S. L. GOULD.

Pulp-Screen for Paper-Machinery

No. 210,521. Patented Dec. 3, 1878.

Fig. 1.

Enlarged.

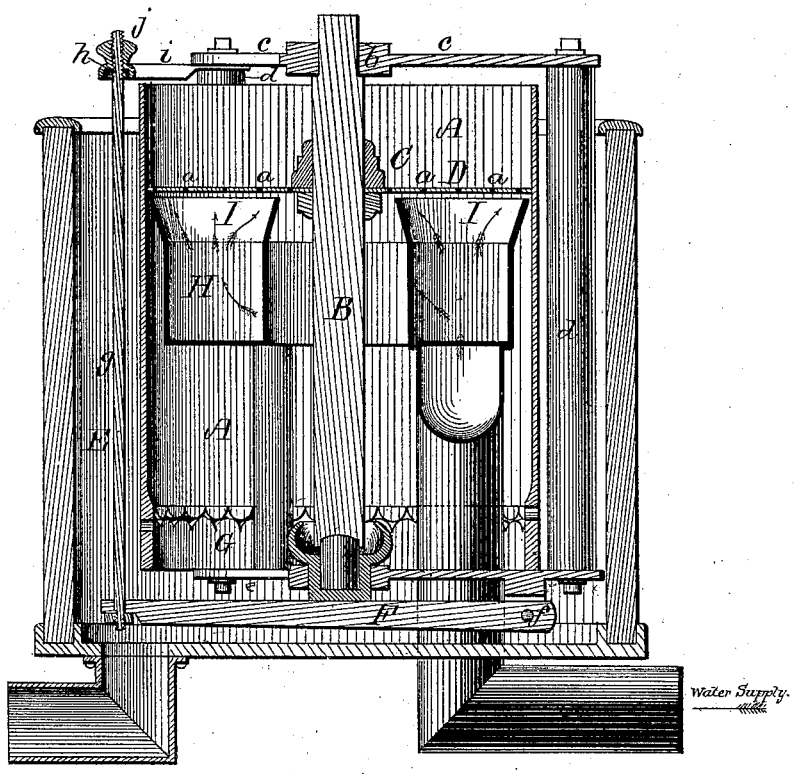


Fig. 2.

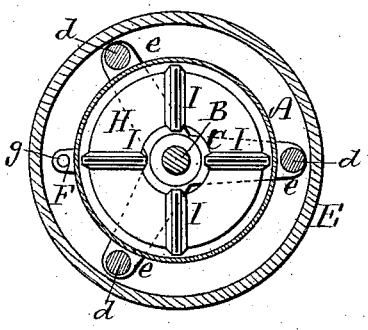


Fig. 4.

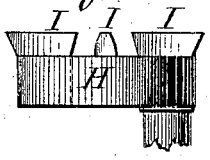
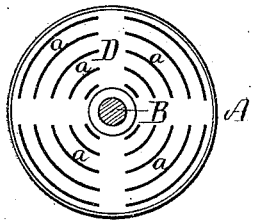


Fig. 3.



Witnesses.

M. Bailey

Est. Gusabaugh

Inventor.

S. L. Gould.

H. Curtis. Atty.

UNITED STATES PATENT OFFICE.

SIMEON L. GOULD, OF GARDINER, MAINE.

IMPROVEMENT IN PULP-SCREENS FOR PAPER MACHINERY.

Specification forming part of Letters Patent No. **210,521**, dated December 3, 1878; application filed November 4, 1878.

To all whom it may concern:

Be it known that I, SIMEON L. GOULD, of Gardiner, Kennebec county, Maine, have invented certain new and useful Improvements in Pulp-Screens for Paper Machinery, of which the following is a specification:

My invention relates to that part of paper-making machinery known as the "jogging-screen"—that is to say, the screen or strainer employed to arrest the knots, lumps, or other foreign substances contained in the pulp, and to which an up-and-down or jogging motion is imparted by suitable means, to facilitate the passage of the pulp through the interstices of the screen—the foreign matter being removed from the upper surface of the latter at intervals of time, as occasion requires.

My invention consists, first, in the employment, in connection with a jogging-screen of paper machinery, of jets or sprays of water, projected from below upon the under side of the screen-plate, and so that the water, under pressure from a suitable head, shall force its way upward through the slits or interstices of the said screen-plate, and, keeping such interstices free from obstruction, permit of free and rapid passage of the pulp through them, and prevent formation and accumulation of "strings," so called, about the lower edges of such interstices.

And my invention consists, secondly, in a screen composed of an upright cylinder, wallowing in the pulp-vat, and containing at its upper part a foraminous shelf, which constitutes the screen-plate, this shelf being placed horizontal or oblique, as practice may determine to be best, and being pierced with slits, holes, or other attenuated perforations, through which the pulp is precipitated, while the impurities remain upon its upper surface.

As is well known, pulp, for the manufacture of paper, consists of an assemblage of fine fibers, of greater or less length, according to the character of the paper to be made; and to enable these fibers to pass through the interstices of the screen, it has been customary to pierce the screen-plate with attenuated slits rather than with small round perforations.

Incidental details of my invention will be duly explained.

The drawings accompanying this specification, and illustrating my invention, represent, in Figure 1, a vertical section, and in Figs. 2 and 3 horizontal sections, of a device embracing my invention.

In these drawings, A represents an upright cylinder, supported and rotated by a vertical axial shaft, B, such shaft being secured to the cylinder by any suitable means, but in the present instance being secured by a hub, C, to a horizontal shelf or plate, D, which spans the upper part of the cylinder A and constitutes the screen-plate, and which is, in the present instance, pierced with a series of segmental, concentric, attenuated slits, *a a*, &c., through which the pulp admitted to the upper part of the cylinder passes. The shelf or screen-plate D, in lieu of being horizontal, may be placed sloping or oblique with respect to the axis of the cylinder, should practice or circumstances demand; and the form, number, or size of the interstices *a a* may be varied from the segmental slits above named, as I do not confine myself to any arbitrary rule in this respect, so long as I provide a suitable screening-surface. For instance, the slits may be arranged in rows of straight, in lieu of segmental, lines, and may be placed parallel or tangential to the circumference of the cylinder.

The upper end of the shaft B is guided by a bearing, *b*, upheld by cross-bars *c*, &c., arranged above the cylinder A, and supported at their outer ends upon posts *d*, &c., erected upon corresponding bars *e*, &c., arranged below the cylinder, or upon the bottom of the chest E, which contains the screened pulp, and in which the cylinder is immersed and wallows, the outlet-pipe by which the pulp escapes from the chest E being so placed that a shallow space shall remain between the under side of the screen-plate and the surface of the pulp in such chest.

The lower end of the shaft B is stepped in any suitable manner to a horizontal beam, F, placed at the bottom of the chest, the base of such lever being pivoted, by a pivot, *f*, to a hanger of one of the bars *e*, or to a post erected upon the bottom of the chest, or to one of the adjacent posts *d*, as the case may be, while to the opposite or free end of the lever is swiveled the lower end of an upright rod,

g, whose upper end in turn passes loosely through a hole, *h*, made in a horizontal bar, *i*, spanning two of the posts *d*, and has a male screw cut upon it, upon which a hand-wheel or nut, *j*, is screwed, and so as to bear upon the top of the bar *i*.

The lower edge of the cylinder A is corrugated or undulating, and below the cylinder and concentric therewith, and supported firmly in position thereat, is an upright circular wall or ledge, G, whose upper edge is also corrugated or undulating. As the cylinder rotates, under the impulse of any prime mover connected with its shaft, the two undulating surfaces in contact effect an up-and-down or jogging motion of the cylinder and its screen within the chest E, which contains the pulp, with the result incident to screens of this character—that is to say, as the screen descends, the body of air below it tends to blow or force the thin body of pulp upon the screen-plate upward and out of the interstices, while, as the screen ascends, the suction incident to the tendency to a vacuum below draws a certain portion of the pulp downward through the said interstices, or, in other words, screens such pulp.

I do not confine myself to the form or locality of the corrugations above named for effecting the jogging motion of the vessel A, as this form may be varied, and the jogging device may be added to the lower end of the shaft B, or other portions of the structure. Again, this jogging of the vessel may be employed or not, as under some circumstances it may be dispensed with, in which case the free end of the lever F is raised by means of the hand-wheel or nut, and the vessel A freed from contact with the ledge, or by means of the wheel the degree or extent of jogging motion is adjusted.

Heretofore the action of these screens has been slow or sluggish, and in addition to this a serious evil results from the tendency of the pulp, after passing the interstices of the screen, to assemble into "strings," so called, which adhere to the lower edges of the said interstices until they assume considerable size and length, and then drop into the screened pulp below and enter into the sheet of paper with injurious results.

To facilitate the passage of pulp through the slits or interstices of the screen by preventing clogging of the same, and to obviate collection of strings, before alluded to, I employ jets of water, as before premised; and to carry out this portion of my invention in one manner in which it may be effectually and economically accomplished, I proceed, in the present instance, as follows: I place below the screen D, and within the walls of the cylinder A, a suitable reservoir, H, to contain water, which is supplied to it under suitable pressure, and constitutes a feeder to a series of upright jet-pipes, I I, &c., erected upon such reservoir and communicating with its interior, the upper edge or mouth of each pipe I being in close proximity to the under side of the screen, in order not to be obstructed by passing through the body of pulp below.

The form, extent, and disposition of the discharge-orifices of the pipes I, will be a matter of practice, to which I do not restrict myself; but in my own use I arrange them as shown in the drawings—that is, as long and attenuated, disposed radially of the cylinder, and so as to command its entire surface when revolving.

The jets of water issuing from the pipes I impinge against the under side of the screen D, and, to a great or less degree, force their way upward through the interstices *a*, and thereby prevent obstruction of the latter and the formation and accumulation of the strings before alluded to. The water thus injected also serves to dilute the pulp, and provides the necessary vehicle whereby the pulp is flowed upon the wire-cloth of the machine, through which such water finally escapes; and, if deemed advisable, this water, after being expressed from the film of pulp, may be returned to the reservoir H and used over continuously, thus effecting an economy in the use of water.

In practical operation of my device the vessel A is put in rotation at a moderate speed and pulp supplied to its interior from above the screen, the inlet-pipe being so arranged as preferably to deliver the pulp at the center of the vessel. The centrifugal force generated by the revolution of the vessel A induces a current of the pulp, which sets outward toward the circumference of the vessel, and thereby gives ample opportunity for such pulp to be drawn downward through the interstices of the screen D by the suction below, while at the same time the jets of water from below the screen are executing the functions required of them, as before explained.

I obtain in my device the effects of the jogging motion of screens heretofore in use; but as my jogging mechanism is placed preferably at the bottom of the chest E, and immersed in the pulp therein, I deaden to a great extent the noise incident to the present device.

I also obtain, by my system, in addition to the jogging motion of ordinary screens, the benefit of the jets of water, before explained, and the current of the pulp setting outward and distributing itself uniformly over the surface of the screen, by the centrifugal force of the revolving vessel.

I am enabled to screen pulp much more rapidly than heretofore, and to prevent formation of strings, thus producing more perfect paper.

The ease with which the "screenings," so called, may be removed from my screen will commend my invention to paper-machine tenders, as it is only necessary to place the scoop in contact with the revolving surface of the screen, when its revolutions fill the scoop without effort on the part of the tender.

My system of water-jets is applicable, with very advantageous results, to screens now in use, and may be applied to them at small cost.

Having thus described the nature and purposes of my invention, I claim, and desire to secure by Letters Patent of the United States, the following:

1. The combination, with a pulp-screen of paper-making machinery, of means for directing a jet or jets of water upon the under side of such screen.

2. A pulp-screen for paper-making machinery composed of a cylinder or vessel having a perforated or reticulated partition through which the pulp passes and is screened, the vessel being contained in a suitable cistern and being rotated by proper means.

3. In combination with the rotary vessel and its screen, a device for effecting jogging motions of such vessel and screen.

4. The combination, with the rotary vessel and its screen, and the device for imparting jogging thereto, of means for varying the distance between such vessel and the jogging mechanism, whereby the extent of such jogging motions is increased or diminished or dispensed with, as the case may be.

5. The combination, with the rotary vessel and its screen, of the water-jet pipes, supplied with water from a suitable head.

6. The rotary vessel provided with the foraminous screen and mounted upon a beam, with provision for raising and lowering the latter.

SIMEON L. GOULD.

Witnesses:
F. E. HITCHINGS,
E. D. GOULD.