

No. 712,347.

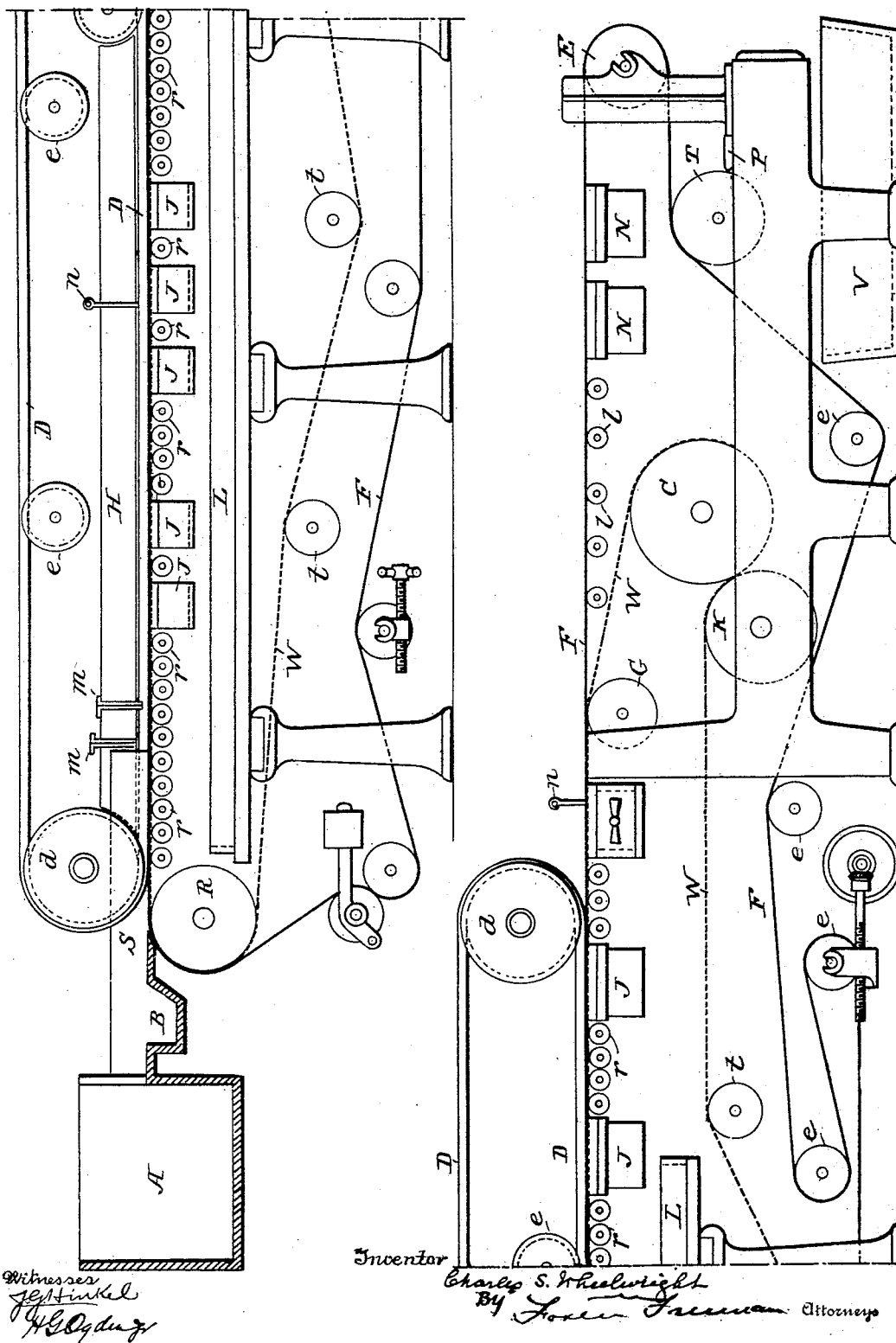
Patented Oct. 28, 1902.

C. S. WHEELWRIGHT.

APPARATUS FOR DRAINING CRYSTALS OF SULFATE OF LIME.

(Application filed Jan. 2, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

CHARLES S. WHEELWRIGHT, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR
TO WHEELWRIGHT FILLER & MANUFACTURING COMPANY, A CORPORATION OF RHODE ISLAND.

APPARATUS FOR DRAINING CRYSTALS OF SULFATE OF LIME.

SPECIFICATION forming part of Letters Patent No. 712,347, dated October 28, 1902.

Application filed January 2, 1901. Serial No. 41,867. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. WHEELWRIGHT, of Providence, in the State of Rhode Island, have invented new and useful Apparatus for Draining Crystals of Sulfate of Lime, of which the following is a specification.

In a pending application for a patent, Serial No. 740,592, I have described and claimed as my invention a process of drying wet or moist acicular crystals of sulfate of lime, the first step in which consists in forming of said acicular crystals a pasty mass. The said crystals, from which the pasty mass is formed, are generally, as appears in said application, mechanically combined with a large amount of water in addition to the necessary water of crystallization and indeed are sometimes, especially when obtained from dehydrated native gypsum or plaster-of-paris, by continuous violent agitation in water merely suspended in the water, the whole forming an exceedingly thin liquid. Such crystals may be readily obtained by an agitating apparatus of the kind described in my Patent No. 555,061, dated February 18, 1896.

My present invention consists of an apparatus or machine by which the water of suspension may be drained from the acicular crystals of sulfate of lime held in suspension in water to form a pasty mass. It consists also in details of construction. The apparatus or machine, however, is of course applicable to draining off water of suspension from any similar crystals. It closely resembles a Fourdrinier paper-machine, so closely, indeed, that but a brief description will be required of the construction and operation of the pasty-mass-forming machine, the terms used in the description being the same that are commonly applied to like parts of the Fourdrinier machine. Details of supporting-frame and motive power are consequently almost entirely omitted both in drawing and description.

The figure in the drawing is a side elevation, partly in section, (for convenience given in two parts,) of the said apparatus or machine.

A is the mixing-box, into which the water of

suspension, with its acicular crystals formed in the agitating-machine, is pumped. It may well be furnished with a fan-agitator of its own and should have an overflow through which any superfluity of water and crystals will flow back to the source from which it is pumped. It is open in front or at the side next the operative parts of the machine down to the level of an endless sheet of traveling felt, upon which the pasty mass is formed, as will be presently described, and from said opening there projects a delivery-spout S of about the width of the said traveling sheet of felt and open at the top.

B is a regulating box or gutter extending from side to side of the spout S and corresponding in office and position to the evening-box of the paper-machine.

D D are the deckles or endless heavy rubber bands traveling about the deckle-wheels *dd* and kept taut or properly strained by the straining or take-up wheels *e e*.

H is one side of the deckle-frame.

W is an endless wire-cloth of rather fine mesh traveling around the roll R, which corresponds to the breast-roll of the paper-machine, and the roll C, which corresponds to one of the couch-rolls of the paper-machine. It travels also over the roll K and is kept properly strained by the take-up rolls *t t t*. Like the wire-cloth of the paper-machine, the wire-cloth W passes over a large number of tubular rollers *r* so close to each other as to almost touch.

F is an endless traveling sheet of felt, much longer than the endless wire-cloth upon which it lies for a portion of the distance it travels. Indeed, the office of the wire-cloth is to support the sheet of felt, since the shaking motion of the wire-cloth required in the paper-machine is not needed here. Indeed, wire may be used so coarse that it would be impossible to form paper upon it. The endless sheet of felt passes on top of the wire-cloth, over the breast-roll R and the tubular rolls *r* as far as the guide-roll G, where the wire-cloth and felt separate, the former passing over the couch-roll C, as before stated, while the sheet of felt passes on over other tubular

rolls *l l*, then over the end roll *E*, over the collecting-roll *T*, and over and under guide and take-up rolls *e e*, &c., back to the breast-roll *R*.

J J, &c., are suction-boxes operated and operating precisely like the suction-boxes of the paper-machine to draw out from the solution or pasty mass containing the sulfate crystals water that does not drain off by gravity through the felt and wire meshes.

10 *V* is a receiving-vat.

L is a save-all.

In the operation of the pasty-mass-forming machine the very watery solution containing the sulfate crystals flows as the pulp flows in 15 paper-making from the spout or channel *S* over an apron formed of oilcloth or similar material (not shown) upon the sheet of felt, where the latter lies upon the wire-cloth and between the deckles *D D*, which determine 20 the width of the pasty mass to be formed. Much of the water drains off through the felt and wire meshes, and there is a further drainage of water by suction-boxes all through the machine, even after the felt and wire are separated. 25 The suction-boxes, however, especially additional suction-boxes *N N*, under the felt, after the felt leaves the wire-cloth near the end roll *E* also draw out air that would otherwise lie between the pasty mass 30 and the felt and cause the former to cling to the latter as the latter passes over the end roll *E*. It may be well to state that the deckles in the machine which I have most successfully used are about fifteen feet in length, and 35 when the pasty mass leaves the deckles it travels on in the form of a sheet with well-defined edges. The thickness of the flowing mass, and finally of such sheet, is determined from place to place by slices *m m*, such as are 40 used in the paper-machine. Heavy hinged slices *n n* farther along in the machine serve to further smooth the surface of the pasty mass and rub out pinholes.

The arrangement of rolls at the discharging end of the machine is of particular importance, for until I hit upon the contrivance shown I found it difficult to remove the pasty mass from the traveling felt. The action is peculiarly striking. The pasty mass clings 45 to the upper side of the felt as the latter passes over the end roll *E* and to the lower side as the felt passes to the collecting-roll, where it is wiped upon the smooth surface of

the collecting-roll, from which in turn it is entirely removed by the scraper. Thus there 55 is accomplished a great saving of the wear of the felt in that the scraper works upon the smooth collecting-roll instead of upon the felt itself; nor is the filling or pasty mass contaminated by hair pulled from the felt by the 60 scraper.

As before stated, the removal of the air from between the sheet of pasty mass and the sheet of felt causes the pasty mass to cling to the felt as the latter passes over the end roll 65 *E*. It continues to cling to the felt as the latter passes to the collecting-roll *T*, the air not working through the felt as the latter passes between the rolls *E* and *T* sufficiently to cause the pasty mass to drop by gravity. 70 Consequently the pasty mass passes over the roll *T*, being held thereon by the felt; but here the felt is above the pasty mass, and while there is air above and in the felt there is no air between the pasty mass and the roll 75 *T*, and the pasty mass clings to the said roll until removed by a scraper *P*, which causes it to drop into the receiving-vat *V*. The pasty mass thus produced or however produced requires further removal of moisture 80 in order to obtain the acicular crystals in their most portable or for some purposes their most desired condition; but, as hereinbefore stated in substance, the present invention is confined to draining off water of 85 suspension from the crystals.

I claim—

In the apparatus for draining off the water of suspension of acicular crystals of sulfate of lime or similar crystals, the combination with 90 the endless sheets of wire and felt, supporting-rolls therefor and rolls for imparting motion thereto, of a collecting-roll so arranged relatively to the end roll, or last roll over which the said endless sheet of felt comes in 95 contact, that the substance drained or draining that lies above and outside of said sheet of felt as the latter passes over the said end roll, shall lie below said sheet of felt, between it and said collecting-roll, in the passage of 100 said sheet of felt over said collecting-roll, and a scraper substantially as described.

CHARLES S. WHEELWRIGHT.

Witnesses:

WILLIAM W. SNOW,

JOHN T. WHEELWRIGHT.