

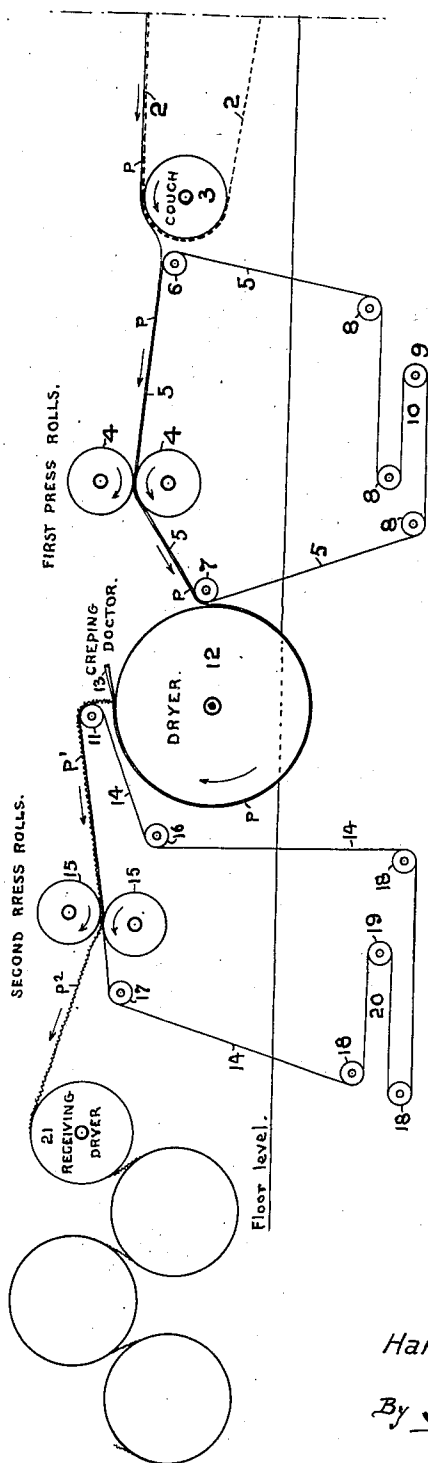
Aug. 5, 1930.

H. LIEBECK

1,772,185

METHOD AND MEANS FOR MAKING CREPE PAPER

Filed Sept. 27, 1928



Inventor.
Harry Liebeck.

By *[Signature]*
Attorney.

UNITED STATES PATENT OFFICE

HARRY LIEBECK, OF SWARTHMORE, PENNSYLVANIA, ASSIGNOR TO SCOTT PAPER COMPANY, A CORPORATION OF PENNSYLVANIA

METHOD AND MEANS FOR MAKING CREPE PAPER

Application filed September 27, 1928. Serial No. 308,699.

Heretofore, it has been customary to make crepe paper by conveying the wet paper from the paper making machine to a drier cylinder and from the surface of which the paper is removed by use of a reciprocating blade known as a "doctor," which act, cooperating with the revolving cylinder, gives to the paper a creped condition, the paper so produced being subsequently dried. Such creped papers are used for decorative purposes, towels, napkins, etc. When crepe paper is formed in this manner, the ridged structure produced over its surface is more or less rigid and consequently the paper lacks a softness which is most desirable for almost all uses to which it may be put. Moreover, the increasing of softness reduces the liability of the paper to tear under rough usage when used either for decorative purposes or for towels and napkins.

The object of my invention is to provide a method and means which will impart to the creped paper a greatly increased softness and secure these results during the creping of the paper.

With the above and other objects in view, the nature of which will be more fully understood from the description hereinafter, the invention consists in the novel method and means for making crepe paper, as hereinafter more fully described and defined in the claims.

In the drawing, I have illustrated diagrammatically the elements which enter into the paper making machine, more especially for producing the soft creped condition.

The endless wire apron of the Fourdrinier or paper making machine proper is indicated at 2, and 3 is the couch roll at the delivery end thereof. It will not be necessary for me to refer to the details of the Fourdrinier machine, as such is well known in the manufacture of paper.

P represents the paper web as it leaves the Fourdrinier machine and subjected to a drying operation by the cylinder drier 12 after preferably being subjected to pressure between the press rolls 4, 4, to densify the fibers of the wet paper sheet as well as squeezing

out any excessive moisture from the paper before the same is treated by the drier.

5 is an endless felt web which passes about a guide roller 6 close to the couch roll 3, thence between the press rolls 4, 4, thence downward about a guide roll 7 arranged close to the cylinder drier 12, thence further downward and about guide rollers 8, 9, 8, 8, and upward about the guide roller 6 first mentioned. The roller 9 may be considered as a tension roller producing a bight or loop 10 in the felt web and for keeping it under proper tension. The web 5 in passing from guide roller 6 to the press rolls is preferably inclined upward, so that any moisture squeezed out by the press rolls 4 will flow backward away from the press rolls, so that the web after passing through the press rolls is in a suitable condition to be delivered to the drier for preliminary drying thereby during a partial revolution of the drier.

As the paper passes upward about the outer surface of the drier 12, it is given a preliminary drying treatment and while still in moist condition is brought into contact with the creping "doctor" 13 which is a reciprocating blade for scraping the paper from the surface of the drier in such a manner as to crepe it without causing any break in the continuity of the paper web. The creped paper so produced is indicated at P' and passes upward and over upon a felt 14 which may be of the same character as the felt 5. The felt 14 is guided about a roller 11 immediately above the "doctor," and thence extends between a second pair of press rolls 15, 15, and thence about a guide roller 17. The direction of the felt from the roller 11 to the press rolls 15 is preferably inclined downward from the former to the latter, though I do not restrict myself in this respect. The felt 14 extends downward from the roller 17, and thence about guide rolls 18, 19, 18, 18, and upward about the guide roll 16, and thence obliquely upward about the roller 11 first mentioned. The guide roller 19 may be adjustable, as in the case of the roller 9, so that the felt 14 may have a bight 20 formed therein and be maintained under proper tension by the said roller 19. Such practice for retaining felts under

proper tension is well known in the art and no further description of the details will be necessary.

When the creped paper leaves the drying cylinder 12 under the action of the "doctor", it is more or less set as to the height or depth of the creped ridges, and if completely dried in this condition it would have considerable elasticity but lack softness. When the creped paper P', however, is passed between the second set of press rolls 15, 15, the creped or crinkled portions are rolled or broken down to reduce their height or depth and increase the creped effect and the paper emerges from said rolls in a condition which will impart softness in texture after being thoroughly dried, which not only removes the harsh and brittle "feeling", but also improves the resistance to tearing under rough handling. When used for towels or napkins, this increased softness is a very desirable quality to the "feel", aside from the increased capacity to be handled without tearing. The softened crepe paper thus produced is indicated at P² and is delivered to the receiving drier 21 which is what is known as the first or "baby" drier of the drier section of a paper making machine, my improvements being introduced into such a machine between the Fourdrinier and drier portions thereof.

It will be understood that the amount of pressure upon the paper and felt applied by the press rolls 15 may be regulated by any suitable means for positioning the rollers with respect to each other, as is customary with press rolls used in connection with paper making machines, and located between the couch roll and the first drier.

It will now be understood that the essential feature of my invention resides in providing the drier 12 with its creping "doctor" intermediate of the couch roll and the press rolls 15, 15, whereby the latter are so positioned as to break down or crush the creped portions of the paper web formed by the action of the "doctor". My improvements may vary the size of the crimped or creped portions of the damp paper web by increasing or decreasing the speed of travel of the paper with a given reciprocation of the "doctor" or by varying the speed and movement of the "doctor" relatively to the travel of the paper, whereby the amount or extent of the creping may be varied according to the use to which the paper is to be ultimately put.

While I prefer to employ the press rolls 4, 4, for densifying the paper web and squeezing out the surplus water immediately after the paper leaves the couch roll, as ordinarily employed in connection with paper making machines, I do not restrict myself to the use of such preliminary press rolls. Their use, however, is desirable in that the excessive water should be pressed out of the paper web

before the same is received on the creping drier.

The treatment of the heated and partly dried paper web to the creping action of the "doctor" 13 produces a more or less set condition to the creped paper, and this "setting" is modified in passing between the press rolls 15, 15, in that the irregularities or ridges and depressions produced under the action of the "doctor" are decreased in size and multiplied in quantity in passing between the press rolls, and in this manner given a sufficiently set condition to retain their shape in passing about the receiving drier 21 and the remaining drying cylinders of the paper making machine, and by reason of which the finished creped paper has its pliability and softness increased.

I have described my improved method and means in that particularity which I deem to be the best exposition of my invention, and that which I prefer in commercial practice, but I do not restrict or confine myself to the minor or secondary details, as such are susceptible of modification, which may be resorted to as matters of mechanical skill and without a departure from the spirit of the invention.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. The herein described method of making creped paper embodying softness and pliability, which consists in subjecting the moist paper web to the simultaneous action of a heated surface and a scraping action of a "doctor" in removing the paper in a heated condition from said surface, thereafter subjecting the creped and partly dried and heated paper web to pressure between rolls for crushing and modifying the creped condition of the paper web, and finally subjecting the modified creped paper web to the action of further heat for completing the drying operation thereof.

2. In a paper making machine for making creped paper, the combination of means for making a paper web and means for finally drying the same, with means for creping the paper web preliminary to the final drying thereof, which consists of a rotating heated drying cylinder about which the moist paper web is guided, a "doctor" operating in connection with the surface of said heated drying cylinder for scraping the heated and partly dried paper web and removing the same from the cylinder, and press rolls between which the partly dried creped paper is passed and by which it is subjected to a crushing action, said press rolls interposed between the creping "doctor" and the means for finally drying the paper web.

In testimony of which invention, I hereunto set my hand.

HARRY LIEBECK. 130