Sept. 11, 1934. A. LADE 1,973,690

CALENDERING MACHINE

Filed Jan. 26, 1932

Fig. 2.

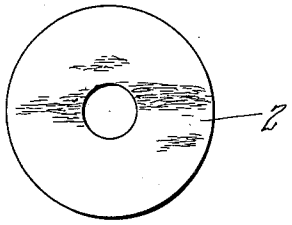


Fig. 1.

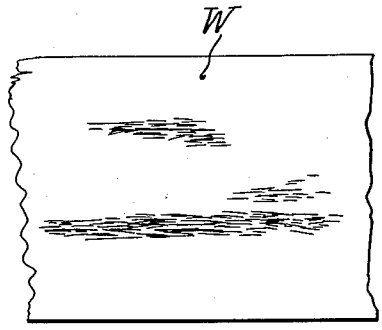


Fig. 3.

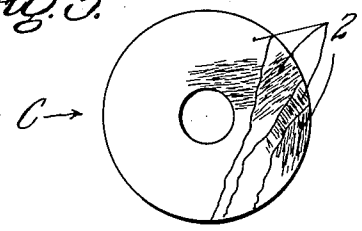


Fig. 4.

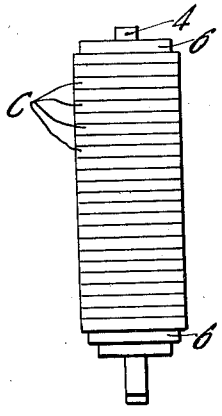
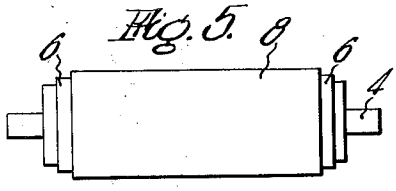


Fig. 5.



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CALENDERING MACHINE

Archibald Lade, Northampton, Mass.

Application January 26, 1932, Serial No. 588,938

4 Claims. (Cl. 92—77)

This invention relates to improvements in calendering apparatus and is directed more particularly to improvements in calendering rolls of the general type disclosed in the reissued patent to J. L. Perkins, No. 13,128 of July 5, 1910.

The objects of the invention are directed to the provision of a calender roll which is inherently heat-resisting and possesses a body and surface of such characteristics as will adapt the roll for use in calendering machines where it is desired to operate on fabric, paper and the like.

To facilitate a clear understanding of the novel features of the invention, reference will be made in a general way to calendering apparatus and the rolls thereof.

A calender usually comprises a "stack" or plurality of coacting rolls which are arranged to receive between the coacting peripheral surfaces thereof, webs of fabric, paper and the like. As the web passes between the rolls they co-operate to act on the web for finishing and calendering operations. For webs of different material and for different actions the rolls are arranged to rotate at various relative speeds.

Common forms of rolls are those having bodies formed by pressing together fibrous material such as cotton, paper or the like. Bodies thus formed are turned to have peripheral surfaces possessing the necessary finishing characteristics. Rolls such as referred to are often placed in a calender adjacent a metal roll or rolls. In some cases paper rolls or cotton rolls may be placed adjacent one another.

Where a metal roll is used next to a paper or cotton roll the metal roll is often times heated. In the calendering or finishing operation due to direct heat, friction or other causes, the cotton or paper roll becomes heated. That is, the roll body takes on heat either by reason of a frictional action or because an adjacent roll is heated.

Cotton and paper are non-heat resisting so the heating thereof causes the fibers of the roll body to disintegrate. The roll body is "burned", as it is called. The burning of the roll body causes the surface thereof to become uneven, broken down and checked so that the roll is rendered unfit for further service. It will be readily appreciated that the ability of a cotton or paper roll to withstand the heat is dependent almost entirely upon the ability of the fibers thereof to withstand heat to which it is subjected during the calendering operation.

According to this invention there is provided a roll having a body which is inherently heat-resisting and has the desired resiliency while its surface has the desired hardness, smoothness and other characteristics necessary for successful calendering operations. This is accomplished by the forming of a roll body from fibrous materials of different kinds, each of which is selected for its particular characteristics and which together co-operate to provide the novel body desired.

The invention in the form at present preferred is shown in the accompanying drawing, wherein:

Fig. 1 is a plan view of a portion of a web forming a part of the invention.

Fig. 2 is a plan view of a disc formed from the web in Fig. 1.

Fig. 3 is a plan view of a cheese formed from a plurality of discs.

Fig. 4 is an elevational view showing a plurality of the cheeses of Fig. 3 in stacked relation on a roll shaft, and

Fig. 5 is an elevational view of a finished roll embodying the features of the invention.

Referring now to the drawing in detail the invention will be fully described.

According to this invention sections called discs and represented by 2 are made from fibrous material as will be described and these are pressed together in superposed relation upon a central shaft 4. The sections are held under pressure between heads or flange members 6 carried by the shaft.

The discs referred to are made from intermingled cotton fibers and the fibers of ramie or china-grass, the latter of which are first degummed or decorticated.

The cotton fibers are selected because when compressed in a roll body they provide a body having the desired resiliency and the body may be turned so as to have the desired surface.

The fibers of ramie are selected because of the inherently natural ability thereof to withstand and resist the action of heat. As compared with cotton fibers, the ability of ramie fibers to withstand the action of heat is much greater, that is, ramie fibers do not disintegrate or break down under heat as readily as cotton fibers. The ability of ramie fibers to withstand heat may be due to the fact that the fibers are more or less hollow or tubular.

The cotton and ramie fibers may be intermingled by passing them through a carding machine or other suitable apparatus so that they are mixed or interlaced with one another.

The intermingled fibers are formed into a relatively thin web W and then sections of the web in the form of the discs 2 are superposed, with the fibers of one web disposed to lie at an angle with respect to or across the fibers of the next adja-

cent web. A number of these webs are superposed to form what is known as a "cheese" represented by C. A plurality of cheeses are stacked up around a shaft 4 and then the whole is pressed in a hydraulic press. After the pressing the material is locked between heads to the shaft forming a roll body 8, the surface of which is turned. This is all accomplished in the manner well known in the art.

It is desirable to mention here that fibers of cotton alone are well suited to provide a roll body, because when pressed there is formed a compact and rugged body which is yieldable to the extent desired and which may have a very desirable peripheral finishing surface. As has been stated, however, the fibers of cotton are not adapted to withstand the action of heat. On the other hand the fibers of ramie may not be as well suited for forming a roll because this material is not sufficiently yieldable. The fibers of ramie however, are much more capable of withstanding the action of heat than the cotton fibers for which reason they are selected for their particular function.

By combining the fibers of cotton and the fibers of ramie, it is possible to produce roll bodies which are not only yieldable and have a desirable finishing surface, but which are heat resisting as well. Various proportions of cotton and ramie may be used according to the extreme limits of the use of the roll. The proportions may vary from twenty to eighty percent ramie and likewise eighty down to twenty percent cotton.

It has been noted for comparison that a roll body formed of cotton fibers alone has operated under certain conditions for a period of one year before it burned out, while a roll formed from the cotton and ramie fibers operated under the same conditions for approximately two years.

In another instance, a cotton roll operated under certain conditions for the processing of approximately one million yards of material, while a roll of cotton and ramie operating under the same conditions withstood the calendering action on approximately five million yards of material. Also as compared with a roll with a paper body which operated for six months under certain conditions, a roll of cotton and ramie operated under the same conditions for eighteen months.

By combining the fibers of cotton and of ramie, the former for its ability to provide a firm and more or less resilient and yieldable body and the latter for its heat resisting function, there is provided a roll body which is equal in all the important respects to rolls of the prior art, while at the same time its ability to withstand heat is very much greater, so that its length of usefulness is much greater than prior art rolls.

Having described the invention in the form at present preferred, what I desire to claim and secure by Letters Patent of the United States is:

1. A calender roll comprising in combination, a shaft having a roll body thereon held in compressed relation between flanges at opposite ends thereof, the said body comprising superposed sections of fibrous material including degummed fibers of ramie.

2. A calender roll comprising in combination, a shaft having a roll body thereon held in compressed relation between flanges at opposite ends thereof, the said body comprising superposed sections of carded fibrous material including uniformly intermingled cotton and ramie fibers, the compressed sections forming a roll possessing the necessary resiliency while being heat resistant.

3. A calender roll comprising in combination, a shaft having a roll body thereon held in compressed relation between flanges at opposite ends thereof, the said body comprising sections of uniformly intermingled cotton fibers and degummed fibers of ramie, the compressed roll possessing the necessary resiliency while being heat resistant.

4. A calender roll comprising in combination, a shaft having a roll body thereon held in compressed relation between flanges at opposite ends thereof, the said body comprising sections of uniformly intermingled cotton fibers and degummed fibers of ramie, the fibers of one section being disposed at an angle relative to the fibers of an adjacent section, the compressed roll possesses the necessary resiliency while being heat resistant.

ARCHIBALD LADE.