

J. L. THOMSON.
Method of Making Paper-Barrels.
 No. 154,300.

Patented Aug. 18, 1874.

Fig. 1.

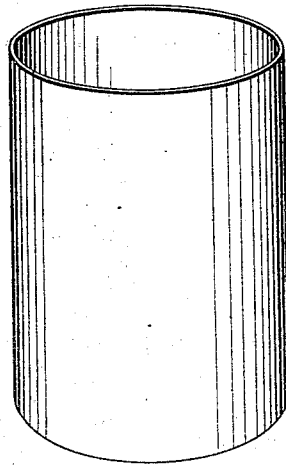


Fig. 4.

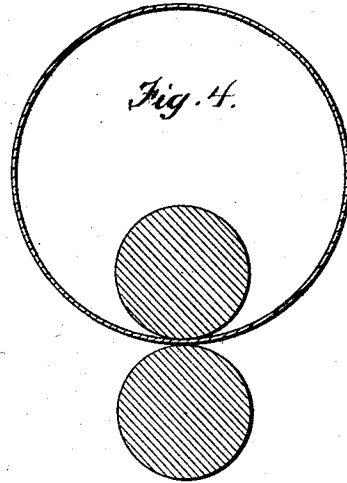


Fig. 2.

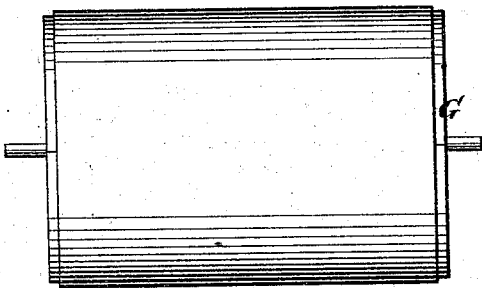


Fig. 3.

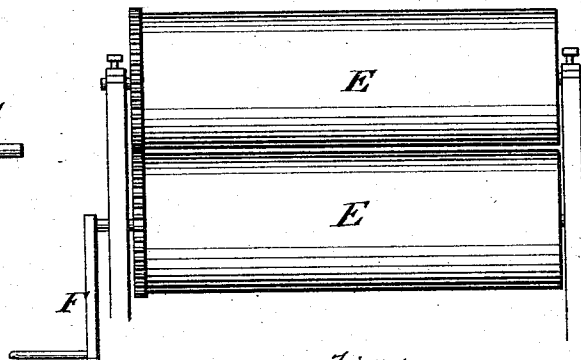


Fig. 5.

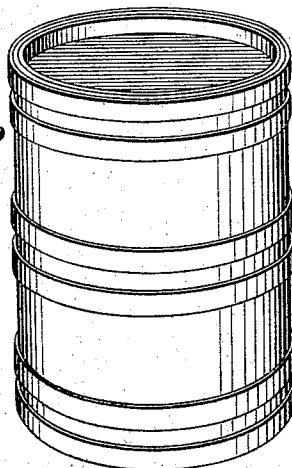


Fig. 6.

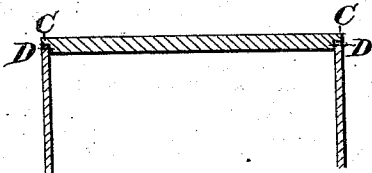
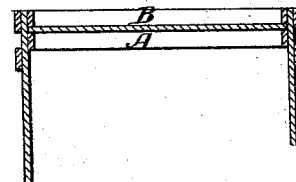


Fig. 7.



Witnesses.
E. T. Brown.
A. R. Hill

Inventor.
J. L. Thomson.
by his Attys.
Hill & Deane

UNITED STATES PATENT OFFICE.

JUDSON L. THOMSON, OF BELOIT, WISCONSIN.

IMPROVEMENT IN METHODS OF MAKING PAPER BARRELS.

Specification forming part of Letters Patent No. **154,300**, dated August 18, 1874; application filed May 8, 1874.

To all whom it may concern:

Be it known that I, JUDSON L. THOMSON, of Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Paper Flour-Barrels; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 is a perspective view of a barrel constructed in accordance with my invention and without heads and hoops. Fig. 2 is a view of the barrel on the expanding cylinder. Fig. 3 is a side elevation of the rollers for hardening, compressing, and finishing the interior and exterior surfaces of the barrel. Fig. 4 is a transverse section of the rollers, showing the application of the barrel thereto, for hardening, compressing, and finishing its interior and exterior surfaces. Fig. 5 is a perspective view of the finished barrel hooped and headed. Figs. 6 and 7 are detail views, to be hereinafter referred to.

Similar letters of reference denote corresponding parts in the several figures of the drawings.

My invention has for its object to improve that class of flour-barrels which are composed of paper, for the purpose of cheapening the cost of manufacture, in time, labor, and material, and for producing a stronger, more compact, and better barrel. To this end the invention consists in the method of forming a seamless flour-barrel by first winding a web of soft paper-pulp from the cylinder of a wet-paper machine directly upon an expanding cylinder until the requisite thickness for the barrel has been reached, then contracting and withdrawing the cylinder while the barrel is still wet, so that both the interior and exterior surfaces of the latter shall be exposed to the action of the air or other drying medium at the same time to prevent the layers of the web from cracking and peeling off; and, lastly, in hardening, compacting, smoothing, and finishing its interior and exterior surfaces between rollers of less diameter than the barrel.

I am aware that sheets of papier-maché

have been made by winding the wet pulp around a cylinder to the requisite thickness, and then cutting it longitudinally, so that it can be removed from the cylinder and spread out into a flat sheet. This, however, does not and cannot form a seamless barrel since the paper must be cut or severed longitudinally before it can be removed from the forming-cylinder, and this, of course, destroys at once the cylindrical form. I am also aware that in the formation of roving-cams for use in the manufacture of yarns it has been suggested that the fresh sheet of paper just from the paper-machine may be wound directly onto a cylindrical former and adhere and felt together so as to be united. I do not regard this as coming within the scope of my invention, because the fresh sheet of paper is not the soft web of pulp from the cylinder of a wet machine. It is the long sheet of paper compressed between rollers after leaving the cylinder of the machine, but not thoroughly dried, and is apparently taken in this condition just as it leaves the paper-machine and wound upon a cylindrical former. Its dampness will cause the plies to unite sufficiently for forming roving-cans, as but little strength is required for these articles. It could not be used for flour-barrels, however, because the layers or plies will not unite to form a hard, compact, and homogeneous mass, but will crack and peel off if subjected to rough usage. The roving-cans contain very light cotton or woollen rovings to be spun into yarns, and a slight, thin receptacle only is required to protect it, whereas a flour-barrel is filled by pressure and the filled barrel weighs two hundred pounds. It must, therefore, be made strong enough to sustain the force applied in packing the flour, as well as the rough handling to which it is afterward subjected during transportation.

In the suggestion referred to no special construction of the cylindrical former is described, nor are any means mentioned for removing the cans therefrom when completed. The presumption, therefore, is that the ordinary solid cylinder is employed, and that the cans are dried upon the cylinder before removal, because they could not be removed from a solid

cylinder while wet without severing them in a longitudinal direction, as hereinbefore described. Neither is it necessary that the roving-cans shall be strengthened and compacted, because they hold but a few pounds of roving, and are not exposed to the action of the weather, but are attached to the frame of a spinning-machine and constantly kept in the factory; nor are the roving-cans smoothed and hardened for the same reason. They are not made on an expanding cylinder; they are not removed from the cylinder in a wet condition; they are not compacted, hardened, strengthened, and smoothed between rollers, and cannot, therefore, form flour-barrels.

In carrying out my invention, I take the soft web of pulp directly from the coucher or cylinder of a wet-paper machine and conduct it around an expanding cylinder until it forms a cylinder of the requisite thickness for a flour-barrel. The web is then torn off, and the expanding cylinder, with the barrel on it, removed, and another put in its place to receive the web of pulp for forming a second barrel, and so on indefinitely. While the barrel is still wet the forming-cylinder is contracted and withdrawn from it, and the barrel set away to be dried by suitable means. It is necessary to the formation of a flour-barrel of this thick strong material, that it shall be dried uniformly, to prevent the surfaces from cracking, so as to expose the unsized inner fiber to the attacks of moisture after the barrel has been filled. This uniformity in drying cannot be attained if the barrel is dried upon the forming-cylinder, because one surface dries faster than the other, and by contraction breaks the outer fiber or skin, and allows it to peel off; and if an unyielding or non-contracting cylinder is used the barrel cannot be removed from it until dried. It is therefore necessary to employ the contracting and expanding cylinder, as I propose, in order to remove it from the barrel while the latter is in a wet state, and it must be removed while in this state, to be uniformly dried. The soft web of pulp cannot be calendered upon the forming-cylinder, because the power necessary for this purpose would press the pulp off the ends of the cylinder as well as roll it up in a ridge in front of the calender, to be scraped off by the latter. Neither can the pressure of the calender be applied gradually, because it must first be exceedingly light, and lastly very heavy. In order to attain the latter result it must be large and strong, and these requisites preclude the possibility of the very light pressure first required, even if these gradual actions could be reached. The time when the very light pressure should cease, the next heavier begin, and so on to the heaviest, could never be determined, owing to the wide difference in the consistency and composition of paper-pulps. For these reasons all paper-machines are pro-

vided with a number of sets of press-rolls, adjusted successively to the different pressures required. The first set is very light, the next a little heavier, and so through the whole number of sets, until the calenders are reached to apply the heaviest and finishing pressure. These successive actions are only applicable to a web of pulp passing in a line between the rolls and calenders, and cannot be applied to the circular body of pulp on the forming-cylinder. The barrel, therefore, cannot be calendered on the forming-cylinder, and if not calendered it will shrink during the process of drying. For this reason I employ the contracting cylinder, and am thereby enabled to remove the uncalendered barrel in a wet condition, so that it can be dried uniformly, to prevent cracking and peeling. After the barrel has been removed from the expanding cylinder and dried, I harden and compress both its interior and exterior surfaces between the two small rollers E E, which are geared together at one end, as shown in Fig. 3, and operated by a crank, F, or other suitable means. The barrel is slipped upon one of these rollers, and the two are adjusted so as to clamp it between them, as shown in Fig. 4. They are then set in motion, and move the barrel between them, so as to act simultaneously upon both its interior and exterior surfaces, to compress, harden, smooth, and finish the same. When the barrel is removed from the rollers it is smooth upon the inside and outside, and its surfaces are rolled down so that the body of the barrel forms a compact and homogeneous fabric, impervious to moisture, and capable of resisting the rough usage to which a flour-barrel is subjected.

After having been hardened and finished as above described the heads and hoops are applied to complete the barrel for use. The heads are made of any suitable material, let into the ends of the barrel wholly or partially, as shown in Figs. 6 and 7. In Fig. 7 it is shown held between the hoops A B, but in Fig. 6 it is formed with a flange, C, resting upon the edge of the barrel, and is held in place by nails D driven into its edge below the flange and through the ends of the barrel. Exterior hoops are also applied as shown in Fig. 5, which represents the completed barrel.

I do not confine myself to any special manner of applying the heads, as this may be varied almost indefinitely.

If desired, the expanding cylinder may be provided with a blanket of any suitable kind to cover the joints, and admit of its easy removal from the barrel.

The protecting hoops may be composed of paper, wood, or metal, or they may be made by winding a narrow web of soft pulp directly upon the barrel, during the process of forming the latter, or after it has been formed and dried.

Having thus described my invention, what I claim is—

The method of forming a seamless barrel from soft paper-pulp, by first winding the web upon an expanding cylinder to the requisite thickness, and then removing and drying the package so formed, and lastly hardening, compacting, smoothing, and finishing

its interior and exterior surfaces between rollers of less diameter than said barrel, substantially as described.

J. L. THOMSON.

Witnesses:

F. N. DAVIS,
A. C. HUTCHISON.

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