(No Model.)

3 Sheets—Sheet 1.

H. SCHULTE.

RAG ENGINE.

No. 492,239. Patented Feb. 21, 1893.

Fig. 1.

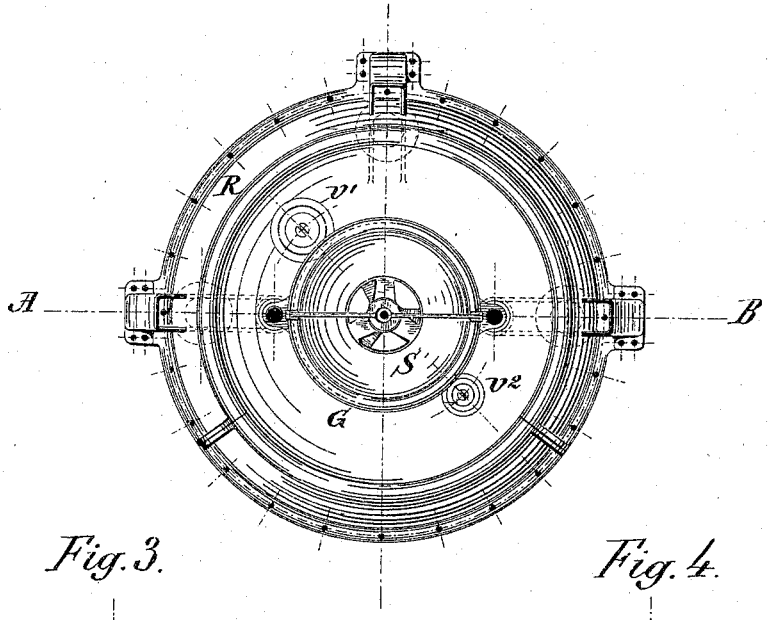


Fig. 3.

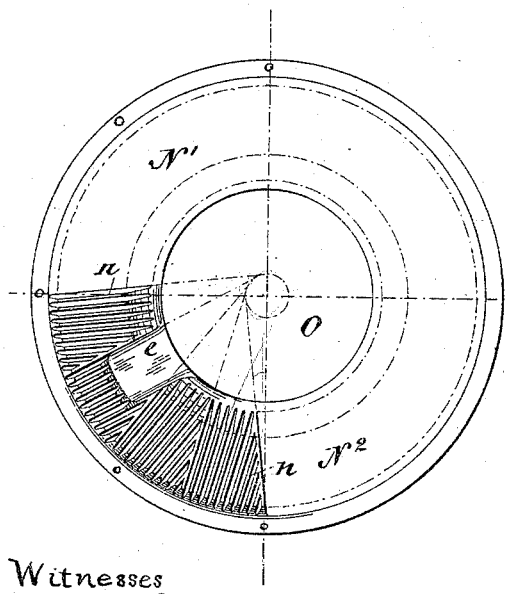
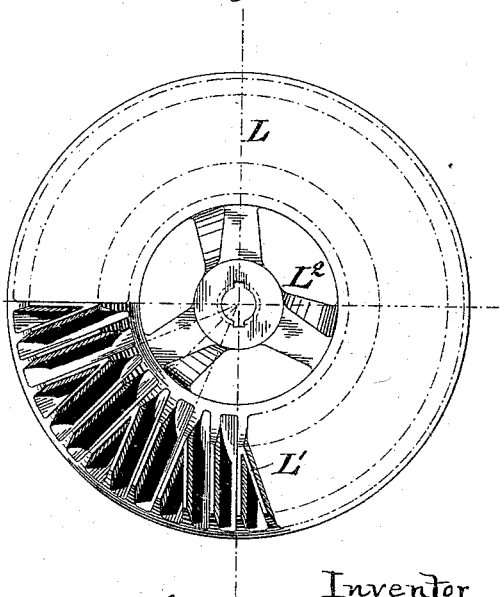


Fig. 4.



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(No Model.) 3 Sheets—Sheet 2.

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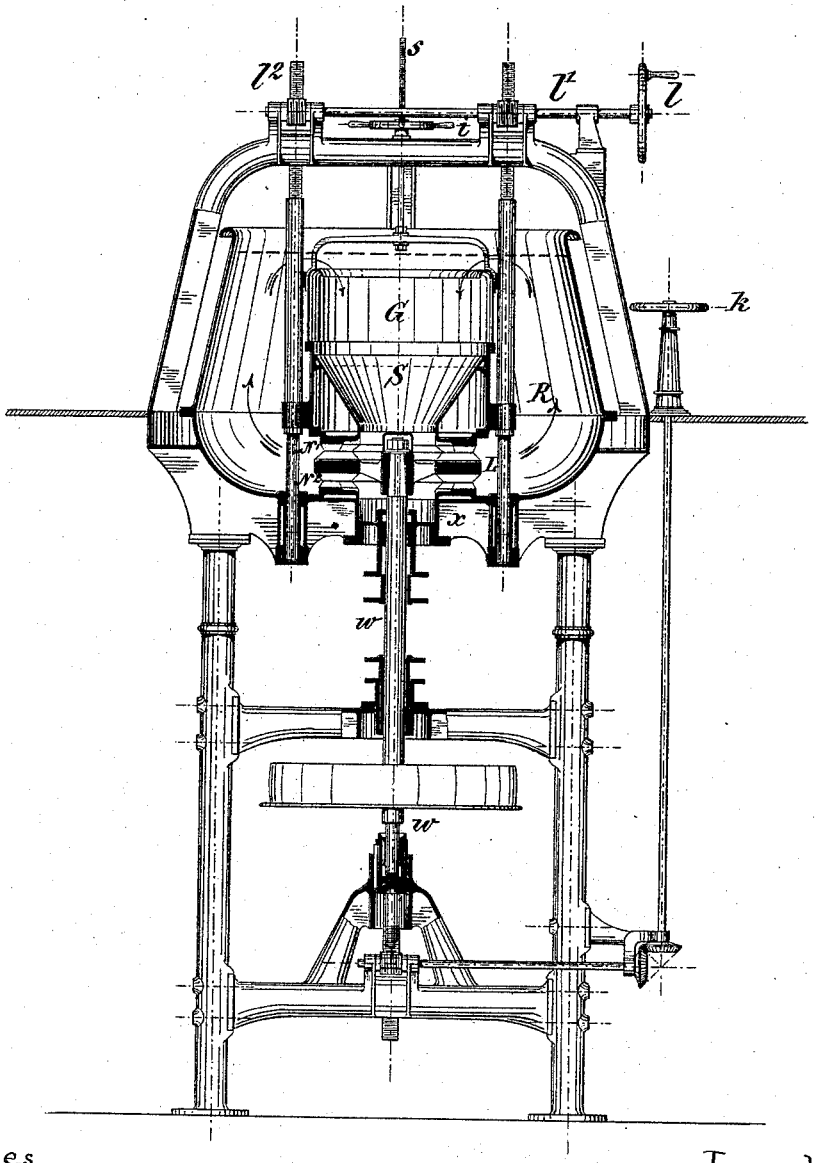
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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RAG ENGINE.

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Fig. 5.

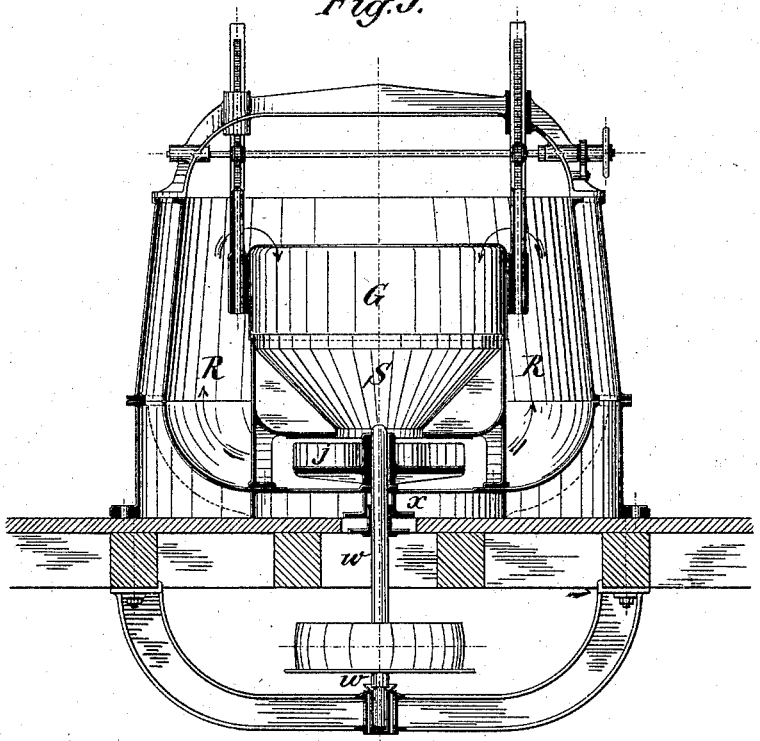
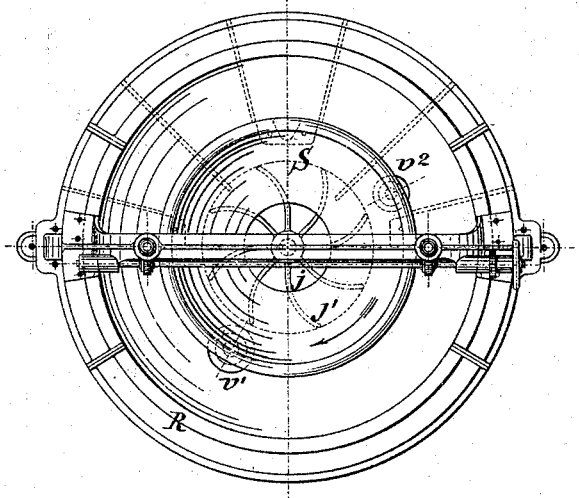


Fig. 6.



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UNITED STATES PATENT OFFICE.

HERMANN SCHULTE, OF VIENNA, AUSTRIA-HUNGARY.

RAG-ENGINE.

SPECIFICATION forming part of Letters Patent No. 492,239, dated February 21, 1893.

Application filed November 10, 1891. Serial No. 411,466. (No model.) Patented in Germany September 20, 1888, No. 47,241; in England September 22, 1888, No. 13,741; in France September 24, 1888, No. 193,165; in Austria-Hungary January 24, 1889, No. 39 and No. 81, and in Italy March 31, 1891, XXV, 29,068.

To all whom it may concern:

Be it known that I, HERMANN SCHULTE, a subject of the Emperor of Germany, and a resident of Vienna, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Rag-Engines, (for which I have obtained Letters Patent in Austria-Hungary January 24, 1889, No. 39 and No. 81; in Germany September 20, 1888, No. 47,241; in England September 22, 1888, No. 13,741; in France September 24, 1888, No. 193,165, and in Italy March 31, 1891, XXV, No. 29,068,) of which the following is a specification.

This invention relates to rag engines which serve for the comminution or disintegration of fibrous substances in the manufacture of paper.

The improved machine constructed according to the said invention can also be used for mixing or bleaching stuff in the said manufacture.

In the accompanying drawings, Figure 1 is a plan of the improved rag engine and Fig. 2 a section of the same on the line A B Fig. 1, Figs. 3 and 4 are details drawn to a larger scale and Figs. 5 and 6 show in section and plan a modification.

This rag engine comprises an outer casing R for the reception of the stuff and an inner casing S of which the outer surface is cylindrical while the inner surface forms a funnel tapering in the direction of the disintegrator which consists of the rotary grinding wheel L and the fixed blocks N′ and N^2.

With a variable feed of paper stuff to the rag engine the casing S of the inner compartment is provided with an adjustable extension ring G which can be readily shifted upward and downward. This ring serves for regulating the movement of the stuff and is raised when the quantity of stuff introduced into the apparatus is great and lowered when the quantity is small, for the purpose of equalizing the passage of stuff from the outer compartment R to the inner compartment S. The adjustment of the ring G is effected by means of the hand wheel *i* acting on the screw *s* carrying the ring G. The stuff passes through the inner casing S centrally to the disintegrator and by reason of the action of the centrifugal force of the knives of the grinding wheel L is thrown outward and rises in the annular space between the casings R and S until it runs back over the rim of the ring G or over the rim of the casing S, when no such extension ring is employed. This circulation of the stuff continues so long, that is to say the stuff passes and re-passes through the grinding surface until sufficiently comminuted.

The bottom of the casing R is provided with two valves v' v^2 (Fig. 1) of which the larger one v' is employed for drawing off the stuff while the other one v^2 is to be used for drawing off washing water.

The rotary grinding wheel L is fixed to the vertically adjustable shaft W W and has knives L′ on the upper and lower sides. The arms L^2 are of helical shape. The two fixed blocks of which the one N′ is fixed to the casing S and the other N^2 is supported upon the bottom of the casing R, have concentric openings *o* and are provided with narrowly arranged knives on their surface opposite to the wheel L and have centrally re-entering pockets or cavities *e* in order that the stuff shall enter the disintegrator not only centrally but also from below and from above between the knives of the wheel L.

Figs. 3 and 4 are plan views of the wheel L and blocks N′ N^2. To simplify the drawing only a quarter of each figure is fully drawn as regards the knives and pockets.

In putting the apparatus to work the wheel L is let down on to the grinding block N^2 by turning the hand wheel K, and then the grinding block N′ is let down onto the wheel L by turning the hand wheel *l* which lowers the rods l' l^2 to which the casing S is attached. The mechanisms connected to these arrangements are shown in the drawings as consisting of worm wheels and screws but without departing from the substance of the present invention an arrangement of levers may be employed. The shaft W W may also be driven by rope pulleys or by gearing instead of by means of a belt pulley.

The disintegrator may be made of iron, steel, bronze, brass, or other metals or alloys or of stone or artificial stone. In the latter two cases the grinding surfaces will be corrugated

instead of having projecting knives or blades. The angle of inclination of the knives or corrugations to each other varies according to the quality of the fibers to be disintegrated, stronger and tougher fibers generally requiring a greater cutting angle than looser fibers. The pressure of the upper and lower grinding surfaces may be varied and adjusted differently by means of the raising and lowering arrangement to any necessary degree as desired.

In a somewhat modified form, as shown in Figs. 5 and 6, the above described apparatus may be used for mixing and bleaching instead of disintegrating. The form is essentially the same as that shown in Figs. 1 and 2; for the sake of simplicity the casing S is made not adjustable but resting firmly on the casing R. In the place of the disintegrator a wheel J having vanes which extend from the center in straight or curved lines is employed for the purpose of effecting the circulation of the stuff in the apparatus. The wheel J may be made of wood or metal or metal alloys or of stone or artificial stone as the corrugations or channels of suitable breadth and depth in the same act like the vanes of a wheel. The drawings show in this modification the mechanism for adjusting the ring-casing G as consisting of toothed wheels and racks instead of the worm gearing shown in Fig. 2 although also an arrangement of levers might be used instead. The driving shaft W is provided with a stuffing box X here as in Fig. 2.

I claim—

1. In a rag engine, the combination of an outer casing R with an inner casing S entirely within the outer casing, capable of vertical adjustment and adapted to receive the material from the outer casing, substantially as and for the purposes set forth.

2. In a rag engine, the combination of an outer casing R and a disintegrator with an inner casing S tapering on its inner surface downward in the direction of the disintegrator, the top of the inner casing being lower than the top of the outer casing, whereby the material circulates from the inner casing through the disintegrator through the outer casing and back into the inner casing, all substantially as set forth.

3. In a rag engine, the combination of an outer casing R with an inner casing S having an adjustable top within the outer casing, all substantially as and for the purposes set forth.

4. In a rag engine the combination of an outer casing provided with a fixed grinding surface N^2, with a casing S within the outer casing and provided with a grinding surface N′ capable of vertical adjustment, and a rotary grinding wheel L between the grinding surfaces N^2 and N′, also capable of vertical adjustment, all substantially as and for the purposes set forth.

5. In a rag engine, the combination of two fixed grinding blocks N′, N^2 provided with spaces *e*, with a rotary grinding wheel L placed between the said blocks, all substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

HERMANN SCHULTE.

Witnesses:

JULIUS MOELLER,

T. G. HARDY.