

E. JONASSEN & F. PYTTERUD.
PULP REFINING ENGINE.
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1,002,698.

Patented Sept. 5, 1911.

Fig.1

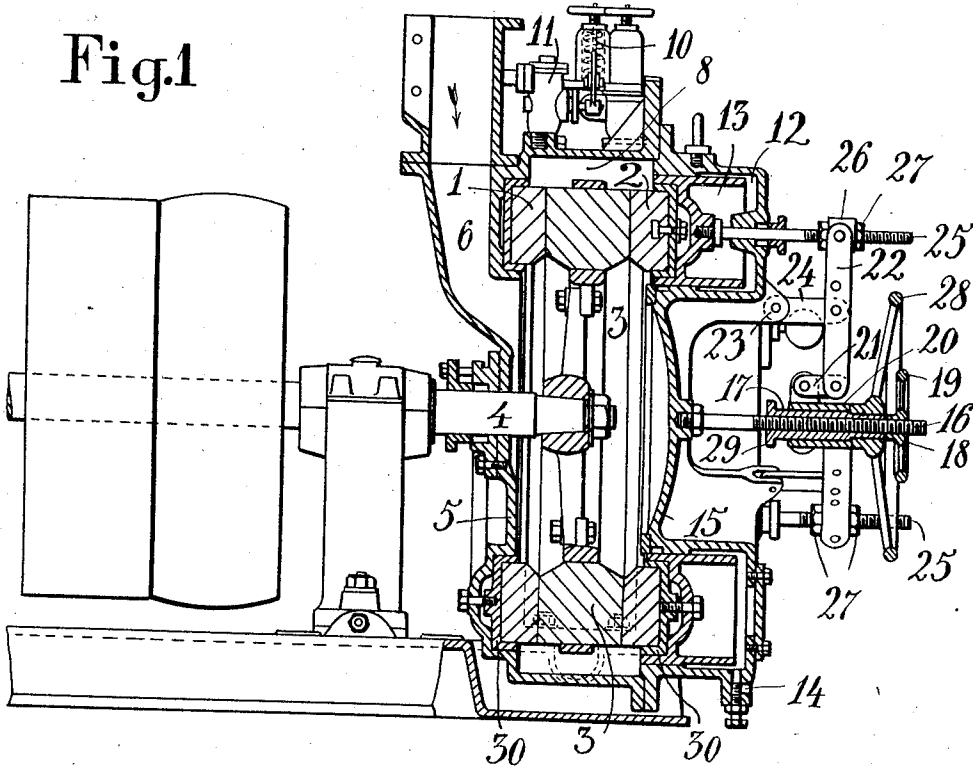
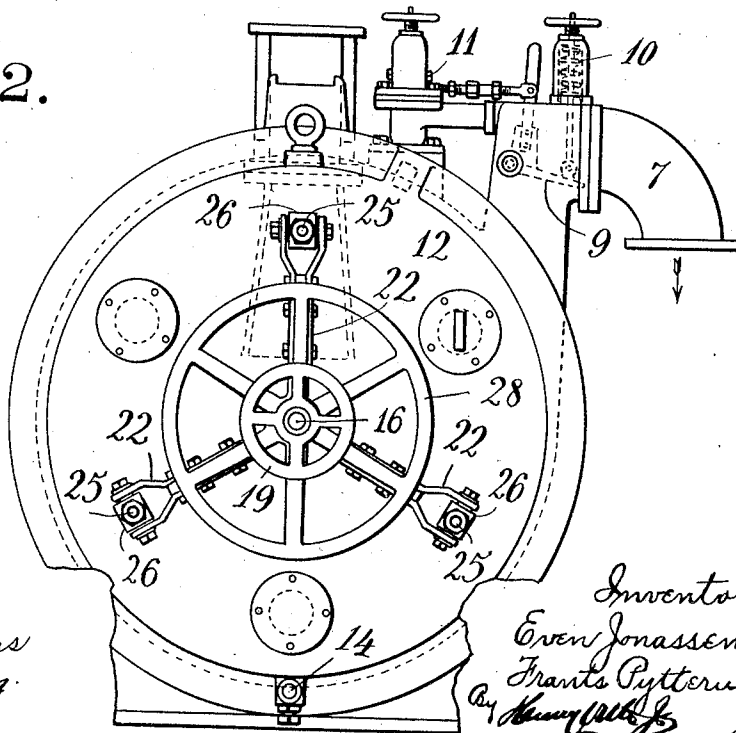


Fig.2.



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UNITED STATES PATENT OFFICE.

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PULP-REFINING ENGINE.

1,002,698.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, EVEN JONASSEN and FRANTS PYTTERUD, subjects of the King of Norway, both residing at Christiania, Norway, have invented certain new and useful Improvements in Pulp-Refining Engines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to pulp refining engines with adjustable grinding stones and has for its object certain improvements in mounting and adjusting said stones in relation to one another.

An embodiment of the invention is illustrated in the accompanying drawing in which:

Figure 1 is an axial sectional view of the refining engine. Fig. 2 is a rear view of the same.

Between stationary grinding stones 1 and 2 is arranged a revolving grinding stone 3, mounted on a horizontal shaft 4. The grinding stones are arranged within a casing 5 provided with an inlet 6 communicating with the space inside of said stones, and an outlet 7 communicating with the peripheral space 8 of the casing. In the outlet 7 is arranged a valve 9 weighted by an adjustable spring 10 and connected through rods and levers with a reduction valve 11 inserted in a pressure fluid conduit leading to an annular cylinder 12. In said cylinder 12 is arranged an annular piston 13 to which is secured the stationary grinding stone 2, so that the position of the stone 2 in relation to the revolving stone 1 is controlled by the fluid pressure in the cylinder 12 and this latter again by the position of the valve 9 in the outlet 7. Thus the pressure between the grinding stones is increased in proportion to the increase in the amount of pulp passing through the outlet 7. The annular cylinder 12 is provided with an adjustable outlet opening 14, through which leakage water from the pressure regulating valve in the pressure fluid conduit may flow out, thereby preventing injurious effects of such leakage.

In order to obtain such refining of the pulp as desired and to avoid great wear of the stones, these latter should not rest tight

against one another but it should be possible to maintain a very small space between the grinding surfaces of the stones. In accordance with this invention this is obtained in the following manner. Centrally upon the cover 15 of the engine casing is mounted a screw threaded spindle 16 carrying an adjustable nut 17 and a lock nut 18 with a hand wheel 19. Upon the nut 17 is mounted a loose sleeve 20 connected through links 21 to levers 22 pivoted at fixed points 23 by means of links 24.

The rear end of the annular piston 13 carrying the stationary grinding stone 2 is provided with three guide rods 25 passing through stuffing boxes in the rear wall of the piston cylinder 12. The outer end of said rods are screw-threaded and carry sleeves 26 which could be fastened to the rods 25 in any position desired by means of lock nuts 27. Said sleeves 26 are then again pivotally connected to the end of the lever 22, connected to the sleeve 20 as above described.

It will be understood that by turning the hand wheel 28 the stone 2 could be moved in axial direction. Thus enabling the space between the grinding surfaces of being adjusted as accurately as desired.

If big and hard particles should get between the grinding surfaces the stones are able to move away from one another a distance corresponding to the space between the end of the loose sleeve 20 and the collar 29 of the nut 17, but in order to allow of such movement taking place the force with which said hard particles act upon the grinding stone must be great enough to overcome the fluid pressure in the cylinder 12.

To enable the stationary grinding stones of being easily removed for the purpose of being exchanged with new stones or of being resharpened the stones are mounted in cast-iron rings 30 fitting into annular seats in the engine casing 5 and annular piston 13 respectively and provided with means for being detachably secured to said parts.

Claims:

1. In a pulp refiner, the combination with the grinding members and means for adjusting the space between said members; of means operated by the pulp leaving the refiner for regulating the pressure between the grinding members.

2. In a pulp refiner, the combination with the grinding members; of means operated by the discharging pulp for automatically

increasing the pressure between said members in proportion to the increase in the amount of said discharging pulp.

3. In a pulp refiner, the combination with
5 a casing having inlet and outlet openings, and grinding members mounted in the casing; of means operated by pulp passing through the outlet to automatically increase the pressure between the grinding members.

10 4. In a pulp refiner, the combination with a casing having inlet and outlet openings, and grinding members mounted in the casing; of means operated by fluid pressure operated by pulp passing through the outlet
15 to automatically increase the pressure between the grinding members.

5. In a pulp refiner, the combination with stationary grinding stones and a revolving annular grinding stone mounted between
20 the stationary stones; of means for maintaining an adjustable space between the grinding surfaces of said stones, and means for regulating the grinding pressure between said stones in relation to the amount of
25 pulp leaving the refiner.

6. In a pulp refiner, the combination with revolving and stationary grinding stones; of means for maintaining an adjustable space between the grinding surfaces of said
30 stones, a casing inclosing said stones and provided with inlet and outlet openings, an adjustable spring-controlled valve in the outlet, and means for regulating the grinding pressure between said stones in relation
35 to the opening of said valve.

7. In a pulp refiner, the combination with revolving and stationary grinding stones; of a centrally arranged stationary spindle, an adjustable nut thereon, a sleeve loosely
40 mounted on said nut and movable in axial direction between collars on the latter, a plurality of levers connected to said sleeve, a frame carrying one of the grinding stones, links connecting the levers and frame, and means to exert an adjustable pressure upon
45 said stone.

8. In a pulp refiner, the combination with a casing, a rotatable shaft, and an annular revolving grinding stone mounted on the
50 latter in the casing; of a stationary annular grinding stone mounted on each side of the revolving stone, rings in which the stationary stones are mounted, an annular piston in which one of said rings is mounted,
55 a hydraulic cylinder in the casing and in which the annular piston is slidably mounted, means for maintaining an adjustable space between the grinding surfaces of said stones, and means for regulating the pressure in said hydraulic cylinder in relation
60 to the amount of pulp leaving the refiner.

In testimony that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

EVEN JONASSEN.
FRANTS PYTTERUD.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."