No. 696,314. Patented Mar. 25, 1902.

G. A. CLARK.

PULP REFINING ENGINE.

(Application filed Jan. 20, 1902.)

(No Model.)

Fig. 2.

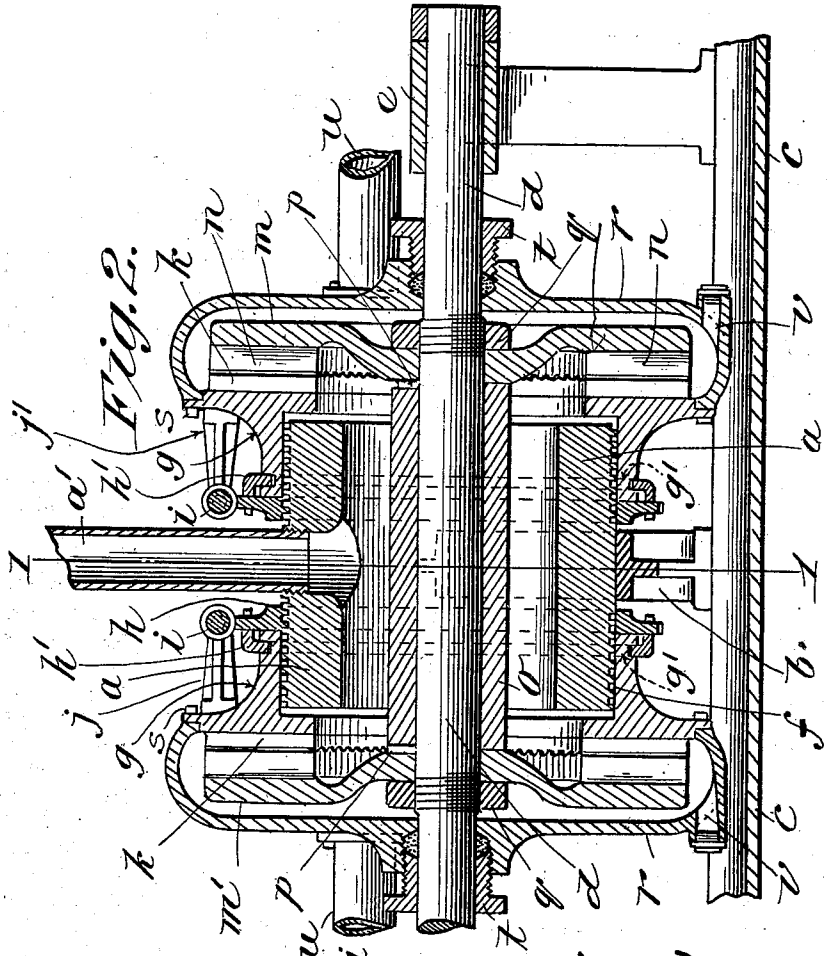
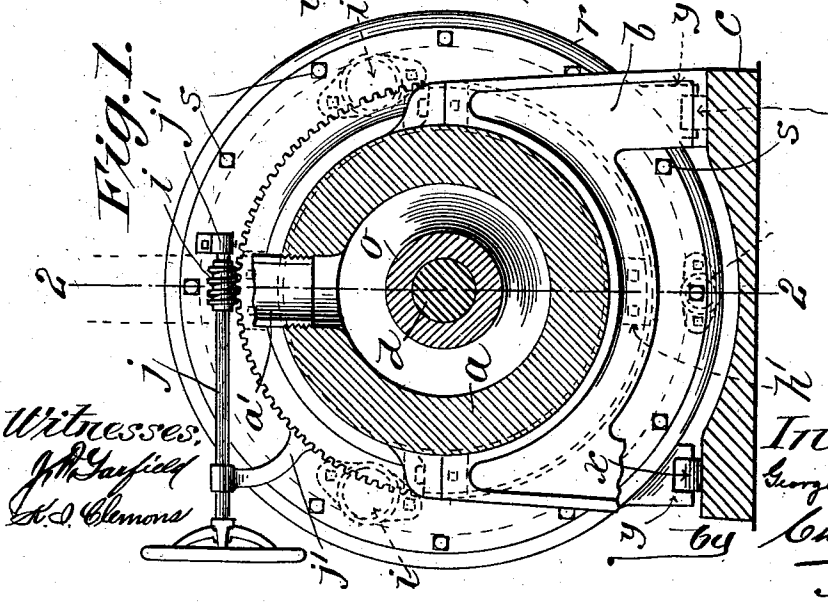


Fig. 1.



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UNITED STATES PATENT OFFICE.

GEORGE A. CLARK, OF HOLYOKE, MASSACHUSETTS.

PULP-REFINING ENGINE.

SPECIFICATION forming part of Letters Patent No. 696,314, dated March 25, 1902.

Application filed January 20, 1902. Serial No. 90,575. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. CLARK, a citizen of the United States of America, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Pulp-Refining Engines, of which the following is a specification.

This invention relates to the construction of refining-engines; and it has for its object the improvement in the construction of that class of refining-engines (of which the well-known Kingsland and Marshall are good examples) in which the pulp passes from a central point therein radially between the refining devices instead of under a roll operating against a bed-plate, as in the well-known curb-engine.

The invention consists in the construction of the engine, as hereinafter fully described, and clearly pointed out in the claims, whereby all the pressure against the revolving head (which resulted in great end thrust on the main shaft of the machine) is relieved and the forces so counterbalanced that said shaft will run as easily and freely in its bearings as it would if the head were not subjected to any pressure. To that end I construct a refining-engine of the type referred to in which I provide a hollow cylindrical body and two outwardly-facing bed-plates on the ends thereof, and a rotatable head for each plate adjustable toward each other and toward said plates, and one supply-pipe centrally located between said bed-plates and through which the pulp is carried into a central chamber in the body, the opposite ends of this chamber being closed by said heads, and the pulp moving toward these heads passes between them and the bed-plates, whereby it is refined when the machine is in motion. This construction provides for more than the mere saving of wear and tear on the machine, for it is well known that the end thrust on the bearings for the main shaft of the Kingsland type of engine is so great when the head is set close to the bed-plate that it is frequently necessary to keep cold water running on the bearings to keep them cool. This would indicate a degree of pressure on the head against which it must be held up to its duty which must inevitably result in more or less springing of the parts, and therefore in a variation of the adjustment of the head relative to the bed, and as the head is set to run quite close to the latter this variation of the adjustment must produce a variation in the product. By the use of my invention the life of the machine is prolonged and the product is more uniform and there is an economy of power in operating the machine, which may be measured by the elimination of the friction above referred to.

Referring to the drawings forming part of this application, Figure 1 is a vertical transverse section of a machine constructed according to my invention. Fig. 2 is a longitudinal sectional view of the same.

In carrying out my invention I provide a hollow cylindrical body *a*, which is supported and secured in a suitable frame *b*, located midway between its ends and transversely thereof, as shown, and this frame is secured to a suitable base *c*. A vertically-disposed main supply-pipe *a'* is located substantially between the ends of the body *a*, whereby the pulp may be conducted into the cylindrical chamber within said body. The main shaft of the engine (indicated by *d*) passes axially through the hollow body and is supported near its end in bearings properly secured on said base *c*, only one of which, however, is shown in the drawings and is indicated by *e*. There is a driving-pulley on this shaft. (Not shown.) The two ends of the body *a* are provided with screw-threads *f*, and over these threaded ends the annular bed-plates *g* are fitted. These bed-plates have no engagement with the threads *f*, which latter are square threads, as shown, the form of the thread providing a suitable surface on which the bed-plates *g* may have a sliding movement toward and from the ends of the body *a*, the bed-plates being provided with suitable hubs, whereby a good support is given to the bed-plates on the body. To provide for the proper endwise movement of these bed-plates, two nuts *h* are screwed onto the body—one on each end—before the bed-plates are placed in position, and suitable connections between these nuts and the bed-plate are provided, whereby endwise movement may be imparted to the plates by the rotary movement of the nut. To provide for this movement, a groove is turned in the end

of the hubs of the plates g, near the nuts h, running entirely around said hubs and shown only in dotted lines in Fig. 2 and indicated by g'. On these nuts h there are bolted, at intervals therearound, angular plates h', which engage this groove, and on the periphery of the nuts, which are circular, there is cut a rack, with which a worm-gear i engages, the shaft j, Fig. 1, on which this gear is mounted being supported in a horizontal position in brackets j', secured to the plates g, and on this shaft is a suitable hand-wheel.

The two bed-plates g are in the form of rings, having central openings therein of somewhat greater diameter than the internal diameter of the body, and the faces of these bed-plates lying at right angles to the axis of the shaft d are provided with a series of radiating knives k, constructed in the same manner as the ordinary bed-plates of a well-known curb beating-engine.

On the shaft d there are secured two circular heads m, having substantially the same diameter as the bed-plates g, and located on the inner faces of these heads are a series of radially-disposed beater-knives n similar to the knives k and having the same function as the knives on the roll of an ordinary curb beating-engine. Preferably, in securing these heads m on the shaft d a collar o is keyed to the shaft and the heads positively interlocked with the ends of said collar by means of a feather p, for example, a nut q on the shaft being screwed up against the outside of the head to hold the latter in engagement with the collar. A hollow casing r incloses the heads m, and the outer end portions of the bed-plate being bolted, as shown in the drawings, to the periphery of the latter, the bolts for the latter being indicated by s. (See Fig. 1.) Where the main shaft passes through these casings it is provided with suitable packing-glands t. Outlet-pipes u connect both of the casings r with the stuff-chests into which the refined pulp is discharged. In common with other machines of this type means may be provided on the casing for securing the discharge-pipe u on either side of the machine, and suitable cleaning-outlets v are provided at the bottom of the casings.

To prevent the rotation of the plates g during the operation of a machine, these, together with the casings r, attached thereto, are provided with rolling supports running on the top of the base c, whereby the weight of these parts is taken off from the body of the machine and the shaft and supported on the base. These supports are provided by casting short legs y on the casing r (see Fig. 1) and supporting therein suitable rolls x, which rest on suitably-planed surfaces running along the outer edge of the base c longitudinally thereof.

From the foregoing description of this machine it is obvious that all of the end thrusts on the shaft b common to machines of this class, as heretofore constructed, are entirely neutralized by introducing the pulp between the two heads m, whereby the advantages described above as pertaining to my improved construction are attained.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A pulp-refining engine comprising a hollow cylindrical body, a supply-pipe for pulp communicating with the interior of the body, a circular bed-plate mounted upon the opposite ends of said body; a shaft passing axially through the latter; two circular beater-heads mounted upon said shaft and constituting substantially a closure for the said hollow cylindrical body, a casing for inclosing each of said heads and bed-plates, means of adjustment between the said heads and said bed-plates, and means for rotating said shaft.

2. In a pulp-refining engine, a hollow cylindrical body, a supply-pipe for pulp located midway between its ends, suitable pulp-refining devices located at each end of said body, and operating in planes at right angles to the axis of said body, whereby the endwise pressure against the said refining devices at one end of said body may be counterbalanced by the oppositely-acting pressure on the other.

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