No. 776,197. PATENTED NOV. 29, 1904.

G. W. NISTLE.

PAPER DRYING MACHINE.

APPLICATION FILED AUG. 6, 1904.

NO MODEL.

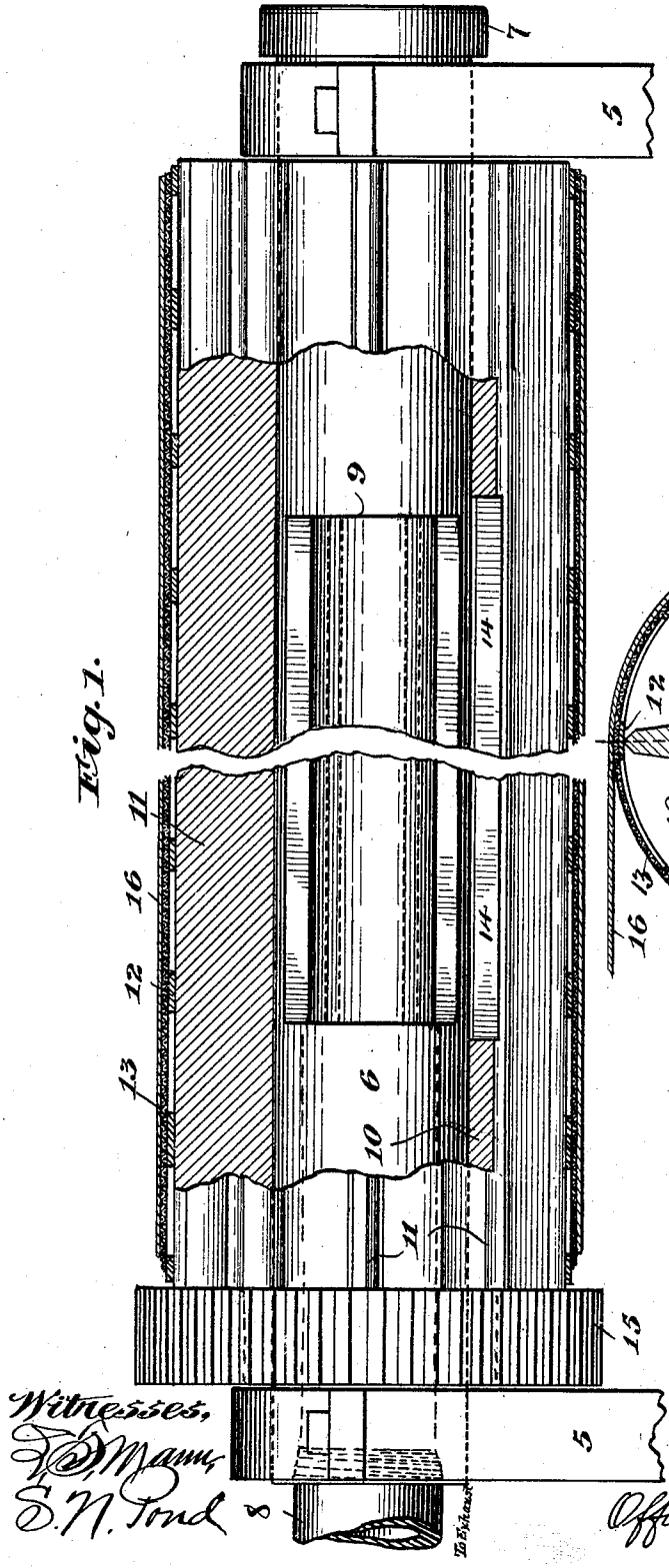


Fig. 1.

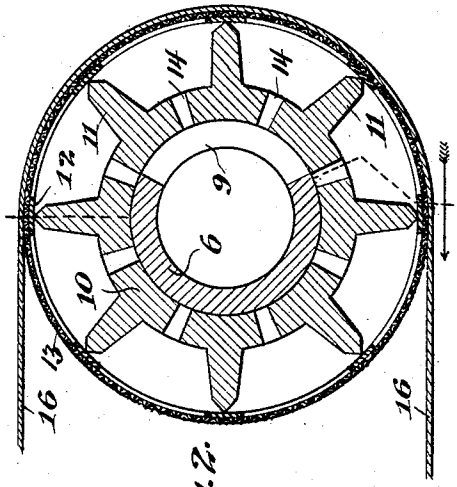


Fig. 2.

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No. 776,197. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

GEORGE W. NISTLE, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO EVERETT W. BROOKS AND ROBERT L. GIFFORD, OF CHICAGO, ILLINOIS.

PAPER-DRYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 776,197, dated November 29, 1904.

Application filed August 6, 1904. Serial No. 219,757. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. NISTLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Paper-Drying Machines, of which the following is a specification.

My invention relates to machines for drying paper, and pertains more particularly to improvements in the construction of the paper-drying rolls. In paper-drying machines the sheet of wet paper is sometimes carried over the periphery of a hollow rotating drum or roll provided with a perforated shell, and the interior of the roll is subjected to air-suction through the agency of a powerful vacuum-pump, the suction side of which is connected to the hollow axle of the roll. In these rolls as at present constructed the periphery is apertured or perforated throughout its entire circumference, so that the suction effect acts both upon that semicircumference which is covered by the wet paper sheet and the opposite semicircumference which is uncovered, and which consequently permits the free ingress of air therethrough. This latter of course greatly diminishes or reduces the suction effect which is produced upon that portion of the paper sheet in contact with the opposite semicircumference, and hence necessitates the use of a vacuum-pump of large capacity in order to produce the necessary drying effect upon the paper.

My present improvement has for its object to improve rolls of this class and permit the employment of an exhausting device of much less capacity with an undiminished drying effect upon the paper, and this object I accomplish through the provision of means whereby the suction effect is applied substantially wholly or only to that portion of the roll which is covered by the paper, and the opposite half of the roll is cut off, so as not to impair the suction effect of the exhausting device.

In the accompanying drawings I have illustrated a mechanical embodiment of the principle of my invention in the best form which I have as yet devised, and referring thereto—

Figure 1 is a side elevation, partly in longitudinal section, of my improved paper-drying roll; and Fig. 2 is a cross-sectional view of the same.

Referring to the drawings, 5 designates each of a pair of uprights in which is secured a stationary roll-shaft 6, one end of which may be closed, as by a cap 7, while the other end communicates with a pipe 8, leading to the suction side of a suitable vacuum-pump or other air-exhausting device. The stationary tubular shaft 6 has a rectangular opening 9 formed in one side thereof and extending widthwise through approximately one-third the circumference of the shaft, while lengthwise it stops considerably short of the two ends.

Surrounding the shaft 6 is the frame or spider of the drum, consisting of a central sleeve 10, having a plurality of radially-extending arms or ribs 11, the outer ends of which support a cylindrical perforated shell 12, which supports a covering of woven wire or other perforated or reticuled material, (indicated at 13.) The arms or ribs 11 are solid throughout and extend the entire length of the roll, as shown in Fig. 1, thus, in effect, dividing the roll into a plurality of independent adjacent sectors, each of which may be successively brought into communication with and cut off from the interior of the tubular shaft 6 through the opening 9 by means of longitudinally-extending ports 14 in the sleeve 10, arranged, preferably, midway between adjacent arms or ribs. The roll may be turned by any suitable train of gearing from a source of power, a gear 15 being herein indicated as mounted on one end of the roll for this purpose. The sheet of wet paper which passes over and contacts that semicircumference of the roll which is opposite the opening of the shaft 6 is indicated at 16.

From the foregoing it will be seen that in the operation of the device as the roll turns upon the central stationary tubular shaft 6

the ports 14 are successively brought into registration with the opening 9 of the central shaft, whereupon the suction becomes effective through said ports upon that portion of the periphery of the roll contained between the adjacent arms 11 on either side of said port. In the position represented in Fig. 2 the suction is operating upon the two ports, which are shown in full communication with the opening 9, has just ceased to operate upon the port on one side of said two ports, and is just about to operate upon the port at the other side of said two ports. Hence that section of the periphery of the roll over two contiguous ports 14 is always subject to the pull of the air-current, and during the greater part of the time the section of the periphery opposite three of said ports is subject to the pull of the air-current; but at no time is that semi-circumference of the roll which lies between the upper and lower sections of the paper sheet in communication with the interior of the hollow shaft through which the suction effect is exerted, and consequently the entire air-current induced by the exhaust action of the fan must necessarily pass through the wet paper in contact with the roll and exert its drying effect upon the latter.

It is evident that the particular mechanism herein shown and described whereby that half of the roll which is out of contact with the paper sheet is cut off from the suction might be considerably modified without departing from the principle of the invention or sacrificing any of the advantages thereof. Hence I do not limit the invention to the particular form of apparatus herein shown and described except to the extent indicated in specific claims.

I claim—

1. The combination with a paper-drying roll having a perforated cylindrical shell over which the paper to be dried is carried, of means for exerting a suction effect through the interior of said roll, and means whereby that portion of the periphery of the roll not engaged by the paper is cut off from communication with the exhaust-current, substantially as described.

2. The combination with a paper-drying roll having a perforated cylindrical shell over which the paper to be dried is carried, of a stationary tubular shaft on which said roll is rotatably mounted, said stationary shaft having an opening communicating with the interior of the roll, and means whereby the suction effect created through said openings is limited to that portion of the periphery of the roll engaged by the paper carried thereover, substantially as described.

3. The combination with a paper-drying roll having a perforated cylindrical shell over which the paper to be dried is carried and formed by a plurality of non-communicating hollow sectors each having a port leading to the inner periphery of the roll, of a stationary tubular shaft on which said roll is rotatably mounted on its inner periphery, said stationary shaft having an opening formed therein on that side toward the paper-engaged surface of the outer periphery of the roll with which opening said ports successively communicate in the rotation of the roll, substantially as described.

4. The combination with a stationary tubular shaft communicating endwise with an air-exhausting device, and further having an opening formed through one side thereof, of a paper-drying roll rotatably mounted thereon, said roll having a ported sleeve, a series of radial arms alternately arranged relatively to the ports of the sleeve, and a perforated cylindrical shell supported on the outer ends of said arms, substantially as described.

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