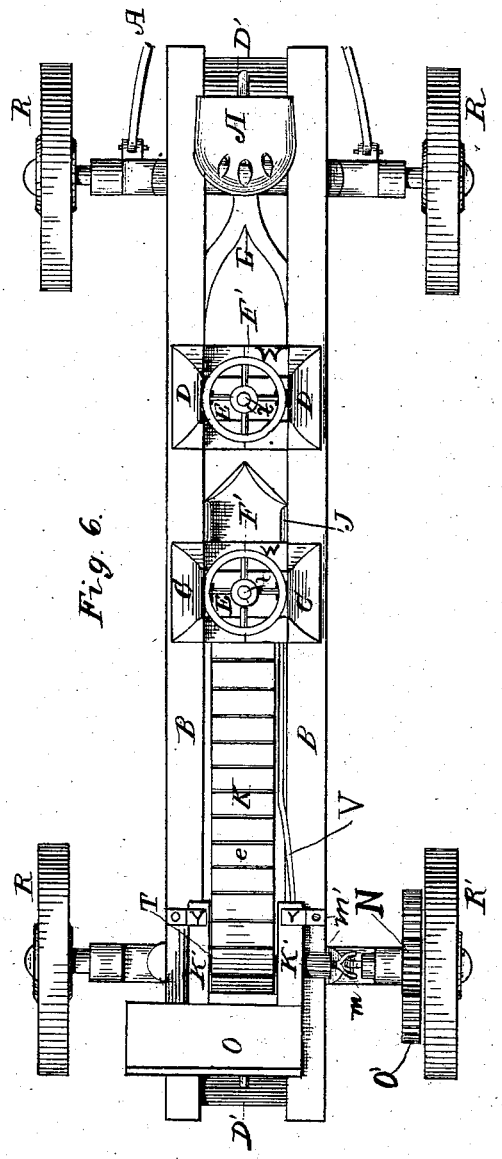


Fig. 6.

Attest:
Hugh O'Neil.
Abigail Hall

Harry B. Hall Inventor.

By Frank A. Fouts Atty

UNITED STATES PATENT OFFICE.

HARVEY B. HALL, OF HOMER, ILLINOIS.

EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 260,865, dated July 11, 1882.

Application filed March 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, HARVEY B. HALL, a citizen of the United States, residing at Homer, in the county of Champaign and State of Illinois, have invented certain new and useful Improvements in Excavators, (Tile-Ditchers,) of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to excavators; and it consists in a machine so arranged in its several parts that a ditch is formed in the ground of any desired depth for the purpose of laying tile therein. I attain these results by means of a four-wheeled vehicle carrying a longitudinal frame, to which is attached two vertical standards provided with adjustable slides, by means of which two earth-cutting wheels and a following share with standing cutters are raised or lowered to suit the convenience of the operator. The dirt thus removed is raised by an elevator having cleats or cups thereon, and discharged to one side from a receiving-chute at the rear of said elevator, all of which will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of my invention. Fig. 2 is a central longitudinal section, showing the weight-boxes, also in section. Fig. 3 is a front elevation of the rear right-hand wheel with a cog secured thereto that meshes into a pinion above, also disclosing a universal joint and fragments of connecting parts. Fig. 4 is a front elevation of one of the forward wheels and fragments of right-angled axle, bolster-frame, and cross-piece. Fig. 5 is a bottom view of my invention. Fig. 6 represents a plan view of the same.

The letter A is a seat mounted on a cross-piece connecting the forward end of the frame.

A′ is the tongue or clevis.

B is the left side bar of the frame; B′, the right side bar.

C C and D D are vertical frames mounted on the bars B B′.

D′ D′ are two end cross-pieces connecting the frame B B′.

E and F are adjustable vertical slides in the frames C D.

F′ and H are wheels attached to the threaded rods *f* and *h*, respectively.

J is the plowshare, having vertical beveled cutters. It is fixed to the lower end of the adjustable frame E.

K is the elevator-cloth, having cleats or cups *e*.

L L are rods connected to the rear axle, extending forward and converging at L′, where they are connected to the front axle, at which point it is secured by a king-bolt.

m is a universal joint connecting the pinion N with the movable frame K′.

O is a chute forming a part of frame K′.

O′ is a large cog-wheel fixed to the axle of the rear wheel, R′.

P P are the rolling cutter-wheels attached to the bottom of the vertical adjustable frame F.

R R R are the two front and rear left-hand wheels.

R′ is the rear right-hand wheel to which is attached the cog O, that meshes with the pinion N.

S is the forward axle, and S′ the bolster.

T is the upper roller in the frame K′, around which passes the elevator-cloth K.

T′ is the lower roller, secured to the plow-standards, and around which the cloth passes.

V is a rod connecting the plow and the movable frame K′.

W′ W are cross pieces connecting the bars B B′, and through which the vertical adjustable slides E and F respectively pass.

X is an incline up which the dirt is forced onto the elevator-cloth K. Y Y are guide-straps for the adjustable frame K K. They are bolted to the frame B B′.

I desire to use what I term a "leveler" in connection with my excavator, (shown in Fig. 2,) and of which the following is a description: A″ is an upright screwed or bolted to the frame B. B″ is a cross-piece provided with a pivot, B^3, that works in a recess in the top of the standard or upright A″. C″ C″ are two balls attached to cords E″ E″, said cords being attached to cross-piece B″ at D″. F″ F″ are slotted vertical boxes, in which the ends of cross-piece B," the cords E," and balls C″ work. By this arrangement an up-and-down motion is given to the cross-piece, and consequently to the balls and cord attached thereto. The operator is enabled thereby to determine just how much the ground over which the machine may pass varies from a level, the rela-

tive position of the balls being apparent through a vertical slot, I^2, in the upright boxes, a scale on the side indicating the exact variation.

B^4 represents knives or choppers rigidly united to hub F^5.

F^3 F^3 are two downwardly-projecting arms on the bottom of the vertical sliding frame F. These arms are each provided with a bearing for the reception of a transverse shaft, the ends of the shaft extending out on either side of the arms and being provided with longitudinal cutting-wheels P, the shaft between the arms having the hub F^5 keyed thereto. By means of the longitudinal cutting-wheels and transverse knives the sod is reduced sufficiently fine to be taken up and easily conveyed by the elevator to the chute, where it is discharged sidewise.

My invention can be drawn by any one of the motive powers resorted to for that purpose. It is operated by lowering the cutting-wheels P P and the plow J to the depth of the ditch desired to be made. This is done by means of the wheels H and F′, connected with the threaded rods *f* and *h*, which are secured to the cross-pieces W W′, the threads working in the top cross-piece of the vertical frames E and F. Said frames are provided with side grooves, that move on the vertical tongue of the frames C D. I maintain an equal relative distance between the rollers T T′ notwithstanding the rising and lowering of the plow J. This is accomplished by means of the rod V, which connects the sliding frame K′ and plow J. I thus secure an equal tension on the elevator-cloth K. To illustrate: When the plow J, to which is attached the roller T′, is lowered, the rod V being connected therewith and also with the frame K′, carrying the roller T, said rollers are necessarily kept the same distance apart, the rod V carrying the frame K′ and roller T forward when the plow is lowered, and by raising the plow the frame and roller are pushed back. I use the universal joint between the frame K′ and pinion N, so as to admit of the movability of said frame without wrenching the pinion. The elevator is operated by means of the cog O, which engages the pinion N, said pinion in turn communicating motion through the universal joint to the roller T, which moves the cloth K.

The cutter-wheels P P, when the machine is drawn forward, cut the earth vertically, and the following plow-standards, of equal width, are also thin upright cutters and move in the same track. Said plow has a flat bottom, upon which is mounted an incline, X. The dirt thus squarely cut is forced upon the incline and onto the moving elevator-cloth K, having the cleats or cups, by means of which said dirt is carried up to the chute O, from which it is discharged to one side.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the wheel R′, cog O′, pinion N, joint *m*, frame K′, roller T, rod V, plow J, and roller T′, the rollers T T′, carrying cloth K, provided with cleats *e*, all arranged in the manner and for the purposes specified.

2. Wheel R′, cog O′, pinion N, universal joint *m*, sliding frame K′, frame-bars B B′, straps Y Y, roller T, and chute O, in combination with cloth K, cleats *e*, roller T′, rod V, plow J, vertical frames E D, threaded rod, *h*, and wheel H, substantially as described, and for the purposes set forth.

3. In a tile-ditcher, the frame-bars B B′, having the cross-piece W′, and vertical tongued frames C C, in combination with the grooved frame F, rod *f*, and wheel F′, the bottom of the frame F being provided with two downwardly-projecting slotted arms, F^3, through which is inserted a horizontal transverse shaft, F^4, that moves freely therein, the ends of said shaft extending out on either side of the frame-arms, and each extension having a longitudinal cutting-wheel, P, secured thereto, and the transverse knives B^4, rigidly united to a hub, F^5, which is keyed to the shaft between the arms, substantially as described and set forth.

4. The wheel R′, having cog O′, that engages pinion N, in combination with the universal joint *m*, adjustable frame K′, carrying-roller T, and chute O, in the manner and for the purpose set forth.

5. In a tile-ditching machine, the combination of the standard A″, bolted to frame B, the cross-piece B″, pivoted at B^3, the cords E″, united to cross-piece at D″, and carrying balls C″ C″, the balls, cords, and end of cross-piece working in the slotted boxes F″ F″, in the manner and for the purposes set forth and described.

In testimony whereof I affix my signature in presence of two witnesses.

HARVEY B. HALL.

Witnesses:
EDWARD HALL,
MARTIN V. MOORE.