No. 690,506. Patented Jan. 7, 1902.

C. WURSTER.

PULPING MACHINE.

(Application filed Aug. 14, 1901.)

(No Model.)

Fig. 1.

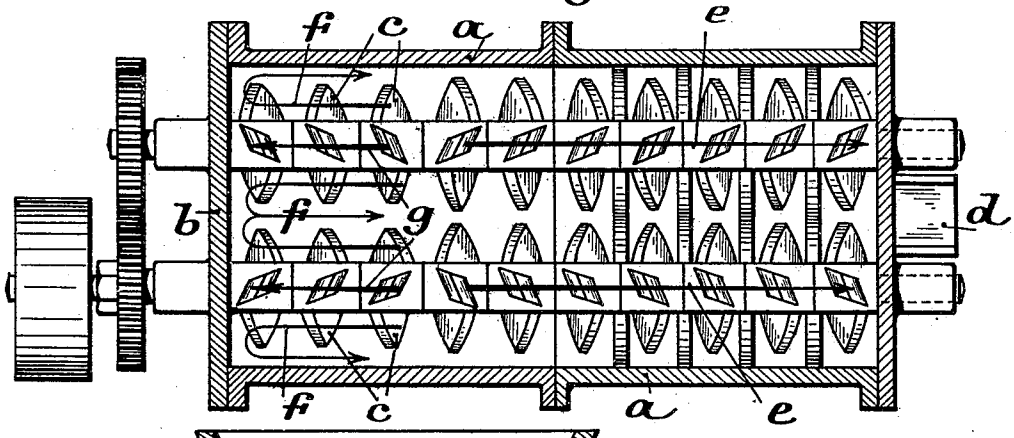
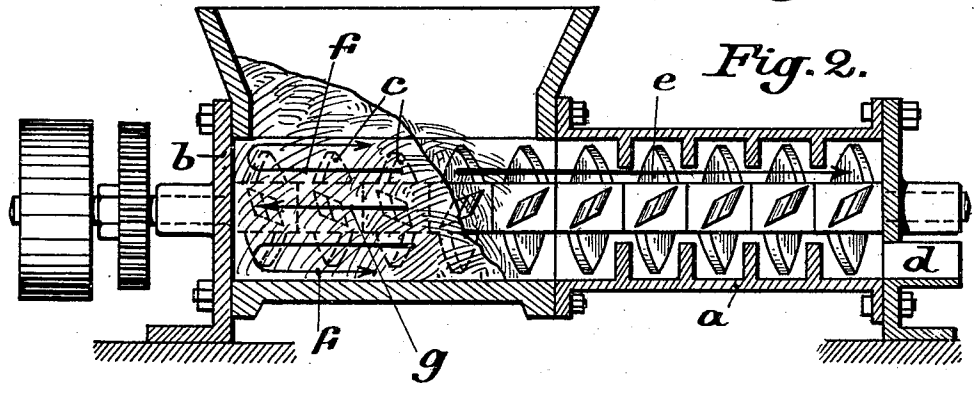


Fig. 2.



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CASIMIR WURSTER, OF LONDON, ENGLAND.

PULPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 690,506, dated January 7, 1902.

Application filed August 14, 1901. Serial No. 71,994. (No model.)

To all whom it may concern:

Be it known that I, CASIMIR WURSTER, a subject of the Emperor of Germany, residing at Dudley Mansion, 29 Abbey road, St. John's Wood, London, England, have invented certain new and useful Improvements in Pulping-Machines; 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 refers to kneading or pulping machines, such as are used for the pulping up of old paper-stock or such like materials. For this purpose machines have been employed which consist of a trough in which one or more shafts provided with propellers are made to rotate, and the propellers are given a certain amount of pitch, so that they do not merely produce a kneading or pulping action, but also transport the material from one end of the trough, into which it is fed, to the other, from which it is discharged. In this process the difficulty is encountered that admixtures of hard or tough objects—such as stones, bits of iron, strings, pieces of leather, or the like—which occur in the stuff that is to be pulped, frequently get wedged between the propellers and either cause ruptures or else stop the machine. To avoid this danger, hitherto all such impurities were sorted out of the material before committing it to the machine, and this sorting process caused a considerable loss of time and consequent expense. It is the object of the present invention to avoid this sorting process by providing the machine itself with an arrangement that will effect the sorting automatically before the stuff is subjected to the pulping process.

The invention consists in giving the propellers that are located under the hopper through which the machine is fed a reversed pitch, whereby the material is heaped up near the open portion of the trough until a sufficient quantity has accumulated. After that the quantity remaining in the open part is continually turned over, and the propellers of the closed part can only seize and transport the material as it comes to one end of the heap, the result of this action being that the impurities are collected at the bottom of the trough under its entrance, from where they can be periodically picked out and where they cannot interfere with the working of the machine.

Of the accompanying drawings, Figure 1 is a horizontal section through the machine provided with the present improvement; and Fig. 2, a vertical section through the same, showing at the same time the action of the reserved propellers upon the material as it is fed into the hopper.

a is the trough, the rear or working portion of which is closed, as seen in Fig. 2, and the foremost or feeding portion of which is taken up by a hopper.

e e are the two shafts carrying the kneading-propellers and provided with gear-wheels and a pulley at the fore end, by means of which they can be driven in opposite senses of rotation and preferably, also, with different speeds, as is usual in machines of this class. The sense of rotation and the pitch of the propellers ought to correspond in such a way that the material arriving at the covered portion of the trough is transported toward the rear end of the machine, where it is discharged through the outlet *d*.

The three foremost propellers, (marked *c* in the drawings,) however, are given a reversed pitch, so that being driven in the same sense of rotation as the propellers *e* their transporting action will be likewise reversed.

The operation of the machine is as follows: The shafts are set in motion and the paper-stock is fed into the hopper. At first it only encounters the action of the reversed propellers *c*, and therefore is driven backward toward the front wall *b* of the trough. As the stock accumulates a heap is formed and a circulating action commences in the material forming this heap. The stuff dropping down from above is continuously seized by the reversed propellers and is carried backward, thereby forcing the half-kneaded stuff that has preceded it outward toward the walls of the trough and thence along its sides toward the closed or rear end, where it is again seized by the propellers *e*, which pulp it up and pass it on to the rear end of the trough and discharge it through *d*. The circulating action of the reversed propellers *c c* is illustrated by arrows. The rear portions of the arrows (marked *g*) indicate the

motion of the material that has been just dropped into the hopper and has been seized by the propellers *c c*. The fore ends of the arrows (marked *f*) indicate the motion of the material which is forced along the bottom and the walls of the open portion of the trough under the pushing action of the fresh material, which is continuously taking its place near the fore wall *b* of the trough. The result of this action is that all the impurities according to their specific weight either fall to the bottom of the trough in the open portion or else come to the surface of the heap accumulated under the hopper, where they can be picked out without stopping the machine. In order that they shall not interfere with the action of the reversed propellers, I prefer to make these latter somewhat shorter than the other propellers *e e*.

Having now particularly described and ascertained the nature of my said invention and the manner in which the same is to be performed, I declare that what I claim is—

1. In a pulping-machine, the combination with a trough having a feeding portion and a working portion, of a shaft arranged in said trough, kneading and transporting propellers carried by said shaft in said working portion and arranged to feed the material in one direction, and kneading and transporting propellers carried by said shaft in said feeding portion and arranged to feed the material in the opposite direction.

2. In a pulping-machine, the combination with a trough having a feeding portion and a working portion, an outlet for said working portion, a shaft arranged in said trough, kneading and transporting propellers carried by said shaft in said working portion and arranged to feed the material toward said outlet, and kneading and transporting propellers carried by said shaft in said feeding portion and arranged to feed the material away from said outlet.

3. In a pulping-machine the combination with a trough having an open or feeding portion and a closed or working portion of one or more horizontally-journaled propeller-shafts bearing kneading and transporting propellers arranged to force the material toward the discharge end of the trough in the closed portion and propellers reversely pitched in the open portions, the latter being shorter than the former, substantially as and for the purpose described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CASIMIR WURSTER.

Witnesses:
HENRY HASPER,
WILLIAM MAYNER.