(No Model.)

E. H. CLAPP.

PAPER PULP DIGESTER.

No. 305,740. Patented Sept. 30, 1884.

Fig 1

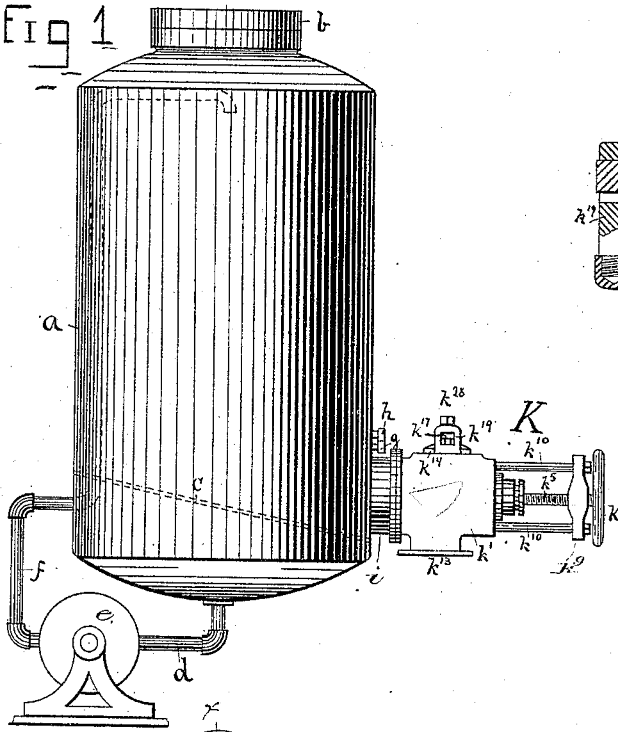


Fig 3

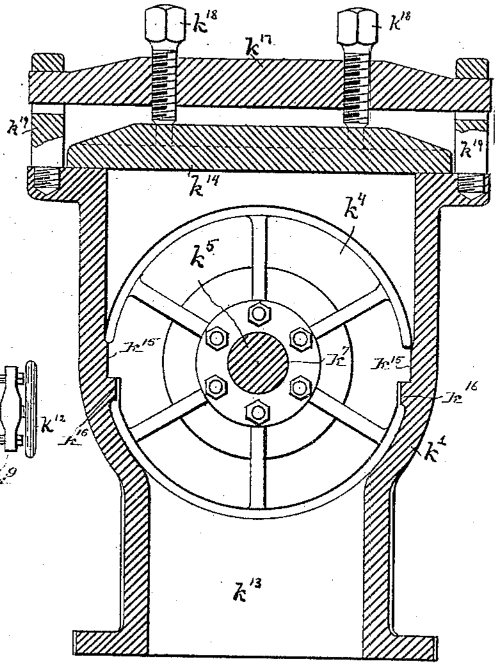
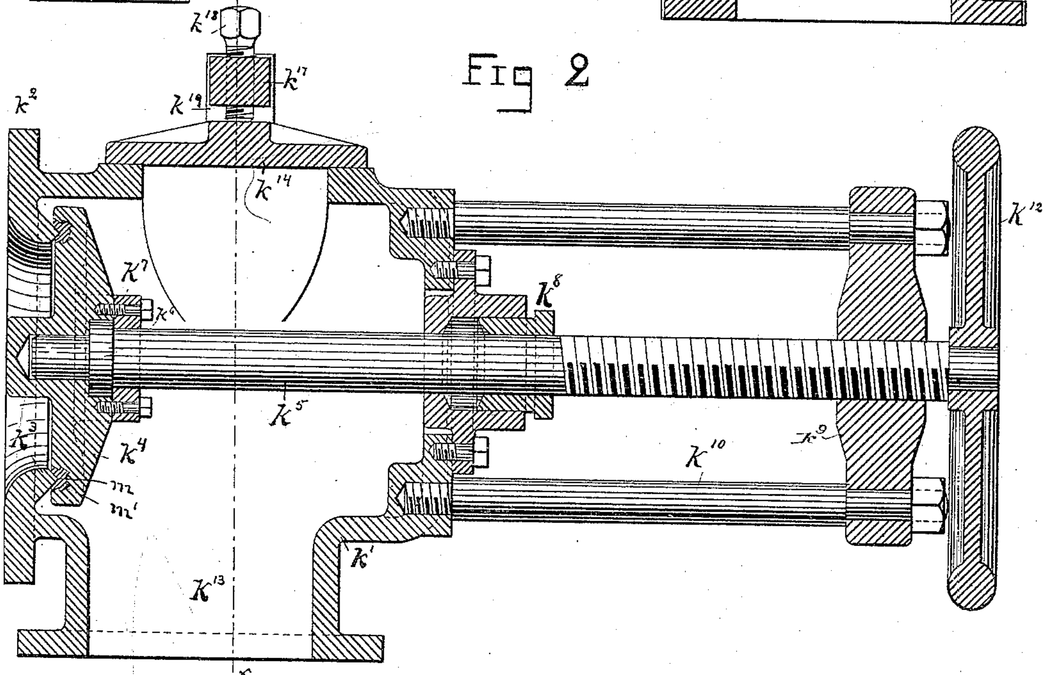


Fig 2



Witnesses

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UNITED STATES PATENT OFFICE.

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PAPER-PULP DIGESTER.

SPECIFICATION forming part of Letters Patent No. 305,740, dated September 30, 1884.

Application filed August 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, EUGENE H. CLAPP, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Pulp-Digesters, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to an apparatus for digesting wood pulp; and it consists in details of construction hereinafter specified.

The apparatus consists, essentially, of a tight case or receiver for containing the pulp material to be treated, the said receiver having within it the usual pipes or appliances for passing steam through the mass of pulp material, in order to properly heat the same, and also a pump for maintaining a circulation of liquid charged with the proper chemicals through the material in the receiver. A discharge-opening is provided for the pulp material, controlled by a valve seating on a ridge or annular projection surrounding the discharge-opening and constituting the valve-seat, the face of the valve being provided with a packing-ring of lead or equivalent soft metal where it engages the seat, thus insuring a tight joint unaffected by wear or chemical action. The valve is constructed, as hereinafter described, so as to enable it to be easily removed, and provided with a new packing-ring when one is worn out, thus enabling the valve to be kept in proper condition with but little cost or loss of time.

Figure 1 is a side elevation of an apparatus for digesting pulp material embodying this invention; Fig. 2, a longitudinal section of the valve through which the pulp material is discharged, on a larger scale; and Fig. 3, a transverse section of the said valve on line *x x*, Fig. 2.

The main tank or receiver *a*, provided with a removable cover or bonnet, *b*, to receive the pulp material and liquids and chemicals by which it is to be treated, may be of usual construction, it containing a perforated false bottom, (shown in dotted lines at *c*,) which supports the pulp material and permits the liquid to percolate through it, the said liquid collecting in the bottom of the tank and being drawn therefrom through a pipe, *d*, and forced by a suitable pump or forcing apparatus (shown at *e*, Fig. 1,) through a pipe, *f*, back into the receiver *a*, where it is delivered upon the top of the pulp material contained therein, again passing through the said material, which is heated by a suitable coil of pipes (shown as entering) leaving the tank at *g h*, the said pipe being supplied with steam from a suitable generator. When the pulp material has been sufficiently acted upon by the chemicals and is thoroughly digested, it is withdrawn from the lower end of the tank *a* through a discharge-passage, *i*, controlled by a valve, *k*, (shown on a larger scale in Figs. 2 and 3,) the said valve consisting, essentially, of a case or shell, k', provided with a flange, k^2, adapted to be bolted or otherwise fastened to the discharge-opening of the tank *a*. The said case k' is provided with an annular projection or raised valve-seat, k^3, (shown as V-shaped in cross-section,) which receives the valve proper k^4, operated by a stem, k^5, having a flange, k^6, secured by a collar, k^7, upon the valve k^4, so as to permit the said stem to rotate independently of the valve while moving the said valve longitudinally. The valve k^4 is provided with lugs k^{15}, resting on guide-ribs k^{16}, (see Fig. 3,) on the interior of the case k', which thus relieve the stem k^5 from lateral strain, and also prevent rotary movement of the valve relative to its seat, so that it always engages its seat in the same relative position and without sliding or rubbing action.

The main shell or casting k' is provided with a stuffing-box, k^8, through which the valve-stem k^5 passes, the portion of the said stem outside the stuffing-box being screw-threaded, as shown, and operating in a nut or threaded yoke, k^9, connected with the main casting by rods k^{10}, so that the rotation of the valve-stem by a suitable hand-wheel, k^{12}, causes the said stem to move longitudinally, withdrawing the valve k^4 from its seat or moving it up thereto, as may be desired.

In order to insure that the discharge-opening may be tightly closed by the valve, so that no liquid can escape therefrom while the pulp material is being treated in the digester, the said valve is provided with a packing-ring, *m*, of lead or equivalent soft non-corrosive material embedded in the face of the valve, and provided, as shown, with locking projections m', to securely fasten it to the said valve, the said ring being pressed in the seating of the valve upon the ridge k^3, which embeds itself therein, as shown, making an extremely tight joint.

The ring m is made by running the molten metal into a groove made to receive it in the face of the valve, the said groove being undercut to produce the locking projections m' in the ring.

The case k' of the valve is provided with an outlet, k^{13}, which, when the valve k is opened, communicates through the interior of the said case with the discharge-opening i from the digester, permitting the digested material to escape from the tank a into any suitable receptacle, and the said valve-casing is provided at its upper side with a removable cap or bonnet, k^{14}, held in place by a yoke, k^{17}, and bolts k^{18}, the said yoke entering slotted studs k^{19}, from which it can be removed by loosening without wholly removing the bolts k^{18}, thus enabling the said bonnet to be easily removed when it is desired to obtain access to the interior of the valve-casing for any purpose.

The opening in the case covered by the bonnet k^{14} is large enough to permit the valve k^4 to pass through it, and consequently, if the packing is injured or is destroyed, so that the valve leaks, the said valve may be disconnected from the stem by simply unbolting the collar k^7, after which it may be removed from the case and provided with a new packing-ring, or otherwise repaired.

I claim—

1. The combination, with a digester provided with a discharge-opening for pulp material, of a valve controlling the said opening, and a packing-ring of lead or equivalent yielding non-corrosive material, and a ridge or raised portion co-operating with the said packing-ring, substantially as described.

2. The discharge-passage for a paper-digester, combined with a valve and actuating-stem therefor, and a raised valve-seat, the said valve being provided with a packing-ring of lead embedded in its face and provided with locking projections securing it to the said valve, substantially as described.

3. The combination, with a paper-digester having a discharge-passage, of a valve apparatus controlling the said passage, composed of a case provided with a valve-seat and guides, a valve co-operating with the said seat and guided by the said guides, and a valve-stem by which the said valve is operated, substantially as described.

4. The combination, with a paper-digester having a discharge-passage, of a valve apparatus controlling the said passage, composed of a case provided with a valve-seat, and a co-operating valve and valve-stem detachably connected therewith, the said case being provided with a removable bonnet of sufficient size to permit the removal of the valve when detached from its stem, substantially as described.

5. The combination, with a paper-digester having a discharge-passage, of a valve apparatus controlling the said passage, composed of a case provided with a valve-seat and guides, a valve co-operating with the said seat and guided by the said guides, a packing-ring, and a valve-stem detachably connected with the said valve, the said case being provided with a removable bonnet of sufficient size to permit the removal of the valve when detached from its stem, substantially as described.

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

EUGENE H. CLAPP.

Witnesses:
JOS. P. LIVERMORE,
W. H. SIGSTON.