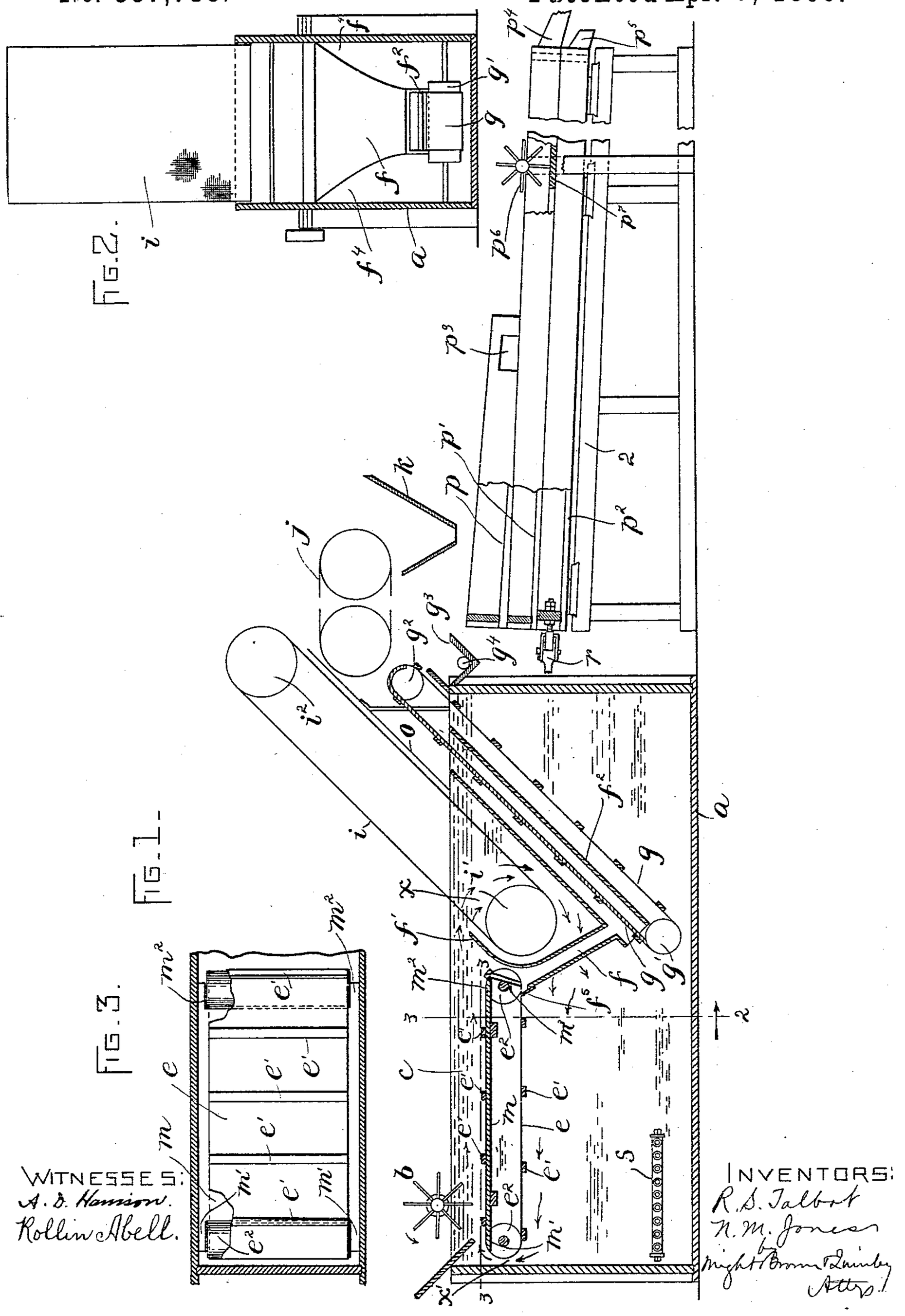
(No Model.)

R. S. TALBOT & N. M. JONES.

APPARATUS FOR ASSORTING WOOD PULP CHIPS.

No. 557,718. Patented Apr. 7, 1896.



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APPARATUS FOR ASSORTING WOOD-PULP CHIPS.

SPECIFICATION forming part of Letters Patent No. 557,718, dated April 7, 1896.

Application filed September 19, 1895. Serial No. 562,988. (No model.)

To all whom it may concern:

Be it known that we, REGINALD S. TALBOT and NATHANIEL M. JONES, of Lincoln, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Apparatus for Assorting Wood-Pulp Chips, of which the following is a specification.

This invention relates to apparatus for separating or assorting chips used in the manufacture of wood-pulp, said chips containing a considerable proportion of waste matter unfit for pulp and composed chiefly of fragments of knot-wood, which is very dense and filled with resinous matter.

Our invention consists in certain improvements relating to apparatus in which the relative specific gravities of water or other liquid, knot-wood or waste, and clear wood are utilized, the chips coming from the cutting apparatus being deposited in a body of liquid, where the knot-wood portions have a tendency to sink, the clear-wood portion having a tendency to rise.

Our invention consists in the improvements hereinafter described and claimed, utilizing the principle above indicated.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a longitudinal section of an apparatus embodying our invention. Fig. 2 represents a section on line 2 2 of Fig. 1, looking toward the right. Fig. 3 is a plan view of the parts below the line 3 3, Fig. 1.

The same letters and numerals of reference indicate the same parts in all the figures.

In the drawings, *a* represents a tank, and *b* represents a rotary agitator or striker which extends across the upper portion of the tank, and is preferably composed of a shaft and a series of independent arms radiating therefrom, the arms being thickly arranged, so that when the agitator is rapidly rotated they will strike practically all points along a line extending across the surface of a body of liquid *c* contained in said tank, the liquid extending to such height that the downwardly-projecting arms of the agitator enter the liquid. The agitator is so arranged that it subdivides the surface of the liquid into a chip-receiving area and a chip-delivering area. The chips are deposited in a mass in the chip-receiving area and are attacked by the agitator and forcibly scattered and submerged, the agitator moving in the direction indicated by the arrow marked thereon. The agitator therefore moves the liquid at and near the surface of the body *c* in such a direction as to cause it to carry the chips into the chip-delivering area and cause them to encounter the chip-elevator, hereinafter described. The knot-wood chips and other heavy matter, all of which will hereinafter be termed "waste," have a tendency to sink in the liquid, this tendency being increased by the surface saturation caused by the forcing of the chips into the liquid by the agitator.

e represents a waste-conveyer, upon which the descending waste is deposited, said conveyer being preferably an endless band provided with slats *e'* and supported by rolls or sprocket-wheels e^2 e^2, to which motion is imparted in any suitable way. The conveyer *e* extends under the chip receiving and delivering areas and delivers the waste into the upper end of the inclined spout or chute *f*. The lower end of said spout is arranged over a waste-elevator *g*, which is an endless band running upon rolls or wheels g' g^2 and arranged at a suitable angle, so that it is adapted to raise the waste from the tank and drop it into a waste-conveyer g^3 at one end of the tank, said conveyer having a screw g^4 or other means for progressively removing the waste that is deposited in it.

i represents a chip-elevator composed of an endless band, preferably of wire-cloth, supported by rollers or wheels i' i^2 and arranged at an incline, the lower portion of said chip-elevator being at one end of the chip-delivering area of the body of liquid, so that it receives the chips from said area and elevates them, finally discharging them upon a conveyer *j*, by which they may be removed to a hopper *k*, which may be arranged over a shaker adapted to separate a portion of the liquid from the chips.

To insure the maintenance of an effective current by the agitator, we provide a false bottom or partition *m* below the upper portion of the conveyer *e*, said partition extending across the tank and constituting a barrier between the water composing the chip receiving and delivering areas and the water

in the space below said areas, so that a horizontal current moving continuously in one direction is maintained in the chip receiving and delivering areas and eddies and counter-currents in said areas are prevented. There is a sufficient communication between the end portions of the space below the waste-conveyer and the receiving and delivering areas to permit water to flow downwardly at x and upwardly at x', the water returning from the outer end of the delivering area under the false bottom to the outer end of the receiving area.

One side of the spout f is extended upwardly at f' sufficiently to prevent pieces of waste matter from coming in contact with the chip-elevator. A casing f^2, into which the spout f delivers its contents, incloses the upwardly-moving portion of the waste-elevator and prevents the same from forming a current in the main body of liquid, the object of this arrangement being to prevent currents which will conflict with the current formed by the agitator, as indicated by the arrows marked on the liquid in Fig. 1. Said casing insures the presence of a body of dead-water in the spout f, so that there is no downward movement of water in said spout sufficient to draw down floating chips from the delivering area.

It will be seen that the construction above described, particularly the false bottom end of the spout $f\,f'$ and the casing f^2, insures an effective movement of the water in the receiving and delivering areas of the tank by the action of the agitator, the water in said areas being shut off from the main body of water to such an extent that the agitator moves all the water above the waste-conveyer e in one direction, and is therefore enabled to deliver the chips with certainty to the chip-elevator.

The chip-elevator being made of wire-cloth and arranged to a great extent over the tank enables the principal part of the water to be drained from the chips while they are being elevated. We prefer to provide a sheet-metal gutter o, arranged to guide the water falling from the chip-elevator back into the tank.

The spout f is preferably made tapering from its upper end to its lower end, the latter as well as the casing f^2 and waste-elevator g being comparatively narrow. The object of making the waste-elevator narrow is to make it less bulky and heavy and enable it to be operated with less power. The proportion of waste is comparatively small, so that the waste-elevator does not require to be made so wide as the chip-elevator.

The chip-shaker, as here shown, consists of a series of screens $p\,p'\,p^2$, each having a wire-cloth bottom, the bottom of the top screen being of coarser mesh than that of the second screen, which in turn is of coarser mesh than the bottom of the third screen. The screens are inclined and rest upon a framework 2, upon which the bottom screen is adapted to slide. The screens may be rapidly reciprocated by means of a connecting-rod or pitman r connected suitably to a driving-shaft. The chips are assorted as to size by the different screens. The first screen is intended to retain only the pieces or slivers which are too large for admission to the digester, said screen having at its lower end an outlet p^3 for the escape of the slivers or the large pieces. The screens p' and p^2 are provided with delivering-spouts p^4 p^5 at their lower end, said spouts being arranged to deliver the chips into different receptacles. To prevent the close packing or matting of the chips in the screen p', we provide a rotary agitator p^6, adapted to stir the chips at a point about midway between the ends of the screen p', said screen having a solid plate p^7 arranged to support the chips under the agitator.

s represents a steam-coil located in the tank at or near the bottom thereof, its object being to heat the water and thereby cause it to liberate the resinous matter from the chips before they go to the digester.

f^5 represents a strip of flexible material, such as rubber belting, affixed to the upper edge of the spout f and bearing yieldingly against the under portion of the waste-conveyer e, as a means for preventing the water from carrying waste matter under the conveyer e and also as a scraper to remove pieces of waste that may adhere to the conveyer. The current generated by the agitator passes over the portion f' of the spout f, through the meshes of the chip-elevator, and from thence downwardly and then backwardly through the spaces f^4 f^4, Fig. 2, between the spout and the sides of the tank.

In Fig. 3 we show a plan view of the waste-conveyer and the false bottom, the ends of the false bottom being shown as recessed to receive the rolls e^2 supporting the waste-conveyer, extensions m' of the false bottom projecting between the ends of said rolls and the sides of the tank. Vertical partitions m^2 extend downwardly from extensions m' of the false bottom to the ends of the strip f' to prevent water from flowing downwardly from the delivering area and between the false bottom and the spout f.

We claim—

1. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, a spout or chute at the delivering end of said conveyer, and a waste-elevator arranged to receive matter from said spout.

2. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-

receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, a spout or chute at the delivering end of said conveyer, a knot-elevator arranged to receive the knots from said spout and a chip-elevator communicating with the chip-delivering area of the liquid.

3. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, a spout or chute at the delivering end of said conveyer, a waste-elevator arranged to receive knots from said spout, and a waste-conveyer, arranged to receive matter from said elevator.

4. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, a spout or chute at the delivering end of said conveyer, a knot-elevator arranged to receive the knots from said spout, a chip-elevator communicating with the chip-delivering area of the liquid and a chip-conveyer arranged to receive chips from the chip-elevator.

5. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, a spout or chute at the delivering end of said conveyer, a waste-elevator arranged to receive knots from said spout, a waste-conveyer, arranged to receive matter from said elevator, and a chip-shaker arranged to receive chips from the chip-conveyer.

6. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, and means for guiding the liquid horizontally through said chip receiving and delivering areas.

7. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, and a partition or false bottom under the said receiving and delivering areas, said partition being arranged to permit liquid to flow from the delivering end of the delivering area downwardly to the space below the false bottom, and from said space upwardly into the receiving end of the receiving area, and to maintain a horizontal progressive current between said ends.

8. A chip-assorting apparatus comprising a tank, a body of liquid therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, a substantially horizontal submerged conveyer located below said areas, and adapted to receive and feed forward knots or waste matter that sinks in the liquid, a partition or false bottom under said receiving and delivering areas, a foraminous chip-elevator at one end of said delivering area, a waste-elevator below the chip-elevator, a casing inclosing the operative part of the waste-elevator, and a spout or chute connected with said casing, and arranged to receive gravitating matter from the waste-conveyer.

9. A chip-assorting apparatus comprising a tank, a body of liquid normally at rest therein, an agitator or striker extending across the tank and subdividing the surface of the liquid into a chip-receiving and a chip-delivering area, said agitator being adapted to impart a progressive movement to the liquid in said areas, means for guiding the liquid horizontally through said areas, and a passage below said areas through which liquid may return from the delivering end of the delivering area to the receiving end of the receiving area.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 10th day of September, A. D. 1895.

REGINALD S. TALBOT.
NATHANIEL M. JONES.

Witnesses:
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