No. 639,791. Patented Dec. 26, 1899.

D. SULLIVAN.

DIGESTER.

(Application filed Mar. 22, 1899.)

(No Model.)

Fig. 1.

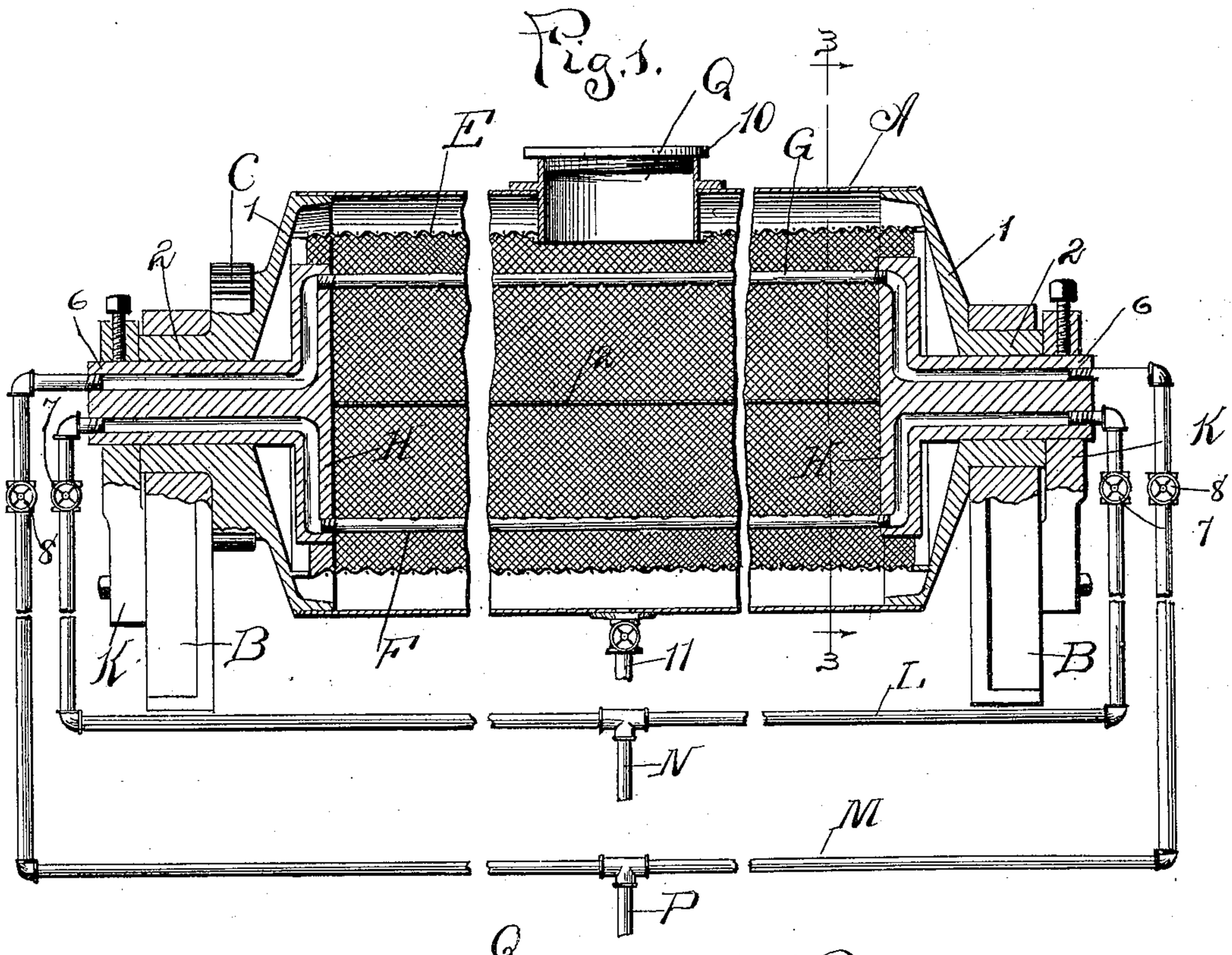


Fig. 2.

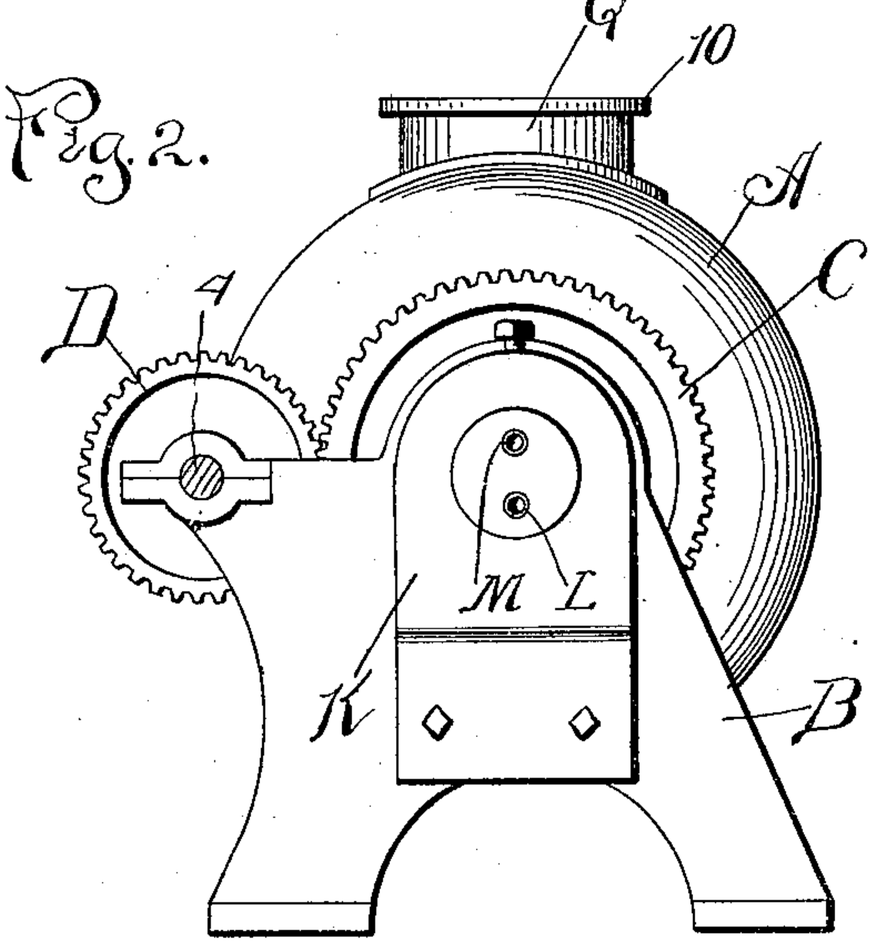
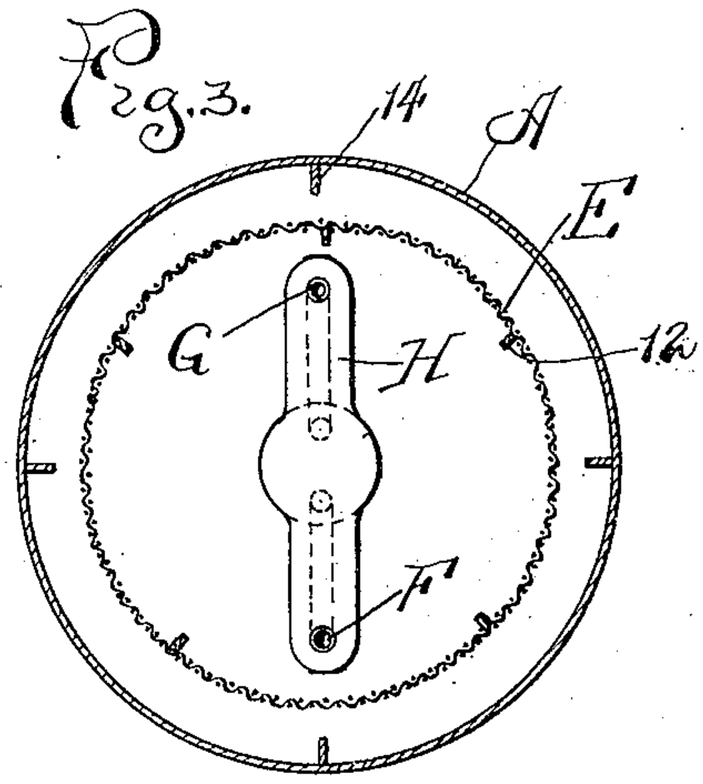


Fig. 3.



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UNITED STATES PATENT OFFICE.

DANIEL SULLIVAN, OF CHICAGO, ILLINOIS.

DIGESTER.

SPECIFICATION forming part of Letters Patent No. 639,791, dated December 26, 1899.

Application filed March 22, 1899. Serial No. 710,033. (No model.)

To all whom it may concern:

Be it known that I, DANIEL SULLIVAN, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Digesters, of which the following is a specification.

My invention relates to apparatus for treating refuse matter—such as hides, horns, bones, and the like—so as to extract or secure the glue therefrom.

Prominent objects of my invention are to provide a simple, practical, and effective apparatus of this kind, to arrange for the thorough and economical treatment of the refuse matter, to arrange for the easy separation of the useful and waste products and the separate withdrawal of each, and to accomplish the above results in an inexpensive manner.

In the accompanying drawings, Figure 1 is a vertical section of a digester embodying my invention. Fig. 2 is an end elevation of the same, and Fig. 3 is a vertical section taken on line 3 3 in Fig. 1.

In the steam-digester which I have shown in the drawings a rotary receptacle, such as the cylinder A, is mounted for rotation upon suitable standards or pillars B B. As a simple arrangement for allowing the rotation of this cylinder A its heads 1 1 are constructed so as to form journals 2 2, adapted to work in the bearings formed in the standards or pillars B B. The cylinder A can be rotated by any suitable power-transmitting connection—as, for example, a pair of intermeshing gear-wheels C D, the former of which is mounted upon one of the cylinder-heads 1 and the other of which is mounted on a suitable driving-shaft 4.

Within the rotary cylinder A is arranged a permeable receptacle, such as the perforate or gauze cylinder E, which desirably rotates with the cylinder A. The ends of this perforate cylinder E are extended to the cylinder-heads 1 1 and are secured thereto in any desirable way.

Within the perforate cylinder E are an inlet and an outlet, such as the perforated or apertured horizontally-arranged pipes F and G. These inlet and outlet pipes F and G are desirably mounted so as to remain stationary and are extended for connection out of the cylinder A. A simple arrangement is to fit the opposite ends of the pipes into a couple of vertically-arranged chambered supports H H, which are constructed with cylindrical portions 6 6. These cylindrical portions are extended through the journals 2 2 provided by the cylinder-heads 1 1, which journals are to such end suitably bored or cored. The outlet ends of the cylindrical portions 6 6 are fitted into and held stationary by a couple of supports K K, which are conveniently secured to the pillars B B.

Inlet and outlet pipes L and M are attached to the extensions 6 6, so as to communicate with the inlet and outlet passages thereof. These pipes L and M are conveniently provided with valves 7 7 and 8 8 and their ends are respectively united so as to form a single inlet and outlet pipe N and P. It is understood that the pipe N is connected with a suitable source of steam-supply and the pipe P to a suitable exhaust-pipe or chimney.

The cylinder A is provided with a manhole Q, extending inwardly so as to communicate with the interior of the perforate cylinder E and having a cover 10. The cylinder A is also provided with a valve drain-pipe for outlet 11.

In using the apparatus the matter to be treated is introduced within the interior of the rotary screen E by way of the manhole Q, which latter is then closed. The steam is then turned on through the pipe N, so as to cause it to enter the interior of the cylinder A by way of the perforations or apertures in the steam-pipe F. At the same time the cylinder A is revolved by means of the gear-wheels C and D. In this way the material under treatment is supported by the portion of the rotary screen E which happens for the time being to be lowermost. When so supported, it is elevated slightly and then allowed to drop back of its own accord, so that it is constantly turned over and over again. While being thus turned over and mixed, it is subjected to the action of the moist steam, which can, as a result of the continuous movement of the matter, penetrate and act upon every portion thereof. As a result the steam acts thoroughly and effectively and quickly. The useful product of the digestion, such as glue or the like, falls through the perforated screen E and collects at the lowermost por-

tion of the cylinder A. From thence it can be drawn by means of the drain 11 without drawing with it any of the refuse matter. The noxious fumes escape from the interior of the cylinder A by means of the outlet-pipe G, L, and N. The waste material can of course be withdrawn by way of the manhole Q.

The inside of the screen E is desirably provided with a number of longitudinal ribs 12, which serve to strengthen it and also to secure a greater extent of movement on the part of the material under treatment. The inside of the cylinder A is also provided with longitudinal ribs 14.

It will be observed that in my digester both the exterior imperforate cylinder and the interior perforate cylinder revolve simultaneously, in which way the material is more thoroughly treated, while at the same time the incoming steam acts continuously on different parts of the cylinders. It will also be observed that the steam issues from and the vapors leave by way of perforated pipes arranged within the inner perforate cylinder, in which way the treatment is extended throughout all parts of the apparatus and is thorough and effective in all parts of it. It will be further observed that the manhole Q extends from the interior of the inner cylinder to the exterior of the outer cylinder and is secured to both of the same, so that the openings in the two cylinders are always in alinement. This arrangement, taken in connection with the fact that the outer cylinder revolves as well as the inner one, permits one and the same manhole to be used both for introducing the material to be treated within the treatment-chamber and for removing the refuse therefrom.

What I claim as my invention is—

1. In a digester, the combination with the rotary imperforate cylinder containing a perforate cylinder, of perforated inlet and outlet pipes arranged within the perforate cylinder near the upper and lower sides thereof, and connections for establishing communication between said pipes and the exterior of the apparatus, said connections being extended through the axle of said imperforate cylinder, and being adapted to permit the rotation thereof.

2. In a device of the class specified, the combination of a rotary cylinder having its ends constructed so as to form journals; a perforate cylinder arranged within said rotary cylinder; perforated inlet and outlet pipes arranged longitudinally within the perforate cylinder; chambered supports to which the ends of said pipes are connected; chambered cylindric portions formed on said supports and extended through the journals on the cylinder-heads; and inlet and outlet pipes connected with said cylindric extensions so as to communicate with the passages thereof.

3. A digester comprising an exterior rotary cylinder, an interior perforate cylinder secured to the outer one so as to rotate therewith, a manhole extending outward from the inner cylinder and opening outside of the outer one, perforated pipes arranged longitudinally within the inner cylinder near its upper and lower walls, connections for said pipes extending out through the ends of the outer cylinder, and suitable bearings for said outer cylinder and for the connections for said perforated pipes.

Signed by me at Chicago, Illinois, this 20th day of March, 1899.

DANIEL SULLIVAN.

Witnesses:
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