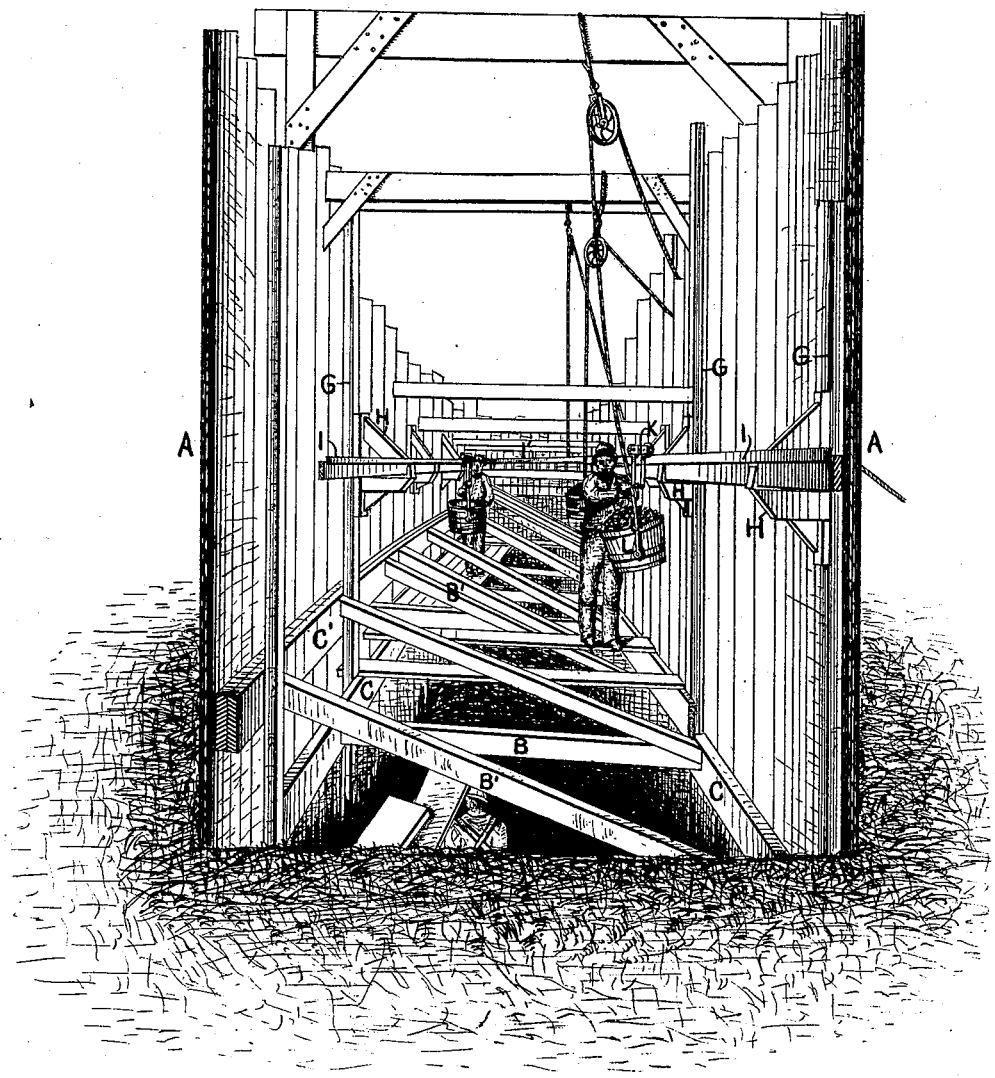
3 Sheets—Sheet 1.

H. A. CARSON.

System and Apparatus for Earth Excavating.

No. 211,620. **Patented Jan. 28, 1879.**

Fig. 1.



WITNESSES.

Edward A. Buse

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H. A. CARSON.

System and Apparatus for Earth Excavating.

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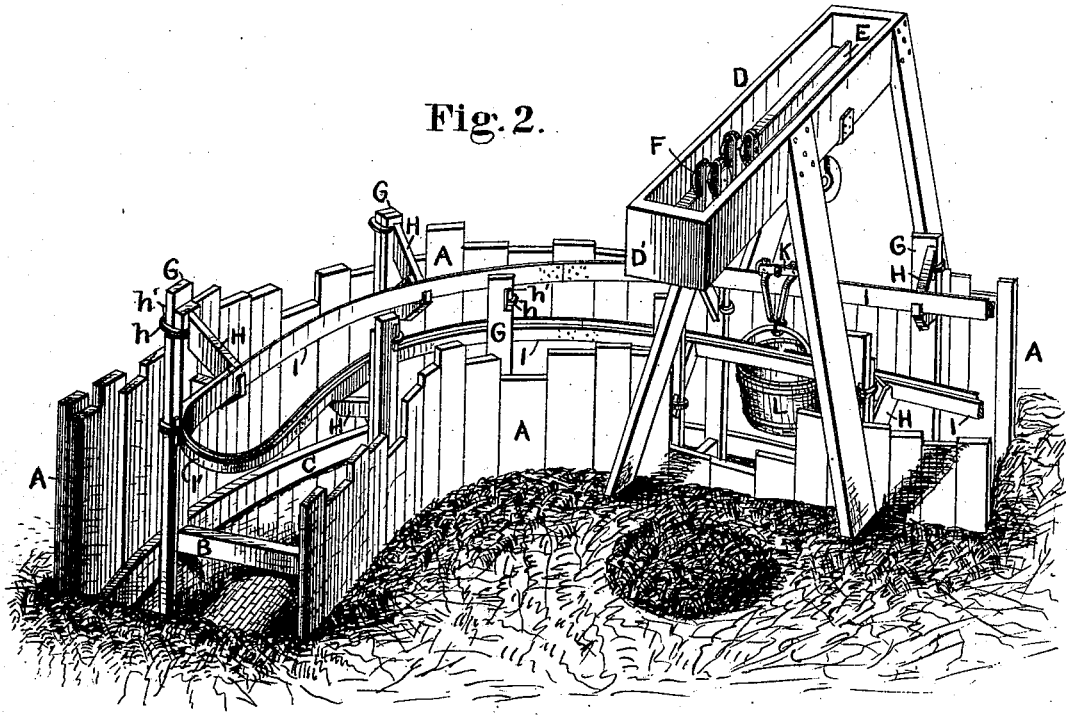
Fig. 2.



WITNESSES.

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H. A. CARSON.

System and Apparatus for Earth Excavating.

No. 211,620. Patented Jan. 28, 1879.

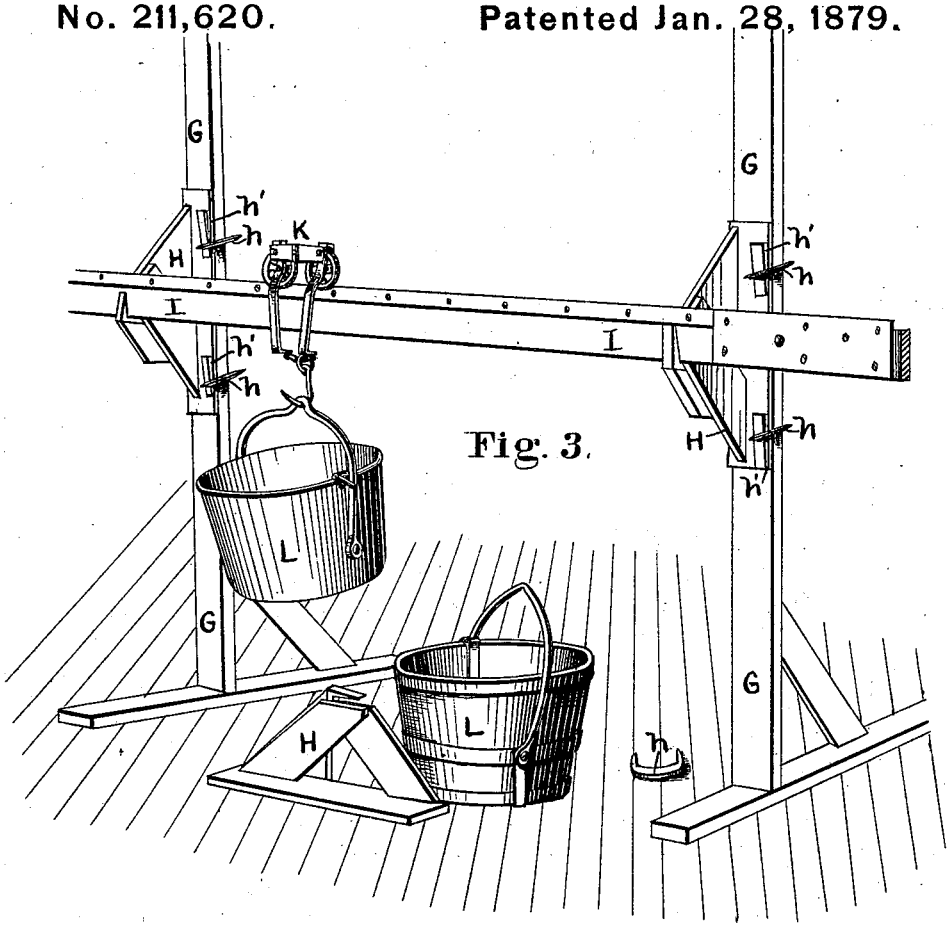


Fig. 3.

Fig. 4.

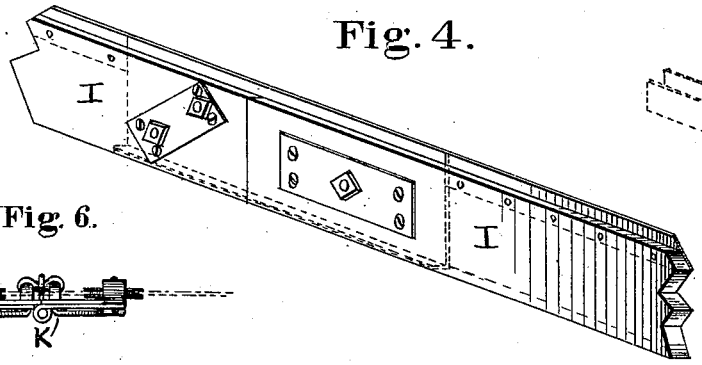


Fig. 5.

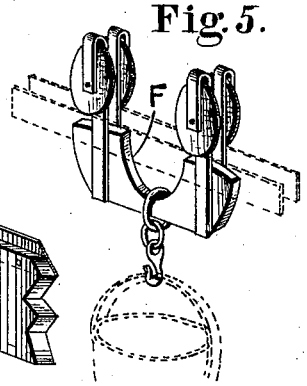
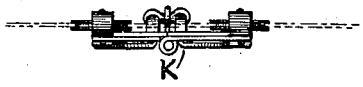


Fig. 6.



WITNESSES.

Edward A. Buss

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UNITED STATES PATENT OFFICE.

HOWARD A. CARSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOEL HERBERT SHEDD, OF PROVIDENCE, R. I.

IMPROVEMENT IN SYSTEMS AND APPARATUS FOR EARTH-EXCAVATING.

Specification forming part of Letters Patent No. **211,620**, dated January 28, 1879; application filed October 24, 1878.

To all whom it may concern:

Be it known that I, HOWARD A. CARSON, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in the Systems and Apparatus for Earth-Excavations, Trenching, &c.; and I do hereby declare that the said improvement is fully described in the following specification, and illustrated in the accompanying three sheets of drawings, making a part of the same, in which—

Figure 1 represents, in perspective, my improved apparatus as it may appear during the operation of trenching, the direction of excavation being toward the front and in a straight line. Fig. 2 shows, in perspective, my improved apparatus applied in the construction of a sewer which has a turn or bend, the direction of excavation being toward the right; and Figs. 3, 4, 5, and 6 represent perspective views of certain parts of the apparatus combined and detached.

My improved system and apparatus have reference to trenching for the laying of sewers, &c., and are particularly adapted for use in streets, where it is desirable that travel be obstructed the least possible amount by the earth removed during excavation, and for excavating alongside hills and other places where it is difficult and costly to refill by common methods.

Prior to my invention the methods of trenching streets for the purposes above specified have been such as to greatly obstruct the thoroughfare in which the said trenching has been performed, the obstruction being generally due to the deposit of earth which has been removed from the trench and placed at its sides in the street, the said deposit being sufficient in many cases, as in narrow streets, to entirely prevent the use of a portion of the thoroughfare by vehicles, and to greatly impede, and even prevent entirely, the passage of pedestrians.

The old system also possesses another disadvantage, in that the earth removed generally receives at least two separate handlings. It is first thrown into the street during the process of excavation, and then, when the work in the trench has been completed, is shoveled back to fill the trench, the complete operation of laying a sewer requiring much more time than is necessary when my improved system and apparatus are used.

The objects, therefore, of my invention are to provide a system and apparatus for trenching, such as for the laying of sewers, &c., by the use of which the work may be much more quickly and conveniently completed, the earth being handled only once, and the street be unobstructed during the progress of the work, except in a width equal to that of the trench, thereby allowing the thoroughfare to be used by vehicles, &c.

My improvement in the system of trenching consists in depositing no earth in the street outside of the trench, but in conveying it backward to that portion of the trench where the sewer or other work has been completed, and then depositing the same as a filling for the excavation.

My improved apparatus consists of the usual sheeting, planks, and braces, together with a sectional track-railway, located upon uprights on the inner sides of the sheeting, and detachable therefrom, and so arranged as to pass along on one side and return on the other; brackets for supporting the said railway, and devices for conveniently and quickly securing the said brackets to the uprights; buckets for receiving the earth, tackle-blocks for raising and lowering the said buckets, and travelers which run upon the railway and carry the buckets to the desired spot; also, "horses," which may be located across the trench near its beginning or other portion, and be supplied with a double track and traveler, the said horses being of sufficient height to allow of a cart passing under their projecting ends to receive such earth as needs to be carried away.

To particularly describe my improvement reference is had to the accompanying drawings, in which like parts are indicated by similar letters.

The first steps in trenching by my improved system are the same as pursued by the old method—that is, a certain amount of excavation is performed, and the sheeting, as at A, is driven down and braced by cross-pieces, as

at B, which take bearing upon planks, as at C, to support the sheeting and prevent the walls of the trench from falling inward. In case of an embankment on one side of the trench, as shown in Fig. 1, the sheeting upon that side may be still further braced by diagonals, as at B′, and planks, as at C′.

The difference between the old and new methods, as thus far explained, resides in the disposition of the earth removed from the trench. Heretofore it has generally been deposited in the street; but my improved system provides for its removal from the neighborhood of the trench, a horse, as at D, Fig. 2, being furnished for the purpose. This horse is placed across the trench, with its end D′ projecting into the street, and sufficiently elevated to allow of a cart passing under the same, and is supplied with a track, as at E, and a traveler, as at F, Figs. 2 and 5, arranged to receive and carry a bucket, as shown in the latter figure. The earth is deposited in this bucket, hoisted and dumped into the cart, and removed, leaving the street unobstructed thereby. This operation takes place at the beginning of the trench, and may be repeated at any such time as the amount of earth to be removed is found to be in excess of that required to properly fill the trench when the work is completed.

For convenience of describing that portion of my invention not already considered, let it be supposed that a brick sewer is to be constructed, as shown at Fig. 2. A length of trench is excavated sufficient for the sewer-workmen to enter and proceed a short distance with construction, and the earth removed, as above specified. The masons then proceed with their work upon the said sewer, during which time the trench-men place the uprights, as at G, in proper position on the inner sides of the sheeting, and secure them. Brackets, as at H, so constructed as to be conveniently attached to the said uprights by clips *h* and wedges *h′*, or other suitable devices, are then secured to the uprights G, the said brackets being arranged to receive and support upon their outer ends a track-railway, as at I, which is now put in place. This railway is constructed of suitable materials—as, for instance, with a board bed and metal rail, as shown—and is made in sections, some straight and others curved, so that any desired length and shape may be obtained, the said sections being secured to each other by bolts and fish-plates, as shown in Fig. 4 of the drawings, or other suitable devices. A portion of it is made semicircular, as at I′, Figs. 1 and 2, its diameter being equal to the distance between the side rails, to which it is attached, forming a return-track. Preferably this railway is located on the brackets H, so that it has a downward inclination from one end to the other, and it is supplied with travelers, as at K, Figs. 1, 2, 3, and 6, which are made in two parts and hinged together, that they may readily turn the curve at I′, the said travelers being supplied with a hook for receiving and supporting buckets, as at L.

The railway being in place upon the brackets H, and the travelers K being placed upon it, the trench-men are ready to proceed with the excavation. The buckets L are now lowered into the trench, where they are filled by the workmen, then raised by tackle-blocks and placed upon the carriers K by an attendant, as shown in Fig. 1. The loaded buckets are then started down the track, passing back to the end I′, where they are dumped upon that portion of the sewer which, in the meantime, has been completed. After being dumped the buckets are sent down the railway to a position near to, but on the opposite side from, that from which they started, where they are lowered into the trench, filled, raised, and the operations above described are repeated.

When a portion of the sewer is completed and the dumping commences the sheeting at such point may be removed and sent forward to be again used; and when that portion of the trench at and near the semicular part I′ of the railway has been filled, the said part and those adjacent to it, and their accompanying brackets, uprights, &c., may be detached, and the bend I′ be carried forward and again secured in place, while the other portions of the track may be used to extend the railway, and the operations be carried on indefinitely, with a comparatively small amount of apparatus.

It will also be understood that the length of trench undergoing excavation at any time is not limited. Any number of buckets can be simultaneously raised, placed upon the track, moved to their destination, and returned without interference with each other, it being only necessary to supply the requisite number of buckets, tackle-blocks, and attendants, and power to work them, so that the earth may be constantly passing backward, and the empty buckets returned on the opposite side, greatly forwarding the completion of the work.

It is also to be understood that the railway is not of necessity inclined, although for short distances it would be preferably so erected; but in a case of a long line of track it might be placed level, and the buckets be moved along by men stationed at different points, or by other means, the important feature of its construction being its continuity, thereby providing for the return of the buckets.

From the above description it will be readily seen that the operations of removing and depositing the earth and the apparatus and workmen for handling the same are entirely confined within the walls of sheeting, leaving the street unobstructed by earth, and therefore open to travel, except, perhaps, at the initial step of the excavation, or at such time as earth is to be removed from the neighborhood of the trench, as hereinbefore mentioned.

The advantages, therefore, derived from a use of my improved system and apparatus are, greater speed, economy, and convenience

in trenching and constructing sewers, &c., and a non-obstruction of the streets by the earth removed during the operations, or by the apparatus itself, the main points being that, an excavation having been made and a certain portion of a sewer constructed, the trench at such parts as this work has been performed is ready to receive the earth removed by subsequent excavations, the said earth being handled and conveyed by apparatus and attendants within the walls of the sheeting lining the trench.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with sheeting or supporting frame-work removable in parts, a return railway-track located within the walls of said sheeting, whereby buckets loaded with earth taken from one part of the excavation can be carried to the points where the same earth is to be dumped for filling other parts of the excavation, and the emptied buckets be brought back upon the return-track to be refilled without interfering with the travel of the loaded buckets, substantially as described.

2. In combination with sheeting or supporting frame-work removable in parts, a return-railway located within the line of the trench or excavation, and buckets for conveying earth, detachable brackets for supporting the said railway, and hinged carriers for conveying the buckets, substantially as shown and described, and for the purposes specified.

3. In combination with a single-rail railway-track, as described, carriers K, for conveying the buckets, consisting of a hinged supporting-frame and sheave-wheels, substantially as specified.

HOWARD A. CARSON.

Witnesses:
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FRANCIS H. RICHARDSON