No. 708,722 Patented Sept. 9, 1902.

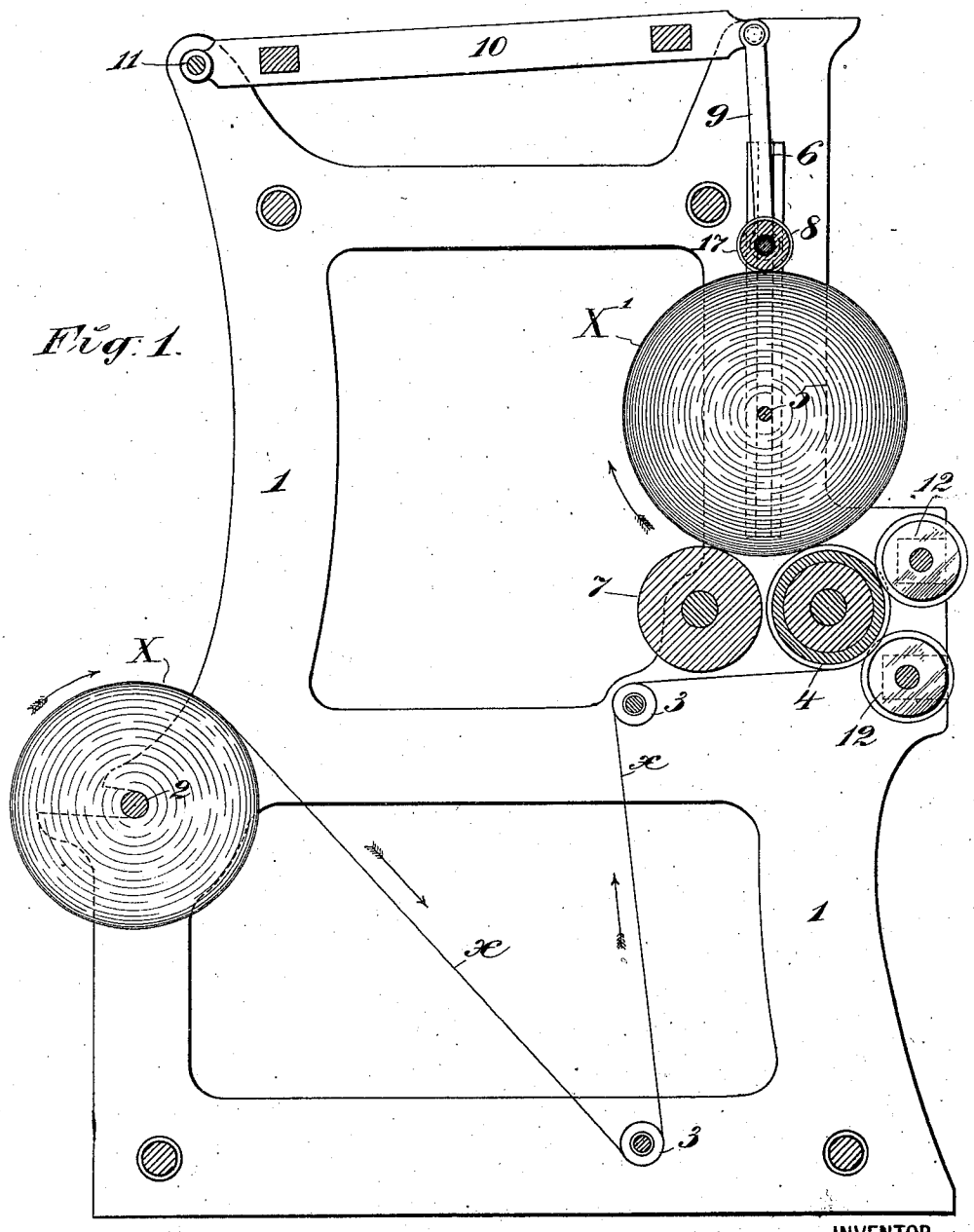
H. W. MATHER.

PAPER CUTTING MACHINE.

(Application filed Nov. 22, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

F. H. Hinman

Peter A. Ross

INVENTOR

Henry W. Mather

BY

Henry Connett

ATTORNEY

No. 708,722. Patented Sept. 9, 1902.

H. W. MATHER.

PAPER CUTTING MACHINE.

(Application filed Nov. 22, 1900.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

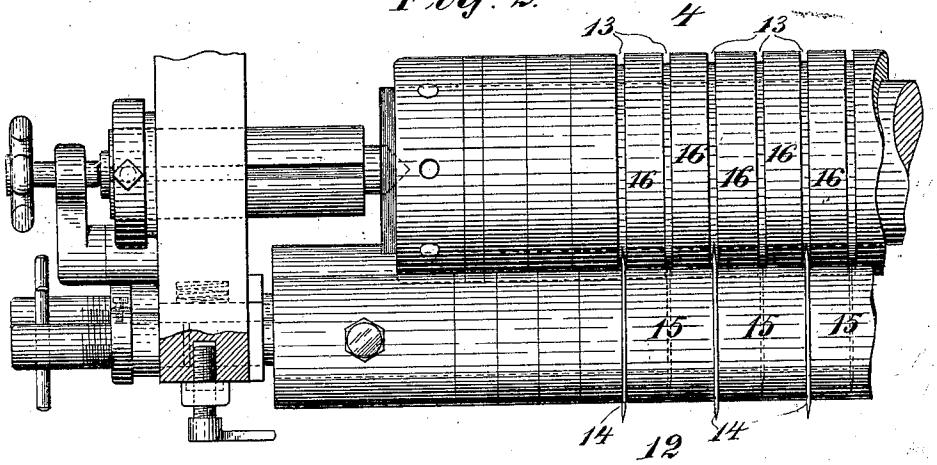


Fig. 3.

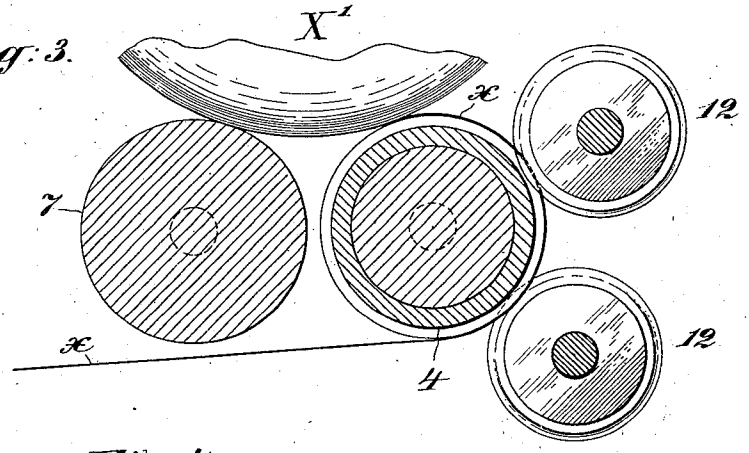


Fig. 4.

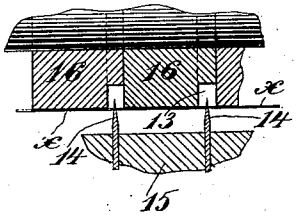
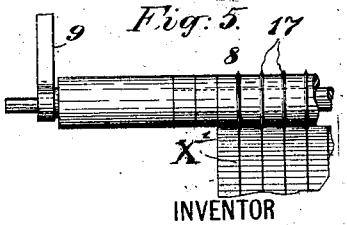


Fig. 5.



WITNESSES:

F. H. Ulman

Peter A. Ross

INVENTOR

Henry W. Mather

BY

Henry Connett

ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY W. MATHER, OF ROSEVILLE, NEW JERSEY.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 708,722, dated September 9, 1902.

Application filed November 22, 1900. Serial No. 37,351. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. MATHER, a citizen of the United States, residing at Roseville, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Paper-Cutting Machines, of which the following is a specification.

This invention relates to the general class of paper-cutting machines, and particularly to those used for slitting a long strip of paper into narrower strips, usually with rotary cutters or cutter-disks.

In slitting paper of moderate thickness and body the means almost universally employed are cutters which produce a shear cut. This form of cutter will be found clearly illustrated and described in the United States Patent No. 620,944, granted to me March 14, 1899. In these constructions two sets of rotating cutters are employed, the edges of which slightly overlap and press laterally against each other like the two blades of a pair of shears. It is found that this mode of cutting is not practicable for thin soft papers, such as tissue-paper, which requires such delicate manipulation that it is found impossible to slit a roll of such paper properly on machines having a shear cut.

The present invention has in view the production of a cutting-machine which will split a strip of tissue-paper into narrower strips in a continuous manner, the strips being smooth at their edges and of perfectly uniform width; and it consists, broadly and essentially, in passing the strip while strained or drawn smoothly over a roll or surface provided with narrow grooves along the lines to be cut under sharp knives situated at the respective grooves and extending slightly into the same, but not in lateral contact with the wall of the groove. The knife thus splits the paper or divides it along the line where it is strained across or bridges the groove in the supporting roller or plate. Preferably the grooved support for the paper will be a rotating roller grooved circumferentially along the lines of the cut, and the knives will be in the form of thin circular disks rotatively mounted on a shaft properly distanced to coincide or register with the respective grooves in the supporting-roller and having very sharp edges. For convenience in varying the width of the strips produced the supporting grooved roller may be made up of disks secured on a shaft, and the ring cutters or knives will be distanced by washers of different thicknesses. This feature of adjustment to suit the difference in width of the strips to be produced is not in itself new and will be found in the above-named patent, No. 620,944.

In the accompanying drawings, which illustrate an embodiment of the invention, Figure 1 is a sectional elevation of a machine embodying my invention. This view is designed to show the positions of the respective parts of the machine as a whole. Fig. 2 is a plan view of a part of the machine on a larger scale than Fig. 1 and showing a paper-supporting roller and cutting-roller. Fig. 3 is a cross-section of the rollers. Fig. 4 is a fragmentary view, on a large scale, illustrating the principle involved in the cutting or slitting of the paper. Fig. 5 is a view illustrating the separator to be hereinafter described.

1 designates the frame of the machine, and 2 the bearings therein for the roll of paper X to be slitted into narrow strips. The strip x of paper from the roll X passes about suitable guide-rollers 3 to the grooved supporting-roller 4 and thence to the roll X'. The slitted paper forming the roll X' is wound on a shaft or arbor 5, the ends of which are guided in upright grooves 6 in the machine-frame, and said roll is supported at one side on the roller 4 and at the other side on a roughened supporting and feeding roller 7 adjacent to the roller 4. Pressing on the top of the roll X' is a separating-roller 8, (to be hereinafter fully described,) mounted rotatively in links 9, pendent from a heavy frame 10, hinged at 11 in the machine-frame. The journals of the roller 8 engage the grooves 6 in the frame.

12 is the cutting or slitting roller.

The rollers 4, 7, and 12 are driven at a uniform speed by suitable gearing. It has not been considered necessary to illustrate and minutely describe all the details of the machine, as these are mainly old and well known, and only such portions are shown herein as will aid in illustrating the present invention. For example, in the machines now in use will be found parts corresponding to all of those named above; but in the old constructions

the roller 4 is a cutting-roller operating to produce a shear cut with the roller 12, while in the present construction the roller 4 is not a cutting-roller and the roller 12 is constructed differently from the shear-cutting rollers in use at present. The roller 8 in the machines already known is merely a pressure-roller, while in the present construction it is differently constructed to serve as a separator. It may be stated here that it is a common practice in machines of this character to employ two cutting-rollers 12, as shown herein, when the paper is to be divided into quite narrow strips, one cutting-roller producing strips, say, of double width and the other splitting these strips. This feature, however, has nothing to do with the present invention, this invention residing in the construction and relative arrangement of the roller 4 and a single cutting-roller 12. The roller 4 has formed in it narrow circumferential grooves 13, properly spaced, and the cutter-roller 12 has circular sharp knives 14, also properly spaced, and when the two rollers are brought together the edge of the knife or cutting-disk 14 on the roller 12 will enter to a slight extent the groove 13 in the roller 4, but not so as to touch or bear laterally on the side wall of said groove. Fig. 4 illustrates the principle involved. The paper *x* is drawn smoothly and tightly over the roller 4, bridging the groove 13 therein, and the knife or cutter 14 splits the paper along the bridge.

As before indicated, the knives or cutters 14 may be disks of thin sheet-steel distanced by washers 15 of suitable thickness, and the roller 4 may be made up of washer-like rings 16 of suitable thickness, the grooves 13 being formed by rabbets and one wall of the groove being on the next adjacent washer. The roll X′ is of course made up of numerous rolls, each consisting of a narrow strip of paper, the several rolls being situated side by side and so close together as to present the appearance of a single roll. It is desirable to very slightly separate these rolls during the slitting and winding in order that they may not adhere together when removed from the arbor, and this is the more important when the paper is very thin and soft. Therefore to effect this separation the pressure-roller 8 is so constructed as to form a separating-roller as well, and to effect this the said roller is provided with a slight circumferential wedge-like projection 17, as best seen in Fig. 5, and this projection or separator is alined with the cutter, so that it will enter the slit between two adjacent rolls of narrow strips in the roll X′ and slightly separate them. In practice it will be found convenient to make this bearing and separating roller of circular blades or disks separated by distancing-washers, as in the case of the cutting-roller 12, and this is the construction herein shown.

The important and novel feature of the cutting devices of the present invention resides in the grooved supporting-surface for the paper being in the form of a roller which moves with the paper or which rotates and has a peripheral speed equal to the speed of the paper, means being employed for drawing the paper snugly over said roller during its travel.

Having thus described my invention, I claim—

1. In a machine for slitting paper into strips, the combination with the slitting mechanism, and means for rolling up the slitted paper, of means for separating the rolls of strips, said means comprising a pressure-roller 8, on the top of the roll of slitted paper, said roller having a projecting **V**-shaped edge which enters the slit between the strips and wedges them apart, substantially as set forth.

2. In a machine for slitting paper into strips, the combination with the circumferentially-grooved roller 4, the slitting-roller 12, having its cutters set to register with the grooves in the roller 4, and the said cutters, of the roughened bearing and driving roller 7, and upright guides, for the shaft 5, said shaft being so situated above the roller 7 that the roll of slitted paper bears peripherally on the latter, substantially as set forth.

3. In a machine for slitting paper into strips, the combination with the circumferentially-grooved roller 4, the slitting-roller 12, provided with cutters which register with the respective grooves in the roller 4, the bearing and driving roller 7, and the shaft 5 for the slitted paper, of means for separating the rolls of strips, said means comprising a pressure-roller on the top of the roll of slitted paper, said roller having projecting **V**-shaped edges which enter the slits between the strips and wedge them apart, substantially as set forth.

In witness whereof I have hereunto signed my name, this 24th day of October, 1900, in the presence of two subscribing witnesses.

HENRY W. MATHER.

Witnesses:
HENRY CONNETT,
PETER A. ROSS.