J. H. CANNON.

DRIER FOR PAPER RULING MACHINES.

APPLICATION FILED MAY 8, 1920.

1,421,166. Patented June 27, 1922.

Fig. 1.

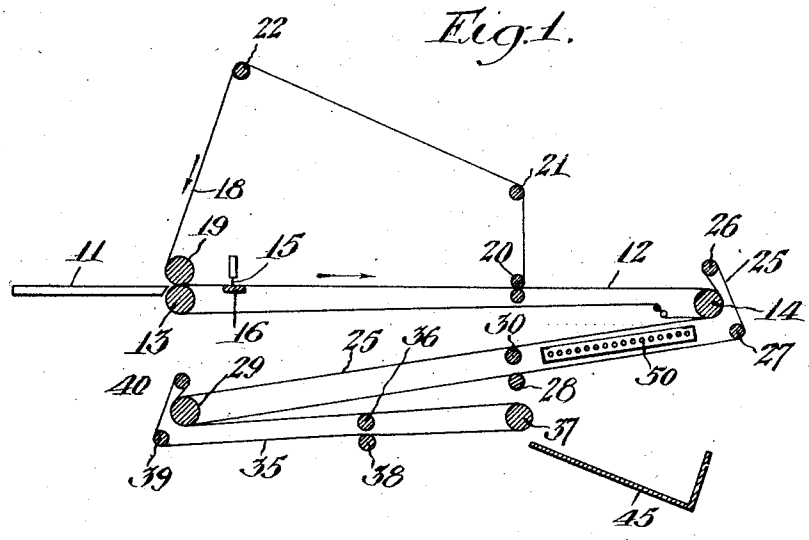


Fig. 4.

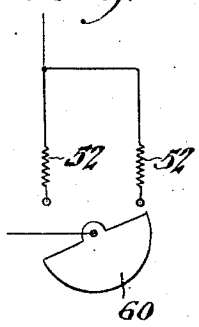


Fig. 2.

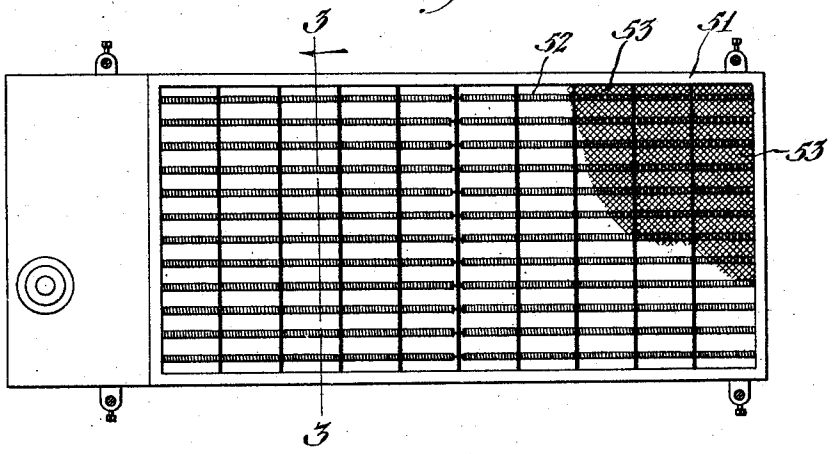


Fig. 3.



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DRIER FOR PAPER-RULING MACHINES.

1,421,166. Specification of Letters Patent. Patented June 27, 1922.

Application filed May 8, 1920. Serial No. 380,001.

To all whom it may concern:

Be it known that I, JAMES H. CANNON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Drier for Paper-Ruling Machines, of which the following is a specification.

My invention relates to machines for ruling paper. These machines are commonly used by printers and by manufacturers of blank books, stationers' supplies, etc. In such machines the paper is moved by a carrier under ruling pens which rule lines on the surface of the paper. The capacity of such machines is limited by the fact that before the paper can be stacked, the ink must be allowed to dry. The capacity of such machines can be increased by any means which will increase the rapidity of this drying.

The object of my invention is to provide means in a paper ruling machine for accelerating the drying of the ink after the paper is ruled and thus increasing the capacity of the machine. While this drying can be accelerated by forcing a current of dry air against the wet lines, I have found that very superior results can be accomplished by the use of radiant heat. In my invention I provide a source of radiant heat preferably an electric heater, the active elements of which are carried at a comparatively high temperature. The radiant heat projected from the heater strikes upon the inked surface of the paper.

As the majority of ruled paper is white or very light in color, this radiant heat wherever it strikes the paper is reflected back into the radiant heater where it strikes upon highly polished surface and is again reflected against the paper, this reflection being repeated back and forth between the paper and the polished surface. While white paper has a low absorbing capacity for heat, the ink, particularly if it is black or deeply colored, has a very high absorbing capacity and the radiant energy striking upon the ruled lines is absorbed, being converted into heat which causes a rapid absorption. Due to the reflection from the paper of the radiant heat striking thereon and the absorption in the ink of the radiant heat striking thereon, it is possible to use very high radiant intensity and to greatly accelerate the drying without injurious effects upon the paper.

Further objects and advantages will be made evident hereinafter.

Referring to the drawing which is for illustrated purposes only,

Fig. 1 is a diagrammatic view of a conventional paper ruling machine with my invention installed therein.

Fig. 2 is a view of the type of heater preferred by me as seen from above, a portion thereof being broken away to better illustrate the internal structure.

Fig. 3 is a section on a still further enlarged scale on a plane represented by the line 3—3 of Fig. 2.

Fig. 4 is a diagram of connections.

The conventional ruling machine shown in Fig. 1 comprises a sticker table 11, upon which the paper to be ruled is placed. A top cloth 12 is provided which passes over rollers 13 and 14. The paper to be ruled is placed on the top cloth 12. The paper is ruled by pens 15 located above a segment board 16, the paper being held down by overhead cords 18 which pass over rollers 19, 20 21 and 22. The paper, cords, etc. pass in the direction shown by the arrow. The paper upon arriving at the roller 14 is caught by lower cords 25 which pass over rollers 26, 27, 28, 29 and 30 and over the roller 14. The paper is then carried upon the lower cords 25 to the roller 29 where it is caught by a lower cloth 35 which passes over rollers 36, 37, 38, 39 and 40 and over the roller 29, the paper being finally delivered into a receiving box 45.

Located below that portion of the top cloth and the lower cords between the roller 14 and 30 is a radiant electric heater 15, this heater is preferably formed as shown in Fig. 2 and consisting of a rectangular box 51 having a plurality of heating coils 52 therein. The top of the box is covered by a screen 53, to prevent stray sheets of paper falling on the heating elements, and the bottom of the box is closed by a polished metal plate reflector 54 which is provided with small openings 55. The coils 52 may be arranged in two or more sections as shown in Fig. 4, a segment switch 60 being used to connect one or more of the coils in circuit as desired. While I have shown the heater 50 as being constructed with two coils it is,

as a matter of fact, usually provided with three or more, the division being made across the ruling machine so that a greater or less width of the heater may be energized corresponding to the width of the paper being ruled.

The method of operation is as follows:

The paper being fed through the roller 13 and 19 is carried between the pens 15 and the segment board 16 where the lines are ruled and is caught by the lower cords 25, being carried into a position directly over the heater 50 where it is supported on these cords which are so spaced as to avoid the inked lines. The heating elements 52 are at a bright red heat and a large proportion of energy dissipated thereby is radiant. A considerable proportion of this radiant energy is reflected from the under side of the heating elements by the reflector 54. This very intense radiant energy is thrown upon the paper, the greater proportion being reflected from the surface of the paper back into the heater where it is again reflected thus greatly increasing the intensity. Any of the radiant energy which strikes upon the wet ink lines is largely absorbed by these lines which are raised to a temperature much higher than the surface of the paper. I have found it is thus possible to produce very rapid drying without danger of injuring the paper and with an astonishingly low consumption of energy.

I claim as my invention:

1. In a paper ruling machine; an artificial source of radiant heat; and means for supporting the ruled paper above said source with the ruled lines down.

2. In a paper ruling machine; an artificial source of radiant heat; a wire netting directly above said source; and means for supporting the ruled paper above said source with the ruled lines down.

3. In a paper ruling machine; an artificial source of radiant heat; a reflector placed below said source; and means for supporting the ruled paper above said source with the ruled lines down.

4. In a paper ruling machine; ruling pens for ruling lines on the paper; carriers for moving said paper past said pens; an electric heater for drying the ink after it leaves said pens, said heater extending completely across said carriers; and means for energizing a definite width of said heater corresponding to the width of the paper being ruled.

5. In a paper ruling machine; ruling pens for ruling lines on the paper; carriers for moving said paper past said pens; a radiant electric heater so placed as to project radiant heat against the inked surface of said paper after it leaves said pens, said heater extending completely across said carriers; and means for energizing a definite width of said heater corresponding to the width of the paper being ruled.

6. In a machine for applying a wet pigment to the surface of paper, the combination of means for supporting the paper; and a heater supported at a short distance from but out of contact with the wetted surface of said paper.

7. In a machine for applying a wet pigment to the surface of paper, the combination of means for supporting the paper, with the wetted surface down; and a heater supported at a short distance from but out of contact with the wetted surface of said paper.

8. In a machine for applying a wet pigment to the surface of paper, the combination of means for supporting the paper, with the wetted surface down; and a heater having a heating element at or near an incandescent temperature, said heating element being supported at a short distance from but out of contact with the wetted surface of said paper.

9. In a machine for applying a wet pigment to the surface of paper, the combination of means for supporting the paper, with the wetted surface down; and a heater having a heating element at or near an incandescent temperature, said heating element being supported at a short distance from but out of contact with the wetted surface of said paper.

10. In combination: means for feeding a sheet of paper; means for applying a pigment to the surface of the paper; means for supporting the paper with the pigmented surface down; and a heater supported directly below said pigmented surface.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 30th day of April 1920.

JAMES H. CANNON.