

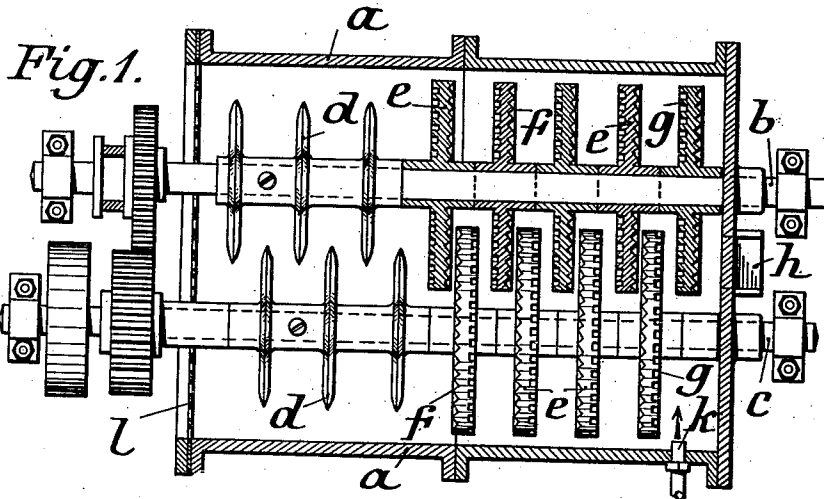
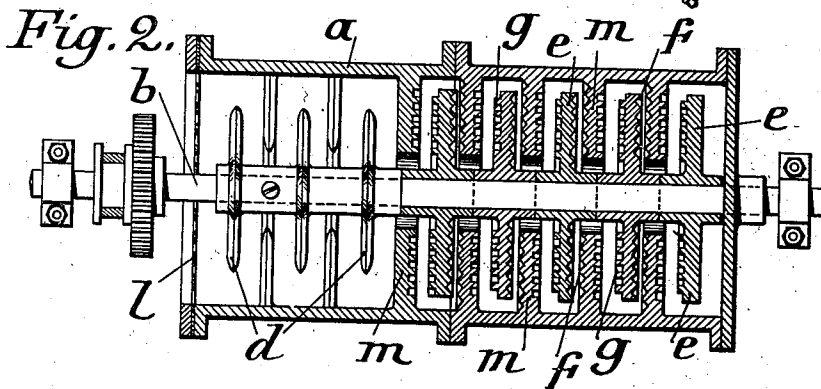
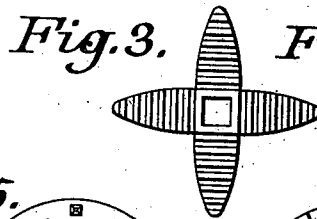
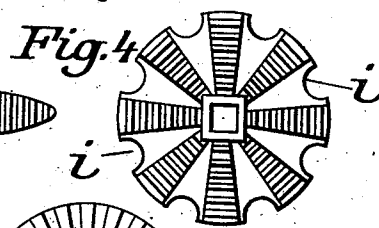
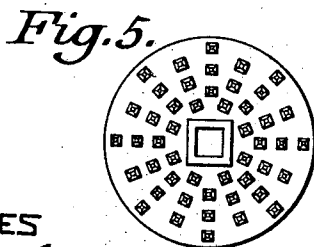
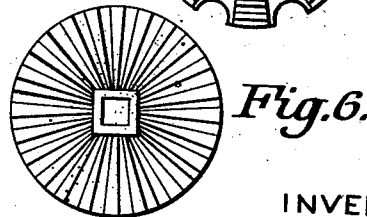
No. 807,228.

PATENTED DEC. 12, 1905

C. WURSTER.

KNEADING MACHINE FOR THE MATERIALS OF PAPER MANUFACTURE.

APPLICATION FILED JUNE 3, 1905.



WITNESSES

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# UNITED STATES PATENT OFFICE.

CASIMIR WURSTER, OF LONDON, ENGLAND.

KNEADING-MACHINE FOR THE MATERIALS OF PAPER MANUFACTURE.

No. 807,228.

Specification of Letters Patent.

Patented Dec. 12, 1905.

Application filed June 3, 1905. Serial No. 283,527.

*To all whom it may concern:*

Be it known that I, CASIMIR WURSTER, chemist, a subject of the German Emperor, residing at Dudley Mansion, 29 Abbey road, St. Johns Wood, London, N. W., England, have invented certain new and useful Improvements in Kneading-Machines for the Materials of Paper Manufacture; and I 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.

The present invention relates to a kneading-machine of that kind in which one or more shafts provided with stirring arms or disks revolve in a trough.

The present invention has for its object to render this kneading-machine also suitable for cutting and grinding, so that they can simultaneously perform those operations that have heretofore been performed in the rag-washing engine, the half-stuff rag-engine or breaker, and the whole-stuff engine or beating and refining engine.

With this machine all raw materials for paper manufacture can be treated in the manner indicated—straw, half-cellulose, wood boiled with soda, steamed wood, rags, waste paper, and the like.

The invention consists in that the arms or disks carried by the shafts and the ribs which in many cases are arranged on the walls of the trough are provided with cutting or grinding devices or with cutting and grinding projections, which are made sharper or blunter, according as they are intended mainly to cut or mainly to grind or beat.

On the accompanying drawings are shown several modes of construction of the invention.

Figure 1 is a horizontal section of a kneading-machine constructed according to the present invention with two shafts. Fig. 2 shows a machine with a single shaft. Figs. 3 to 6 show various forms of the arms or disks.

In the construction with two shafts (shown at Fig. 1) there are provided at the feeding end in the trough *a* on the two shafts *b* and *c* a few neutral stirrers *d*, which neither cut nor grind. In the other part of the trough the shafts carry disks *e*, which are formed with sharp-edged projections *f* on the one side and on the other side are formed with blunt projections *g*. The shaft *b* is adjustable in the axial direction, so that either the sides of the two groups of disks having the sharp-

edged projections *f* or the sides having the blunt projections *g* can be approached toward each other. In the first case a cutting action takes place, while in the second case a grinding action occurs. The action can be gradually increased by keeping the disks rather far apart at the commencement of working and then to cause them gradually to be set closer. Special means for the transport of the material from the charging end toward the discharging end *h* need not be provided, as the material in following the law of gravity automatically travels toward the discharging end. The disks can, however, by way of example, as shown at Fig. 4, be formed with notches *i* on the periphery, which during the rotation of the disks scoop up small quantities of the material and throw it over to the other shaft, and so transport the material toward the outlet.

The apparatus can also be employed for washing the rags in a counter-current if in the first part of the trough only kneading or stirring arms are provided. The washing-water in this case is supplied at the end of the trough through a pipe *k* and leaves the trough at the other end through a sieve *l*. This affords a considerable advantage over the half-stuff rag-engine, which effects the cutting up of the rags in a favorable manner, but which operates unfavorably for the washing, as always only small quantities of the discharging dirty water are replaced by small quantities of clean water.

In Fig. 2 only a single shaft is provided, while in the trough *a* ribs *m* are formed, which operate together with the disks *e*. The shaft *b* is also in this case adjustable.

Figs. 3 to 6 show different forms of arms and disks for cutting and grinding. Fig. 3 shows a four-armed body, the arms of which are provided with transverse ribs. Fig. 4 shows a disk with projecting sectors that are also provided with tangentially-placed ribs. Fig. 5 shows a disk with small pyramidically-formed projections, while Fig. 6 shows a disk with radially-arranged ribs. The projections shown in the several figures are made sharp-edged or blunt, according as they are intended more for cutting or more for grinding.

The essential advantage of the described machine will appear from the following considerations: The half-stuff rag-engine or breaker is essentially an apparatus for cutting, while the whole-stuff rag-engine or beater is only intended to beat and grind. It is intend-

ed to convert the cellulose mechanically into the body well known as "wet stuff" to manufacturers and termed "gelatinous cellulose" by the inventor, which in the sheet of paper ce-  
 5 ments the separate fibers together, and thus produces the strength of the paper sheet. These totally-different operations of the breaker and the beater can, according to the present invention, be carried out in a single  
 10 machine by either approaching to each other the knife-like operating projections or the grinding or crushing blunt projections.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—  
 15

1. In a refining-engine, the combination with a casing, of a rotary member in said casing provided on one face with a grinding-surface and on the other with a cutting-surface,  
 20 a second member at one side of said first-named member and provided with a grinding-surface facing the grinding-surface of said first-named member, a third member at the other side of said first-named member  
 25 and provided with a cutting-surface facing the cutting-surface of said first-named member, and means for actuating said first-named member.

2. In a refining-engine, the combination  
 30 with a casing, of a rotary member in said casing, provided on one face with a grinding-surface and on the other with a cutting-surface, a second member at one side of said first-named member and provided with a  
 35 grinding-surface facing the grinding-surface of said first-named member, a third member at the other side of said first-named member and provided with a cutting-surface facing the cutting-surface of said first-named mem-  
 40 ber, means for adjusting said first-named

member between said second and third members, and means for actuating said first-named member.

3. In a refining-engine, the combination with a casing, of a set of rotary members, 45 each provided on one face with a grinding-surface and on the other with a cutting-surface, a second set of members, each provided with a cutting-surface and a grinding-surface, the like surfaces of the two sets of 50 members facing each other, and means for actuating one of said sets of members.

4. In a refining-engine, the combination with a casing, of a set of rotary members, each provided on one face with a grinding-surface and on the other with a cutting-surface, 55 a second set of members each provided with a cutting-surface and a grinding-surface, the like surfaces of the two sets of members facing each other, means for longitudinally adjusting one of said sets of members 60 and means for actuating one of said sets of members.

5. In a refining-engine, the combination with a casing, of a set of neutral stirrers, a 65 set of rotary members each provided on one face with a cutting-surface and on the other with a grinding-surface, a second set of members each provided with a cutting-surface and a grinding-surface, the like surfaces of 70 the two sets of members facing each other, and means for actuating one of said sets of members.

In testimony whereof I have hereunto set my hand and affixed my seal in the presence 75 of the two subscribing witnesses.

CASIMIR WURSTER. [L. s.]

Witnesses:

HENRY HASPER,  
 WOLDEMAR HAUPT.