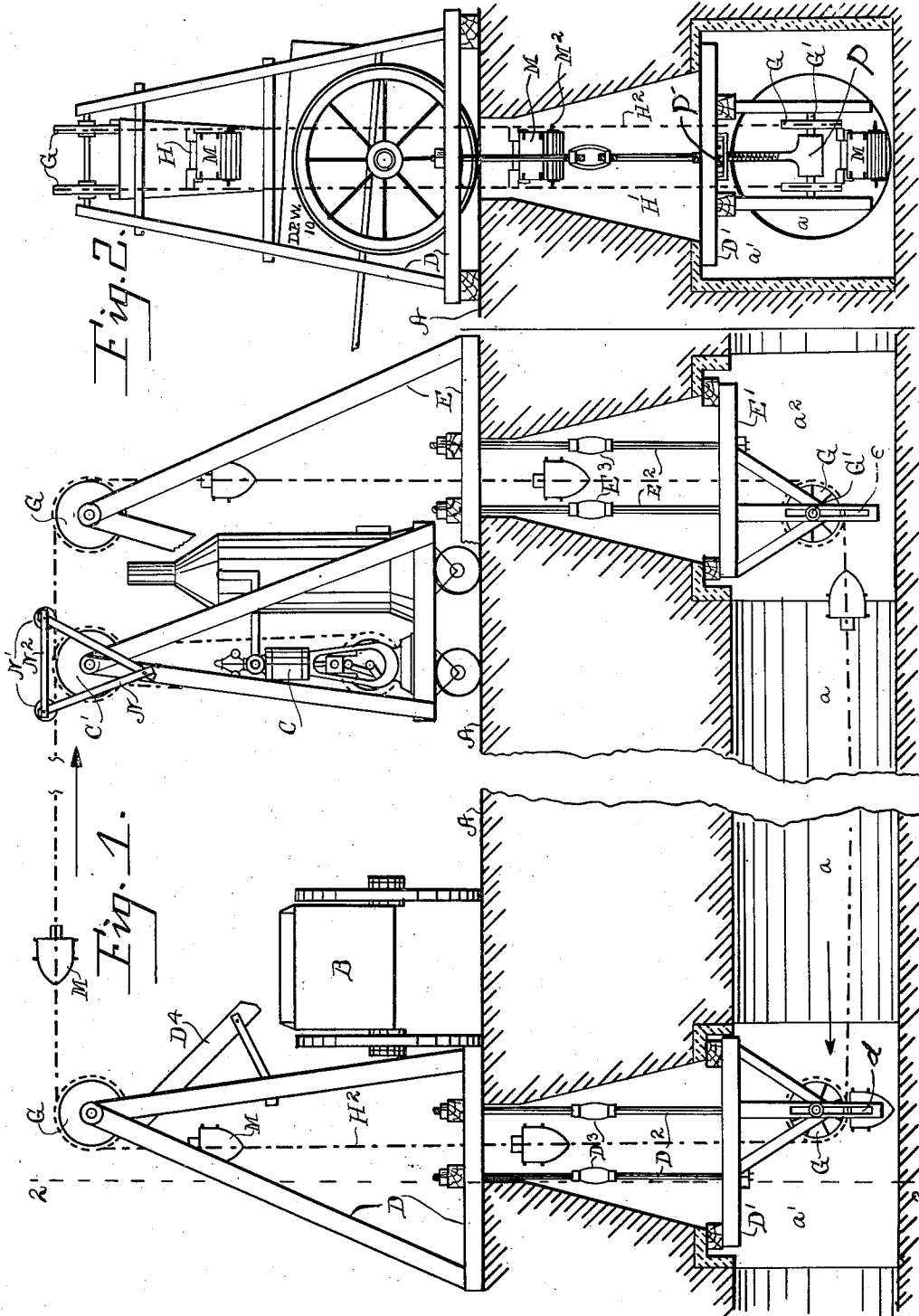


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 MEANS OF CLEANING SEWERS.
 APPLICATION FILED FEB. 8, 1909.

928,938.

Patented July 27, 1909.

2 SHEETS—SHEET 1.



Witnesses:
 Arthur Phelps Marr
 S. H. Stodder

Inventor
 Frank A. Cerruti
 Attorney
 Thomas Drew Stetson

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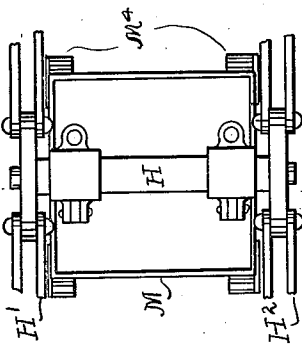


Fig. 5.

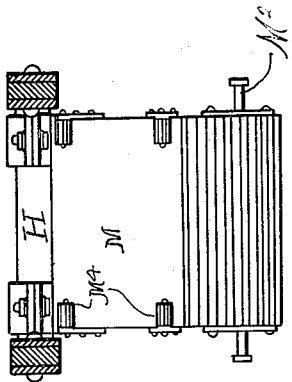


Fig. 4.

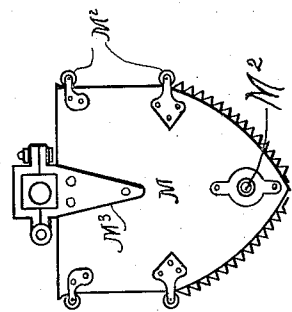


Fig. 3.

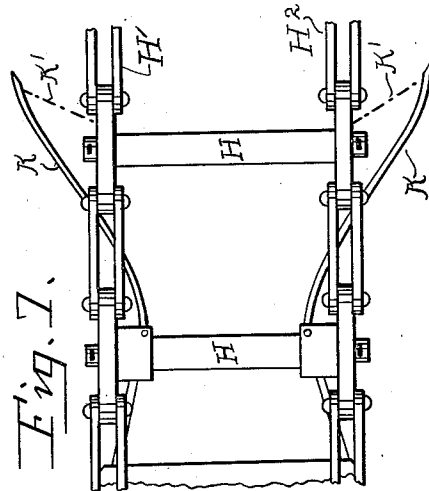
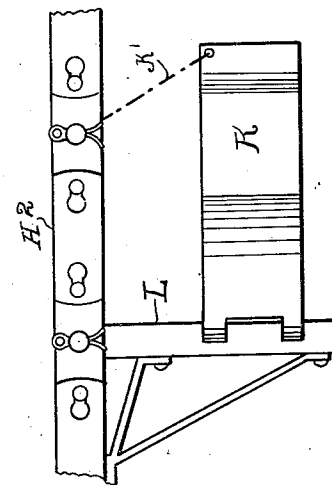


Fig. 1.

Fig. 6.



Witnesses:
 Arthur Phelps Ward
 S. H. Stodder

Frank A. Cerruti Inventor
 By Attorney
 Thomas Drew Stetson

UNITED STATES PATENT OFFICE.

FRANK A. CERRUTI, OF NEW YORK, N. Y.

MEANS OF CLEANING SEWERS.

No. 928,938.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed February 8, 1909. Serial No. 476,651.

To all whom it may concern:

Be it known that I, FRANK A. CERRUTI, a citizen of the United States, residing in the borough of Bronx, in the city and State of New York, have invented a new and useful Improvement in the Means of Cleaning Sewers; and I do hereby declare that the following is a full and exact description thereof.

The improvement applies more especially to sewers in which for any reason as smallness of the inclination and consequent sluggishness of flow, scarcity of water for long periods, or the presence of water therein unusually loaded with solid particles, the lower part of the interior becomes packed with solid particles having density and adhesive properties which it is difficult to dislodge even by the wasteful process of "flushing." My apparatus may be applied with advantage in some cases even to portions of sewers which are ordinarily kept fairly empty by the flow of water. It may be applied in all cases where there are manholes at any ordinary distances,—say fifty to a hundred and fifty feet apart.

Some of my apparatus has been long known and approved,—all as will be described. There will be little difficulty in purchasing or in making with ordinary tools and skill all that is required to clean large or small sewers even if badly choked. The removal of the semisolid material is effected by a rapid succession of buckets.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation of my apparatus with a vertical section of a sewer and two manholes in which it is being worked. Fig. 2 is an elevation at right angles to that in Fig. 1 and a corresponding vertical section of the sewer and of one of the manholes on the line 2—2 in Fig. 1. Fig. 3 is a side view of one of the buckets on a larger scale. Fig. 4 is a face view of the same. Fig. 5 is a plan view of the same. Fig. 6 is a side elevation showing the wings. Fig. 7 is a plan view corresponding to Fig. 6.

Similar letters of reference indicate like parts in all the figures where they appear.

A is the surface of the street, a the sewer and a' a^2 manholes, all of the ordinary construction, as is also the cart B which receives

and conveys away the material of whatever consistency removed by my apparatus.

C is a portable steam engine with boiler and appurtenances which actuates the driving sprocket wheels C' . These essential but ordinary parts are carried on a stout wheeled frame and provided with ordinary means not shown for reliably chocking or anchoring at any convenient point between the manholes.

D is a frame erected over the manhole a' , and D' is a frame mounted in the sewer under such manhole, the two frames being confined and released by tie rods D^2 and turnbuckles D^3 all the parts being arranged to allow a clear space in the middle.

E, E' , E^2 and E^3 are corresponding frames and securing means connected with the other manhole a^2 , and arranged to allow a clear space also in the axial line. Each of these frames carries pulley wheels for two stout chains running side by side down the manhole a^2 , along the stretch of sewer between the manholes, up the manhole a' and along the air above the street, back to frame E. I will use the same letter G for all these "carrying" pulleys.

H' and H^2 are the two main chains and H are cross-bars connecting them. The wheels C' strongly revolved by the engine C as required, engage and release the two chains alike. The chains run strictly parallel and wide enough apart to allow the buckets to be carried between them and to be partially revolved in opposite direction at each traverse.

D^4 is an inclined chute mounted in the framing D adapted to receive the mud descending from each bucket as it is tilted above and lead it into the cart.

M M are the buckets carried between the chains. Each is fixed on a cross shaft H' free to partially revolve in bearings in each chain. Each bucket is rounded at its bottom and transversely corrugated, and each is provided with a sufficient projection M^2 on its right and left sides to engage with the chain on that side and prevent its completing a rotation. Additional pulleys carried on frames set at any required intervals hold up the chains and the unfilled buckets as they traverse horizontally along the route above the street. The driving wheels C' give the required continuous or intermittent or reversed motion to the two chains.

The chains H' H^2 may be any of the styles

of chain adapted to receive motion from properly shaped teeth on the wheels C' and to allow of introducing or taking out links to cause the chains and the buckets to traverse the sewer at lower and lower levels as the work between any given manholes proceeds. In places where modern practice has introduced manholes so near together as to involve too much labor in effecting the required removals and readjustment it may be expedient in the use of my invention to make the chains long and the buckets many, and to extend each stretch so as to pass one or more manholes,—in other words make the lengths treated at one time include a much longer stretch than the distance between one manhole and the next.

Each frame D' and E' is provided with means shown as simple slots *d*, *e*, which allows the bearings of the pulleys G supported therein to be raised and lowered. In commencing to treat a section deeply filled with hard or relatively hard deposit these lowermost pulleys G should be held near the top of the interior of the sewer. As the work proceeds these pulleys and consequently the nearly horizontal path of the chains and the buckets in moving along in the sewer may be lower. Considerable variations in the slack of the chains are allowable.

The raising and lowering of the lower pulleys G is effected with convenience by mounting each pair of those lower pulleys on a cross-shaft G', and carrying the latter in a holder having a screw-threaded extension upward engaging a large circular nut P', see Fig. 2. This latter is provided with holes into which may be inserted any convenient pin to serve as a short lever by which it may be turned, the turning in one direction raising and in the other direction lowering the holder P, and correspondingly changing the depth in the sewer at which each bucket will make its traverse. To effect great changes the engine C must be stopped and the chains H' H² lengthened or shortened, but when the chains are moderately slack small adjustments of the depth of the traverse in the sewer may be made without stopping the mechanism.

To leave sufficient clear space in the middle of the respective manholes, the tie-rods D² must be as near the sides of the manhole as possible. The buckets M may be made of sheet steel rectangular in plan view. At each end is riveted an ear M³ which is enlarged at the top and provided with a hinged binder and fastening bolt as indicated in Figs. 3 and 4. The cross-bar H is square except in the bearings near each end by which it is carried in the chains H', H².

The projections M² may be the projecting ends of a bar extending through the interior of the bucket, but I prefer to keep the interior as clear as possible to facilitate the

emptying, and have represented the projections as each made independently and riveted on. They perform the important duty of engaging with the chains H', H², and thereby arresting the revolving motion of each bucket in the right position, as it partially revolves alternately in one direction or the other on its cross-bar H.

There is a liability under some conditions for the chains to slip off by rising above their correct positions, as they pass the toothed driving wheels C'. I prevent this by providing above each chain H, rollers N', carried on the ends of bars N² and held down by inclined braces N attached to the supporting frame C². This arrangement leaves the space directly above the sprocket wheel free so that the chain can be deflected slightly upward in passing, or the sprocket teeth may project up through the chain or both.

Figs. 6 and 7 show attachments K L to be applied to the chains and compelled to traverse along the sewer with the chains, being removed by hand or otherwise as they approach the ascending manhole *a'*. What I will term "wings" are set obliquely to the line of motion and adjustable by light chains K' K' on a frame L, carried by the main chains H', H². The parts do not for this work require to be very accurately formed or very carefully worked. There may be a difference between one side and the other,—or only one wing may be used so as to treat only one side at a time. It is only important that the wings shall slice off, or some way get hold of, the solid or semi-solid matter lying out of the path of the buckets and by their form and position utilize the power of the engine C and the endless chains H', H² to draw more and more of the material at the several successive traverses into the ditch or watery channel which has been before excavated near the center line, and cause all of it which is not borne away by the gentle current in the sewer to be lifted by the rapidly and persistently following buckets and transferred into the cart.

M⁴ are rollers carried on the several buckets which serve to reduce the abrasion on the bottom of the sewer if the chain is too much lowered.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Portions of the apparatus may be used without the whole. Other means than the screw-threaded support P and its nut may be used to raise and lower the chains in their passage along the sewer. Other forms of links than shown may be used to form the chains, but it is important to have many of them wide, forming each a bearing for a cross shaft carrying a bucket and also to have all or a large number of them capable of being

rapidly disconnected to allow the chains to be lengthened or shortened when required.

I claim as my invention:

1. In combination with a sewer, endless chains and provisions for moving them, arranged to traverse two manholes, and a portion of the street and of the interior of the sewer, and cleaning means operated by such chains, comprising buckets pivoted between, with liberty to partially revolve, having bottoms rounded and roughened, and having the sides presented toward the chains equipped with projecting stops adapted to engage with the chains and prevent complete revolutions.

2. As a means for cleaning sewers, two endless chains extended down through a manhole, along the interior of the sewer, up through another manhole, and back above the surface of the street, in combination with buckets carried by such chains, wheels therefor arranged to keep the chains extended, sprocketed driving wheels engaged with the chains, a connected motor for revolving them, and hold-down rollers above the upper traverse of the chains arranged to leave the space above the driving sprocket clear and adapted to insure the continued engagement as herein specified.

3. In apparatus for cleaning sewers, two equal endless chains and means for traversing them, carrying buckets between, partially revolving on transverse axes, means comprising the rounded and roughened bottom engaging with the solid matter in the sewer for turning, and the pins M^2 contacting with the chains for holding each bucket in a horizontal position while traversing the interior of the sewer to another manhole, provisions by an upright traverse of the chain for raising the bucket face upward, dumping the contents, and for carrying the bucket at a high level back to the first manhole and causing it to descend for another operation.

4. In apparatus for cleaning sewers, two parallel endless chains carrying buckets suspended between, with liberty for making

partial revolutions, in combination with wheels M^4 carried on the buckets and running on the bottom of the sewer.

5. In apparatus for cleaning sewers, two equal endless chains and provisions for moving them in parallel paths adapted to traverse a portion of the sewer, to ascend in a manhole, traverse along above the street surface, and descend through another manhole, provisions for carrying buckets by such chains and thereby excavating a channel, and wings separately applied as required on such chains and caused to traverse thereby, arranged to increase the width of such channel.

6. In apparatus for cleaning sewers, endless chains and provisions for moving them arranged to traverse two manholes, and a portion of the street and of the interior of the sewer, provisions for carrying buckets by such chains and thereby excavating a channel, and provisions for lowering the path of such chains in the sewer and thereby increasing the depth of such channel, and wings separately applied as required on such chains and caused to traverse thereby, arranged to increase the width of such channel so that nearly the whole of the solid matter is dislodged.

7. In apparatus for cleaning sewers, two endless chains and provisions for moving them, traversing two manholes, and a portion of the street and of the interior of the sewer, and cleaning means operated by such chains, comprising a series of buckets following each other in a path between, descending through one manhole and ascending through another, a frame above and below each manhole, and tie-rods with turn-buckles for holding such frames in place with facility for removing at will.

Signed at New York, N. Y., this 27th day of January 1909.

FRANK A. CERRUTI.

Witnesses:

F. A. CHICKERING,
ARTHUR PHELPS MARR.