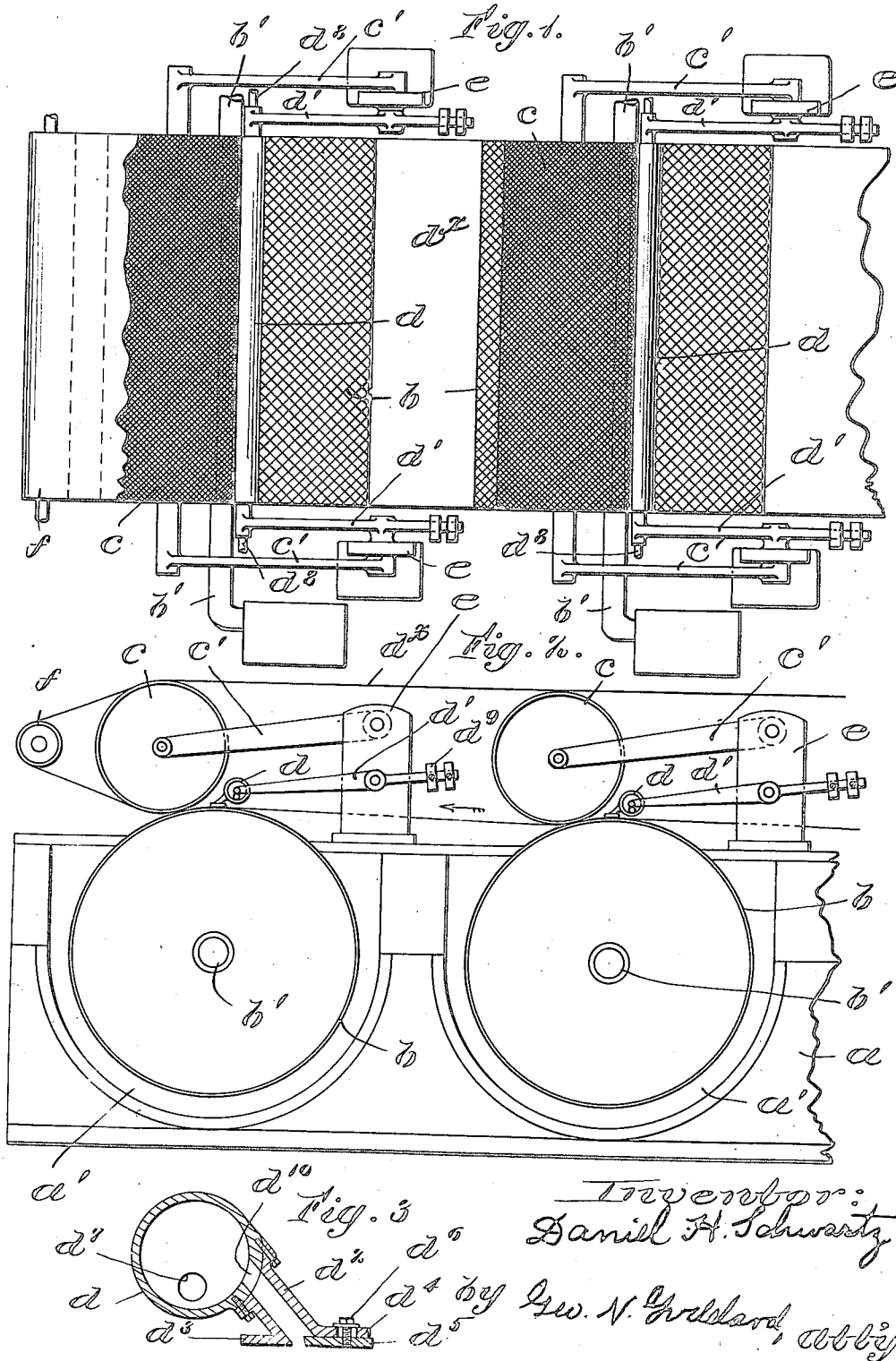


D. H. SCHWARTZ.
PAPER MAKING MACHINE.

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UNITED STATES PATENT OFFICE.

DANIEL H. SCHWARTZ, OF HOLYOKE, MASSACHUSETTS, ASSIGNOR TO HOLYOKE VACUUM SLUICE COMPANY, OF SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PAPER-MAKING MACHINE.

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To all whom it may concern:

Be it known that I, DANIEL H. SCHWARTZ, a citizen of the United States, and resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Paper-Making Machines, of which the following is a specification.

This invention relates to paper making machines and is shown more particularly applied to that class of machines in which a series of cylinder molds are employed in combination with properly arranged couch rolls to transfer the pulp in thin sheets or layers to the carrier felt or apron, the couch rolls acting to press or squeeze out the water from the pulp layer that is being transferred to the carrier felts.

Heretofore it has been customary to locate a slice bar in front of each couch roll to prevent the water squeezed out of the pulp by the couch roll from back-flowing upon the felt that is approaching the couch roll which is still carrying one or more layers deposited thereon by the preceding cylinder molds of the machine.

The present invention is intended to provide a means for taking up the water from in front of the couch roll as fast as it is squeezed out and positively conducting it away so as to avoid unnecessary wetting or saturation of the felt, and the pulp at this point, comprises essentially in combination with the cylinder mold and the couch roll a conduit or trough arranged in contact with the felt somewhat in advance of the couch roll so as to remove the water therefrom and convey it away in a manner to avoid the saturating of the advancing felt and its layer of pulp.

These and other features of the invention will be explained in detail in this specification and will be defined in the claims hereto annexed.

In the accompanying drawings I have illustrated an effective construction and arrangement embodying the principles of this invention in which:

Figure 1 is a plan view of one end of a pulp machine, so much thereof being shown as is necessary to an understanding of the present invention.

Figure 2 is a side elevation thereof.

Figure 3 is a central section through the

water-removing member the same being shown on enlarged scale.

Referring now to the drawings, the tank *a* having a series of concaved bottom vats *a'* for holding the pulp is of the usual construction. In these separate vats are mounted a corresponding series of cylinder molds connected with a suction pump in the usual manner so as to create a suction through the reticulated peripheral wall of the cylinder molds in order to cause a thin layer of pulp to adhere to the circumference of the revolving cylinder mold which layer of pulp is carried up into contact with the usual carrier felt *d** above which rests the usual couch roll *c* which has a finely perforated circumferential wall, and is rotatably supported in the free ends of the opposite pivotal arms *c'* which hold it in position while allowing it to press the carrier felt down against the interposed layer of pulp that has been picked up and carried to the felt by each cylinder mold. The supporting arms *c'* are mounted in any suitable upright or brackets *e* arranged on opposite sides of the machine.

As the carrier felt *d** travels along the machine in the direction indicated by the arrow, it picks up from each successive cylinder mold a thin layer of pulp which adheres to the under side of the carrier felt, the said aggregated layers being carried around a suction roll *f* at the end of the machine and along the top side of the carrier felt until the cohering layers are deposited at some other part of the machine for further treatment, all in accordance with the usual practice.

It will be seen that as each layer of the combination layers of pulp passes between successive cylinder molds and their cooperating couch rolls the latter perform their function of squeezing out the water from the pulp. When, according to the common practice heretofore, a slice bar is laid across the felt above the top of the cylinder mold there must be a substantial accumulation of water in the longitudinal space between the slice bar and the couch roll which has to flow off to the opposite ends of the cylinder mold which results in a substantial wetting of the felt and of its adhering layer of pulp as they approach the couch roll.

I have overcome this difference by providing means for positively conducting away

the squeezed out water so as to prevent its accumulation and the consequent separation of the pulp layer from the felt. To this end I provide a pipe or tubular conduit d which is provided with a longitudinal slot d^{10} on one side and which has at one or both ends an outlet d^7 connected with an exhaust or suction pipe d^8 through which sufficient suction is created by the action of a suitable pump not shown. To facilitate the drawing up of the water into the tubular conduit d I provide it with an elongated nozzle d^2 extending practically the full length of the conduit and preferably provided with flanges d^3 d^4 whose bottom faces are substantially tangent to the circumference of the pulp cylinder mold at the point where the trough rests on the superimposed carrier felt.

As shown in the enlarged view in Figure 3, the suction or intake nozzle of the conveyor trough may be narrowed or widened by means of an adjustable nozzle plate d^5 which is adjustably secured to the flange d^4 of the nozzle by means of clamping screws d^6 passed through transverse slots in the flange d^4 .

This liquid conduit or trough is supported in contact with the felt d^* slightly in advance of the couch roll by means of pivoted arms d^7 which are preferably provided with counter-weights d^9 so as to secure the desired degree of pressure of the nozzle member upon the carrier felt interposed between it and the top of the cylinder mold.

The action of the device is as follows:

A partial vacuum or suction is produced through the suction pipes d^8 and the slight quantity of free water that oozes out of the pulp in front of the couch roll is instantly picked up and carried off through the outlet pipe so that no accumulation of water is permitted at this point. In consequence, thereof, the felt and its previously deposited layers of pulp approach the couch roll without any additional wetting or exposure to water which tends to impair the action of the couch roll in expelling water from the pulp. The invention, therefore, serves to keep the felt in an unsaturated condition which facilitates the operation of the machine.

By disposing the suction nozzle directly against the face of the felt the accumulation of liquid on the carrier felt in advance of the couch roll is prevented both because such arrangement wholly avoids the possibility of any accumulation of liquid by reason of the direct suction exerted on the surface of the felt, but furthermore and because it is found in practice that such an arrangement and disposition of the suction nozzle acts to extract the liquid directly through the underlying felt thus leaving comparatively little free liquid in the pulp to be squeezed out by the couch roll. In consequence of

this arrangement the pulp is uniformly compacted and distributed and is generally free from blisters or air bubbles which are frequently found where any accumulation of liquid on the surface of the felt is permitted.

What I claim is:

1. In a paper machine the combination of a pulp carrying cylinder mold, a couch roll mounted to press against the said cylinder mold, a carrier felt arranged to travel between the cylinder mold and the couch roll and to take up the pulp from said cylinder mold, a suction nozzle mounted in contact with the felt in advance of the couch roll to draw off the liquid squeezed from the pulp to avoid saturation of the advancing felt, substantially as described.

2. The combination of a pulp carrying cylinder mold, a carrier felt, a couch roll arranged to press the felt against the cylinder to squeeze the interposed felt, a tubular conduit having a suction nozzle resting against the felt, and means for varying the width of the nozzle opening, substantially as described.

3. In a paper machine the combination of the pulp carrying cylinder mold, a cooperating couch roll and carrier felt, an exhaust member arranged in front of the couch roll in contact with the felt for conveying away the water from the felt, said exhaust member being provided with an elongated nozzle extending parallel to the couch roll, and an adjustable plate for narrowing or widening the width of said elongated nozzle, substantially as described.

4. In a paper machine, the combination with a pulp-carrying cylinder mold, a couch roll, a carrier felt interposed between the mold and the couch roll to travel between them, and a liquid suction member located in front of the couch roll and arranged to extract the liquid from the felt approaching the couch roll thereby preventing any accumulation of liquid on the surface of the carrier felt, substantially as described.

5. In a paper machine, the combination of a cylinder pulp mold, a carrier felt arranged to travel over and be pressed against the periphery of said mold along a line where it is covered with pulp, a hollow suction nozzle in contact with the carrier felt along the transverse line of contact between the felt and the pulp covered mold, whereby a direct suction through the felt is exerted to extract the fluid therefrom and prevent any accumulation of liquid on the felt, substantially as described.

6. In a paper machine, the combination of a revolving pulp mold, a carrier felt arranged to travel in peripheral contact with the mold to transfer the pulp therefrom, a suction device having an intake nozzle arranged in direct contact with that portion

of the felt that is engaged with the pulp mold in order to extract the liquid from the felt, said nozzle having an intake that is variable as to width in order to vary the force of the suction applied to the felt, substantially as described.

7. A vacuum sluice for a paper making machine embracing in its construction an elongated tubular exhaust member provided with a longitudinally extending nozzle formed with a felt-engaging face adapted

to extend across a carrier felt in close contact therewith, the intake opening of said nozzle extending lengthwise thereof and through said felt-engaging face to form direct suction contact with the felt in order to extract moisture and air directly from the felt, substantially as described.

In witness whereof, I have subscribed the above specification.

DANIEL H. SCHWARTZ.