T. J. HUTCHINSON.

DIGESTER.

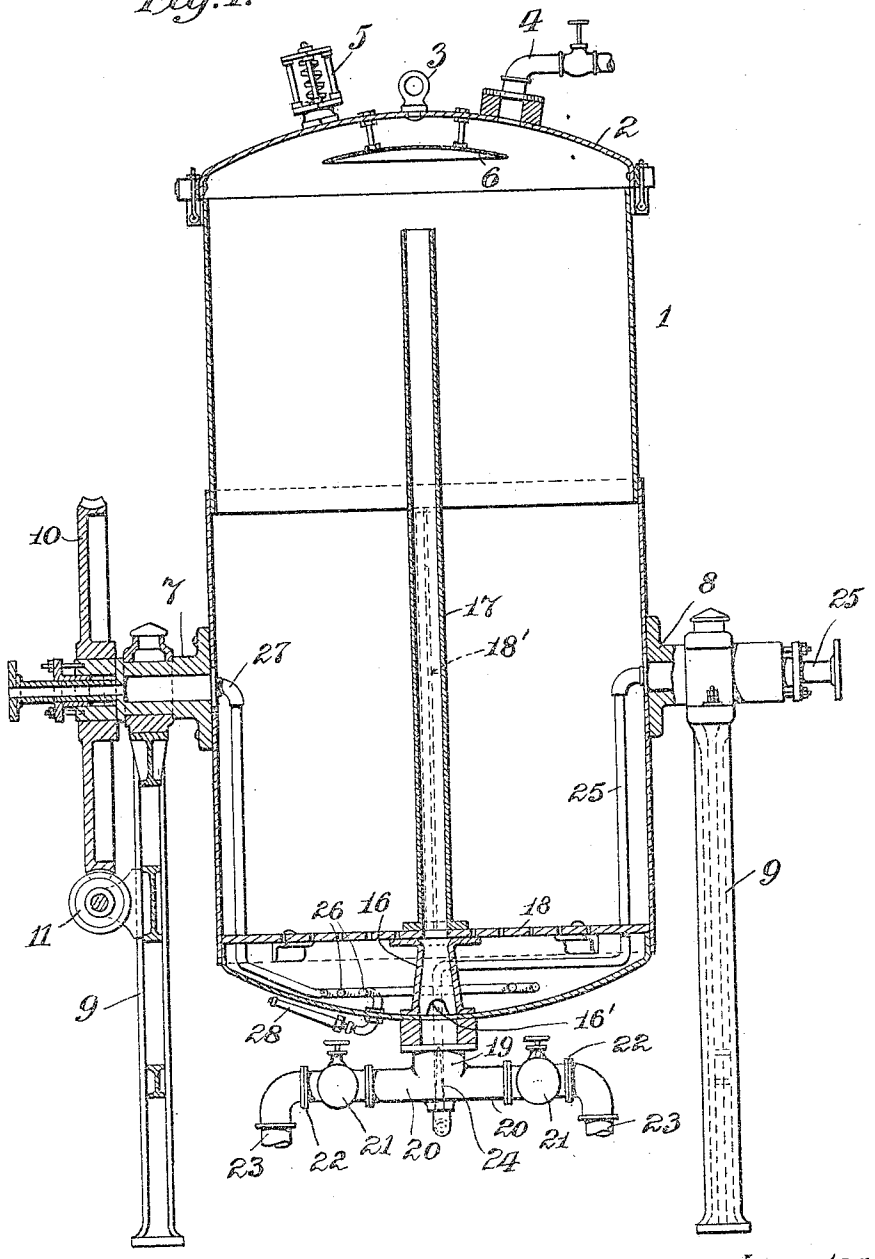
APPLICATION FILED DEC. 28, 1907.

914,349.

Patented Mar. 2, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



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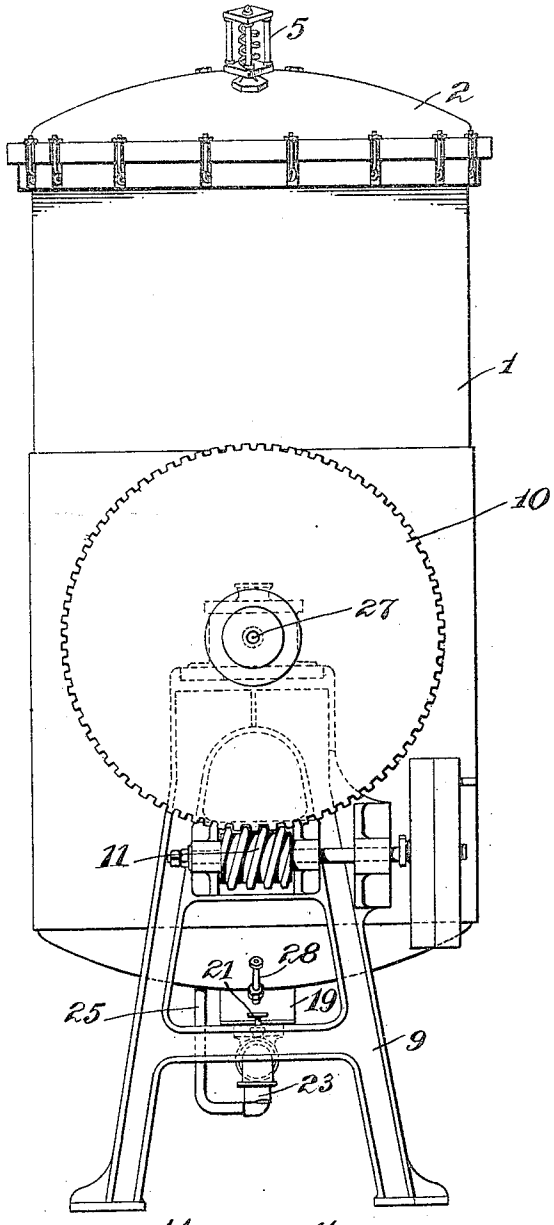
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

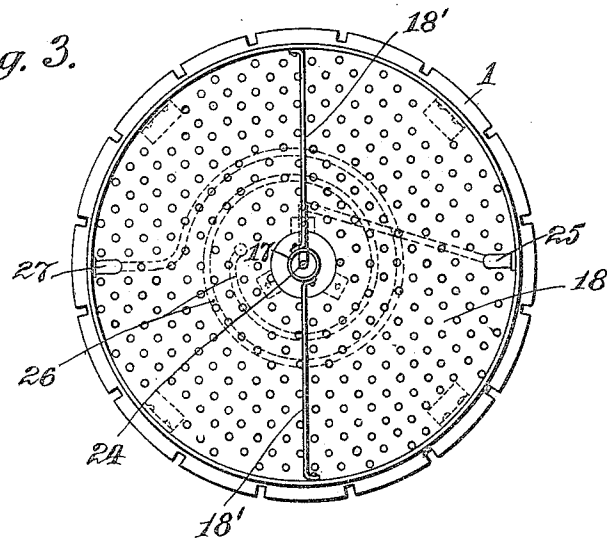
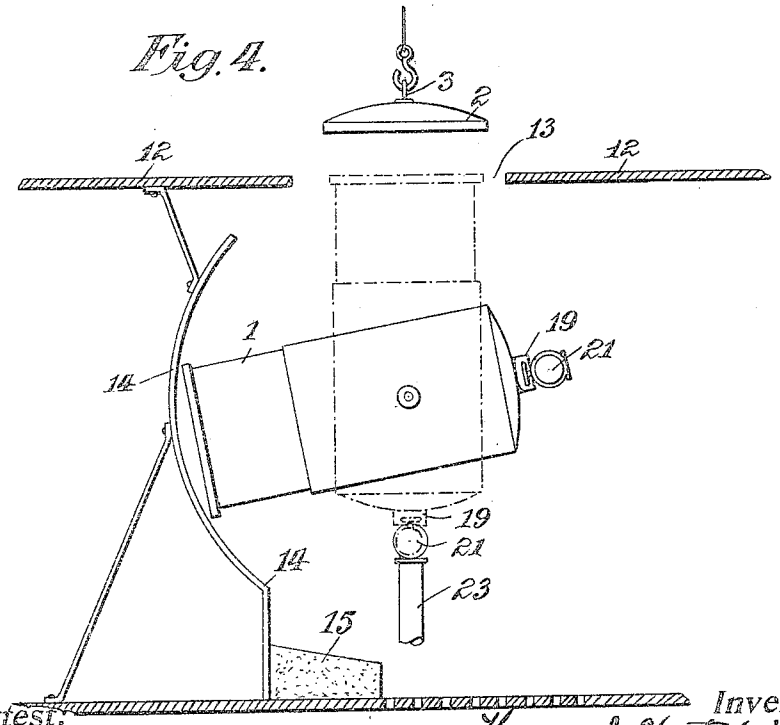


Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS J. HUTCHINSON, OF MANCHESTER, ENGLAND.

DIGESTER.

No. 914,349. Specification of Letters Patent. Patented March 2, 1909.

Application filed December 28, 1907. Serial No. 408,340.

To all whom it may concern:

Be it known that I, THOMAS J. HUTCHINSON, a subject of His Majesty the King of England, and a resident of Manchester, England, (whose post-office address is No. 54 Arcade Chambers, Manchester, England,) have invented certain new and useful Improvements in Digesters, of which the following is a full, true, and exact specification.

My invention relates to digesters and like apparatus in which solids may be subjected to the action of liquids under heat or pressure or both, and consists in an improved construction, arrangement and combination of the several parts and sub-combinations thereof, as hereinafter fully explained, whereby the operation of such apparatus will be greatly facilitated, and whereby also the processes of charging, treating and discharging with such apparatus can be expeditiously and efficiently carried on with the least amount of time and labor.

The invention further aims to produce a device of the kind mentioned in which the least number of parts are required to be manipulated in order to put the same in operation.

In the accompanying drawings forming an integral part of this invention, Figure 1 represents a central vertical section of one form of my improved digester; Fig. 2 is a side elevation of Fig. 1; Fig. 3 is a plan view of the digester receptacle with cover removed; and Fig. 4 is a side elevation with parts removed illustrating the operation and use of the invention.

The digester comprises a cylindrical receptacle 1 closed at the bottom and provided with an opening at its upper end which is substantially of the same diameter as the body of the receptacle so that the operations of charging and discharging the same may be carried on with the least obstruction. A removable cover 2 fits tightly on a marginal flange surrounding the opening, being secured to said flange by a series of pivoted bolts, as illustrated in the drawings, and is further supplied with a central tackle-eye 3 by means of which it may be lifted and removed, a valved inlet 4 for steam or other fluid, and a safety-valve 5 of obvious function. The cover also carries centrally, on its under side, a curved spreader-plate 6 secured to the cover by means of a number of studs and adapted to coöperate with the puffing pipe as later explained.

Somewhat nearer its bottom than its top the cylindrical receptacle 1 is provided with two horizontal hollow trunnions 7 and 8 secured to the opposite side walls in diametrical alinement, and each constituting an entrance to the interior of the cylinder. The trunnions are carried in bearings in the two upright supporting standards 9, and these are suitably supported on either side of a drainage space directly beneath the receptacle. A worm-gear 10 is secured to the projecting end of the trunnion 7 and meshes with the worm 11 of a horizontal drive-shaft carried on the standard. Power applied to this shaft serves to rotate the wheel and tilt the receptacle into an inverted position so as thereby to discharge its contents onto the drainage space above mentioned. The employment of the worm-gearing, besides being positive and powerful in its action, serves the further advantage of maintaining the receptacle rigidly in its upright position and prevents swinging of the receptacle when it is inverted. The location of the trunnions somewhat below the center of the receptable brings the tilting axis substantially level with the center of gravity when the receptacle is charged, or after the contents have settled, and hence less power is required for discharging; but greater security is required for holding the receptacle upright when empty or receiving its charge. The cylindrical receptacle as thus mounted is used in conjunction with a charging platform 12 immediately above it (Fig. 4), and an aperture 13 is provided in this platform to receive, or at least register with, the wide entrance to the receptacle when erect. The cover is bodily removed through the aperture 13 by means of any appropriate hoist engaging the tackle-eye 3 above mentioned, and as indicated by Fig. 4. Adjacent and parallel to the path of movement of the opening or mouth of the receptacle as the same is tilted to inverted position there is provided a curved retaining wall 14, suitably braced from the floor and ceiling or platform, which serves to retain and confine the contents of the receptacle during the movement from upright to inverted position, the said wall being close to the mouth of the receptacle and co-extensive with its said path of movement between the two po-

sitions, so that the contents cannot find their escape until the drainage space is reached. An inclined slab or block of concrete 15 is planted at the base of the curved wall for receiving a portion of the charge and draining it.

The interior of the receptacle contains a perforated false bottom and a puffing-pipe. The latter is formed of a base section 16 secured to the bottom wall of the receptacle in line with the exhaust passage therethrough and a riser section 17 which is suitably braced from the sidewalls by means of the braces 18′ (Fig. 3). The false bottom, designated 18, is conveniently interposed between the two sections of the puffing-pipe, and all three are securely bolted together so that the passage through the puffing-pipe is continuous from end to end and in alinement with the exhaust passage in the bottom of the receptacle. The base section 16 is supplied with lateral openings 16′ through which the liquid contents may flow into the interior of the pipe and through the exhaust passage. An exhaust-head 19 forming a continuation of said exhaust passage is secured to the bottom wall of the receptacle, and is formed with two or more branches 20, each supplied with a shut-off valve 21 and coupling flanges 22. The exhaust-head, as stated, is carried by the receptacle as a part thereof and when the latter is restored to its normal vertical position after discharge, the branches 20 are thereby brought into registry with the coupling-heads of two or more corresponding drain-pipes 23, to which they are adapted to be removably coupled in any suitable manner. By appropriate manipulation of the shut-off valves 21, it is obvious that the liquid contents of the receptacle may be drawn off into any desired drain-pipe, according to the nature of the liquid or the facilities for recovering the chemicals thereof, or for any desired purpose.

The puffing-pipe is intended to direct an upward stream of the liquid in the receptacle against the spreader-plate 6 so as to create a circulation within the receptacle, and for this purpose it is supplied with an injector nozzle 24 located within the main trunk or body of the exhaust-head 19. The steam or other motive fluid for this nozzle is supplied through the hollow trunnion 8, and the pipe 25 thereof leads from thence through the bottom of the receptacle to the exterior and enters the receptacle again at the center of the exhaust head. By this arrangement the said injector supply may be a permanent part carried by the apparatus, when tilted, but is nevertheless accessible for renewal or repair.

Between the false and real bottoms of the receptacle is located the heating-coil 26, and the steam or other heating medium therefor is supplied through a pipe 27 entering the receptacle through the other trunnion 7, and the coil has its escape vent 28 attached to the exterior of the receptacle so that this connection also does not require to be disturbed by the tilting of the vessel.

It will be understood that the several parts of the foregoing apparatus are intended to be assembled and united according to the best practice, although the details of such construction are not illustrated in the drawings, and also that packings and other appurtenances to machines of this character are intended to be employed wherever needed.

It is believed that the operation and various uses of the apparatus will be apparent to those skilled in this art without further explanation, and it is to be understood that my invention is not limited to the specific form of apparatus shown in the drawings, but that it is capable of variation in the construction and shape of its several parts without detracting from its merits as a whole, and

What I claim and desire to secure by Letters Patent is as follows:

1. A digester comprising a normally vertical receptacle having a removable cover closing its upper opening and trunnions upon which said receptacle is adapted to be tilted, in combination with a curved wall adjacent to the path of movement of said upper opening and adapted to retain the contents within the receptacle during the tilting of the same.

2. A digester comprising a normally vertical receptacle having an upper opening substantially equal to its diameter and a removable cover therefor, in combination with means for inverting said receptacle, a fixed curved wall adjacent and parallel to the path of movement of said upper opening and coextensive with said path of movement between the charging and discharging positions of said receptacle.

3. A digester comprising a normally vertical receptacle having an upper opening and cover therefor, and means for inverting said receptacle to discharge, in combination with a curved retaining wall for said opening coextensive with its path of movement between charging and discharging positions, a draining floor beneath the receptacle and an inclined slab between said floor and the base of said retaining wall.

4. A digester comprising a normally vertical receptacle adapted to be tilted on a horizontal axis to discharge, and provided with an opening at its upper end, and a platform having an aperture adapted to register with said opening in upright position in combination with a curved retaining wall adjacent to the path of movement of said opening and adapted to retain the contents therein during the tilting of the recep-

tacle, and a drainage floor beneath the receptacle.

5. A digester comprising a normally vertical receptacle having trunnions upon which it is adapted to be tilted and a puffing pipe within the receptacle, in combination with an exhaust head for said receptacle with its main channel registering with said puffing pipe and provided with branches leading from said main channel and an injector nozzle for said pipe located in said main channel.

6. A digester comprising a tilting receptacle provided with a hollow trunnion, a puffing-pipe within the receptacle, an injector pipe passing through said trunnion and receptacle and entering the receptacle from the exterior thereof in line with said puffing-pipe.

7. In a digester, a receptacle having an exhaust passage and a puffing-pipe within the receptacle registering therewith, in combination with an injector nozzle supported on the receptacle in alinement with said puffing pipe.

8. In a digester a tilting receptacle having an exhaust head secured to its bottom and an injector nozzle carried by said exhaust head and adapted to discharge through the exhaust passage of the receptacle.

9. In a digester, a tilting receptacle having a false bottom, a puffing-pipe secured thereto and provided with a base-section interposed between the same and the bottom of the receptacle, said base section being provided with an opening to permit entrance of the digesting liquor to said puffing-pipe.

10. In a digester, a puffing-pipe formed in sections, the lower section thereof having lateral openings in combination with a false bottom interposed between said sections and having an aperture registering therewith.

11. In a digester, a tilting receptacle provided with a bottom discharge opening and an exhaust head attached thereto, in combination with an injector nozzle carried by said exhaust head.

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

THOS. J. HUTCHINSON.

Witnesses:

DAVID SLUTER,

JOHN A. LOWDE.