

(No Model.)

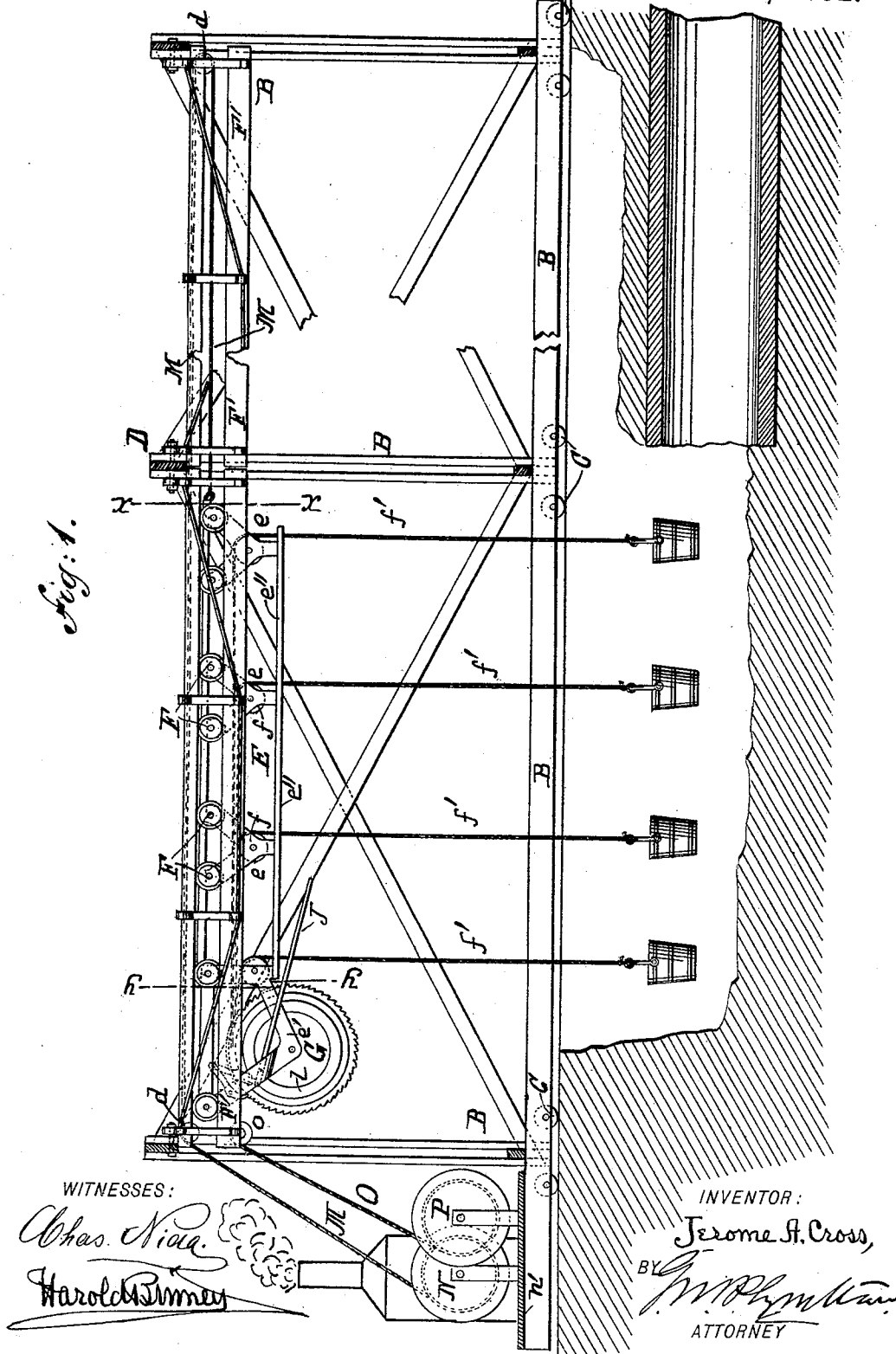
3 Sheets—Sheet 1.

J. A. CROSS.

APPARATUS FOR EXCAVATING AND LAYING SEWERS.

No. 487,517.

Patented Dec. 6, 1892.



(No Model.)

3 Sheets—Sheet 2.

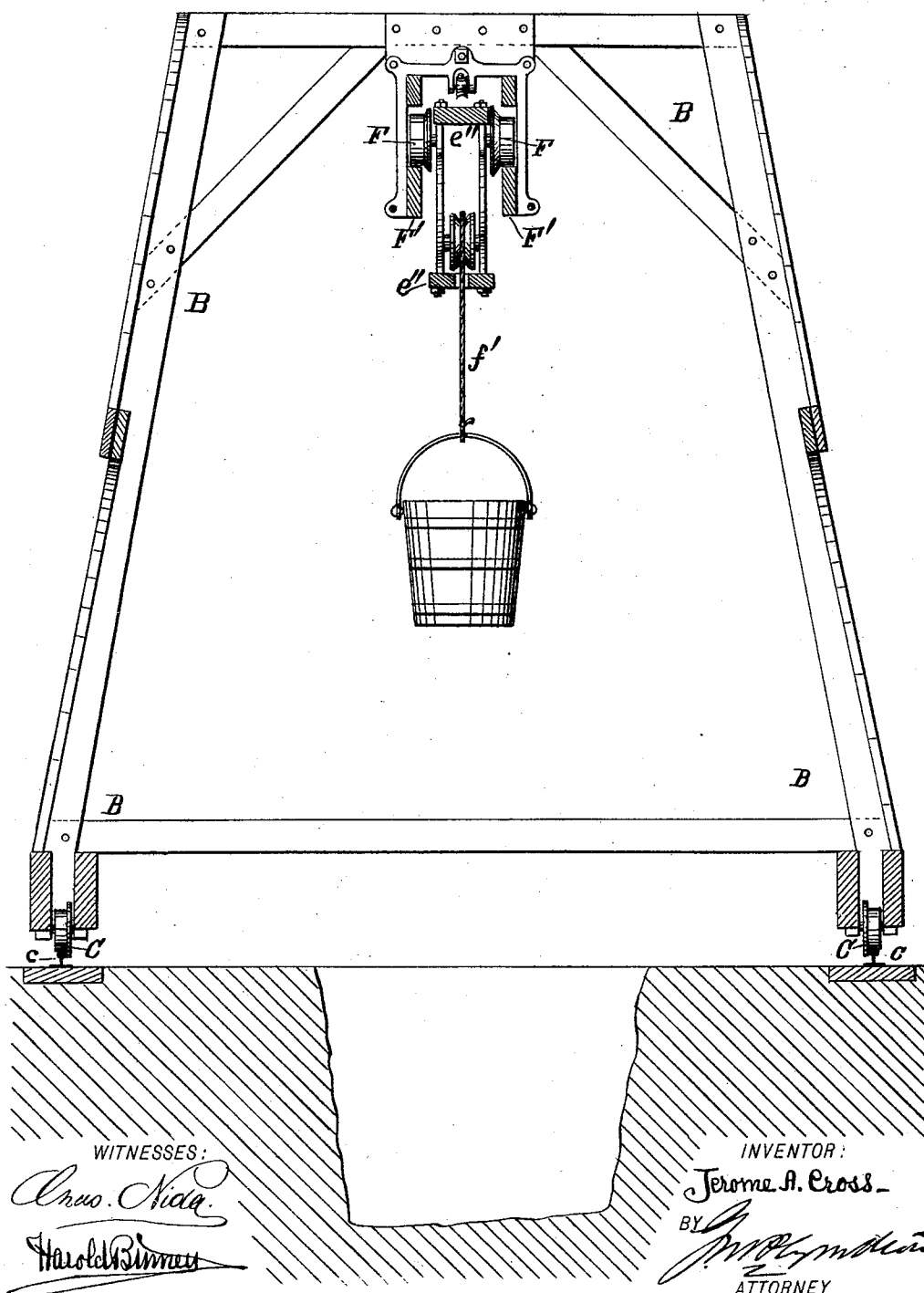
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Fig. 2.



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Fig: 3.

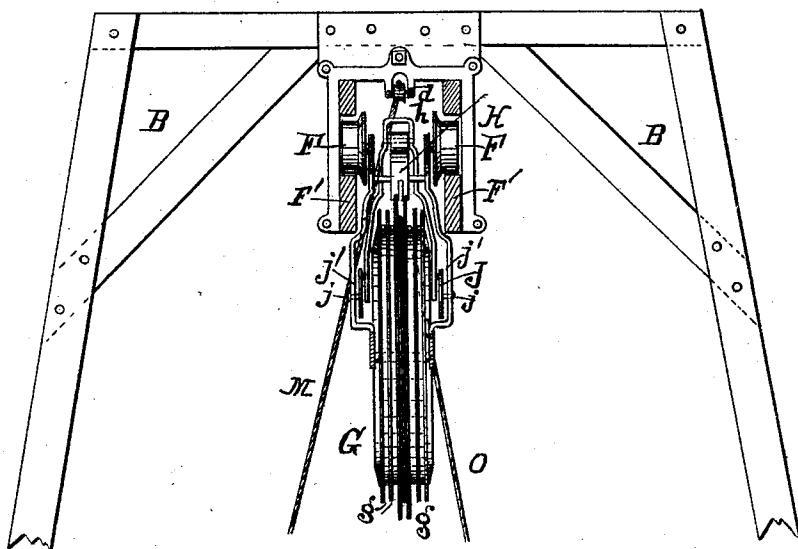


Fig: 4.

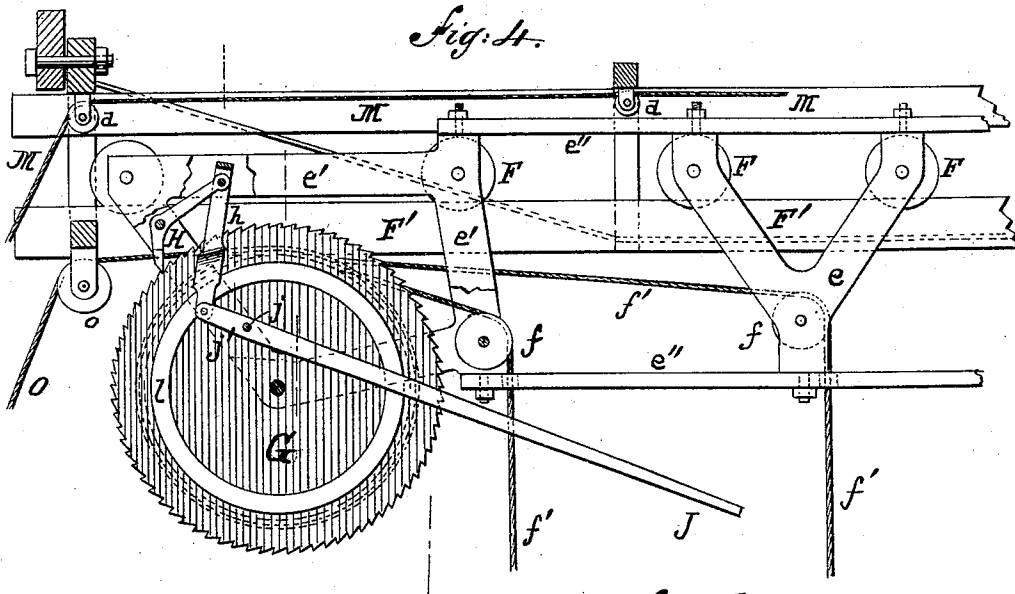
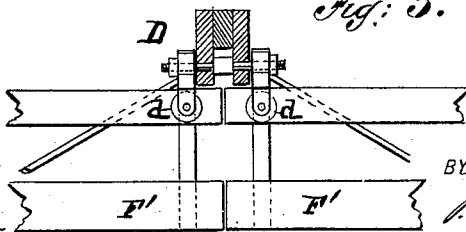


Fig: 5.

WITNESSES:

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JEROME A. CROSS, OF FULTONVILLE, ASSIGNOR OF ONE-HALF TO LAUER & HAGARMAN, OF ROCHESTER, NEW YORK.

APPARATUS FOR EXCAVATING AND LAYING SEWERS.

SPECIFICATION forming part of Letters Patent No. 487,517, dated December 6, 1892.

Application filed April 7, 1891. Renewed November 8, 1892. Serial No. 451,313. (No model.)

To all whom it may concern:

Be it known that I, JEROME A. CROSS, a citizen of the United States, and a resident of Fultonville, in the county of Montgomery, New York, have invented a new and useful Apparatus for Use in Excavating and Laying Sewers and for Analogous Uses, of which the following is a specification, reference being taken to the accompanying drawings, forming part of this specification.

My invention relates to devices for carrying away and replacing the excavated soil, and is designed to facilitate the removal of the soil and to do away with the necessity of twice handling it.

To these ends it consists in the apparatus constructed, arranged, combined, and used substantially in the manner hereinafter described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a side elevation of my complete apparatus, omitting only the driving mechanism or engine and a few similar additions. Fig. 2 is a cross-section on the line *x x*, Fig. 1. Fig. 3 is a cross-section through *y y* of Fig. 1, looking to the left in said figure. Fig. 4 is a detail view of the controlling mechanism for the raising and lowering of the buckets. Fig. 5 is a detail view of the junction of successive sections of the framework of my apparatus.

Like letters of reference indicate like parts in the several views.

The several distinct but co-operative mechanisms of my apparatus are carried by and supported in the framework B. This may be supported upon the wheels or rollers C and moved along on the tracks *c* as the sewer progresses. This frame may be made sectional and jointed at D, as shown in Figs. 1 and 5, so that for curves one or two sections may alone be used.

The hoisting mechanism is supported by a carriage E, consisting of trucks *e e'*, connected together by the girders or braces *e''*, preferably of wood. The trucks *e e'* are provided with trolley or truck wheels F, running upon the tracks F', which run the whole length of my frame B. The trucks *e* are further provided with the pulleys *f*, over which run the bucket ropes or hoists *f'*, which may run

through and be guided by the lower brace *e''*. The truck *e'* carries the drum G, upon which are wound in the process of hoisting the bucket-ropes *f'*. The trolley or truck *e'* may also be provided with a pulley *f* and a hoisting-rope *f'* in a manner similar to that employed in trucks *e*. That there may be no interference between the hoisting-ropes *f'* as they run from the drum G to the successive pulleys *f*, I place the pulleys *f* each about two inches higher than the one next to it on the side toward the drum G. This may or may not be necessary, according to the location of the various parts. It will of course be understood that the buckets are suitably secured to the lower ends of the hoist-ropes *f'*.

The hoisting-drum G may be divided by flanges *g* into as many divisions as may be desired. I prefer, however, to allot one such division to my device for causing the drum to rotate in a direction to raise the buckets, which device will be hereinafter described, and one division for each one of the hoist-ropes *f'*. I also prefer to make these divisions of a width just sufficient to receive the ropes for which they are intended, successive turns of the same rope being superimposed in a plane spiral. For this purpose the flanges *g* may be made of considerable height. I may, as shown, form one or more of these flanges into a ratchet-wheel (see Figs. 3 and 4) and provide the pawl H, so arranged that when the pawl engages the ratchet the unwinding of the ropes *f'* is prevented.

I prefer to control my ratchet by the handle or lever J, pivoted at any desired point, as *j*, to the truck-frame *e'* and connected with the pawl by a link *h*. I utilize this link *h* as a brake on the drum, and for this reason I prefer to make it, as shown in Fig. 3, in the form of a yoke extending on both sides of the drum G and pivoted at both ends to a link connected and parallel with the lever J or, in case the lever J projects on both sides of the drum, to both such projecting ends of the lever. These ends are indicated in Fig. 3 by reference-letter *j'*.

Upon either or both sides of the drum G, I place or suitably form an annular and concentric facing *l*, so located that the link *h*

comes in contact therewith in its downward motion directly after the pawl H becomes disengaged from the ratchet. The faces of the parts *l* and *h* may be so inclined that by the principle of the wedge great pressure may be produced by an exertion of slight force on the lever J. It will now be seen that on moving the lever J in a direction to release the pawl the brake is brought into or nearly into contact, and the rotation of the drum may then be controlled by exerting any desired brake-pressure by the further movement of the lever J. It will of course be understood that the ratchet may form a separate and distinct attachment without departing from my invention; but I prefer to form it as shown.

I will now describe the apparatus that serves to cause the translation of the carriage E lengthwise along the tracks F', and thereby carries the soil in the buckets to the position at which it is desirable to empty them, and which also serves to return the carriage to the position at which it is desired to remove soil. To the end of the carriage E farthest removed from the hoisting-drum G is secured a rope or line M, which runs to the farther end of the frame B and the tracks F' and there passes over a pulley *d*, placed above the tracks at the end of that section of the framework. This pulley *d* is clearly shown in Fig. 5 at the junction of two sections of the frame B, where it forms a support for the return of the rope M toward the forward or hoisting end of the frame B. The line or rope M after passing, as above described, over the pulley *d* at the far end of the frame returns over successive pulleys *d* at each junction D of the frame-sections to the other extreme end of the frame, where, after passing over another pulley *d*, it is wrapped around and secured to a suitably-driven windlass or hoisting-drum N, carried upon a platform *n'*, upon which platform may be located a steam-hoist or other actuating mechanism. The winding up of the rope M upon the drum N draws the carriage E toward the far end of the frame B. The carriage E is drawn back by the rope or line O, which passes around the drum G, thence over a pulley *o*, and around a second windlass or hoisting-drum P, placed upon the platform *n'* and preferably actuated by the same power that drives the windlass N. This rope O passes round one of the divisions upon the hoisting-drum G in the opposite sense, but in similar manner with the ropes *f'*, and forms the means for causing the drum G to rotate in a direction to hoist the buckets, as above indicated and referred to. When the rope M is taut and the drum N is held stationary, the rotation of the drum P in a direction to wind up the rope O will cause a rotation of the hoisting-drum G, which in turn, as already described, winds up the hoisting-ropes *f'*, and thereby hoists the buckets. The drum G is held by the pawl and ratchet, above described,

from unwinding the hoist-ropes *f'*, even when the power on the windlass or drum P is taken off. In such a case, as before described, the carriage may be drawn to the far end of the frame by applying power to the windlass N. If, on the other hand, the windlass N is released and the windlass P is rotated in a direction to wind up the rope O, the carriage will be drawn in the opposite direction, as more power is required to hoist the buckets than to move the carriage E. If it be desired, this action may be further assured by providing any suitable stop-motion to the drum G to prevent its turning in either direction.

I have now clearly set forth how my buckets are hoisted, how they are carried horizontally, and how they are brought back after dumping. It is obvious that they may be lowered by removing the power from the drum or windlass P and releasing the pawl H. The descent may be controlled by the braking mechanism above described. It will also be obvious that as successive lengths of sewer are completed the tracks *c* in the rear of my apparatus may be removed and placed ahead and the whole apparatus moved forward for operation upon a new length.

The earth may be lifted from the place in which the sewer is to be laid, carried back to a place where the sewer has been completed, and there deposited, thus accomplishing the acts of removal and of filling in at a single operation, while the process of constructing the sewer itself may go on at an intermediate point.

It is also possible with my apparatus, though it may not often be desirable, to hoist and to translate horizontally my buckets simultaneously or to lower and translate them simultaneously. The movement of the buckets is in such cases a straight diagonal line, which is the resultant of the two motions. The former of these operations will be accomplished by holding the drum or windlass P stationary and winding up the rope M upon the windlass N. By allowing the windlass P to slowly unwind the hoisting action may be reduced as desired and the buckets thereby moved in any desired curved path toward their position for dumping and time thereby greatly economized. The reverse operation may be obtained by suitably controlling the unwinding of the windlass or drum N, slowly winding up on drum or windlass P, and controlling the lowering of the buckets by the lever J.

It will be seen that, though desirable, it is not necessary to locate the controlling mechanism for the lowering of the buckets upon the drum G, since the drums P & G rotate, except during the motion of translation, simultaneously.

So many other modifications of details may suggest themselves from time to time without being in any manner a departure from my in-

vention. I have, however, described one form of my apparatus and one manner in which it may be used, and

5 I therefore claim, and desire to secure by Letters Patent of the United States, the following:

1. In combination, in an apparatus for excavating sewers and for analogous purposes, a portable framework provided with tracks or ways *F'*, a carriage consisting of several
10 trucks connected together, the said carriage being provided with pulleys *f* and adapted to travel on the said ways, a rope *M*, fixed to said carriage, and a windlass therefor for drawing the said carriage in one direction, and a rope
15 *O* and windlass for drawing the carriage in the opposite direction and for operating the hoisting mechanism, bucket-ropes *f'*, extending over each of the pulleys *f*, a drum *G*, provided with a separate groove for each of such ropes
20 *f'*, buckets or carriers for each of the said

bucket-ropes, the said rope *O* being wound upon the drum *G* for operating it, and means for controlling the movement of the drum *G*, substantially as and for the purposes set forth.

2. In combination, in an apparatus for excavating sewers and for like purposes, a portable framework provided with tracks or ways, a series of trucks adapted to travel on the said ways, pulleys *f*, supported on the said trucks, a series of bucket-ropes and buckets therefor,
25 and a grooved winding-drum movable with the said trucks for such ropes and a pawl and ratchet therefor, substantially as and for the purposes set forth. 30

In testimony whereof I have hereunto, this 31st day of April, 1891, set my hand. 35

JEROME A. CROSS.

Witnesses:

WELLINGTON CROSS,
T. A. SIMPSON.