

UNITED STATES PATENT OFFICE.

LUDWIG ENGELMAYER, OF ASCHAFFENBURG, GERMANY.

APPARATUS FOR DISSOCIATING WOOD-PULP.

SPECIFICATION forming part of Letters Patent No. 567,822, dated September 15, 1896.

Application filed March 6, 1895, Serial No. 540,716. (No model.) Patented in Germany November 3, 1894, No. 84,576; in Switzerland February 11, 1895, No. 9,709; in Sweden February 16, 1895, No. 6,077; in Norway February 23, 1895, No. 4,275; in Hungary March 2, 1895, No. 2,273, and in Austria November 2, 1895, No. 45/4,146.

To all whom it may concern:

Be it known that I, LUDWIG ENGELMAYER, a subject of the Emperor of Germany, residing at Aschaffenburg, Bavaria, Germany, have invented certain new and useful Improvements in Apparatus for Dissociating Wood-Pulp, (for which I have obtained Letters Patent in Germany, No. 84,576, dated November 3, 1894; in Norway, No. 4,275, dated February 23, 1895; in Sweden, No. 6,077, dated February 16, 1895; in Switzerland, No. 9,709, dated February 11, 1895; in Hungary, No. 2,273, dated March 2, 1895, and in Austria, No. 45/4,146, dated November 2, 1895,) of which the following is a specification.

The present invention relates to simple means for so treating cooked wood forming a pulp, and particularly sulfite pulp, that small knots not previously removed from it and bundles of fiber which have not been separated may be suitably reduced and disunited, without, however, destroying the long fibrous quality of the pulp. This result has been heretofore accomplished only in an imperfect manner by means of specially-constructed and expensive appliances to which the pulp, disunited in edge-mills or similar apparatus, is subsequently subjected.

By the employment of the present invention I dispense with the necessity of making use of the aforesaid special appliances for eliminating the knots or splinters from the pulp, and I obtain a product entirely free from all such imperfections.

In producing the pulp the wood freed from the bark and reduced to small pieces is cooked with sulfite liquor under steam-pressure. The wood is dissolved into fibers within a trough or drum with a beater-shaft after the cooking has been finished. The mass or pulp is mixed with considerable water, so that it becomes a thin liquor. Then the larger knots and coarser parts of the wood are removed from the pulp, and in this condition it is subjected to the process herein described. When flowing over the upright brackets of the sand-trap *d*, (see Figure 1,) the sand and other solid particles which are contained in the pulp will deposit between the brackets. The pulp then passes under the washing-drum *f*,

similar in construction and purpose to the well-known washing-drums in rag-engines. This drum being perforated with small holes, a great deal of the water will pass through such holes and be led away, so that the pulp may flow upon the endless wire sieve *a*, where it is also relieved of water. The remaining water is pressed out as the pulp passes between the couch-rollers *b c*. The pulp now forms a sheet.

It may be stated that the adding of much water to the pulp before it reaches the sand-trap is necessary to bring the pulp to a condition to give up the sand, &c., allowing the same to deposit within the sand-trap.

In carrying out my invention the cooked wood, forming a pulp after the same has been through a strainer device and freed from water, is passed between two rolls having unequal peripheral speeds and of which one—advantageously the slow-speed roll—has a larger diameter than the other. The position of the rolls with regard to each other should be so exactly adjusted that they will only crush or roll the knots or bundles of undivided fibers contained in the pulp which has not been boiled down sufficiently soft, such knots or splinters being simultaneously rubbed and the fibers of the same disunited by the unequal speed of the rolls.

The individual fibers produced by cooking the wood will not be damaged or broken, since the rolls are adjusted in such manner that these fibers will pass through between them almost without contacting. Thus the long fibrous nature of the product will be in no way impaired. In case the pulp should still show some small knots or splinters after having passed the rolls the same may be passed through a second pair of rolls, or it may be passed through several such pairs of differential rolls.

My invention is illustrated in the accompanying drawings, in which similar letters denote similar parts throughout both views.

Fig. 1 is a side elevation with the driving devices removed, and Fig. 2 a plan of the device.

After the cooked wood forming a pulp has passed a sand-trap *d* and washing-drum *f* the

same passes onto a strainer device of any suitable kind. In the drawings an endless wire sieve *a* and couch-rolls *b* and *c*, between which the said sieve is guided, are shown, 5 the pulp lying in a thin layer on the said sieve and being passed thereby through the rolls *b* and *c*, from which it issues in the form of a sheet, passing directly to the differential rolls A and B.

10 The roll B is mounted in stationary bearings, while roll A, which rotates more slowly, is supported in a fork-like frame E, pivotally mounted in bearings F and adjustable by means of set-screw D at the front and screws 15 C at the rear. By means of this arrangement the roll A may be adjusted with regard to the roll B, so that only the knots and clotted fibers will be affected by the said rolls during the passage of the pulp through the 20 same, while the individual disunited fibers will pass through uninjured.

It will be seen that for such purpose the pressure exerted upon the pulp by rollers A and B must be greater than that exerted by 25 rolls *b* and *c* and that their operative surfaces must be closer together than those of said rolls *b* and *c*.

The rolls are driven by means of a pulley K, advantageously mounted on the shaft of 30 the roll having the greater circumferential speed, the roll A being driven by means of suitable intermediate gearing G H.

It is advantageous to pass the pulp through a second pair of similar rolls in order to 35 insure the process being thoroughly well carried out, such second pair of rolls being shown at A' B' and driven by suitable gearing from the driving-shaft of the upper rolls.

The present invention for disuniting the 40 knots or clotted fibers contained in the pulp does not change the sheet form of the same in any way.

By means of this invention pulp is produced of the finest and most equal quality 45 possible, and which is consequently particularly adapted for the manufacture of the better kinds of paper. The long fibrous nature of the product is retained, which has

in addition the advantage that it also forms better felt, and will not stick on and adhere 50 to press-rolls and drying-drums, as is so often the case, forming cloudy paper.

I claim as my invention—

1. In treating wood-pulp, the combination with a wet-machine and means for feeding 55 the pulp thereto, of the couch-rolls *b*, *c*, and a pair of differently-speeded rollers located behind said couch-rolls, substantially as set forth.

2. The combination with a wet-machine 60 comprising the strainer *a*, means for feeding the pulp thereto and the couch-rolls *b*, *c*, of differently-speeded rollers A B located behind said couch-rolls and means for adjusting their relative positions, substantially as set forth. 65

3. The combination with a wet-machine comprising the strainer *a*, means for feeding the pulp thereto and the couch-rolls *b*, *c*, whereby the pulp is formed into a sheet, of 70 two pairs of differential rollers through which said sheet is successively passed, substantially as set forth.

4. The combination with washing-drum *f*, strainer *a* and the couch-rolls *b*, *c*, in suitable relation to said strainer, of the differently- 75 speeded rollers A, B, located behind said couch-rolls, substantially as set forth.

5. The combination with the strainer comprising wire *a* and the couch-rolls in proper relation to one end of said strainer and from 80 which the sheet of pulp issues, of a roller B mounted in stationary bearings, and a roller A of larger diameter and adapted to rotate more slowly than roller B and supported in forked frame E pivotally mounted in bear- 85 ings, and means for adjusting the roller A with relation to the roller B, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of 90 two subscribing witnesses.

LUDWIG ENGELMAYER.

Witnesses:

ALVESTO S. HOGUE,
JEAN GRUND.