Nov. 18, 1924. 1,516,429

C. J. HARTLEY ET AL

SEWAGE DISTRIBUTOR

Filed Sept. 18, 1923

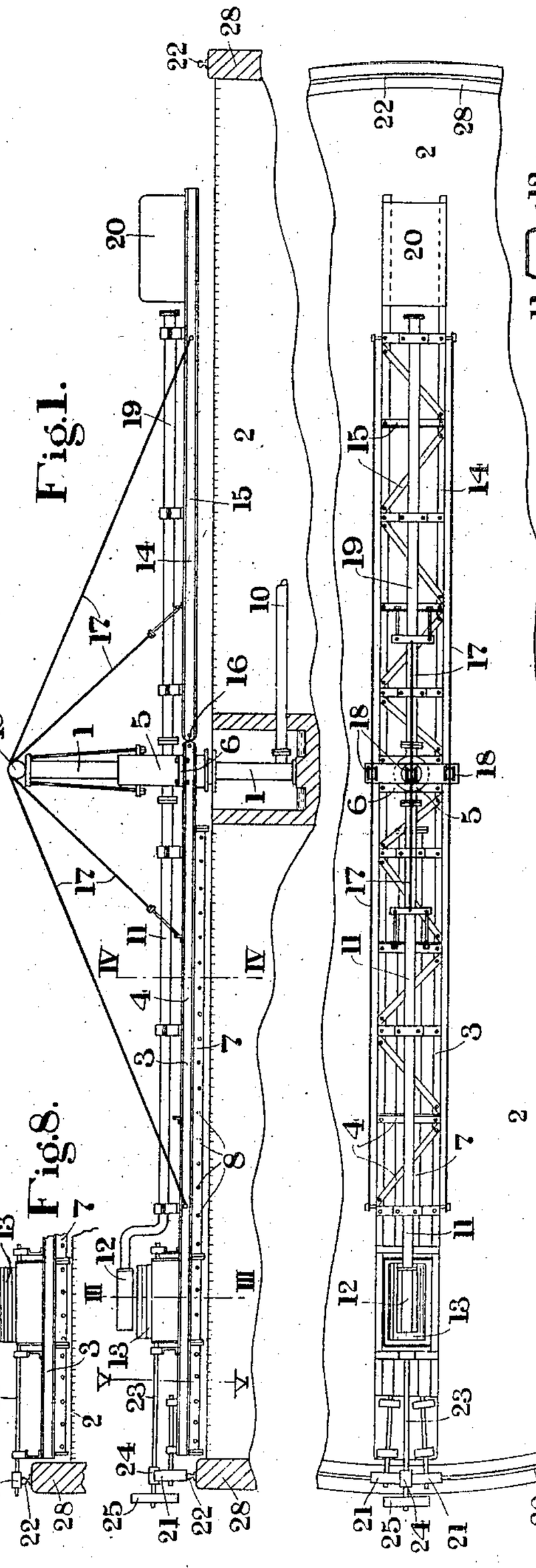

Fig. 1.

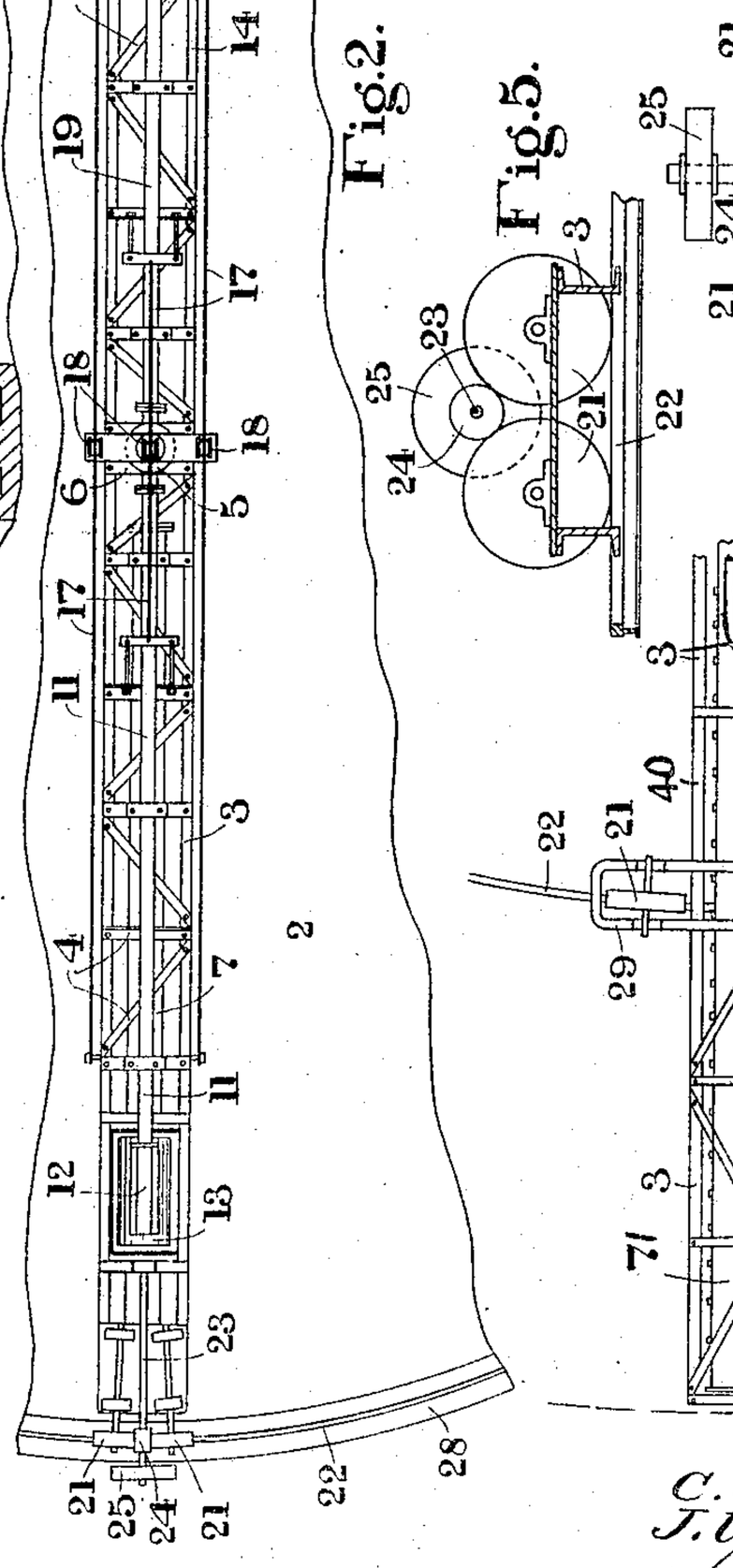

Fig. 2.

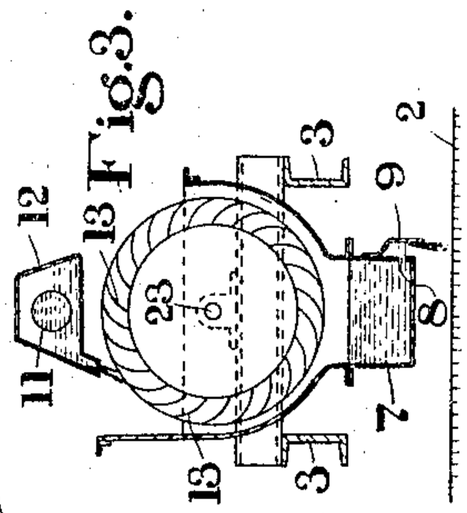

Fig. 3.

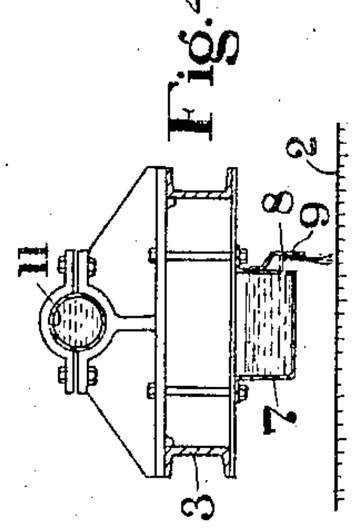

Fig. 4.

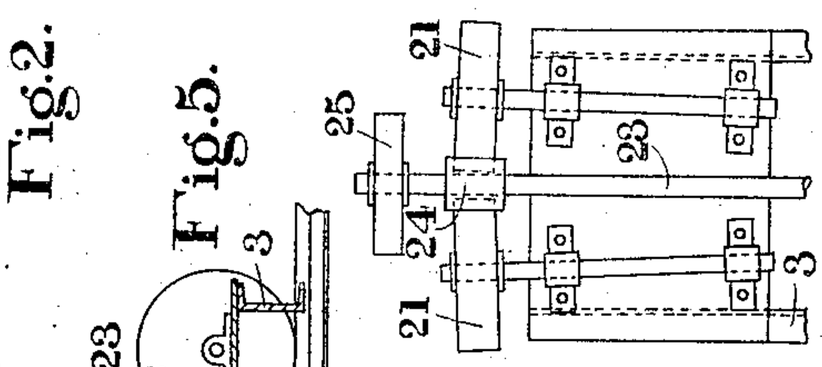

Fig. 5.

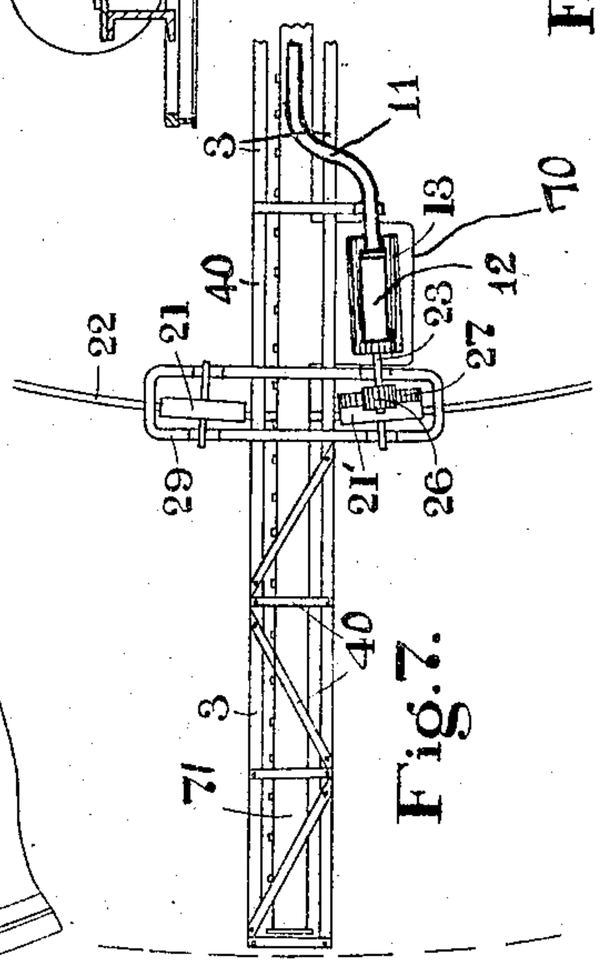

Fig. 6.

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

CYRIL J. HARTLEY AND JOHN W. HARTLEY, OF STOKE-ON-TRENT, ENGLAND.

SEWAGE DISTRIBUTOR.

Application filed September 18, 1923. Serial No. 663,479.

To all whom it may concern:

Be it known that we, CYRIL JOHN HARTLEY and JOHN WILLIAM HARTLEY, both subjects of the King of Great Britain, residing at Stoke-on-Trent, Staffordshire, England, have invented certain new and useful Improvements in Sewage Distributors, of which the following is a specification.

This invention relates to improvements in apparatus for distributing sewage and other liquor over filter beds and more particularly to those wherein the liquor is distributed by the radial arms, propelled around a central column by the flow of sewage which drives water-wheels which rotate track wheels carried by the arms and run in frictional contact with a circular track. When two opposed arms have been used for balancing purposes and the arms have been supported by sling ropes from the central column, the ropes contract and expand under varying weather conditions so that stresses are set up in the arms and the balance and the frictional driving contact of the track wheels are interfered with.

The invention consists in an improved apparatus of simpler and more economical construction wherein the above difficulties are avoided and efficiency and economy in running are effected.

In the drawings:

Figure 1 is an elevation of one form of the improved distributing apparatus showing part of the filter bed in section, the dash plates being omitted.

Figure 2 is a plan with the filter bed broken away.

Figures 3 and 4 are sectional elevations on III—III and IV—IV, Figure 1, respectively of the water-wheel and distributing arm, on a larger scale.

Figures 5 and 6 are respectively a sectional elevation and a plan of the track wheels and friction drive therefor, shown in Figures 1 and 2 the section being taken on V—V, Figure 1.

Figure 7 is a plan of another form of driving mechanism.

Figure 8 is a side elevation of a further form of driving mechanism, the dash plates being omitted.

In the form of apparatus shown in Figures 1 to 4, a hollow central column 1 is mounted on a filter bed 2. A radial distributing arm 3 is rotatably mounted on the central column. It comprises a lattice framework 4 which at its inner end is secured to a sleeve 5 rotatably supported on the central column 1 by means of a flange 6. The framework 4 carries a distributing trough 7 which extends from one end to the other of the distributing arm. It is suitably perforated to distribute sewage onto the filter bed 2; for example it has a series of holes 8 close to its bottom but on one side as shown in Figure 3. Dash plates 9 are fixed to the trough opposite to the holes 8 so that when the sewage impinges on the plates it is dispersed into films on the bed 2.

The sewage is fed to the trough 7 from an inlet pipe 10, through the hollow column 1, sleeve 5, and a pipe 11, fitted with a feed trough 12 which delivers it onto a water-wheel 13, which in turn discharges it to the distributing trough 7. The pipe 11, feed trough 12 and water wheel 13 are all supported by the lattice framework 4.

In order to equalize the distribution of the sewage over the filter bed 2, the water-wheel 13 is arranged at a point which, considered radially from the center of the bed, lies over a dividing circle between two equal areas of the bed 2.

In order to balance the distributing arm 3 a radially opposed balancing arm 14 is provided. In the form shown it comprises a lattice framework 15 which is pivotally connected at 16 to the framework 4. The two frameworks 4 and 16 are supported by sling ropes 17 which are connected at their ends to the two frameworks and pass freely over the top of the column 1, for instance they pass over pulleys 18 freely mounted on the column. In order that the balancing arm shall properly balance the distributing arm it is conveniently provided with a pipe 19 closed at its outer end but otherwise similar to the pipe 11, and also with a counter weight 20 which can be adjusted initially so that the balancing arm balances the distributing arm. The distributing arm 3 is provided with track wheels 21 which run on a circular track 22 and are rotated by the water wheel 13 through suitable power transmission mechanism. When the track 22 is mounted on an outer wall 28 of the filter bed it is convenient to provide the shaft 23 of the water wheel 13, as shown in Figures 1 and 5 with a small friction driving wheel 24 in driving contact with the track wheels 21, the shaft 23 also having a fly wheel 25. In the form shown in Figure

7 the sewage is fed by a pipe 11 to a feed trough 12 and thence to a water wheel 13 which is situated above a trough 70 which forms a lateral extension of and communicates with the distributing trough 71. The lattice framework 40 which supports the distributing trough 71, extends over the trough 71 to the outer end thereof. The shaft 23 of the water-wheel 13 has a small toothed wheel 26 which meshes with a toothed wheel 27 secured to one of the track wheels 21′. This arrangement is convenient when the filter bed has no surrounding wall in which case the track 22 is suitably supported above the filter bed in a position nearer the center of the bed. The track wheels 21′ are then conveniently mounted in a frame 29 carried by the lattice framework 40.

In the form of drive shown in Figure 8, a track wheel 21× of small diameter is mounted directly on the shaft 23 of the water-wheel 13, the track 22 being supported by the outer wall 28 higher above the filter bed 2. This track 22, Figure 8, may be arranged slightly eccentrically around the centre column of the filter bed, a wide track wheel 21× as shown being used so that the wear thereof is distributed.

The arrangements described enable a high speed water-wheel to be used which is an advantage with a comparatively low head of driving fluid such as is usually available in sewage plant.

As the distributing arm is driven by the high speed frictional drive, the importance of constant or uniform pressure of the track wheels on the track is obvious and this is maintained by the invention which ensures constant balance due to the automatic action of the sling ropes under all weather conditions.

We claim:

1. Apparatus for filtering sewage or other liquor comprising a filter bed having a circular track, a central column on said filter bed, a radial distributing arm rotatably mounted on said column and bearing on said track, a radial balancing arm pivoted to said distributing arm and extending to the opposite side of said filter bed to said distributing arm, and sling ropes connecting said arms, said sling ropes being freely supported on said central column for the purpose of permitting said balancing arm to rise and fall as said ropes contract and expand under varying weather conditions, whereby said distributing arm may remain at constant level substantially as and for the purpose hereinbefore set forth.

2. Apparatus for filtering sewage or other liquor comprising a filter bed having a circular track, a central column on said bed, a radial distributing arm rotatably mounted on said column, a balancing arm pivoted to said distributing arm and situated on the opposite side of said column to said distributing arm, sling ropes connecting said arms and freely supported by said column, track wheels carried by said distributing arm and running on said track, a water-wheel on said distributing arm actuated by the liquor fed thereto, and means for transmitting the motion of said water-wheel to said track wheels, substantially as and for the purpose hereinbefore set forth.

3. Apparatus for filtering sewage or other liquor comprising a filter bed having a circular track, a central column on said bed, a radial distributing arm rotatably mounted on said column, a balancing arm pivoted to said distributing arm and situated on the opposite side of said column to said distributing arm, sling ropes connecting said arms and freely supported by said column, a distributing trough and a water-wheel on said distributing arm, means for feeding liquor to said water-wheel and thence to said trough, said water-wheel having a shaft, track wheels on said distributing arm engaging with said track and power transmission means between said shaft and said track wheels substantially as and for the purpose hereinbefore set forth.

4. Apparatus for filtering sewage or other liquor comprising a filter bed having a circular track, a central column on said bed, a radial distributing arm rotatably mounted on said column, a balancing arm pivoted to said distributing arm and situated on the opposite side of said column to said distributing arm, sling ropes connecting said arms and freely supported by said column, a distributing trough and a water-wheel on said distributing arm, means for feeding liquor to said water-wheel and thence to said trough, track wheels on said distributing arm engaging with said track, said water-wheel having a shaft, a friction wheel on said shaft in driving contact with said track wheels and a fly-wheel on said shaft, substantially as and for the purpose hereinbefore set forth.

5. A rotary distributor for sewage or other liquor comprising a filter bed, two opposed radial arms for distributing sewage on said bed, a central column and a circular track on said bed, means for rotating said arms about said column by frictional contact with said track, and sling ropes connecting said arms and freely passing over the top of said column, substantially as and for the purpose hereinbefore set forth.

In testimony whereof we have signed our names to this specification.

C. J. HARTLEY.
J. W. HARTLEY.