S. L. GOULD.
Pulp-Engine.

No. 196,751. Patented Nov. 6, 1877.

Fig. 1.

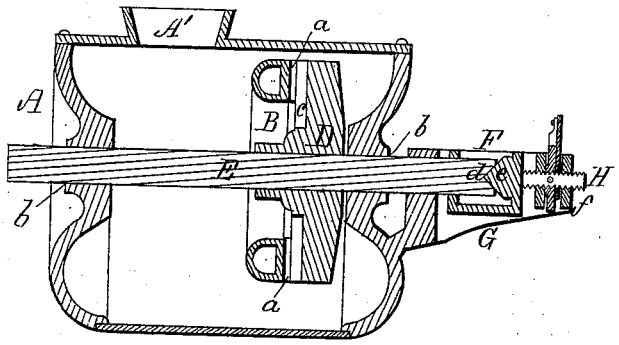


Fig. 2.

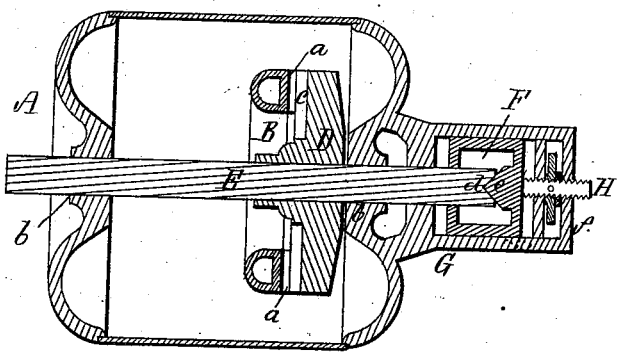
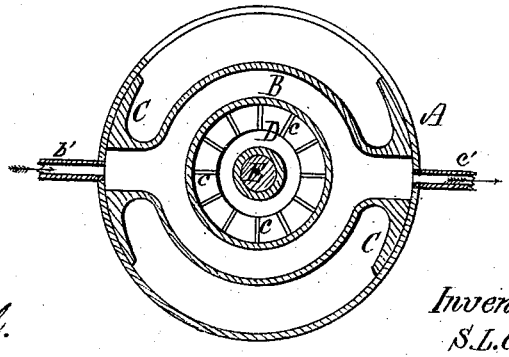


Fig. 3.



Witnesses.
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W. H. Boardman.

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UNITED STATES PATENT OFFICE.

SIMEON L. GOULD, OF GARDINER, MAINE.

IMPROVEMENT IN PULP-ENGINES.

Specification forming part of Letters Patent No. **196,751**, dated November 6, 1877; application filed August 13, 1877.

To all whom it may concern:

Be it known that I, SIMEON L. GOULD, of Gardiner, Kennebec county, Maine, have invented certain Improvements in Pulp-Engines, of which the following is a specification:

The drawings accompanying this specification represent, in Figure 1, a vertical and longitudinal section, in Fig. 2 a horizontal section, and in Fig. 3 a cross-section, of a paper-pulp engine embodying my improvements.

In the said drawings, A represents the curb or case of my engine, the same being in the form of a horizontal cylinder with closed ends and a flattened top, such top having a chute or hopper, A′, by means of which rags or other material are introduced into the interior of the case.

The portion of my engine for disintegrating and reducing the "stock" which is to be converted into pulp consists of a vertical, stationary, annular grinding-bed, and a rotary grinding wheel or disk operating in connection therewith, the contiguous faces of the two being armed with suitable radial blades or knives, between which the stock is reduced.

The stationary annular bed is shown at B as a substantial ring of cast-iron, secured at opposite sides to the interior of the case A, as shown at C C, and arranged vertically and at right angles to the axis of the said case, one side of the said annular bed B being armed with a series of radial knives or blades, *a a*, &c.

This ring B, I prefer to cast hollow, as shown in the drawings, and connect with its interior a feed and discharge pipe, *b′ c′*, by means of which a current of cold water may be permitted to flow through it.

The purpose of thus reducing the temperature of the bed B, and consequently of the "stuff" within the case A, is to avoid injury to the "sizing" employed in sizing the pulp, as a high temperature interferes with a proper action of such sizing.

The rotary grinding-wheel is shown at D as a solid disk of cast-iron, disposed alongside of the bed B, and of about equal diameter therewith, and secured to a long horizontal shaft, E, which extends through the bore of the bed B, and finds a bearing, *b*, at each end of the case A, the face of the disk D next adjacent to the ring-bed B being armed with a series of radial blades, *c c*, &c., which operate in connection with the blades *a*, to reduce rags or other material subjected to their action, power being applied to the said shaft in the ordinary manner.

As the grinding head or disk D must be forced with considerable power up to and against the bed B, and held there while the grinding takes place, very great friction necessarily exists at the end of the shaft where the resistance occurs.

To obviate or reduce the friction at such end of the shaft, (shown at *d* in the accompanying drawings,) I surround it with a box, F, and I fill this box with water, a conical step or pivot, *e*, being secured to the inside of such box, and entering a corresponding socket in the end of the shaft.

As the water in the box F surrounds the end of the shaft and the step, the heat which would otherwise result from the friction of the parts is obviated, and the use of lubricants avoided, as the water constitutes an effective lubricant.

The water-box F is supported within a bracket, G, extending from the end of the case A, and a feed-screw, H, operated by suitable means, is screwed through the outer end or head *f* of such bracket, by means of which the rotary disk D is fed up to the annular bed B with any desired degree of power.

The stock to be ground or reduced in this engine is introduced, with the proper amount of water, into the case A through the opening or hopper A′. The revolutions of the disk D generate a centrifugal force, which induces a current and circulation of the stock through the center of the annular bed B, and outward between such bed and the disk, and is discharged at the circumference of the two, the blades *a* and *c* serving to disintegrate and reduce such stock as it passes between them. This continuous circulation and grinding of the stock is allowed to continue until it is reduced to pulp of the desired consistency or fineness, when the contents of the engine are discharged through a trap in the bottom, in the ordinary manner.

The water-box, as explained, obviates any danger of undue heating of the end of the

shaft and its step, and does away with the labor and expense of lubricating it.

The annular or open, as well as hollow, form of the grinding-bed B enables it and its knives to remain in a comparatively cool condition, which is a very desirable result.

Owing to the absence of arms in the grinding-bed B and disk D, and other obstructions in the case A, little resistance is offered to the flow or circulation of stock, for which reason the reducing process takes place rapidly, and less power is required to drive the engine, while, still further, no "dead stock," as it is termed, is allowed to stand in the case.

Owing to the contiguous faces of the bed B and disk D, and their armature being flat, any pieces of iron or other hard foreign substances which may find their way to the interior of the case in the stock do not become entangled in and break the knives, but are readily precipitated to the bottom of the case, from whence they may be removed through a suitable trap.

For the same reason—that is, the straight edges of the knives—I obtain a large working-surface, which, acting in a direct manner upon the stock, pulls and separates, rather than chops up, the fibers of the material.

I claim—

1. In paper-pulp engines, the annular stationary grinding-bed B and rotary disk, in combination with the case or curb A, when the contiguous faces of the two are flat, and the whole so arranged that the stuff in circulation takes a course through the center of the bed B, passes between the latter and the disk D, and is discharged at the circumference of the two, the said bed being secured to the walls of the case, as stated, and the disk supported upon a shaft which passes through the bed, the whole being arranged and operating substantially as and for purposes stated.

2. In paper-pulp engines, the combination, with the curb or case, and the shaft extending through said curb, of the water-box outside the curb, containing a quantity of water, which surrounds the end of the shaft and its step, and maintains a low temperature of the same, as well as constituting a lubricant thereto, the whole being substantially as and for purposes stated.

3. The general construction of a paper-pulp engine, as herein shown and described, consisting of the case A, annular flat-faced grinding-bed B, rotary flat-faced disk D, and water-box F, the whole being substantially as and for purposes stated.

4. The hollow annular grinding-bed provided with water inlet and outlet ports, substantially as and for purposes stated.

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Witnesses:
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