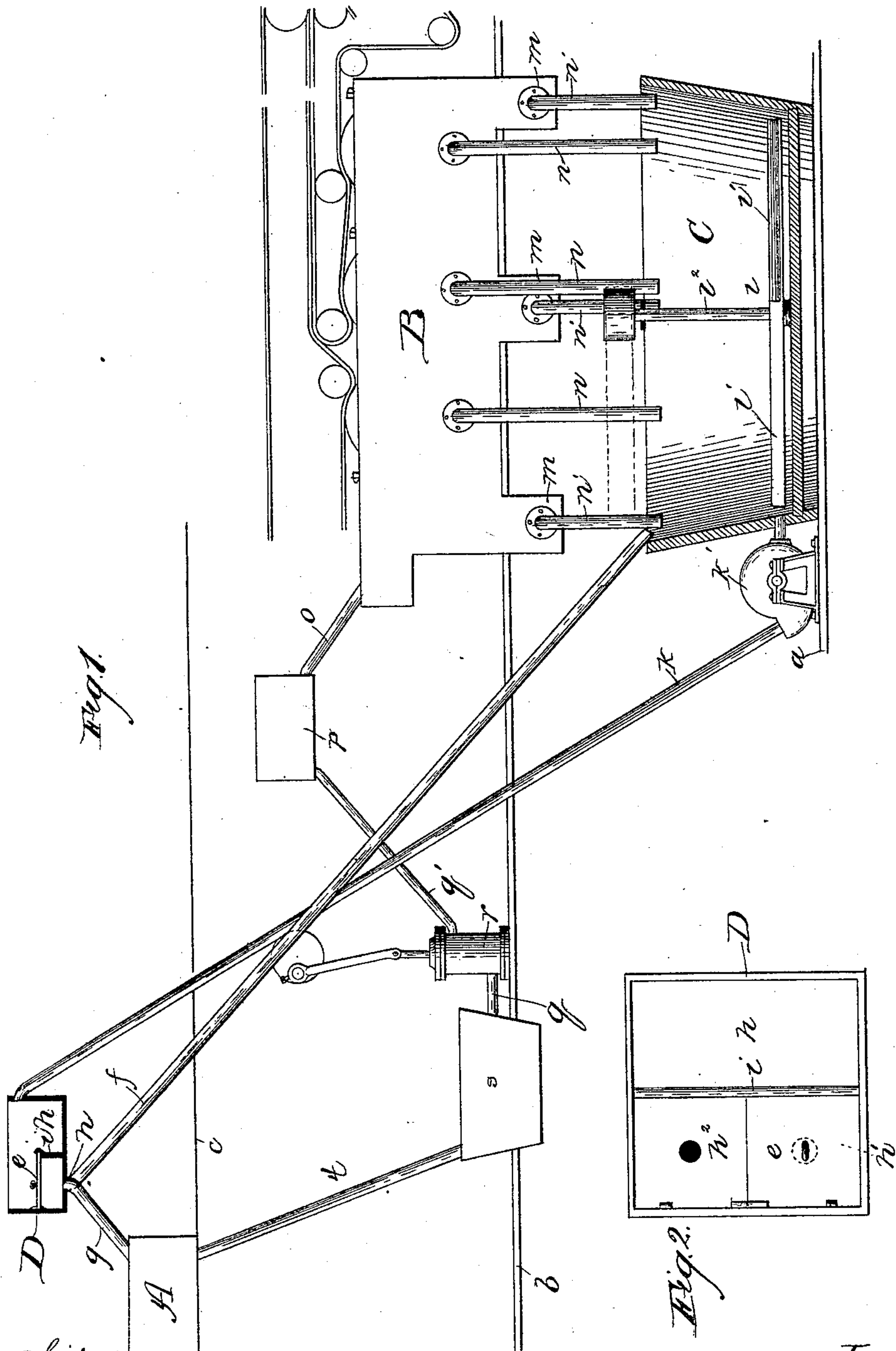


(No Model.)

S. WILMOT.  
PAPER MAKING MACHINE.

No. 427,943.

Patented May 13, 1890.



Witnesses:  
Clifford G. White.  
J. H. Dyrenforth

Inventor:  
Samuel Wilmot,  
By Dyrenforth & Dyrenforth  
Attys.



# UNITED STATES PATENT OFFICE.

SAMUEL WILMOT, OF LOCKPORT, ILLINOIS.

## PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 427,943, dated May 13, 1890.

Application filed December 7, 1889. Serial No. 332,914. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL WILMOT, a citizen of the United States, residing at Lockport, in the county of Will and State of Illinois, have invented a new and useful Improvement in Paper-Making Machines, of which the following is a specification.

In the manufacture of paper from straw, and especially wheat straw, great difficulty has hitherto been experienced, owing to the presence in the pulp of non-disintegrated portions or knots of straw, which, being tougher than the rest of the material, would resist the action of the grinders or "engine," and which would, if great care were not employed, become mixed with the pulp as it is spread upon traveling webs or picked up by revolving cylinders in the formation of the paper.

Letters Patent of the United States No. 401,917 were granted to me on the 23d day of April, 1889, for an improvement in paper-making machinery of the cylinder type, consisting of what is known as a "washup" vat constructed to effect the separation of knots and foreign substances from the pulp before the latter reaches the revolving cylinders, and in the use of which great saving of valuable material is effected. As stated in the specification of my aforesaid patent, it is necessary more or less frequently, even in the use of my improvement, to drain out the pulp to rid the vat of knots and other deleterious substances which congregate therein, and that I provided a trap or settling-reservoir (not shown in the drawings) into which the pulp thus drained off could be directed and what was good thereof saved.

My invention consists in the general construction and arrangement of the apparatus which I employ for saving the pulp drawn off to get rid of the non-disintegrated portions and conducting it to grinders for the purpose of further treatment; and it further consists in details of the construction of the apparatus and combinations of parts, all as hereinafter set forth and claimed.

In the drawings, Figure 1 is a diagrammatic view of a section of a paper-mill employing a cylinder-machine, showing my improved apparatus, partly in section and in operative position; and Fig. 2 is a top plan view of a detail.

To facilitate the handling of the pulp, the various parts of the apparatus shown are located upon floors *a b c* at different levels or stories in the mill.

*A* is the pulp-grinder, of any common construction, which is located on the upper floor *c*. From the grinder a pipe *t* leads down to a vat or "stuff-chest" *s*, located in the floor *b*. The pulp from the grinder *A* runs through the pipe *t* into the stuff-chest *s*, where it is constantly stirred to prevent settling, and whence it is forced by a pump *r* through pipes *q q'* to a box located at an elevation above the floor *b*, and flows through a pipe *o* to the cylinder-vat *B*, which is constructed to operate as a settling-chamber or collector for the knots.

In construction and general arrangement no particular novelty exists in the parts thus far described. Hitherto the practice has been, when necessary to clean out cylinder-vats, to empty the vats of their contents, which consisted largely of good pulp with which the knots and foreign substances were mixed, and to waste all the material thus run off, owing to the lack of proper appliances for separating and saving what could afterward be utilized at an expense of labor and time which would render such saving a matter of economy. My improved apparatus which effects this saving automatically is shown in the drawings in connection with a cylinder-vat *B* of my improved construction, which has been patented, as aforesaid, though it will be understood that I do not limit myself to its use in such connection, since it may be employed advantageously with other forms of collectors.

Located on the floor *a*, preferably directly below the vat *B*, is a vat or receptacle *C*, which may be circular. Conduits or pipes *n n'* lead, respectively, from the bases of the various compartments and traps *m* of the vat *B* down to the vat *C*, and are provided with valves, (not shown,) whereby the flow of pulp from the upper to the lower vat may be started or turned off at will. Within the vat *C* is a stirrer *l*, comprising blades *l'*, extending horizontally from a vertical rotary shaft *l<sup>2</sup>* a short distance (in practice about ten inches) above the floor of the vat. A conduit or pipe *k*, in which a pump *k'* is interposed, leads from the



vat C, at a short distance above the bottom of the latter, to a box D, located at a point above the grinder A. Extending centrally across the box is a partition  $i$ , which rises 5 from the base of the box to about half the height of the latter, and another partition of equal height extends from the center of the partition  $i$  to the back of the box. The box is thus divided into three compartments  $h$ ,  $h'$ , 10 and  $h^2$ . The conduit  $k$  enters through one side of the box toward the top of the latter into the compartment  $h$ , while from the bottom of the compartment  $h'$  a conduit  $g$  leads to the grinder A, and from the bottom of the 15 compartment  $h^2$  a conduit  $f$  leads back to the vat C.

The operation is as follows: When the accumulation of knots and other deleterious substances in one of the cylinder vats or compartments of the vat B makes it necessary to 20 drain out the contents thereof, the valve of the respective conduit  $n$  is opened and the pulp allowed to flow into the vat C. The stirrer  $l$ , which rotates constantly a short distance above the bottom of the vat, prevents the knots from settling, and only allows the heavier particles of foreign substances—such as sand, iron, or the like—to lodge below the 25 stirrer in the space before mentioned, which is left for that purpose. Occasionally, also, when the accumulation of deleterious substances in the traps  $m$  renders it advisable to drain them of their contents the supply of pulp to the vat B may be shut off and the 30 valves of the conduits  $n'$  opened. In order to utilize the pulp which is discharged into the vat C, it is necessary to run it through grinders to disintegrate the knots, and this may be done by running it either through grinders 35 especially provided for the purpose, or, and preferably, at intervals through the grinder A, which is used to reduce the paper-stock in the first place. In the primary reduction of the softened paper-stock to pulp great care 45 must be exercised not to grind the material so long as to destroy the fiber, and as to reduce the knots, which are tougher than the rest of the stock, to the proper condition for use, if done in the first instance would cause the 50 rest of the stock to be ground to powder, it is necessary to allow the knots to remain more or less intact. When, however, the knots are ground a second time, or, at most, when unusually tough, a third time with fresh paper-stock, they become properly reduced and fit 55 to form paper. Of course in the primary disintegrating operation a certain proportion of the stock is overground in reducing the greater part to the proper condition; but the proportion of pulverized material is so small that it does not materially affect the quality of the paper produced. In the operation of grinding the knots a second time to disintegrate 60 them to the proper condition of fiber the pulp with which they are mixed is reduced to powder, and the proportion of the latter being

greater than is desirable it is necessary to mix the pulp as it is reground with fresh pulp to reduce the proportion of the powdered material. To accomplish this, the mixed pulp 70 and knots in the vat C are forced by the pump  $k'$  through the conduit  $k$  to the box D, whence the flow is regulated to the grinder A. In order that the operator in charge of the grinder A may, without leaving the floor  $c$ , 75 readily control the supply of material from the vat C to the grinder, the pump  $k'$  is kept constantly in operation, and a lid  $e$ , capable of closing the top of either compartment  $h'$  or  $h^2$ , is arranged to be slid from one to the 80 other, whereby the material as it is pumped into the compartment  $h$  will overflow the partition  $i$  into either the compartment  $h'$  or  $h^2$ , and thus be directed through the conduits  $g$  or  $f$  to the grinder or back to the vat C at will. 85 The compartment  $h$  operates as an additional trap to catch particles of foreign material which may be carried to it from the vat C. With the means thus supplied the operator may always control the quantity of material 90 which reaches the grinder from the vat C, and thus cause it to mix in proper proportion with the fresh supply of paper-stock. When necessary, the vat C may be drained down to the level of the conduit  $k$ , and, after stopping 95 the stirrer  $l$ , the heavy settlings which have accumulated at the bottom removed.

While I have shown and described my improved apparatus in connection with a cylinder-machine as being the one more generally 100 in use for the manufacture of paper from straw, it may of course be used to great advantage in Fourdrinier (flat-web) or combined flat-web and cylinder machines used for the same purpose by providing the de- 105 vices for collecting non-disintegrated straw with discharge-conduits leading to vats C, as in the cylinder-machine above described.

What I claim as new, and desire to secure by Letters Patent, is— 110

1. In a paper-mill, the combination, with the grinder and device for collecting non-disintegrated straw, of a vat C, a discharge-conduit for pulp leading from the collecting device to the vat C, and a conduit leading from 115 the vat C to the grinder, whereby pulp as it is discharged from the collecting device may be conveyed to the grinder, substantially as and for the purpose set forth.

2. In a paper-mill, the combination, with the 120 grinder and device for collecting non-disintegrated straw, of a vat C, located at a lower level than the collecting device, a discharge-conduit leading from the collecting device to the vat C, and a conduit having a pump interposed in it leading from the vat C to the 125 grinder, whereby pulp as it is discharged from the collecting device into the vat C may be conveyed to the grinder, substantially as and for the purpose set forth. 130

3. In a paper-mill, the combination, with the grinder and device for collecting disintegrated



straw, of a vat C, located at a lower level than the collecting device and provided with a stirrer *l*, a discharge-conduit leading from the collecting device to the vat C, and a conduit leading from toward the base of the vat C to the grinder, whereby pulp as it is discharged from the collecting device into the vat C may be conveyed to the grinder, substantially as and for the purpose set forth.

10 4. In a paper-mill, the combination, with the grinder A and device for collecting disintegrated straw, of a vat C, located at a lower level than the collecting device and provided with a stirrer *l*, a discharge-conduit leading  
15 from the lower part of the collecting device to the vat C, a box D at a higher level than the grinder A, a conduit *k*, having an interposed pump *k'*, leading from toward the base of the vat C to the upper part of the box D, conduits  
20 *g* and *f*, leading from the lower part of the box D, respectively, to the grinder and back to the vat C, and means, substantially as described, for closing the conduits *f* and *g* alternately, whereby pulp as it is discharged from the  
25 collecting device into the vat C may be conveyed to the box D, and the supply from thence

to the grinder controlled, substantially as and for the purpose set forth.

5. In a paper-mill, the combination, with the grinder A and device for collecting disintegrated straw, of a vat C, located at a lower level than the collecting device, a stirrer *l* within the vat C, provided with blades *l'*, which rotate a short distance above the base of the said vat, a discharge-conduit leading from the lower part of the collecting device to the vat C, a box D at a higher level than the grinder A, divided by low partitions into compartments *h*, *h'*, and *h*<sup>2</sup>, a conduit *k*, having an interposed pump *k'*, leading from a short distance above the base of the vat C to the upper part of the compartment *h* of the box, a conduit *g*, leading from the base of the compartment *h'* to the grinder, and a conduit *f*, leading from the compartment *h*<sup>2</sup> back to the vat C, substantially as and for the purpose set forth.

SAMUEL WILMOT.

In presence of—

F. W. STOWE,

F. F. STOWE.