D. KEATING.

SEWER EXCAVATOR.

No. 180,718. Patented Aug. 8, 1876.

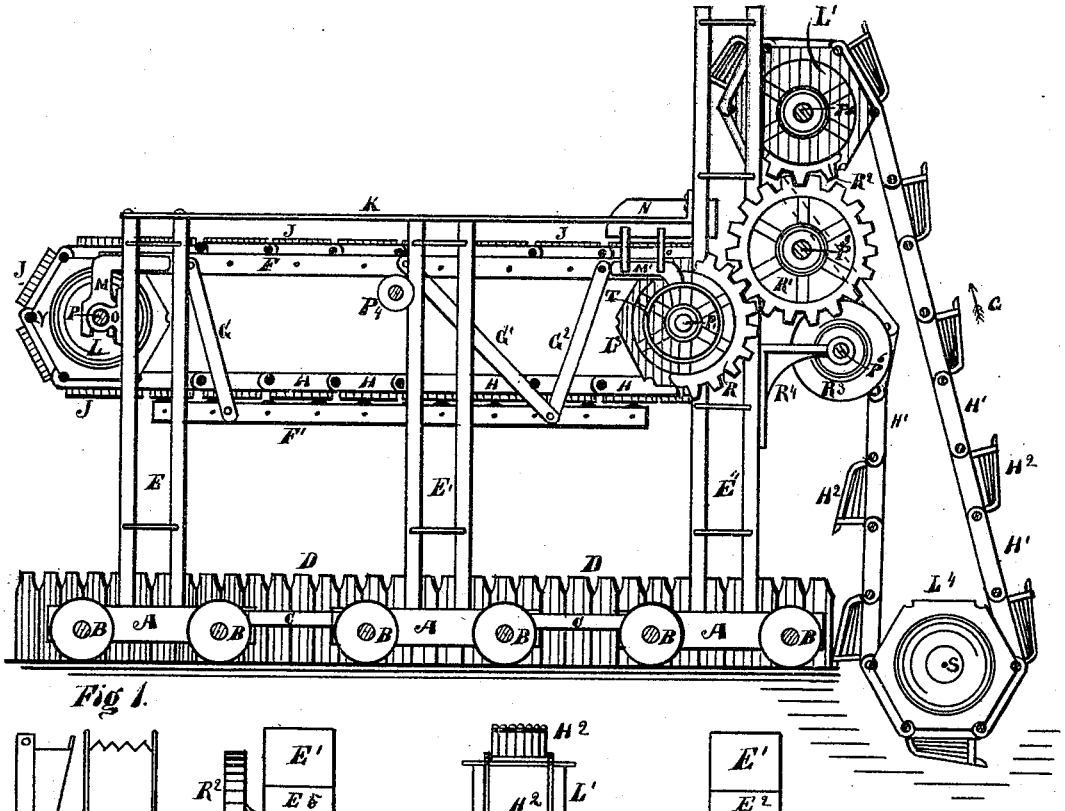


Fig 1.

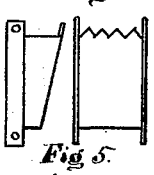


Fig 5.

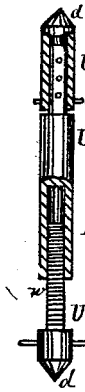
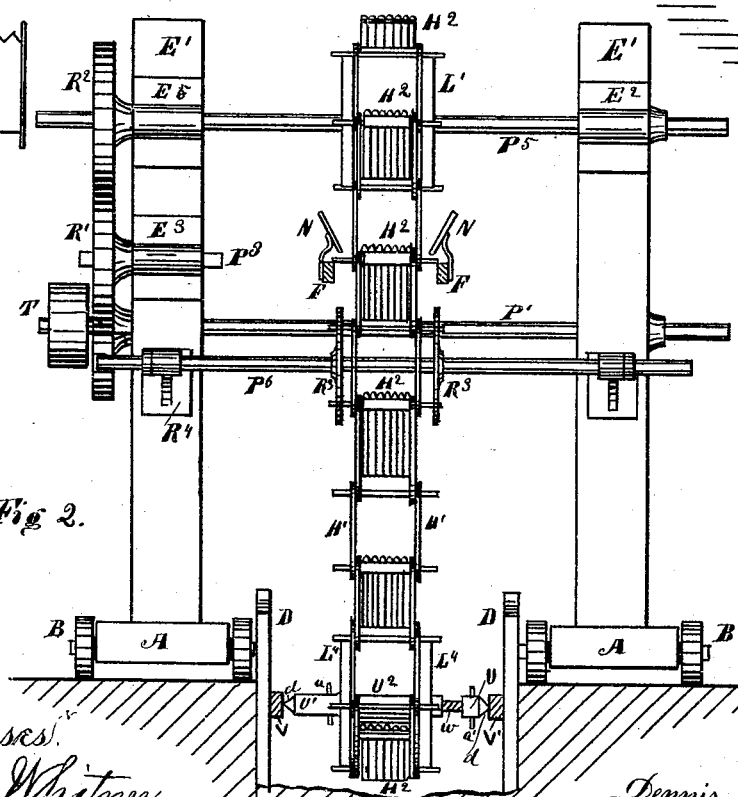


Fig 4

Fig 2.



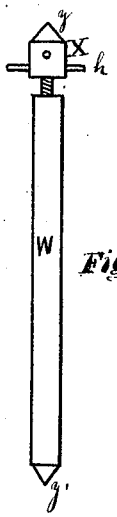


Fig 3.

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DENNIS KEATING, OF INDIANAPOLIS, INDIANA.

IMPROVEMENT IN SEWER-EXCAVATORS.

Specification forming part of Letters Patent No. **180,718**, dated August 8, 1876; application filed March 14, 1876.

To all whom it may concern:

Be it known that I, DENNIS KEATING, of Indianapolis, county of Marion and State of Indiana, have invented a new and useful Improvement in Machinery for Digging Sewers, &c., of which the following is a description, reference being had to the accompanying drawings.

My invention consists in the construction and arrangements of buckets and other mechanism operated by an endless chain, whereby I can excavate earth, as from a sewer, &c., to any required depth, and transfer said earth to a set of earth-carrying buckets arranged on tramways in such a manner as to transfer said earth from the sewer in front, and to deposit the same into the sewer again at any given distance in the rear, after the mason-work has been completed, thereby saving an immense lot of labor, and the necessity of cumbering the streets with earth on either side of the ditch, which is of great importance in cities where the streets are narrow and will not admit of such obstruction.

Figure 1 represents a side elevation of my improved excavation for sewers, &c. Fig. 2 is a front view of the same. Fig. 3 is a view of one of the jack-screw stay-braces used to support the sheeting of the sewer. Fig. 4 is a sectional view of the compound extension-shaft on which the chain-wheel L^4 revolves. Fig. 5 is a view of the tight bucket with serrated upper front edges.

A A represent a series of movable platforms, mounted upon wheels B, and are united together by tie-bars C, as shown in Fig. 1. On the movable platforms A are mounted the standards E, E′, and E″. The front standards E′ are longer than those in the rear, and are of sufficient strength to hold the mechanism, as shown, for excavating the earth, which will hereafter be more fully described. The standards E E′ are designed to support the tramways F F′. To the rear standards E, near their tops, are secured the boxes O, which support the shaft P in the position shown in Fig. 1. On this shaft P is secured the chain-wheel L, which is so arranged as to receive the pivot-bars Y of the endless chain H, to which are attached the buckets J, as shown. The shaft P^1 is also provided with a chain-wheel, L^3, and is mounted in suitable boxes at the rear of the front standards E″, as shown, over which the same endless chain H operates. The tramway F extends from shaft P to shaft P^1, and is supported on said shafts by forked bearings M M′, in the manner shown. A series of rollers (not shown) is provided, upon which the buckets J are supported, and allowed to travel backward, thus preventing any sway of the buckets. When any considerable length is required of the endless chain and buckets H J, more buckets and sections of chain are added, and extra sections of tramways and extra standards E′ introduced between the wheels L and L^3, and extra supports are added to the tramway by the addition of shafts P^4, which are attached to such extra standards E′ of Fig. 1. The lower tramway F′ is supported by means of the stay-braces G G^1 G^2, as shown, and the lower tramway F′ is provided with rollers to support and allow the buckets J to pass freely over them. To the front end of the upper tramway is attached two side-boards, N, with suitable standards. These side-boards are designed to catch the earth as it falls from the buckets H^2, and guide the earth into the buckets J, which will be more fully described hereafter. On the front standards E″ is mounted in suitable boxes the shaft P^5, which supports the chain-wheel L^1 near the top of the standards, as shown in Figs. 1 and 2; and lower down on the standards E″ are the bracket-boxes R^4, which also support the shaft P^6, on which are secured the disks R^3, that support and hold the near part of the elevating-chain at a distance in front of the earth-conveying buckets J, so as to allow the buckets H^2, to freely deliver the earth into the buckets J, and at the same time prevent the buckets H^2 from catching on the buckets J. On the end of the shaft P^1, that is attached to the rear of the front standards E″, is secured the main driving or power pulley T, and also the pinion R, which is partially broken away to show the chain-wheel L^3 beyond. The shaft P^3 is supported by the box E^3, (shown in Fig. 2,) and is also provided with a pinion, R^1, which is used as an intermedial wheel, and meshes with pinion R and pinion R^2 on the end of the shaft P^5.

The pinion R^2 is partially broken away to show the chain-wheel L^1 beyond. The lower chain-wheel L^4 is supported and revolves on a jack-screw extension-shaft, U U^1 U^2, which is inserted in the hole S of the chain-wheel L^4. The shaft U U^1 U^2 is constructed with a sleeve or socket end, U^1, the extreme outer end of which is provided with a cone or pivot-point, *d*. The main shaft U^2 extends through the chain-wheel, and has a smaller part that fits into the socket U^1. The socket U^1 is also provided with a pin, *a*, that fits into holes properly drilled therein, and is used to hold the sleeve or socket U^1 in any extended position on the shaft U^2, as shown in Fig. 4. In the other end of the shaft U^2 is inserted a screw, *w*, which is provided with a cone or pivoted head, U *d*, and is also provided with levers *a'*, to operate the screw. The pivoted ends *d d* of the compound shaft U U^1 U^2 are designed to be placed at any required position in the sewer, as shown in Fig. 2. Here it will be seen that the pivots *d d* rest against the side brace-bars V V^1, that support the sheeting D D, or on the sheeting on each side of the sewer, and by this mode of adjusting the lower chain-wheel L^4 I am enabled to control and regulate the amount of earth removed.

The side brace-bars *v v'* extend back, and are held in position by means of the pivoted jack-screws W, which are provided with a pivot point, *y'*, at one end, and with a pivot-point, *y*, attached to the head *x* of the screw. At the other end the screw X is also provided with levers *h* to operate it. The digging-buckets H^2 are of peculiar construction. They are made of bars of iron or steel, bound together by suitable bands, and the upper ends of the bars at the front of the bucket are made sharp, or shaped like a pick. The design of the open buckets is to allow all water that may be contained in the earth to be elevated to run out before the earth is deposited from the elevation-buckets into the conveyer-buckets J, thus preventing the masons that are at work in the sewer under the tramway from getting wet, as the buckets J are traveling over them from the front to the rear of the machine. I sometimes use a bucket formed of sheet metal, the upper front edge of which is serrated so as to more readily take hold of the earth, a view of which is shown in Fig. 5.

To operate my improved machine, it is first necessary to dig a hole of the proper width of the ditch to be dug, then drive the sheeting D and secure the side brace-bars V V, after which set the machine to the proper width to allow the movable platforms A to work freely outside of the sheeting, as shown in Fig. 2; then lower the elevator-chain with the chain-pulley L^4 and compound extension-pivoted shaft U U^1 U^2, and secure it in its position against the sheeting D D, as shown in Fig. 2; apply power to the pulley T, which will cause the conveyer-buckets J to travel backward on top of the tramway F, and also communicate, by means of the pinions R R^1 R^2, power to the elevator, which causes the buckets H^2 which are attached to the chain H^1 to move in the direction of the arrow *c*; then the laborers commence to pick and shovel the earth in front of the elevator, and the earth is elevated and deposited into the buckets J of the conveyer, and at first is carried back and deposited on the ground until the ditch has been excavated of sufficient length to allow the masons to commence work, after which, as the machine advances and the masons get part of their work completed, the earth is deposited on it, thus taking the earth from in front of the masons and depositing it on their work when complete, and thus saving the expense of a large amount of laborers, and the necessity of cumbering up the streets at the side of the ditch with earth to impede travel, &c.

By my improved machine I do away with all staging that formerly had to be built in sewers, and the labor of shoveling out the earth by hand, and consequently there is no danger from loss of life, as is frequently the case where staging is used; and I can perform the labor of digging a sewer in a great deal less time; and I am also enabled to dig sewers in narrow streets, where before it would have been impossible to do so, owing to the accumulation of earth and the obstruction of the street.

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

1. In a sewer-digging machine, the combination of adjustable standards E E″ and movable platforms A B, arranged to operate on each side of the sewer, in the manner shown, and for the purposes set forth.

2. In combination with adjustable standards E and E″, the shafts P P^1, arranged to extend across the sewer and to support the conveyer chain-wheels L L^3, in the manner shown, and for the purposes set forth.

3. In combination with the shafts P P^1 and additional shafts P^4, the tramway F, supported on the shaft P P^1 by bearings M M and the tramway F′, supported to the tramway F by the stay-braces, G G^1 G^2, in the manner shown, for the purposes specified and set forth.

4. In combination with the tramway F and support M′, the earth-guides N N, arranged as shown, for the purposes specified.

5. In combination with the front standards E″, the buckets E^5 E^3 R^4, shafts P^5 P^3 P^6 and P^1, arranged as shown, for the purposes set forth.

6. In combination with the chain-wheels L L^3 and tramways F F′, the conveyer-buckets J and chain H, arranged to convey the earth deposited from the elevator chain-buckets H^2 in a line parallel with the ditch at the rear, and in said ditch, as shown, for the purposes set forth.

7. In combination with the chain-wheel L^1,

arranged near the top of the front standard E″, the elevator-chain H^1 and buckets H^2, formed of bars, or solid, with serrated cutting-edges at the front upper edge, in the manner shown, for the purposes set forth.

8. The chain-wheel L^4, arranged to be used at any desired position in the ditch by means of the compound shaft U U^1 U^2, in the manner shown, for the purposes set forth.

9. In combination the chain-wheel L^4, the compound shaft U U^1 U^2, chain H, and chain-wheel L^1, arranged to operate as shown, for the purposes set forth.

10. In combination with the sheeting D D of the sewer, the compound shaft U U^1 U^2 and chain-wheel L^4, arranged to operate in the the manner shown, for the purposes set forth.

11. The compound shaft, formed of the socket U^1, provided with a pivot-point, *d*, and extension-pin *a*, the main shaft U^2, and the jack-screw U, also provided with a pivot point, *d*, and lever *a*, in the manner shown, for the purposes set forth and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DENNIS KEATING.

Witnesses:

E. O. FRINK,

E. C. WHITNEY.