

Feb. 14, 1939.

G. C. FLINT

2,146,809

VAPORIZER

Filed May 17, 1937

3 Sheets-Sheet 1

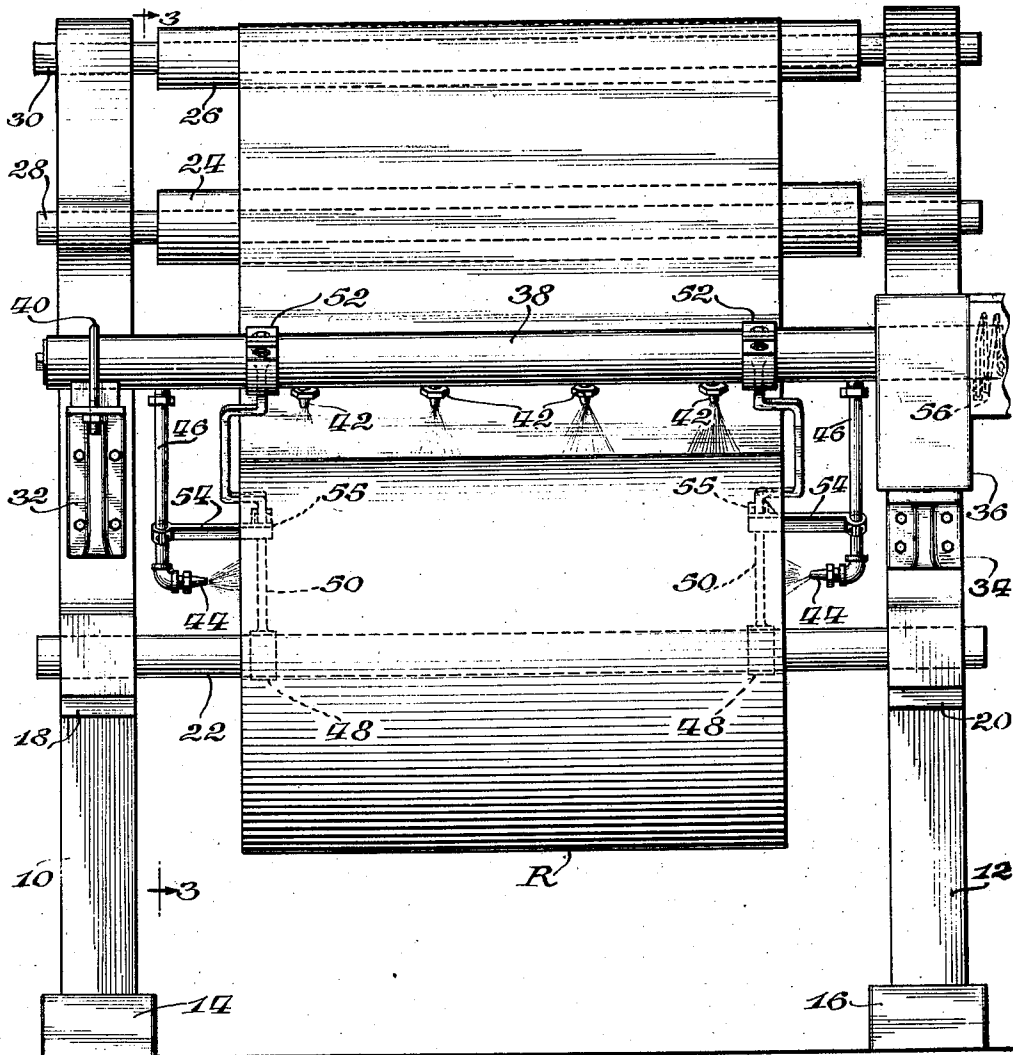


Fig. 1

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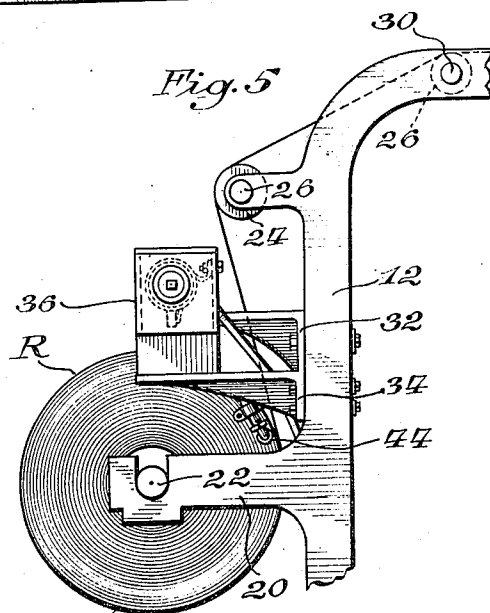
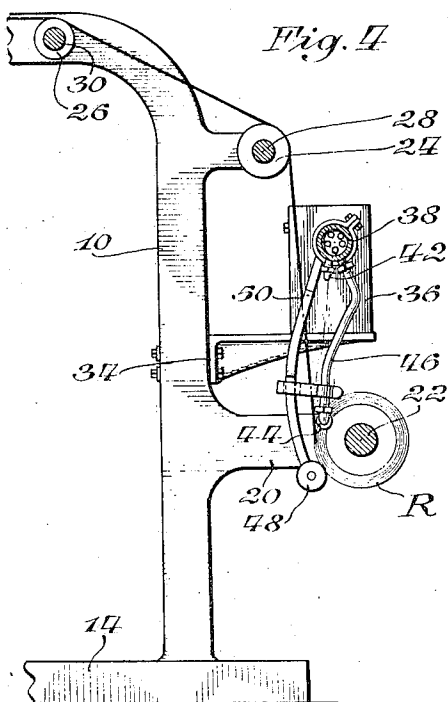
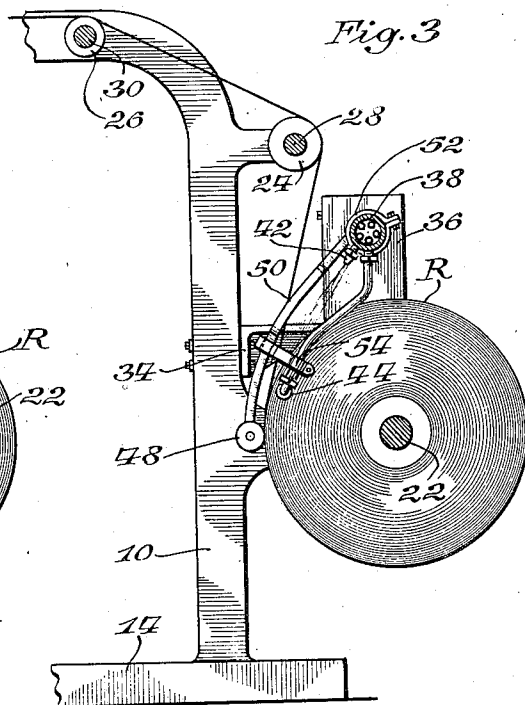
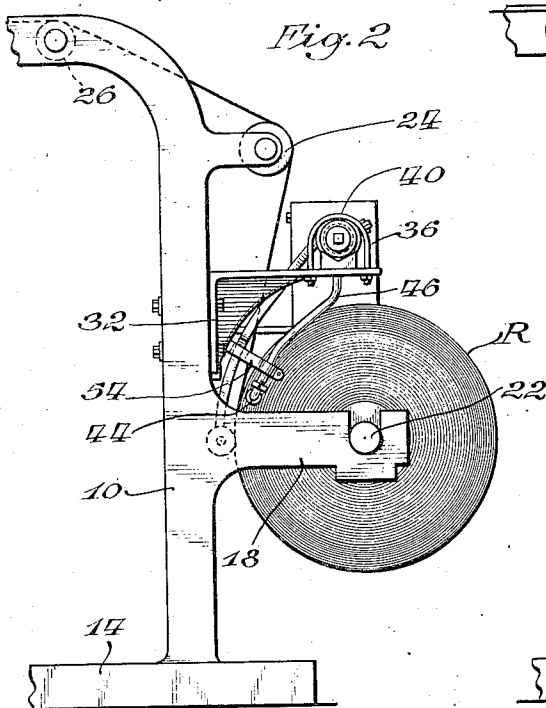
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

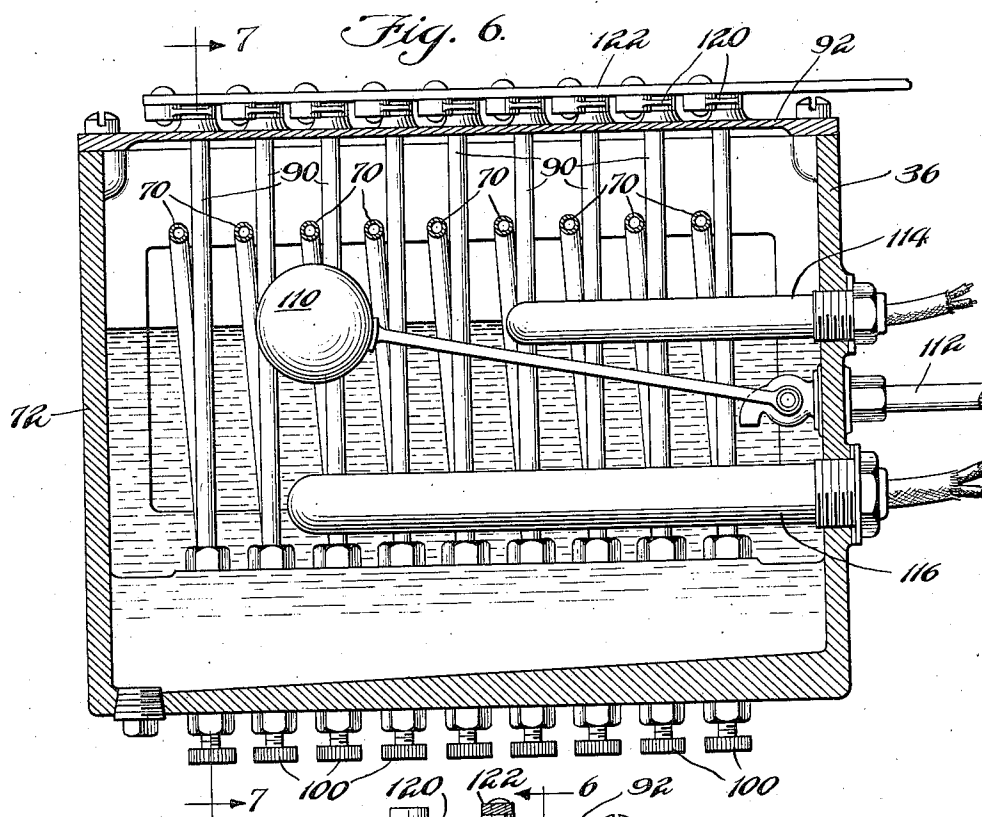
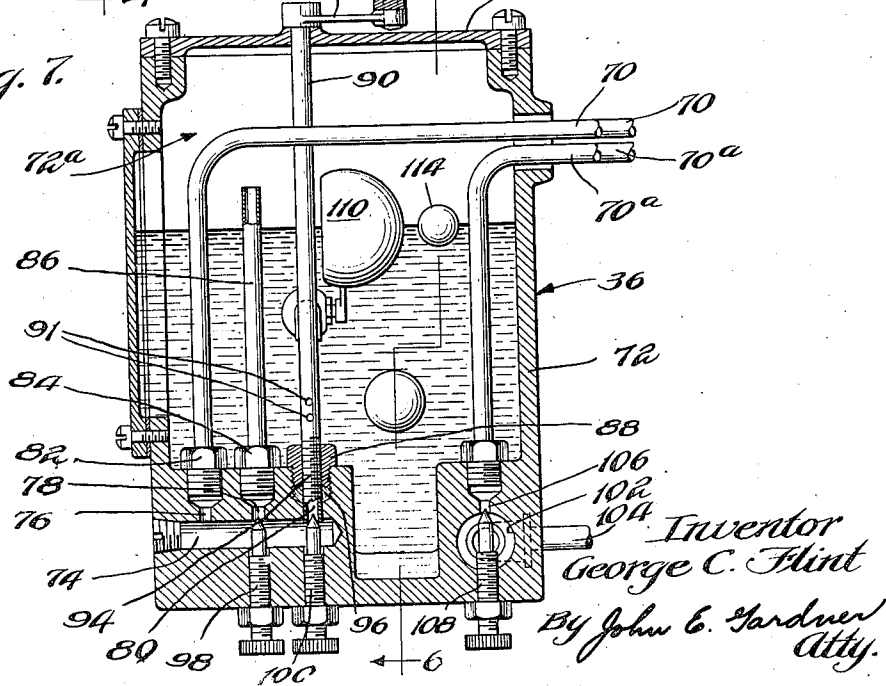


Fig. 7.



UNITED STATES PATENT OFFICE

2,146,809

VAPORIZER

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Application May 17, 1937, Serial No. 142,989

7 Claims. (Cl. 91-44)

My invention relates to improvements in vaporizers and similar devices.

My invention relates more particularly to vaporizers of the type adapted to be employed in the vicinity of a roll of paper or similar material.

It is a well-known characteristic of paper, cloth, and other flexible materials, that are supplied in rolls, that when the same is being unrolled, and especially at a high rate of speed, there is a tendency due to static electricity of the adjoining surfaces, of the paper to adhere together, thereby requiring of necessity slower movement of the paper or other material from the roll. It is also a well-known fact that the application of an exceedingly fine spray of vapor or mist at the point of contact breaking will tend to break the static electricity which holds the adjoining surfaces together and thus permit the paper to be unrolled at a greater rate of speed.

Accordingly, the principal object of my invention is to provide improved mechanism for producing a vapor, mist or an exceedingly fine spray and discharging the same into a space directly at the point where paper, cloth or other material is being taken from a roll, thereby wetting both sides of the material simultaneously.

A further object of the present invention is to provide means of the type described capable of movement governed by the size of the roll, to cause the spray to be directed at the exact point of separation upon any desired size of roll.

A further object of the present invention is to provide improved means of the type described that will simultaneously project a spray or vapor at the point of separation of material from the roll and also upon the outer edge thereof.

A further object is to provide means for automatically changing the direction in which the spray is directed to conform to the size of the roll, whereby both surfaces of the entire roll of paper are subjected to the spray.

A further object is to provide improved means cooperating with the roll for securing the aforementioned adjustment.

A further object is to provide mechanism of the type described that is comparatively simple in construction, yet highly efficient and capable of long and useful service without becoming broken or out of order.

Other objects and advantages will be more apparent from the following description, wherein reference is had to the accompanying three sheets of drawings, upon which

Fig. 1 is a front elevational view of a standard supporting a roll of paper or other material to

which my improved mechanism has been attached;

Fig. 2 is a left side elevational view thereof;

Fig. 3 is a sectional view on the same plane as Fig. 2 and is taken generally on the lines 3-3 of Fig. 1;

Fig. 4 is a similar sectional view showing the location of all of the parts after the roll has been reduced in a substantial degree,

Fig. 5 is a fragmentary elevational view of the roll support and my improved mechanism taken generally upon the right side of the machine as shown in Fig. 1.

Fig. 6 is a longitudinal vertical section of the vaporizer mixer mechanism employed, taken generally on the line 6-6 of Fig. 7; and

Fig. 7 is a transverse sectional view through the same mechanism, taken generally on the line 7-7 of Fig. 6.

In the embodiment of my mechanism which I have shown on the drawings, I provide generally the upright standards 10 and 12 mounted upon suitable base members 14 and 16 positioned upon the floor. The standards 12 and 10 may be formed with the horizontally extended bearing members 18 and 20 adapted to support the rod member 22 upon which a roll R of paper or other material may be mounted. For running off the paper, as for example into a printing press, in a horizontal plane, the same may be trained over suitable rollers 24 and 26 mounted upon the shaft members 28 and 30 that are journaled in the standards 12 and 10. Directly above the bearing members 18 and 20 I provide a pair of brackets 32 and 34. The bracket member 34 may support a vaporizer mixer mechanism 36 which I employ in connection with this invention. This mechanism may be of the general type shown and described in my copending application, Serial No. 43,008, filed October 1, 1935. This mechanism, briefly, is a mechanism whereby air and water are mixed in suitable quantities so that through suitable nozzle members a very fine spray or vapor may be produced and discharged under pressure.

Accordingly, and to carry out the purpose of the present invention, I extend the horizontally disposed pipe member 38 across the width of the roll R and mount the opposite end in suitable U-members 40 upon the bracket 32. I provide a plurality of nozzle members 42 connected as disclosed in the aforementioned invention to the mixer mechanism 36. I also provide a pair of nozzle members 44 horizontally disposed adjacent the edges of the roll R and secured to the pipe 38 by a suitable connector 46. A pair

of follower rollers 48 are adapted to lie against the side of the roll R and are connected by the arm members 50 to clamps 52 to secure them to the pipe member 38. A pair of brackets 54 are provided clamped upon the pipe members 46 and formed with the forked end 55 to engage the rod members 50, thus connecting together for rotary movement the nozzles 44 and the rollers 48. I also provide a coiled spring member 56 secured to the mechanism 36 at one end and secured to the pipe 38 at the other. The spring may be under compression so that it is at all times tending to rotate the pipe member 38 in a counterclockwise direction, as viewed in Figs. 2, 3 and 4.

As heretofore mentioned, it is desirable to direct an exceedingly fine spray or mist into the crevice that is formed at the point where the sheet of paper is leaving the roll, thus destroying the static electricity which tends to adhere the paper together and prevent the free and easy movement of the same from the roll. By thus directing a mist or spray, this condition is destroyed with the result that the paper may be unrolled with a far greater rate of speed than heretofore possible. The purpose of providing the horizontal nozzles 44 directed at the edge of the roll, is to assist in this action by providing a mist or spray along the exterior edge of the outer layer and its adjoining layers.

The connection between the vaporizer mixer mechanism 36 and the nozzles 42 and 44 may be generally accomplished by a plurality of individual pipelines 70 and 70a which connect with the nozzles 42 and 44 and supply to these nozzles air under pressure and a combination of vapor, and a mist or spray of liquid.

The mixer mechanism 36 may comprise generally a housing 72 provided with a plurality of lateral passages or mixing chambers 74 to which the several conduits 70 and 70a are connected. The housing 72 may be provided with a plurality of lateral ducts or openings 76, 78 and 80, the conduits 70 being attached to each of the openings 76 by suitable connections 82, and the passageway 78 being attached by a similar connection 84 to a vapor pipe 86 extending into the upper portion 72a of the housing 72, while the passageway 80 is attached by a somewhat similar connection 88 to a tubular member 90 which extends upwardly through the cover plate 92 of the housing 72. The lower end of the members 90 are screw-threaded, as shown at 94, within the member 88, and the lower end of the member extends downward through the conduit 80 so that the lower end projects slightly into the lateral passage or mixing chamber 74 and is there formed to serve as a valve seat.

Suitable means, as for example the openings 91, are provided in the wall of the tubular member 90 to permit fluid in the housing 72 to enter the member and escape freely through the member 90 into the mixing chamber 74. The space between the lower end of the connection 88 and the bottom of the opening into which the same is secured, is shown provided with suitable packing material 96 surrounding the lower end of the tubular member 90 so that the fluid in the housing will not escape into the passage past the lower end of the member 90.

In the form shown, a pair of needle valves 98 and 100 are provided adapted to cooperate with the passageways 78 and the lower end of the member 90 respectively to control the passage through the vapor pipe 86 and the tubular mem-

ber 90 and by their adjustment determine the amount of liquid and vapor drawn into the mixing chamber 74 by the suction of the pipe 70a and thence discharged through the opening 76 to the pipe 70 and to the nozzles.

Any suitable means may be provided for controlling the supply of air to the air pipes 70a. As shown, I provide a longitudinal passageway 102 in the housing 72 connected by a suitable pipe 104 with a source of air under pressure. A plurality of tubes 70a, one for each nozzle 42 or 44, communicate with the chamber 102 through the port 106. A needle valve 108 for each pipe 70a is provided to control the opening between the passage 106 and the chamber 102, thus controlling the amount of air passing to each individual nozzle.

In the preferred construction of the vaporizer mixer mechanism shown, I provide a float valve 110 directly connected to control the liquid supply through the pipeline 112 which communicates with housing 72. I also provide suitable means in the form of an electrically operated thermostat 114 and the electric heater 116 for maintaining the fluid in the housing at a constant temperature. Both of these elements may be of well known construction, the thermostat being preferably located at the upper level of the fluid in the housing, and the heating element connected thereto so that the electric current to the heating element will always be controlled by the thermostat and thus maintain the fluid in the housing at the desired temperature.

With the construction, as pointed out, it will be obvious that the device is provided with the necessary air and liquid supply and connected to a suitable source of electrical energy so that with the needle valves controlling the flow of fluid through the pipes 70 and 70a, and which can be adjusted to secure the desired density as well as velocity of the vapor as it issues from the jets 42 and 44, it is obvious that the density of the fluid or spray is automatically controllable and each one of the jets is independently controllable. It is further obvious that the temperature of the liquid in the housing may be employed to provide a vapor in the upper portion 72a of the housing as dense or as attenuated as may be desired, from a very wet steam down to a very slight or almost imperceptible humidity, and that when such vapor is mixed with a positively controlled volume of fluid under the mixing chamber 74 through the pipe 80, the resultant vapor may be as dense or as attenuated as may be desired.

It is obvious that when the device is suitably adjusted changes in atmospheric humidity will tend to require changes in the volume of vapor discharged from the several nozzles. This is especially true where material is being prepared for some special process, such as, for example, charging cloth with a glazing or stiffening material, or when moistening paper to receive printed impressions or the like, and in such cases the changes in atmospheric humidity render it desirable to adjust the volume of vapor being supplied to the moving web.

Suitable mechanism for making a uniform change in all of the jets may include the bell cranks 120 connected to the upper ends of the pipes 90, and the operating lever 122 connected to all of the bell cranks. This lever may, of course, be moved either manually or in any desired manner if connected to the mechanism. By reason of the coiled spring member 56 and 76

the location of the nozzles 42 and 44, it will be obvious that as the size of the roll diminishes the pipe member 38 will be rotated in a counter-clockwise direction, at all times holding the center of the nozzles 42 directed to the center of the crevice formed by the outer layer of paper leaving the roll. This action is accomplished by reason of the rollers 48 which bear against the roll and as the roll diminishes in size the spring member 56 is permitted to rotate the pipe 38, thus moving all of the nozzles and automatically keeping them centered upon the edge and the outer layer of paper.

By directing the spray or mist into the crevice that is formed at the point where the sheet of paper leaves the roll, it will be obvious that both sides of the paper are being moistened simultaneously and to the same degree. This action has a very beneficial advantage in the use of paper for printing, in that it is a well known fact that moistened paper will take thinner inks and the same will adhere much more readily. Thus it can be seen that a saving in ink is also effected as well as an increase in the speed with which the paper can be used.

Another very effective result of applying a spray or mist to the sheet of paper as it leaves the roll is to prevent the production of paper dust, which is well known to those skilled in the art, as a very detrimental factor to speed of operation and cleanliness in a paper printing plant. The provision of a spray effectively eliminates all possibility of paper dust with the result that it is not necessary to shut down the paper handling machinery at any time during the day to remove the dust which ordinarily gathers without the use of my improved vaporizer.

While I have described this invention in connection with the specific type of mechanism for providing the kind of spray desired as shown in the heretofore mentioned application, it will be obvious that other means may be employed to provide the desired kind of spray or mist.

While I have illustrated a specific embodiment of the invention, it will be apparent to those skilled in the art that changes and modifications may be made in the exact details shown and I do not wish to limit myself in any particular. Rather, what I desire to secure and protect by Letters Patent of the United States is:

1. In apparatus for moistening a continuous sheet of paper on a roll by directing a vapor into the crevice formed where the sheet is leaving the roll and against the opposite edges of the roll at a point adjacent the unrolling of the sheet therefrom, the combination of a mixing chamber, a pipe line extending horizontally therefrom and parallel to a horizontally mounted roll of paper, a plurality of nozzles secured in the side of said pipe and directed toward the crevice, a pair of angularly disposed extensions on said pipe, a nozzle on each of said extensions disposed parallel to said pipe and directed upon opposite sides thereof toward a point adjacent the periphery of the roll of paper at the point of the unrolling of the sheet therefrom, all of said nozzles connected to said mixing chamber and means for rotating said pipe in accordance with the size of the roll of paper which is being moistened.

2. In apparatus for moistening a continuous sheet of paper on a roll by directing a vapor into the crevice formed where the sheet is leaving the roll and against the opposite edges of the roll at a point adjacent the unrolling of the

sheet therefrom, the combination of a source of vapor under pressure, a mixing chamber connected thereto, a pipe line extending horizontally from said mixing chamber and parallel to a horizontally mounted roll of paper, a plurality of nozzles secured in the side of said pipe and directed toward the crevice, a pair of angularly disposed extensions on said pipe, a nozzle on each of said extensions disposed parallel to said pipe and directed upon opposite sides thereof toward a point adjacent the periphery of the roll of paper at the point of the unrolling of the sheet therefrom, all of said nozzles connected to said mixing chamber and means for rotating said pipe in accordance with the size of the roll of paper which is being moistened, said means including a loaded spring connected to said pipe and roller means controlled by said spring and bearing against the outer surface of said roll of paper.

3. In apparatus for moistening a continuous sheet of material by directing a continuous supply of vapor into the crevice formed where the sheet is leaving the roll, the combination of a pair of vertical standards, means for supporting a roll of material in a horizontal position therebetween, a pair of brackets above said means, a mixing chamber and a horizontal pipe disposed upon said brackets, means for rotating said pipe, means for controlling the rotation of said pipe in accordance with the size of the roll of material mounted between said standards, and a plurality of nozzle members mounted on said pipe and connected to said mixing chamber, said nozzle members directed into the crevice formed where the material is leaving the roll, the rotation of the pipe being controlled to constantly direct the nozzle members toward the crevice of the roll of paper as it diminishes in size.

4. In apparatus for moistening a continuous sheet of material by directing a vapor into the crevice formed where the sheet is leaving the roll, the combination of a pair of vertical standards, means for supporting a roll of material in a horizontal position therebetween, a pair of brackets above said means, a mixing chamber and a horizontal pipe disposed upon said brackets, means for rotating said pipe, means for controlling the rotation of said pipe in accordance with the size of the roll of material mounted between said standards, said means including a loaded spring connected to said pipe and rollers connected to said pipe bearing against said roll of paper, and a plurality of nozzle members mounted on said pipe and connected to said mixing chamber, said nozzle members directed into the crevice formed where the material is leaving the roll, the rotation of the pipe being controlled to constantly direct the nozzle members toward the crevice of the roll of material as it diminishes in size.

5. In apparatus for moistening a continuous sheet of paper on a roll by directing a vapor into the crevice formed where the sheet is leaving the roll and against the opposite edges of the roll at a point adjacent the unrolling of the sheet therefrom, the combination of a horizontally disposed pipe member mounted above a roll of paper, stationary support members therefor, a plurality of nozzle members secured in spaced relation in the side of said pipe and directed toward the crevice, said nozzle members connected to a source of vapor under pressure, a pair of pipe members extending at right angles to said horizontal pipe, a pair of nozzle members

therein directing toward the crevice at the opposite edges of the roll of paper, means for rotating said pipe and means for controlling the rotation thereof in accordance with the size of the roll of paper against which said nozzles are directed, said last named means including a loaded spring member connected between a stationary support and said horizontally disposed pipe member and a pair of rollers disposed against the outer side of said roll of paper and rigidly connected to said horizontal pipe.

6. In apparatus for moistening a continuous sheet of paper on a roll by directing a vapor into the crevice formed where the sheet is leaving the roll and against the opposite edges of the roll at a point adjacent the unrolling of the sheet therefrom, the combination of a horizontally disposed pipe member mounted above a roll of paper, stationary support members therefor, a plurality of nozzle members secured in spaced relation in the side of said pipe and directed toward the crevice, said nozzle members connected to a source of vapor under pressure, means for rotating said pipe and means for controlling the rotation thereof in accordance with the size of the roll of paper against which said nozzles are directed, said last named means

including a loaded spring member connected between a stationary support and said horizontally disposed pipe member and a pair of rollers disposed against the outer side of said roll of paper and rigidly connected to said horizontal pipe.

7. In apparatus for moistening a horizontally disposed continuous sheet of paper on a roll by directing a vapor into the crevice formed where the sheet is leaving the roll, the combination of a mixing chamber, means extending horizontally therefrom across the roll of paper being unrolled single spray means associated with said horizontal means directed into the crevice and adapted to spray both sides of the paper simultaneously as the same is being unrolled, and automatic means associated with said single spray means for gradually changing the direction in which said means are pointed as the size of said roll of paper diminishes said automatic means including rollers engaging the roll of paper and means connected between said rollers and said single spray means for changing the direction the single spray means is pointed as the size of the roll of paper diminishes.

GEORGE C. FLINT.