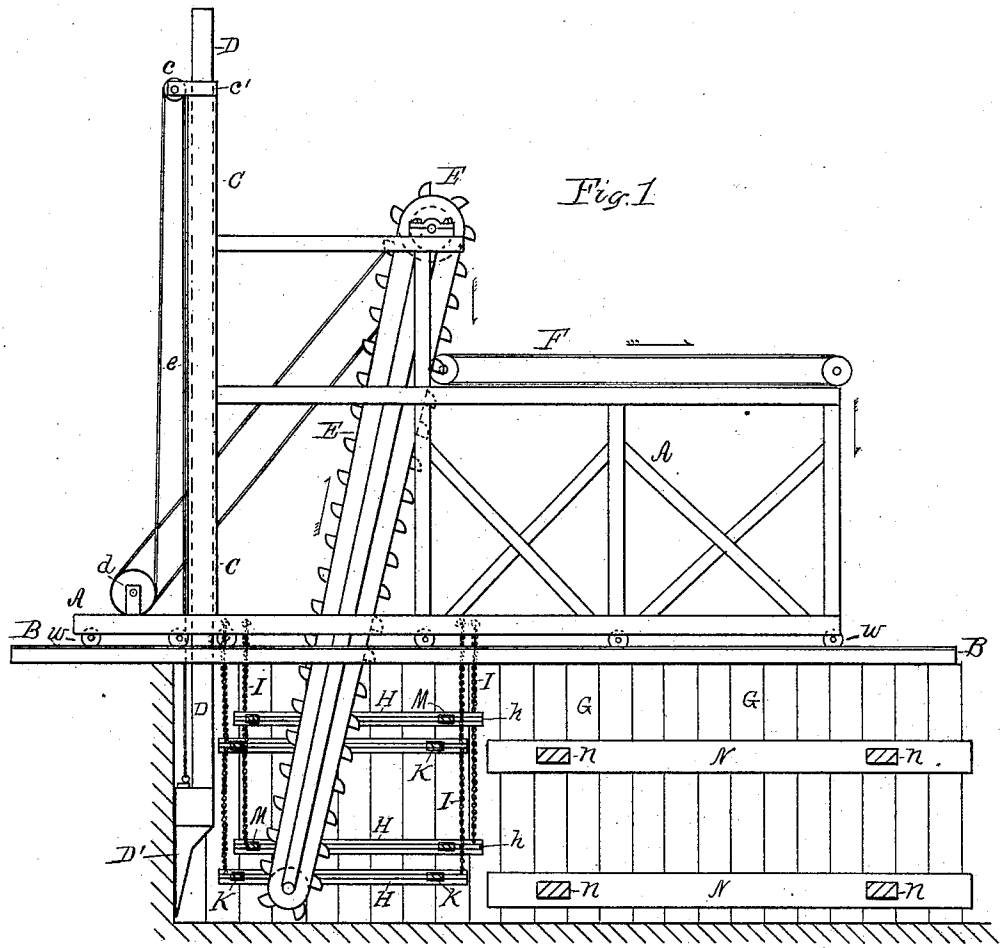
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J. S. WHITCOMB.

EXCAVATING APPARATUS.

No. 387,476. Patented Aug. 7, 1888.

Fig. 1



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Fig. 2

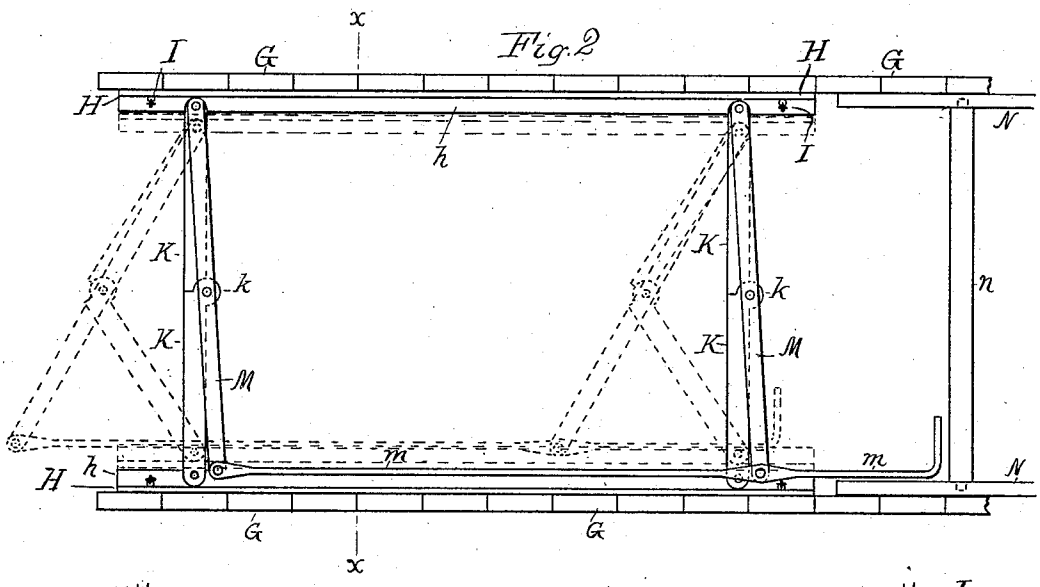
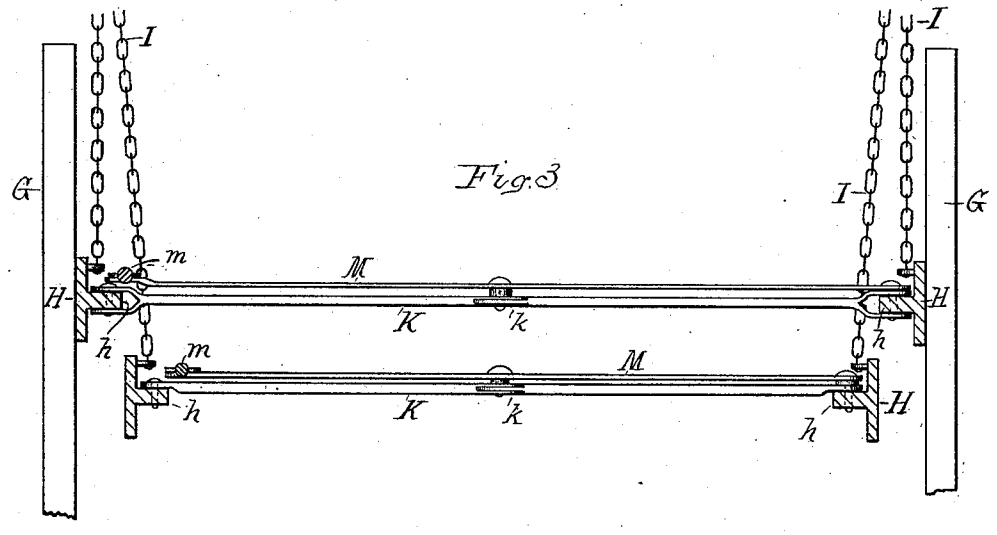


Fig. 3



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UNITED STATES PATENT OFFICE.

JOSEPH S. WHITCOMB, OF MINNEAPOLIS, MINNESOTA.

EXCAVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 387,476, dated August 7, 1888.

Application filed December 27, 1887. Serial No. 258,981. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. WHITCOMB, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Excavating Apparatus, of which the following is a specification.

My invention relates to apparatus for digging deep trenches for sewer-pipes, water-mains, &c., by means of a cutter and elevating devices for removing the earth, and the principal object of the present improvements is the providing of convenient devices for temporarily bracing and sustaining the sheathing-planks; and these features, generally stated, consist of sets of flexibly-suspended bars extending parallel with the sides of the trench and toggle-joint and lever devices for pressing them against the sheathing and freeing and advancing them in alternation when desired.

The improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the excavator, and shows a longitudinal section of a trench. Fig. 2 is a top view of the sheathing and sheathing-supporting devices; and Fig. 3 is a transverse section of Fig. 2 on the line X X, showing pairs of the supporting devices in their expanded and contracted positions.

In said drawings, A designates a suitable frame on wheels *w*, that run on tracks on stringers B. On the forward end of the frame are upright posts C, forming ways for the shaft D of the cutter D'. The cutter is lifted by a rope, *e*, running over a pulley, *c*, mounted on a bracket, *c'*, at the top of the posts C, and wound on a drum, *d*, operated by the ordinary hoisting-engine.

The usual devices are provided for causing the cutter to descend by gravity at desired intervals to its work. The form of cutter described and claimed in my application for patent, filed May 3, 1887, Serial No. 236,921, is preferable for the purpose. An elevator-leg, E, made adjustable in any usual way, is used to elevate the loosened earth from the trench and discharge it onto a horizontal endless apron, F, by which it is carried to the rear of the machine and deposited in the trench or at either side, as desired. By using the form of cutter referred to the slices of earth will be thrown almost entirely into the ascending buckets of the elevator, and but little loose earth will remain in the trench by the time the cutter has completed its descent.

G G are the usual sheathing-planks for holding up the sides of the trench. These it is desirable to place in position as soon as practicable after the cutter has done its work, and as they require bracing to hold them in upright position there are provided the T-shaped adjustable bars H, suspended by chains I or other flexible supports from the machine-frame. The bars H are hung in horizontal position with their web or flat sides parallel to the sheathing.

To the flanges or treads *h* of the T-irons are pivoted the ends of toggle-bars K, which are connected at the middle by knuckles *k*. For each pair of the T-irons two sets of the toggles are used and are located so as to operate both ends of the T-irons.

M M are levers fulcrumed on the pivots of the toggle-bars K at one side, with their middle portions connected to the pintles of the toggle-joints *k* and their free ends connected to a rod, *m*, extending beyond the rear of the devices. Several sets of these devices may be used to advantage in deep trenches by arranging two sets in the upper portion and two near the bottom and connecting each of the upper pairs with one of the lower by the chains I, as shown. When the toggle-bars are straightened out, the bars H press against the sheathing to hold it in place, and as the machine is advanced after each descent of the cutter D' and a sheathing-plank is set in the newly-cut portion of the trench one of the rods *m* is operated to bend the toggle and free a pair of the bars H, as shown by dotted lines in Fig. 2 and in the lower portion of Fig. 3, so that they can be advanced to engage the newly-placed sheathing-planks, while the other bars H remain in position to hold the sheathing from which the advanced bars were freed. As the machine is advanced and additional sheathing-planks are placed, the bars H are moved forward step by step in alternation, as described.

In the rear of the adjustable sheathing-supports are placed planks N, held in place by braces *n*, to sustain the sheathing until the work of pipe-laying has been completed.

Having described my invention, what I

claim, and desire to secure by Letters Patent, is—

1. In excavating apparatus, the combination, with sheathing for supporting the sides of a trench, of horizontal supports for the sheathing and toggle devices for pressing the same to engagement, substantially as set forth.

2. The combination, with the frame of an excavating apparatus and sheathing for the sides of a trench, of supporting-bars for the sheathing suspended from said frame, toggles connected to the bars, and levers for operating the toggles, substantially as set forth.

3. The combination, with the sheathing-supports, of the toggle-bars pivoted thereto, the levers pivoted at one side and connected to the joints, and the operating-rods connected to said levers, substantially as set forth.

JOSEPH S. WHITCOMB.

Witnesses:
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