

T. J. HUTCHINSON.
TREATMENT OF FIBROUS MATERIAL AND APPARATUS THEREFOR.
APPLICATION FILED NOV. 5, 1909.

1,003,606.

Patented Sept. 19, 1911.

2 SHEETS—SHEET 1.

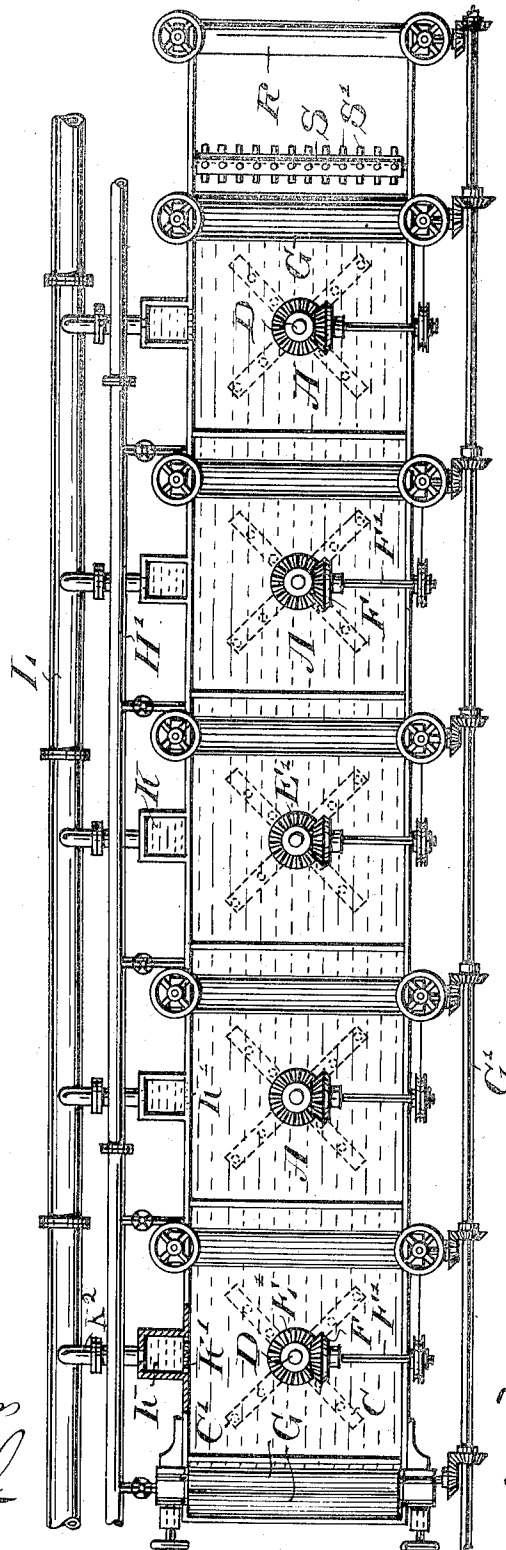


Fig. 1.

Witnesses

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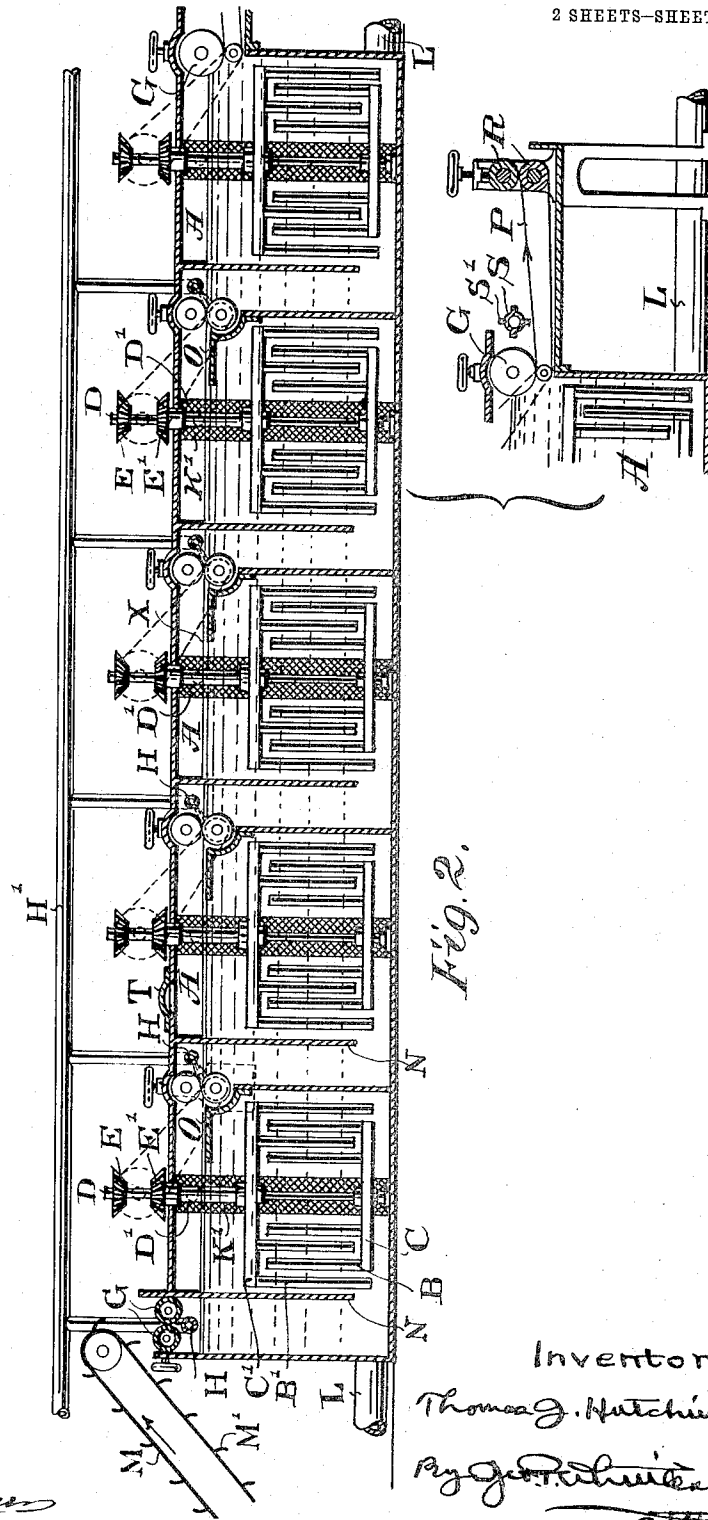
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UNITED STATES PATENT OFFICE.

THOMAS JAMES HUTCHINSON, OF BURY, ENGLAND.

TREATMENT OF FIBROUS MATERIAL AND APPARATUS THEREFOR.

1,003,606.

Specification of Letters Patent.

Patented Sept. 19, 1911.

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To all whom it may concern:

Be it known that I, THOMAS JAMES HUTCHINSON, a subject of the King of Great Britain and Ireland, and a resident of Bury, in the county of Lancaster, England, have invented new and useful Improvements in and Relating to the Treatment of Fibrous Material and Apparatus Therefor, of which the following is a specification.

This invention relates to a process of and apparatus for washing and otherwise similarly treating with liquids fibrous material such as bagasse which has had its paper making impurities removed from it by a mild digestion in an alkaline solution and which material floats in water.

The object in view is to thoroughly wash the material and to deliver it from the machine in a sheet or web which is either dried in the machine or as it passes therefrom or which will subsequently easily dry.

The machine comprises two or more tanks (or compartments, hereinafter referred to as tanks) containing the water or washing or other liquid (hereinafter referred to as water) and fitted with suitable beaters. The material is passed from one tank to another by rising or being elevated to each tank exit where squeezing rolls having rounded flutes may be placed. On its exit from the last tank the material passes in a layer or rough sheet to or upon a longitudinally traveling endless belt or conveyer formed of laths or equivalently formed and through which any liquid may easily drain, and which may also be laterally vibrated or oscillated. The disposal of the fibrous material in a sheet or web of about a uniform thickness upon this conveyer belt may be facilitated by rotary beaters or pegs or wipers rotating at a high speed above the belt in the same direction and engaging with the fibrous material upon the belt. Other devices than rotary wipers may be employed. From the conveyer belt the material may be again passed through squeezing rollers and then be carried around steam or other heated drums for drying. The fibrous material to be treated is preferably lifted up from a drainage floor upon which it has been discharged from a digester. The lifting device employed may consist of an endless traveling belt furnished with tines or prongs and so disposed as to deliver the material from the floor to the first tank.

The accompanying drawings illustrate

one form of apparatus constructed to embody my improvements and will now be referred to.

Figure 1 shows the apparatus in plan. Fig. 2 illustrates it in vertical longitudinal section.

Similar letters of reference are used to indicate similar parts where they occur in the different drawings.

A, A, indicate a series of roofed in intercommunicating tanks of similar construction. These tanks are filled to the required level with water. Within each tank is a rotary beater consisting of two sets or series of rounded beating arms which rotate rapidly in opposite directions upon vertical shafts and intermesh or closely pass each other. One such set of arms in each tank is indicated by the letter B; the other set by B¹. The arms B are secured upon radial arms or spokes C secured to the vertical shaft D; the arms B¹ are secured to radial spokes or arms C¹ attached to the tubular shaft D¹ which rotates upon and around the shaft D. The upper ends of the shafts carry bevel wheels E E¹ and are driven in opposite directions by the bevel wheel F mounted upon the shaft F¹. At the exit from each tank is disposed a pair of vertically arranged squeezing or mangling rollers G having rounded intermeshing flutes and driven in any convenient manner, as from the common shaft G¹, and between which rollers the material passing from one tank to the next in the series must pass. One of the rollers G in each pair may be employed to drive the shaft F¹ upon its own tank.

At the entrance to the first or left hand tank a pair of horizontally disposed squeezing rollers G fluted like the others are placed between which the material passing into the apparatus must pass. The water may be delivered to the tanks in any convenient manner. In the arrangement shown each tank has its own clean water separately supplied and withdrawn from it, the method of supply being to arrange a perforated supply pipe H on the delivery side of the various squeezing rollers and to deliver the water in jets upon the material at the nip of such rollers.

H¹ is a common feed pipe by means of which water is supplied to each of the perforated pipes H. Down one side of each tank is a recess or chamber K which com-

municates with the interior of the tank through a screen or sieve K^1 . Water passes from each tank through its screen or sieve K^1 to the chamber K. Each chamber opens through an overflow opening K^2 into a common pipe L through which the water from all the tanks is drawn off.

The squeezing rollers G at the exit of the last tank of the series differ somewhat from the others in the series and are not provided or combined with a perforated water supply pipe.

The fibrous material to be treated is dumped on to a suitable drainage floor not shown from which it is lifted by the tines or prongs M^1 of the traveling endless belt M and delivered to the rollers G of the first tank. With everything operating properly such material passes down through such rollers and is subjected to the action of jets of water from the pipe H. Falling or being forced down by the continued admission of further material the material passes under the lower edge of the partition N and is engaged by the beaters B B^1 . By these beaters the material is thoroughly opened out and exposed to the action of the water, and passing upward therethrough finally reaches the nip of the rollers G disposed at the exit of the first tank and between which alone it can leave the tank. These rollers continuously withdraw the washed material from the first tank and deliver it to the second, the material entering the second tank in the same manner as it enters the first. The material is then withdrawn from the second tank in the same manner as it has already been withdrawn from the first, and enters and leaves the other tanks of the series in the same manner.

To insure the arrival of the washed material at each pair of exit nipping rollers in as uniform a sheet as possible a tray O may be arranged in front of each pair of rollers slightly below the nip of the rollers and below the water level indicated at X.

The squeezing rollers of the last tank of the series are so disposed as to deliver their material to an endless belt P, which passes around the lower roller of the pair. This belt also passes around the lower roller of a further pair of squeezing rollers R. The belt is perforated, formed of laths, or otherwise formed to permit the drainage through it of any liquid remaining in the fibrous material without permitting the passage of the fibrous material, and it may be oscillated or vibrated to facilitate such drainage in the manner and by the means already known in connection with similar belts. The final squeezing is administered by the rollers R.

During its passage along the belt P the material has its fibers more regularly disposed, so as to assist in the more regular formation of the sheet already roughly

formed, by means of a rotary beater or the like which consists of a small rapidly rotating drum S having pegs or fingers S^1 attached to its periphery, and rotating in the same direction as but at a higher surface speed than the belt and material thereon, and engaging by its fingers with the fibrous material.

From the rollers R the sheet of roughly dried material may be conveyed to steam or other heated drying rollers by and upon which it may be dried in the usual manner, or the sheets may be allowed to dry or be dried in any convenient way. These drying rollers are not shown as the construction and operation of such rollers is well understood.

The liquid may be supplied to the tanks in any other manner than that described and illustrated. For example clean water may be supplied only to the last tank of the series and may flow from one to the other being withdrawn from the first tank only, or the first tank but one. In the latter case the first tank may have its separate water supply and withdrawal, and such water may be treated for the recovery of the alkalis and impurities removed from the fibrous material. Indeed, with any system of supply and withdrawal the water may be treated for the recovery of anything it contains.

The drainage floor from which the fibrous material is taken up for the first tank may have an inclination sufficient to cause the material to feed forward by gravity as it is taken up by the belt M, and the digester or source of supply of the material be conveniently arranged and disposed above such floor. The digester is preferably of the type and disposition described in the specification to British Letters Patent No. 20268 of 1907.

The different rollers, beaters, conveyers, the elevator and the other elements of the apparatus and their accessories may be constructed and operated in the well known manner and they do not need further description or illustration.

T indicates a manhole, one of which may be placed in the cover of each tank.

The construction of the tanks may be modified from that shown in the drawings. For example, the partitions N may be dispensed with and the material pass directly from the rollers G to the beaters, and the material from the beaters instead of at once passing upward directly therefrom to the next rollers G may first pass under the lower edge of a partition similar to N placed at the rear or delivery side of the tank, and then float upward to the next rollers G or be positively withdrawn from the tank and transferred upward to the rollers by a conveyor belt of a similar nature to M.

I claim:—

1. Apparatus for washing fibrous paper making material derived from bagasse, con-

sisting of a series of tanks containing beating apparatus and provided with water inlets and outlets, and having combined with them rollers by means of which the fibrous material is fed or forced into the tanks and from one to the other and withdrawn from the last tank, all constructed arranged and operating substantially as hereinbefore described.

10 2. The combination with a series of tanks, of rollers for feeding fibrous material into the first tank, rollers for feeding said material from one tank to the next, rollers for withdrawing said material from the last
15 tank, and a traveling draining belt to receive said material and form it into a sheet, layer or web.

20 3. The combination with a series of tanks, of rollers for feeding fibrous material into the first tank, beaters in each tank to agitate said material, rollers for feeding said material from one tank to the next, rollers

for withdrawing said material from the last tank, a traveling draining belt to receive said material from the last set of rollers, and
25 a rotating beater running faster than said belt and acting to spread said material on said belt to form it into a sheet, layer or web.

4. The combination with a series of tanks. 30 of an overflow at the delivery side of each tank, a downwardly extending partition in the next tank adjacent to said overflow, rollers adjacent to said overflow for feeding fibrous material from each tank to the
35 next, and rotary beaters in each tank.

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

THOMAS JAMES HUTCHINSON.

Witnesses:

WILLIAM GEO. HEYS,
JOHN O'CONNELL.