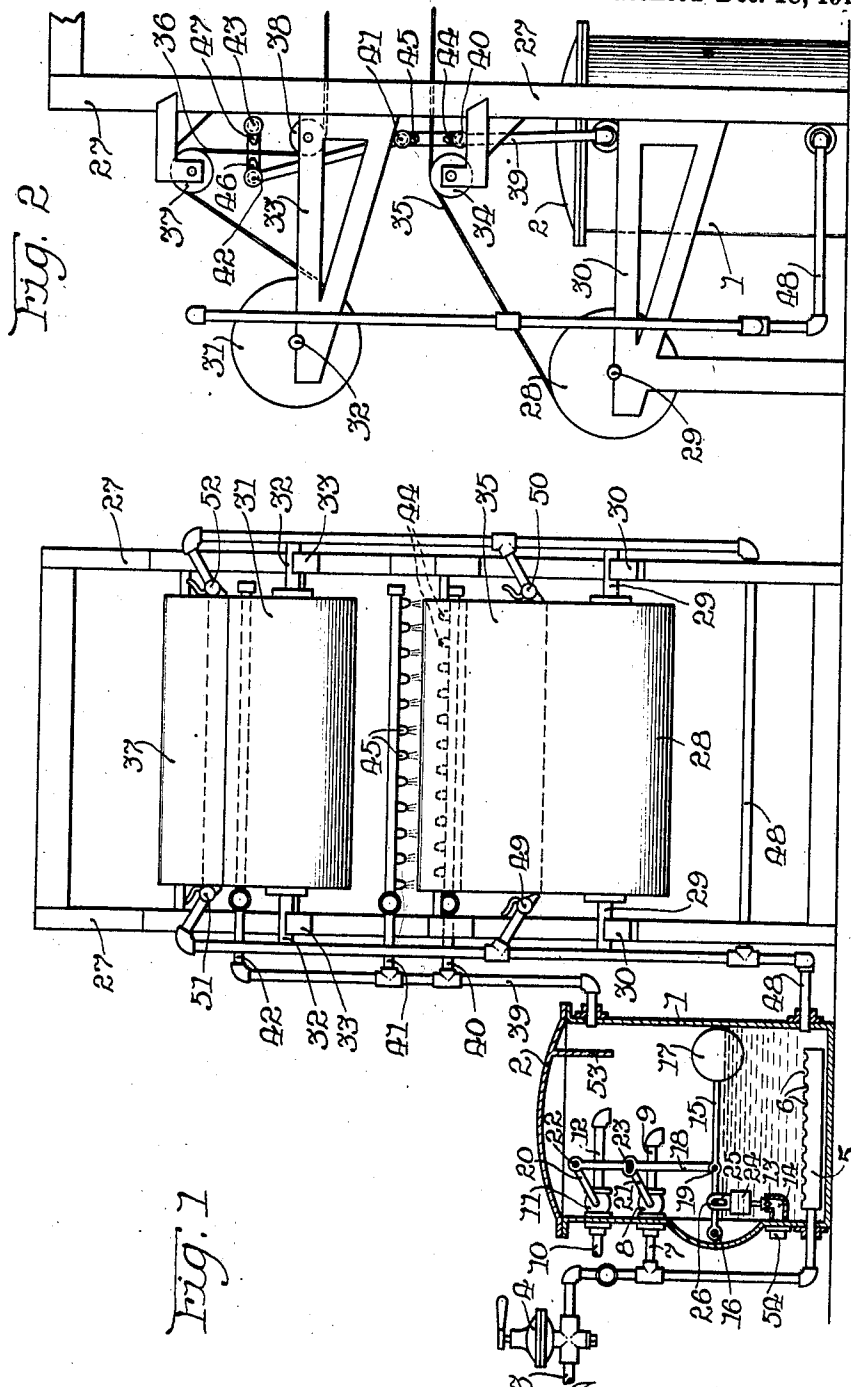


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 PAPER MOISTENING DEVICE.  
 APPLICATION FILED SEPT. 12, 1917.

1,250,894.

Patented Dec. 18, 1917.



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# UNITED STATES PATENT OFFICE.

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## PAPER-MOISTENING DEVICE.

1,250,894.

Specification of Letters Patent. Patented Dec. 18, 1917.

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### *To all whom it may concern:*

Be it known that we, SAMUEL EDWARD KATELY and HARLEY C. ALGER, citizens of the United States, residing, respectively, at Chicago, in the county of Cook and State of Illinois, and at Oak Park, in the county of Cook and State of Illinois, have invented new and useful Improvements in Paper-Moistening Devices, of which the following is a specification.

Our invention relates to improvements in devices for moistening paper which is to be printed and has for its object the production of a device of this character which will deliver vapor or moisture of even consistency under various conditions; another object is the production of such a device which will be automatic in its operation; while a further object is the production of such a device which will not only moisten the body of the paper, but will also moisten the edges of the paper and preferably with hot water.

It is well known that slightly moistened paper can be printed upon more readily than dry paper. For example, with an equal supply of black ink, printed under conditions otherwise the same, the printing upon slightly moistened paper will appear blacker and clearer, while less ink is required for the slightly moistened paper if the printing produced is of the same degree of color. Further, the detrimental effect of static electricity is greatly reduced if the paper is moistened and the paper therefore passes through the press more smoothly thus allowing higher speed with increased production of the press. Further, dry paper is more brittle and tears more easily than moistened paper so that moistened paper, especially when well moistened at the edges, can be handled through a press with a less number of breaks than dry paper, which saves paper, saves time by reducing the number of delays in removing torn paper and also permits of higher press speeds.

In the accompanying drawing our invention is shown as it may be applied to a rotary web press, where it has particular application on account of the high speed, which seems to produce static electricity, on account of the tension usually required on the paper or web, on account of the cost of delays which is high because of the high running expense of such presses and also

on account of the fact that it is often necessary as in newspaper printing to get the printing done in a minimum of time. It will be understood however that our invention may readily be adapted to other types of printing presses and we do not wish to confine ourselves to the particular form described.

In the accompanying drawing Figure 1 is a side elevation partly in section showing our invention as it may be applied to a double deck rotary web press, while Fig. 2 is an exterior side elevation at right angles to Fig. 1.

Referring to the drawing, 1 represents a shell chamber or tank of suitable shape, placed in any suitable position, adapted to contain water in its lower portion and normally closed from communication with the atmosphere by a cover 2. A steam line 3 supplies steam from a suitable source and a pressure reducing or pressure regulating valve 4, maintains the desired pressure of the steam supplied to the tank. The steam line 3 leads to a valve 8 and pipe 9 to a level above the water contained in the tank while a branch from pipe 3 leads to a header 5 having openings 6-6 below the water level within the tank. A water line 10 supplies any water required through a valve 11 and pipe 12. A valve 13, seating on a valve seat 14, is normally held closed by a weight 24 and allows the escape of excess water through the opening 54 when the valve 13 is lifted from its seat 14.

A lever 15, pivotally supported by a pin in the shell at 16 carries a float 17 which is actuated by the level of the water within the tank and which is adapted to swing the lever 15 as the water level within the tank rises or falls. A slotted link 18 pivotally connected at 19 to the lever 15 and to an arm 20 of the valve 11 at 22 operates the water supply valve 11. An arm 21 of the valve 8 connects with the slot of the link 18 by means of a pin at 23 and operates the steam supply valve 8. The weight 24 of the valve 13 carries a slotted arm 25 which engages a pin 26 on the lever 15.

As the float 17 rises due to accumulation of water in the lower portion of the tank 1, the valve 11 is closed, valve 8 is then opened while a still further upward movement of the float due to accumulation of water in

the tank opens the valve 13. As the float 17 falls the valve 13 is closed, the valve 8 is next closed and the valve 11 is finally opened as hereinafter more fully described.

5 A portion of the frame of a double deck printing press is represented by 27. Such a press may carry an upper and lower roll of paper, the lower roll being shown at 28 supported on a shaft 29 carried by brackets 10 30—30 extending from the frame 27, the upper roll being shown at 31 supported on a shaft 32 carried by brackets 33—33 also extending from the frame 27. The paper or web 35 from roll 28 passes over a suitable roller 34 and thence through the press, 15 while the paper or web 36 from roll 31 passes over suitable rollers 37, 38 and thence through the press. The lower web at 35 is shown in a horizontal position while the upper web at 36 is shown in a vertical position.

The steam or vapor is held available for delivery to the paper in the upper portion of the tank 1 and a pipe line 39 conveys the vapor from the tank and connects with a 25 pipe adapted to spray the vapor on the web. Better results are obtained when the vapor is applied on both sides of each web and, as shown, the pipe 39 conveys the vapor to two pipes 40 and 41 arranged in a U-shape and 30 carrying nozzles 44 and 45 respectively which apply the vapor on either side of the web 35. Pipe 39 also conveys vapor to the pipes 42 and 43 similarly arranged and carrying nozzles 46 and 47 respectively which 35 apply the vapor on either side of the web 36 as shown more clearly in Fig. 2. The nozzles 44 and 46 are preferably positioned so as to apply vapor to the webs at points in between nozzles 45 and 47 respectively there- 40 by giving a more even distribution of moisture.

Water heated by contact with the steam or water of condensation resulting from the separation of drops of water from the steam 45 supplied is held in the lower portion of the tank 1 available for delivery to the edges of the paper and a pipe 48 conveys the hot water through suitable piping to faucets 49, 50, 51 and 52, which are adapted to apply 50 the hot water to the edges of the rolls of paper 28 and 31 as shown.

It will be noticed that the inlet pipes 12 and 9 turn downwardly so that water or any drops of water will be blown toward the bot- 55 tom of the tank 1, while a baffle 53 further serves to help separate large drops of water from the steam by preventing direct passage to the pipe 39.

The operation of the device is as follows: 60 Steam from any suitable source is supplied by the pipe 3 and passes through the valve 4 which reduces or regulates its pressure to the desired degree. Suppose that the tank 1 is empty in which case the float 17 will be in 65 its lowest position near the bottom of the

tank 1 with pin 26 near the lower end of the slot in arm 25; valve 8 will be closed while valve 11 will be open so that water will at once flow through pipe 10, valve 11 and pipe 12 falling to the bottom of the tank 1 where 70 it will accumulate and steam will pass through the branch of pipe 3 leading to the header 5 and will flow through the opening 6—6 and bubble up through the water. The water will then be heated so that hot water 75 will be available for moistening the edges of the paper by passing through pipe 48 to faucets 49, 50, 51 and 52, which may be adjusted to apply the amount of water re- 80 quired.

If the steam supplied is superheated sufficiently it will take up moisture from the water through which it passes so that the resulting vapor or thoroughly moistened steam passes through the pipe 39 to branch 85 pipes 40 and 41, and nozzles 44 and 45 which apply it on either side of the web 35 and to branch pipes 42 and 43 and nozzles 46 and 47 which apply it to either side of the web 36. As the water level falls due to the steam 90 taking up moisture or due to the passage of water from the tank through pipe 48, the float 17 falls opening valve 11 supplying more water so that the float automatically controls the valve 11 to maintain a supply 95 of water over the header 5.

If the steam being supplied carries considerable moisture or water of condensation, then the excess moisture will remain in the bottom of the tank while the resulting vapor 100 passing to the upper portion of the tank will still be thoroughly saturated but will be free from large drops of water which tend to moisten the paper unevenly. If the water of condensation is sufficient to cause the level 105 of water in the tank to rise, the float 17 will rise opening valve 8 which allows the steam to pass through pipe 9 to the tank and the water of condensation will be separated and fall to the bottom of the tank while the va- 110 por resulting from the separation will pass through pipe 39 as previously described. When the level of the water rises still higher float 17 will rise higher and the pin 26 will strike the upper end of the slot in the arm 115 25 thus lifting the valve 13 permitting the escape of excess water through the opening 54 and preventing the tank from being flooded.

As the water level falls, float 17 will fall 120 allowing the valve 13 to close while valve 8 remains open; should the water level fall lower the float 17 will fall lower closing valve 8 and causing the steam to be delivered through header 5 as previously described. 125 When the level of water falls still lower the float 17 will fall still lower opening valve 11 which supplies water to the tank as previously described.

It will therefore be seen that the device 130

operates automatically and is adapted to receive steam and water under varying conditions and apply the resulting vapor of even consistency to the paper while at the same time it provides a supply of hot water for moistening the edges of the paper.

It will be evident that other forms of construction embodying our invention may be made and we do not wish to confine ourselves to the exact construction described.

What we claim as our invention is:

1. A device for applying moisture to paper to be printed comprising a tank, means for supplying water thereto, means actuated by the level of water within the tank for controlling the supply of water to the tank, means for supplying steam to the tank whereby the water is heated and means for conveying the resulting vapor from the tank to the paper to be printed.

2. A device for applying moisture to paper to be printed comprising a tank, means for supplying water thereto, means for leading water therefrom, means actuated by the level of water within the tank for controlling the passage of water to and from the tank whereby the desired level of water is maintained within the tank, means for supplying steam to the tank and means for conveying vapor from the tank to the paper.

3. A device for applying moisture to paper to be printed comprising a tank, means for supplying water thereto, means for conveying water therefrom, a float actuated by the level of water within the tank for controlling the passage of water to and from the tank whereby the desired level of water is maintained within the tank, means for supplying steam to the tank and means for conveying vapor from the tank to the paper.

4. A device for applying moisture to paper to be printed comprising a tank, a steam supply line, said tank being adapted to receive steam from the steam supply line and to separate water of condensation from the steam, means for conveying the resulting vapor from the tank to the surface of the paper and means for conveying condensation from the tank to the edge of the paper.

5. A device for applying moisture to the paper to be printed comprising a tank, a steam supply line leading to the tank, said tank being adapted to separate water of condensation from the steam supplied, means for conveying water from the tank and

means for conveying vapor from the tank to the paper to be printed.

6. A device for applying moisture to paper to be printed comprising a tank adapted to contain water in its lower portion, means for supplying water thereto, means for conveying water therefrom, means for supplying steam to the tank, means for conveying moisture resulting from the contact of steam and water to the paper to be printed and means actuated by the level of water in the tank for controlling the supply of steam and water to the tank.

7. A device for applying moisture to paper to be printed comprising a tank adapted to contain water in its lower portion, means for supplying water thereto, means for conveying excess water therefrom, means for supplying steam thereto, means for conveying vapor resulting from contact of the steam and water, from the tank to the paper to be printed, means actuated by the level of the water within the tank for controlling the supply of steam and water to the tank and the conveying of excess water from the tank and means for conveying water from the lower portion of the tank to the edges of the paper to be printed.

8. A device for supplying moisture to paper to be printed comprising a tank adapted to contain water in its lower portion, a valve for supplying water thereto, a valve allowing the escape of water therefrom, a pipe adapted to supply steam to the tank and having a valve adapted to control the supply of steam, a branch pipe adapted to lead steam to the tank below the water level when the steam supply valve is closed, means for conveying the vapor resulting from the contact of the steam and water from the tank to the paper to be printed, means for conveying water from the tank to the edges of the paper to be printed and a float actuated by the level of water in the tank for operating the above mentioned valves to maintain the proper level of water within the tank.

In testimony whereof we have affixed our signatures in the presence of two subscribing witnesses.

S. EDWARD KATELY.  
HARLEY C. ALGER.

Witnesses:

ANNA B. KATELY,  
EMMA ALGER.