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PROCESS OF WINDING AND CUTTING PAPER INTO SIZES

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Fig. 1.

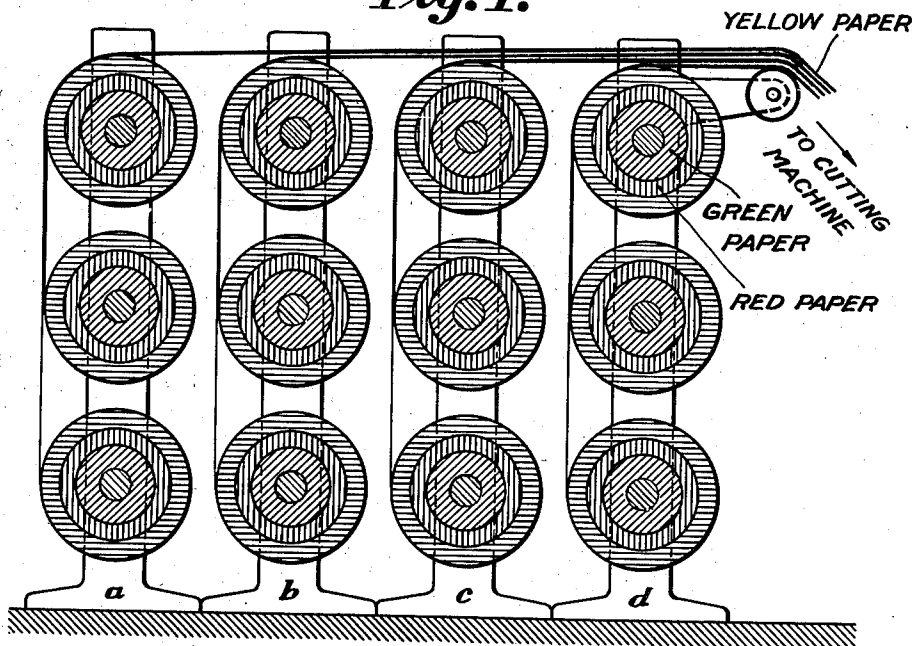
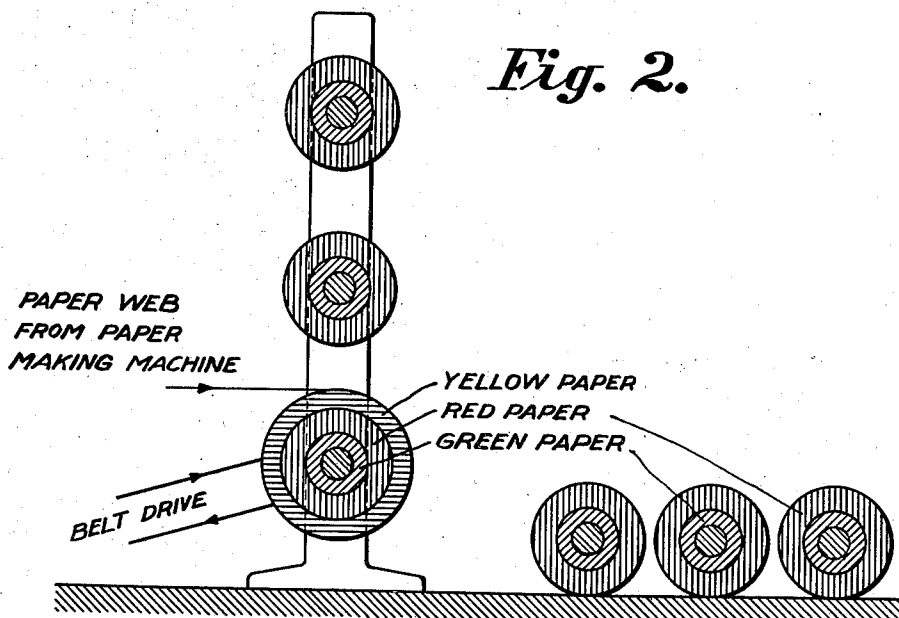


Fig. 2.



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PROCESS OF WINDING AND CUTTING
PAPER INTO SIZESEinar Henrik Janson, Amotfors, and Johan Olof
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5 Claims. (Cl. 164—17)

Our invention relates to an improved process for cutting paper into sizes, in which the lot of paper to be cut is composed of a plurality of different kinds of paper. As to the difference of the various papers to be cut, this may consist in difference as to quality, weight, colour or any other fact of distinction.

As is well known in the paper-making art, paper-making machines produce paper in a continuous sheet which is customarily wound into rolls on suitable cores. While some paper is sold by the roll, a great deal is sold in sheet form cut to specified sizes. In the ordinary course of business, a paper mill may have to fill orders for paper involving a wide variety of colors, sizes and qualities. In filling such orders, rolls of paper are mounted in the supply frame of a cutting machine, the paper for such rolls being fed to the machine to be cut into sheets of predetermined size. As the cutting machines are in general capable of cutting a plurality of sheets simultaneously, it is evidently desirable, for economical operation, to utilize the maximum cutting capacity of the machine. In filling miscellaneous orders, particularly small orders for different kinds of paper, it has heretofore frequently been necessary to operate the cutting machine at considerably less than its maximum capacity. Otherwise, it would be necessary to make many extra roll changes, which is time consuming and therefore objectionable.

The present invention has for its object to enable a better utilizing of the capacity of the cutting machine, especially in the case of cutting of smaller lots of paper of different kinds, and to lower the percentage of waste, which otherwise in the case of cutting of small lots will generally become very high, as well as in general to reduce the cutting costs.

We have discovered that when each of the various kinds of paper to be cut, in the winding previous to the cutting operation, is distributed equally among a number of cores equal to the maximum number which can be accommodated by the cutting machine, or a multiple thereof, the winding being carried out so that on the several cores the various kinds of paper follow each other in similar quantities and order of succession, a great saving in time, costs, and handling labor is effected.

The winding may suitably be made either directly in the paper machine, or as the paper is leaving said machine or in special winding machines provided for this purpose.

Assuming for instance the lot of paper to be

cut at one time to consist of three different types, e. g. green, yellow, and red paper, it may, for instance, be started by winding the green paper innermost, in each roll, then red paper outside of this and finally yellow paper on top. Of each quality the same length is suitably wound on each roll e. g. first 300 meters of green, then 400 meters of red, and finally 500 meters of yellow paper on each roll. The length of each kind of paper in the rolls is suitably chosen such, that the total number of rolls on which the whole lot is wound will be slightly less or equal to an even multiple of the maximum number which can be accommodated in the cutting machine. The capacity of this latter will in this way be completely utilized. In the accompanying drawing Fig. 1 is a transverse sectional view of twelve rolls distributed on four supporting frames *a* to *d* belonging to a cutting machine designed to cut twelve sheets simultaneously. The cutting machine is not shown, as the construction of this machine does not relate in any way to the invention. In each roll, the three equal lots of green, red and yellow paper are wound and clearly marked. The yellow paper is shown as being led to the cutting machine to be cut into size, and as all frames belonging to the machine are filled, twelve layers of paper are simultaneously cut, thus, the cutting machine is completely utilized.

The different kinds of paper will thus, in this manner each be cut separately, without making it necessary to change the rolls in the cutting machine frames until the different qualities contained in the lot have all been cut. Figure 2 illustrates the method by which the rolls may be wound. A number of rolls are shown consisting of cores upon which have been wound equal quantities of green paper, then equal quantities of red paper. Yellow paper from a paper-making machine is being wound on one of the rolls. When the winding of a predetermined amount of yellow paper on this roll has been completed, the other rolls will receive in turn similar amounts of yellow paper, whereupon the set of rolls will be ready to be mounted on the support frames *a* to *d* of the cutting machine. When loading the rolls, the different kinds of paper contained on each roll may be affixed to each other by a suitable means. The roll onto which paper is directly wound in a paper machine, is driven by suitable means, such as a friction gear, in order to secure, during loading of the roll, a speed of rotation corresponding to the speed of the paper machine delivering paper

to said roll. It is obvious that these details are not essentials of the invention and, therefore, not specifically illustrated in the drawing. Furthermore, it may often be very useful to provide an automatic alarm device or the like to indicate when a desired quantity of paper has been wound onto the roll.

It is evident that each roll before being completely wound, for instance in a paper machine, must be changed three times during the winding operation. To facilitate this changing as much as possible, the smallest quantity of paper may for instance be wound innermost in each roll, then the quantity next in size, and so forth. Thus the rolls will have the least possible weight at the end of each winding step, whereby they are rendered more easy to manipulate e. g. when being shifted in the paper or winding machine respectively.

If substantially equal lengths of different kinds of paper are to be wound on the rolls, that kind having the highest "gramweight" per square meter should preferably be wound innermost on the rolls, since these latter in this way will be given the highest degree of firmness.

We have discovered that as much as 25 different kinds of paper may in this way be wound onto and cut from the same roll.

The described process is of great advantage in comparison to those previously used in the art. Thus, the capacity of the cutting machine is increased, partly because of the time for shifting the rolls in the same being reduced to a minimum, thereby rendering the effective cutting period of the machine longer, and partly because of the fact that a greater number of rolls may be inserted in the machine than has heretofore been possible especially in the case of cutting smaller lots.

When working according to methods heretofore used, it has been necessary to shift the rolls the same number of times in the cutting machine as e. g. in the paper machine, while, when working according to the present invention, the number of times for exchanging rolls in the cutting machine may be reduced by a number equal to the number of different kinds of paper in the rolls, without having to increase the number of exchanges of rolls in the paper machine. The total number of roll-changes when working with two different kinds of paper in each roll will thus be reduced by 25%, when using three different kinds by 33.3%, and so forth.

The possibility of winding several different kinds of paper on the same roll will furthermore bring about a lowering of the so called "cutting percentage" due to the fact that the amount of waste which is produced by the small diameter of the core on which the paper is wound may be considerably reduced as a consequence of the possibility for making each roll bigger and the number of rolls smaller than heretofore has been possible.

By reducing the number of rolls it is also possible to considerably reduce the stock of cores which is otherwise required. In cutting of smaller lots into sheets it is thus possible to reduce the number of cores inversely as the number of kinds of paper in each roll.

The wear on the cores as well as of the cutting machines will also become reduced thanks to the less frequent exchange of cores.

The necessity for using so called auxiliary winding stands during the cutting is also reduced,

whereby the use of cheaper and simpler types of cutting machines is rendered possible and advantageous. The number of operators necessary for the cutting is also reduced in this manner. It is thus seen that the present invention will in many ways render the winding and cutting operations easier and less expensive. In the cutting of smaller quantities it has, for instance, been possible to reduce the cutting costs as much as 50%.

It is obvious that the paper webs wound onto a roll in accordance with our invention do not necessarily have to be equal as to breadth. In the case of handling paper of different breadth, however, it was found useful to wind the broader webs innermost in the roll. It is furthermore, to be noted that in cases where different kinds of paper are successively produced by one and the same paper making machine, the method according to our invention will be applied in such manner that all orders of one kind of paper are produced without interruption but wound on different rolls and each roll loaded with the quantity of paper corresponding to a single order. By this, the paper machine will first be stopped when all orders for that kind of paper are disposed of, the rolls, however, are changed at least as often as orders for that special kind of paper have to be filled.

It is evident that the invention is not limited to winding and cutting of materials which are commonly understood as paper but may be useful for all kinds of sheet material which can be stocked and thereafter treated in a manner similar to the processes disclosed by the present specification. Thus, all matter contained in the above description or shown in the accompanying drawing is not to be interpreted in a limiting sense. The following claims are intended to cover all of the generic and specific features of the present invention.

Having described our invention what we claim is:

1. In a process of cutting paper of different kinds into sizes, which comprises winding paper on rolls, the steps of winding in succession paper of different kinds on a roll, feeding a paper cutting machine with the stock of paper thus contained on said roll, and cutting said paper into sizes in inverse succession to the initial winding of the paper on the roll.

2. A process of cutting paper into sizes which comprises provision of stocks of paper of different kind, winding paper from said stocks onto a plurality of rolls successively loading each of said rolls with an equal number and an equal quantity of said kinds of paper in a succession which is the same for all rolls feeding a cutting machine with the paper on said rolls, and cutting said paper into sizes in inverse succession to the initial winding onto said rolls.

3. In a process of cutting paper of different kinds into sizes, the steps of winding paper of different kinds onto a plurality of rolls, loading each of said rolls in succession with an equal number and equal quantity of said kinds of paper in a succession which is the same for all rolls, the total number of the loaded rolls being equal to or an even multiple of the maximum number of rolls which can be inserted in a cutting machine, feeding said cutting machine with the paper on said rolls, and cutting said paper into sizes in inverse succession to the initial winding onto said rolls.

4. In a process of cutting paper which com-

prises provision of stocks of paper of different kinds, the steps of winding paper of different kinds onto a number of rolls equal to or an even multiple of the maximum number of rolls which
5 can be inserted in a cutting machine, winding on all of said rolls to be loaded an equal number and quantity of said kinds of paper from said stocks in succession, feeding said cutting
10 machine with the paper on said rolls, and cutting said paper into sizes in inverse succession to the initial winding onto said rolls.

5. A process for cutting lots of different kinds of paper to size on a machine capable of si-

multaneously cutting a plurality of sheets, comprising the steps of making up a number of similar rolls of paper equal to the maximum capacity of the cutting machine, winding onto
5 each roll in similar sequence portions of the different kinds of paper, each said kind of paper being equally distributed among the said rolls, and feeding paper simultaneously from all said
10 rolls to a cutting machine, whereby the different kinds of paper are cut to size in inverse sequence to the initial winding onto the rolls.

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