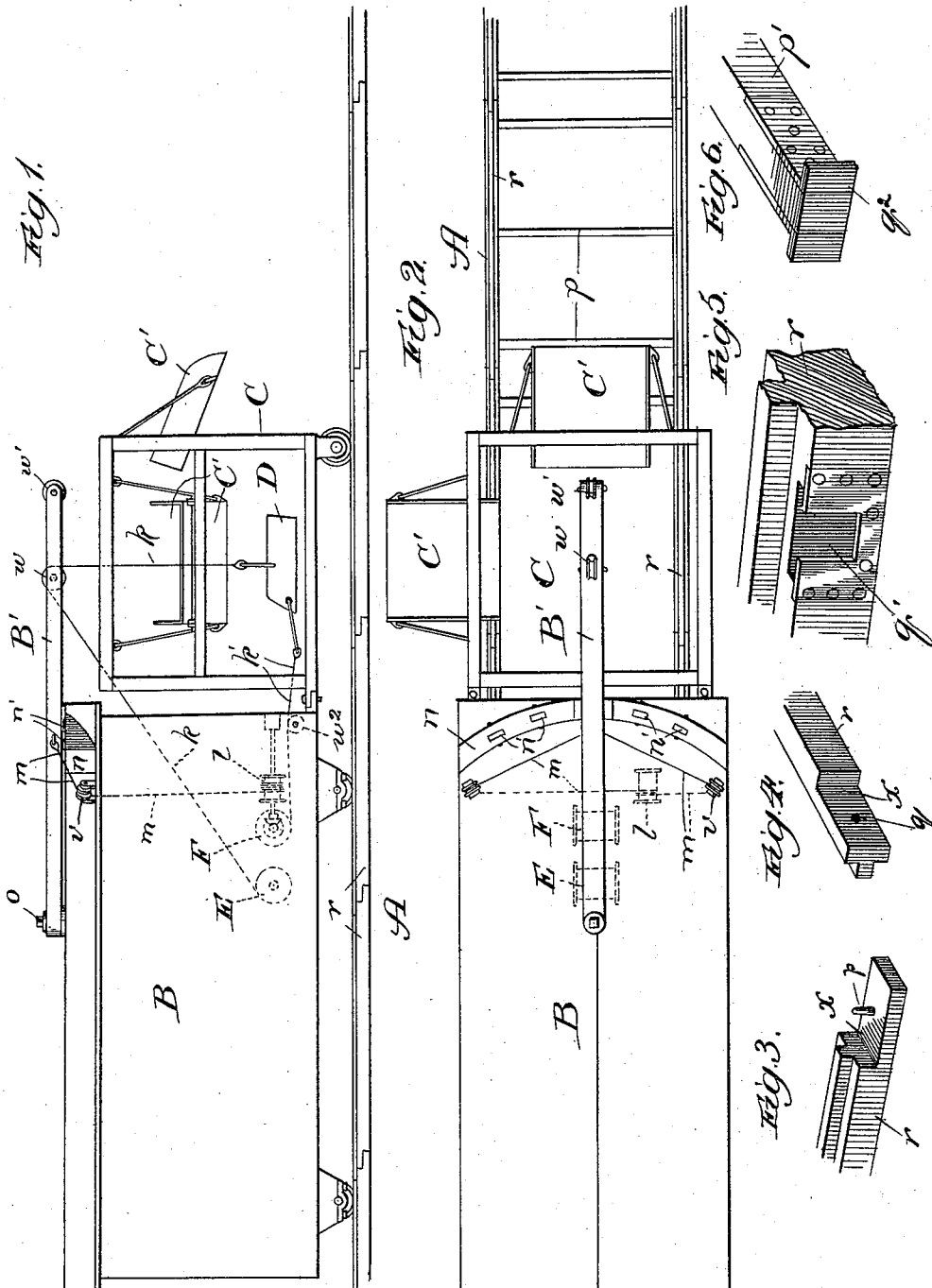


(No Model.)

W. DAVY.  
SEWER EXCAVATING APPARATUS.

No. 478,254.

Patented July 5, 1892.



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# UNITED STATES PATENT OFFICE.

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## SEWER-EXCAVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 478,254, dated July 5, 1892.

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*To all whom it may concern:*

Be it known that I, WILLIAM DAVY, a citizen of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented a new and useful Improvement in Sewer-Excavating Apparatus, of which the following is a specification.

The object of my invention is to provide for excavating the ground to build sewers by machinery to supplant the hand-labor hitherto commonly employed for the purpose, and thereby greatly expedite and cheapen sewer-building. My plan is to lay a removable car-track in the line on which the excavating is to be done for a car containing machinery for operating and controlling an excavating shovel device worked behind the car and between the rails of the track to dig the soil and elevate and then dump its load, ordinarily first at one side of the excavation and track, and subsequently back into the previously-excavated portion with which the sewer-pipe or structure will meantime have been laid. Thus after the excavation has been started and got sufficiently under way the laying of the pipe or conduit may be begun and carried on and the filling in and cleaning up be done as the laying proceeds by transferring the soil as it is excavated ahead to and filling with it the rear portion of the excavation after the conduit is laid therein.

My improved apparatus is illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of my improved apparatus. Fig. 2 is a plan view of the same. Figs. 3 to 6, inclusive, are broken perspective views of details of construction enlarged over the scale of their representation in the preceding views.

A is a car-track formed in sections  $r$  of such length (say about twelve feet) as will render them convenient for handling. The track is intended, as hereinafter described, to be extended from time to time in the direction of progress of the excavation by taking up sections from the rear and adjusting them at the front end of the course. Hence the junction of the sections may not with proper consideration for convenience and expedition be of a permanent nature, though they should be smooth or even. For my purpose adequate stability may be afforded in

the track by providing rabbet-joints  $x$  at the ends of the rails, with a pin  $p$  on the end of one to enter a socket  $q$  in the end of the adjacent rail, thereby to hold them in alignment, but readily separable.

As the nature of my improved apparatus renders necessary that the excavating operation be performed between the rails of the track and the bracing of the rails needs to be at closer intervals than will afford sufficient space between them for the shovel or scoop to be operated in, one or more of the braces at the point of excavation must be removed to afford adequate space for the operation of the shovel. I therefore provide braces or "tie-bars"  $p'$ , which may be readily applied in place and as readily removed, and the form thereof preferred for the purpose is that represented in Fig. 6 of a T-head  $q^2$  at each end of the brace adapted to enter a T-slot  $q'$  in the adjacent inner side of a rail  $r$ .

The excavating apparatus, for the locomotion of which the track is provided, essentially involves a car B, carrying the machinery for operating the scoop or shovel D, and a supplemental car C or frame in the nature of a separable "trailer," supporting the chute or chutes  $C'$ , through which to direct to a desired point or points the discharge from the scoop or shovel of the soil excavated by it and forming its contents, to discharge which it is elevated to the chute-plane.

The car B carries a boom  $B'$ , extending backward from its rear end, and which is preferably, though not necessarily, movable in a lateral direction. To that end I fasten the boom at its rear end to the roof of the car by a pivot  $o$  and support it at the end of the car on a curved way  $n$ , provided with anti-friction rollers  $n'$  in its upper surface to facilitate the swinging of the boom, to effect which a cable  $m$  may have its ends attached to the opposite sides of the boom and be extended thence over guide-pulleys  $v$  down into the car around a drum  $l$  therein, the turning of which in either direction will effect the swinging of the boom in that direction. Inside the car are also two rotary drums E and F, from the former of which extends a cable  $k$  over a pulley  $w$ , journaled in the boom, whence the cable hangs and suspends the scoop or shovel D of any suitable construction. The scoop or

shovel D is connected from its forward end by a cable  $k'$ , which may pass over a guide-pulley  $w^2$  on the rear end or the car to the drum F, with which it is connected.

5 The operation is as follows: The track A is first laid to flank the line of proposed excavation, and the car B is imposed thereon with the "trailer C" directly over the point at which the excavation is to be begun. The  
10 drums E and F are turned to pay out the cables sufficiently to drop the scoop D to the ground, the brace or braces  $p'$  of the track below the trailer C having been removed and adjusted in the track ahead of the car B.  
15 The drum F is then turned in a direction to wind upon it the cable  $k'$  and thereby drag the scoop, which is properly guided, to fill it, when the drum E is turned to wind upon it the cable  $k$  and raise the scoop, the cable  $k'$   
20 being meantime paid out by turning the drum F in the proper direction for the purpose. When the shovel has been raised to or about to the level of the side chute  $C'$ , the drum  $l$  may be turned to pull the boom, and with it  
25 the shovel, toward the said chute, whereby the shovel will be brought close to the latter and may be readily dumped into it. The contents of the shovel are thus dumped to one side of the excavation, whence they may be  
30 carried forward to the ultimate end of the proposed excavation for filling thereof. After so dumping the drums E, F, and  $l$  are properly turned to swing back the boom and lower the shovel and drag it forward and again fill  
35 it, when the same operation as that described and terminating in dumping the shovel is repeated. When the excavation has progressed sufficiently at the one point, the car B is advanced with the frame C to continue it, and  
40 the laying of the conduit may be begun in the excavation, so that thenceforward all the dirt taken up by the shovel may be dumped through the rear chute  $C'$  upon the laid conduit and thus fill up the excavation as the  
45 work proceeds. The work is thus continued till the sewer is finished. While it is possible to operate the drums E, F, and  $l$  by hand, it is preferred to employ a suitable engine (with a boiler) for the purpose, which, how-  
50 ever, is too common in analogous connections—as, for example, in feeding apparatus for use in burning clay to make ballast—to require illustration or minute description. It is not necessary that the trailer C shall be as  
55 close as represented in the drawings to the car B, for it may be as far behind the latter as desired, the boom  $B'$  being caused to extend accordingly. Provision for the aforesaid modification employed to a moderate degree  
60 is suggested by the pulley  $w'$  in the end of

the boom, over which the cable  $k$  would be suspended if the trailer were but a short distance behind the car B.

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

1. In a sewer-excavating apparatus, the combination of a car-track to be laid along the line of excavation and formed in separable rail-sections braced at intervals with adjustable and removable tie-bars, a car carrying a boom extending from its rear end, and winding mechanism, a trailer car or frame behind the said car and over which the said boom extends, and a shovel suspended from the boom in the trailer-car by a cable connected with the winding mechanism, said shovel being also connected from its forward end by a cable with the said winding mechanism, the whole being constructed and arranged to operate substantially as described.

2. In a sewer-excavating apparatus, the combination of a car-track A to be laid along the line of excavation and formed in separable rail-sections  $r$ , braced at intervals with adjustable and removable tie-bars  $p$ , a car B, carrying winding mechanism and a boom extending from its rear end and supported to be swung laterally on the car, a trailer car or frame C behind the car B and over which the said boom extends, one or more chutes  $C'$  on the trailer-car, a shovel D, suspended from the boom in the trailer-car by a cable  $k$ , connected with the winding mechanism, and a cable  $k'$ , connecting the shovel from its forward end with the winding mechanism, the whole being constructed and arranged to operate substantially as described.

3. A sewer-excavating apparatus comprising, in combination, a car-track A to be laid along the line of excavation and formed in separable rail-sections  $r$ , braced at intervals with adjustable and removable tie-bars  $p$ , a car B, carrying winding mechanism and a rotary drum  $l$  and a boom extending from the rear end and supported to be swung laterally on the car, a cable  $m$ , connecting the boom with the drum  $l$ , a trailer-car C behind the car B and over which the said boom extends, one or more chutes  $C'$  for a side and the rear end of the trailer-car, a shovel D, suspended from the boom in the trailer-car by a cable  $k$ , connected with the winding mechanism, and a cable  $k'$ , connecting the shovel from its forward end with the winding mechanism, the whole being constructed and arranged to operate substantially as described.

WILLIAM DAVY.

In presence of—

M. J. FROST,

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