

(No Model.)

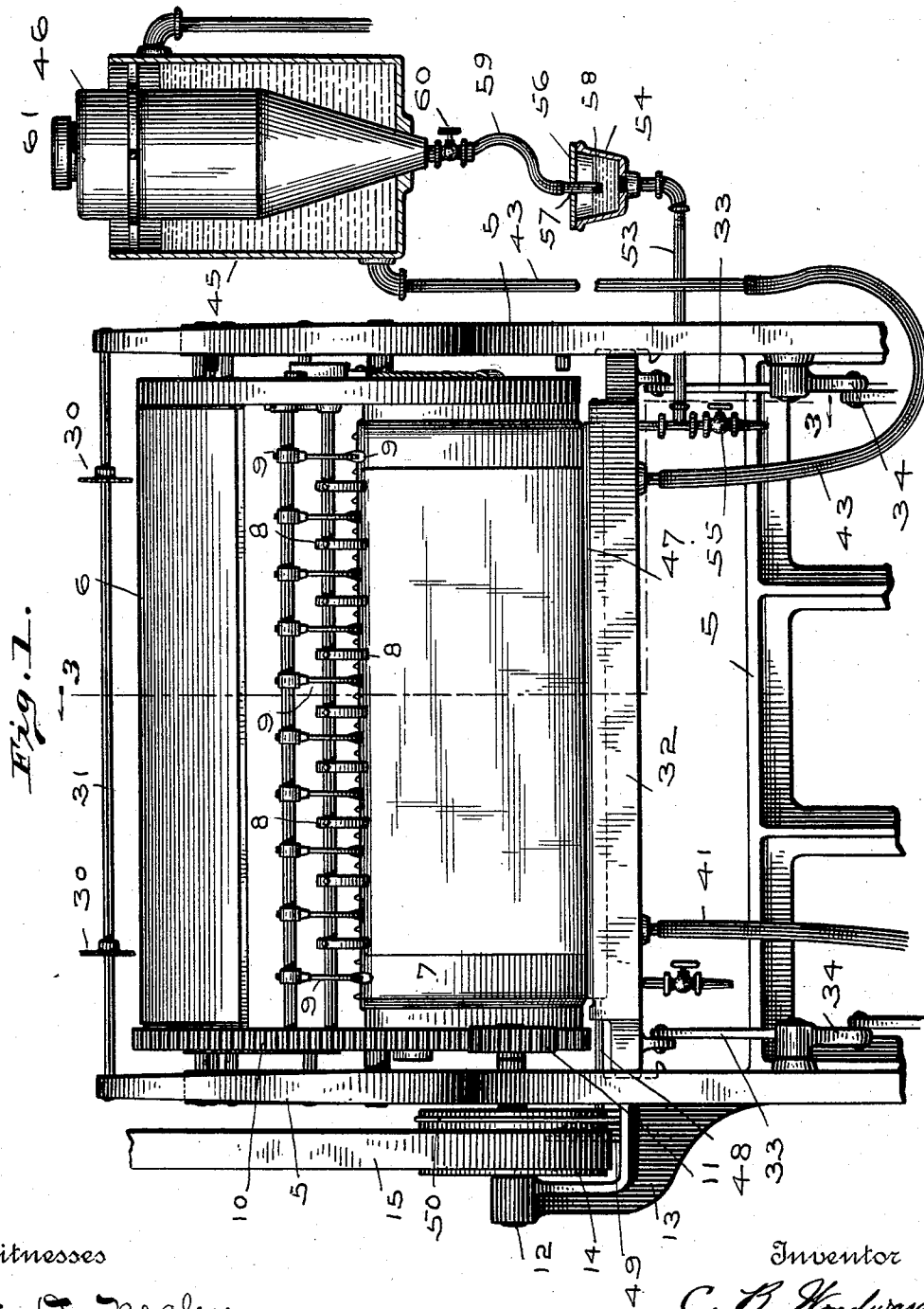
3 Sheets—Sheet 1.

C. B. WOODWARD.

MACHINE FOR COATING PAPER WITH EMULSION.

No. 539,848.

Patented May 28, 1895.



Witnesses

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E. E. Vernell.

Inventor

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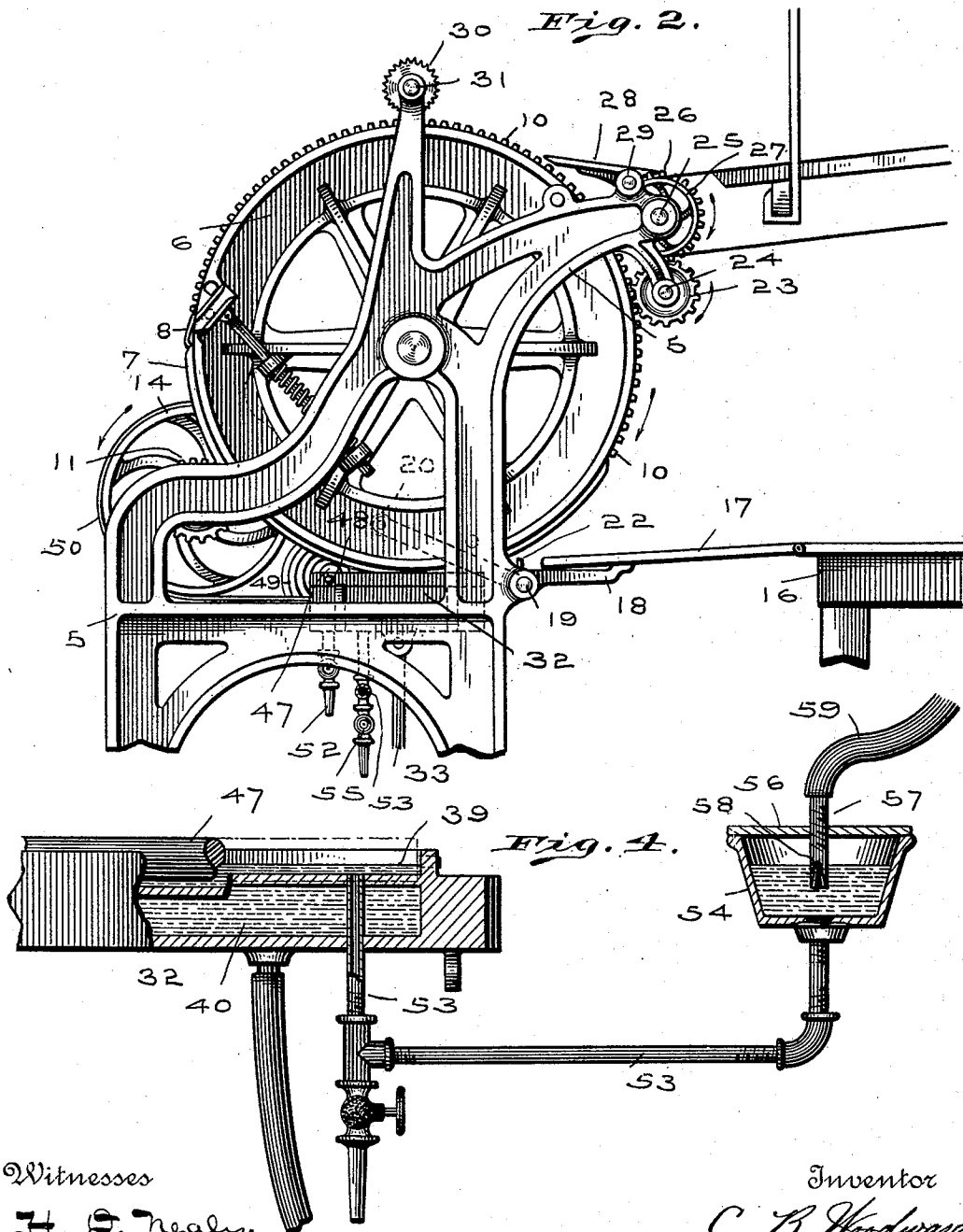
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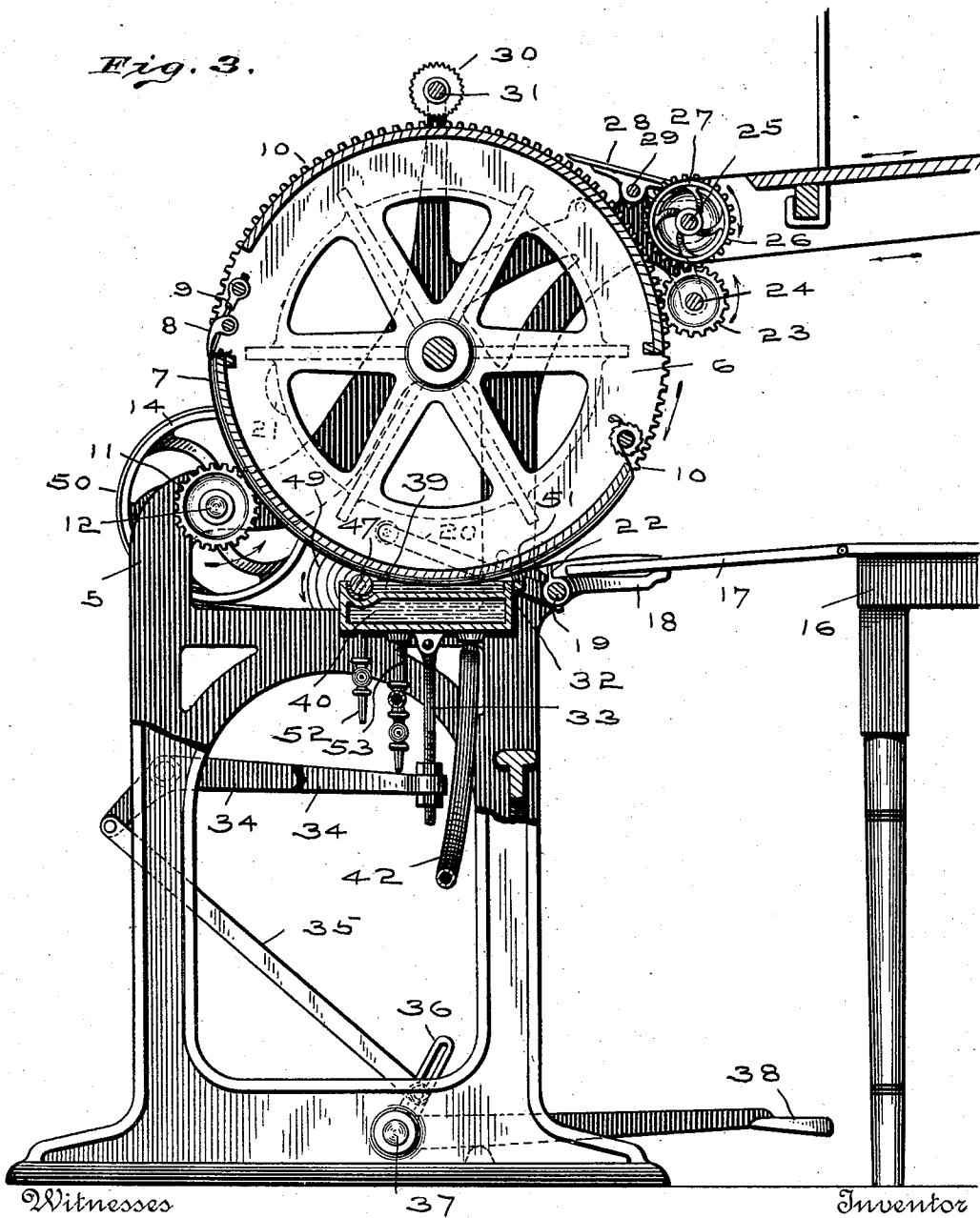
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UNITED STATES PATENT OFFICE.

CHARLES B. WOODWARD, OF ST. LOUIS, MISSOURI.

MACHINE FOR COATING PAPER WITH EMULSION.

SPECIFICATION forming part of Letters Patent No. 539,848, dated May 28, 1895.

Application filed May 31, 1894. Serial No. 512,996. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. WOODWARD, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Machines for Coating Paper with Emulsion, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a machine for coating photographic, printing or other papers with an emulsion or chemical solution either before or after such paper has been printed upon, and the object is to make an equal and even coating over the entire surface of the paper, and at the same time to prevent streaking or the formation of air bubbles in such coating.

In the drawings I have shown one form of a machine for accomplishing these results, where the emulsion is put on the paper in a warm or heated state.

Figure 1 is an end elevation of the machine, its lower part being broken away and the emulsion-feeding device shown in section. Fig. 2 is a side elevation of the upper part of the machine. Fig. 3 is a sectional view taken on the irregular line 3 3 of Fig. 1. Fig. 4 is an enlarged longitudinal section of one end of the emulsion-dipping pan and the emulsion-feeding device.

In all the different views like marks of reference refer to the same parts.

5 is the framework of the machine, and 6 the revolving cylinder which is similar to those used on cylinder printing presses, the surface of the cylinder inside of its rims being divided into two parts, over each of which, if desired, tympan sheets 7 may be spread, but in the drawings only one-half of the cylinder is thus utilized. The outer tympan sheet or covering is preferably of some water-proof or glazed material, held in place in the ordinary way, and the sheet to be coated is held in place on the tympan by the usual grippers 8.

9 represents the lifting fingers for raising the end of the sheet from the cylinder just before it leaves such cylinder.

10 represents gear teeth formed on the periphery of the cylinder rim on one side, and

these teeth mesh with the teeth of the small gear 11 carried on the short shaft 12, having bearings in the framework 5, and a bracket 13 on that side of the machine.

14 is a drive-wheel or pulley mounted on the shaft 12 and is driven by the belt 15 connected with any suitable source of power.

16 is the feed table which has a hinged extension 17 whose outer end rests on arms 18 secured to the rock shaft 19 which is rocked or turned through the arm 20 connected with the shaft 19, the end of the arm 20 being moved at the proper time by contacting with a lug or projection 21 on the end of the cylinder as it revolves. Paper guides 22 are also secured on the shaft 19, and the object of the hinged table extension is to allow such extension to be raised, thereby lifting the sheet being fed to the cylinder above the guides 22, so as to be readily caught by the grippers.

23 is a small gear wheel mounted on a shaft 24 having bearings in the framework 5 of the machine, the gear 23 meshing with the teeth 10 on the cylinder rim.

25 is a counter shaft also having bearings in the framework 5, and has a small gear 26 mounted thereon, which meshes with and is driven by the gear 23 on the shaft 24.

27 are wheels mounted at proper distances apart on the counter shaft 25 and over which tapes or bands are carried for conveying the sheets from the cylinder.

28 are finger bars fixed on a rod 29 between the wheels 27 and the cylinder, and as such cylinder revolves and the coated sheet about reaches the fingers 28, the grippers 8 release their hold on the sheet, and the fingers 9 lift the edge of the sheet above the ends of the fingers 28 so that the sheet will be carried over such fingers to the tape-carriers to be conveyed to any desired point for drying.

30 are disks mounted on a loose shaft or rod 31 above the top of the cylinder, the disks having serrated edges and bearing on the edges of the paper or sheets after they are coated and while they are being carried around on the cylinder.

32 is the dipping pan or trough which has guides on its ends which work in grooves in the framework 5 immediately beneath the cylinder, and is adapted to be raised or lowered

with relation to the cylinder, it having pivotally connected to its underside at each end a vertical rod 33 whose lower end is adjustably connected to the lever 34 pivoted to the framework 5, the opposite ends of each of the levers being connected by a link 35 with a crank 36 on a rock shaft 37 operated by a treadle 38.

The dipping pan or trough is formed preferably in two parts, an upper open dipping pan 39 which is adapted to hold a quantity of emulsion or coating fluid, and a chamber 40 below through which is passed hot water or steam for keeping the emulsion warm when necessary, the water or steam entering the chamber 40 through the flexible pipe 41, and leaving it through the flexible pipe 42 which is connected by the pipe 43 with the tank 45 located at any suitable point near the machine, and in which is suitably supported the supply can or tank 46 for holding the supply of emulsion or coating fluid which keeps the pan filled as hereinafter described. One side of the dipping pan is circularly recessed for the reception of a roller 47 which has bearings in the end walls of the pan or trough, and whose central rod or shaft 48 extends to the outside of the machine frame where it has mounted on it a cone or speed pulley 49 connected by a belt or band 50 with the drive wheel or pulley 14.

51 is a narrow brush which is secured lengthwise of the dipping pan on its front side, and when the dipping pan is in its raised position the brush is adapted to bear against the tympan sheet and smooth down the paper to be coated.

52 is the drain for the dipping pan, and 53 is the supply pipe which is connected to the under side of a small basin or cup 54 outside of the machine frame, the connection of the cup to the dipping pan being rigid so that the cup will always be in the same relative position to the dipping pan. The pipe 53 is also provided with a drain valve 55 for emptying such pipe and the cup 54, and when necessary, the emulsion tank 45.

Across the open top of the cup 54 is a fixed cross-piece or plate 56 in which is secured a short pipe 57 which extends about half the depth of the cup and has cut in its lower end a notch 58 in the shape of a narrow inverted V the top of this notch being on a line with the desired level of the emulsion in the dipping pan. The short pipe 57 screwing through the plate 56 can be so adjusted as to secure any desired depth of emulsion in such dipping pan. The short pipe 57 is connected to the lower end of the supply tank 46 by a flexible pipe or hose 59 and just below a valve 60.

The tank 46 is closed air tight by a screw cap 61, after it is filled with emulsion, and so when the valve 60 is opened the emulsion will flow out of the tank as fast as air can pass up through the body of emulsion through the pipe 57 and flexible pipe 59, so that when the emulsion has filled the dipping pan through

the pipe 53, and the cup 54 and dipping pan are filled up to a level with the top of the V-shaped notch 58, the flow of emulsion from the tank 46 will cease.

When a sheet or sheets is to be coated with emulsion, the machine is started and the roller which is then partly immersed in the emulsion will be revolved, and will take on a coating of emulsion, and when a sheet has been fed to the cylinder from the feed table 16, upon the treadle 38 being depressed, the dipping pan will be raised, so that when the part of the cylinder which has the tympan sheets on it and on which the paper or sheet to be coated lies, reaches the dipping pan, the sheet will be passed over the top of and in contact with the emulsion in the pan. As the sheet is coated by coming in contact with the emulsion, the roller 47 is still revolving, and when the sheet reaches it the roller makes contact with said sheet, rolling over it, and thus adds, takes away, or regulates the coating to any desired thickness over the surface of the sheets, removing any air, bubbles or other blemishes in the coating. The sheet will after it has been entirely coated, be carried around by the cylinder until it reaches the discharge point when the grippers will release their hold thereon, and the fingers lifting the sheet over the ends of the finger bars or guides 28, the paper will be carried on to the tape conveyer or carrier, which removes the paper to any desired point for drying.

It is very evident that the emulsion in the dipping pan must always be kept at the same level, and this is accomplished through the emulsion in the cup which closes the end of the short pipe 57. When the emulsion gets below its ordinary level in the dipping pan, the same will be the case in the cup, and the falling of the emulsion level in such cup will open or expose the upper or smaller end of the V-shaped notch in the end of the pipe 57, allowing a very small amount of air to enter the pipe, this causing such an amount of emulsion to escape from the pipe, as will bring the emulsion back to its usual level in the dipping pan 39 and cup 54, thus closing again the notch 58 until the level of the emulsion in the dipping pan is again lowered, as before stated. It will thus be seen that the emulsion is always kept at the proper level in the dipping pan, and no matter how little or how much is used from such pan, the level of the emulsion is immediately brought back to its normal level.

Any desired thickness of coat can be put on the paper or sheets, and this may be accomplished by increasing the speed of the roller through its speed pulley, or by increasing or decreasing the upward movement of the dipping pan so that the pressure of the roller on the paper will be more or less.

The use to which the herein described machine has been mainly put, is to coat or cover printed pictures with a suitable transparent emulsion, and afterward burnishing the coat-

ing when dry, giving the picture the appearance of a photograph. To do this it is necessary that the coating be perfectly even or of the same thickness over the entire surface of the picture, or paper upon which it is printed, that there be no streaks in the coating, and that it be perfectly free from air bubbles.

With this machine all of the results mentioned are attained.

I do not wish to limit my machine exclusively to the use above specified, as the machine herein may be employed in coating photographic or other paper.

The machine is adapted to coat any kind of paper or material which may be desired, and obtain equally as good results as is obtained in my process.

The roller 47 to work perfectly, should be very smooth. I have found that glass or nickel-plated metal rollers are preferable, they giving the best results, but rollers made of any material can be used.

The machine may be constructed in many different ways to accomplish the same result, without departing from my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for coating paper with emulsion or other solutions, the combination of a paper-carrying device, a dipping pan, a lever device for bringing the emulsion into contact with the paper to be coated and thereby coating the same, and a roller revolving in the emulsion pan and bearing on the paper as it is coated, thereby governing the thickness of the coat.

2. In a machine for coating paper with emulsion or other solutions, the combination of a revolving cylinder, a dipping pan adapted to be heated, a roller revolving in such pan, a pipe connected with an air-tight supply-tank above the dipping pan, and a cup connected with and forming a part of such pan, into the emulsion in which cup the said pipe extends, whereby when the emulsion in the pan and cup falls below the level of the end of such pipe it will cause the pan to be re-filled to its normal level.

3. In a machine for coating paper with emulsion or other solutions, the combination of a revolving cylinder, a dipping pan, an air-tight supply-tank above such pan, and a pipe connected to such tank and entering the emulsion of the dipping pan, whereby when the emulsion in such pan falls below the level

of the end of such pipe, air will be admitted to the tank, and emulsion will be supplied to the pan until it is again on a level with the end of the pipe.

4. In a machine for coating paper with emulsion or other solutions, the combination of a revolving cylinder, a dipping pan adapted to be heated, a roller revolving in such pan and through the emulsion, a lever device for bringing the paper to be coated in contact with the roller and emulsion in the dipping pan, a supply-tank connected with the emulsion pan, and an automatic feed appliance for retaining the emulsion in the pan at the same level.

5. In a machine for coating paper with emulsion or other solutions, the combination of a revolving cylinder, a dipping pan, an open cup carried by or forming a part of such pan, a closed supply-tank above, a pipe connected with such tank and entering the emulsion of such cup, and a notch in the end of the supply pipe, whereby when the emulsion in the pan and cup falls below the end of such notch, air will be admitted to the tank and the pan filled to its normal level.

6. In a machine for coating paper with emulsion or other solutions, the combination of a dipping pan, a revolving cylinder adapted to carry the paper to be coated, a lever device for lifting said pan so that the emulsion in the pan will coat a sheet carried on said cylinder, a roller revolving in such pan and over the paper while being coated, whereby the thickness of the coat will be governed thereby, and an automatic feed device for retaining the emulsion in the pan at the same level.

7. In a machine for coating paper with emulsion or other solutions, the combination of a cylinder, a dipping pan adapted to be heated through suitable means, a roller revolving in such pan in a recess therein and through the emulsion, a lever device for lifting such pan so that the emulsion and roller will make contact with a sheet carried on said cylinder, and an automatic feed appliance for retaining the emulsion in the dipping pan at substantially the same level.

In testimony whereof I have hereunto set my hand and affixed my seal, this 28th day of May, 1894, in the presence of the two subscribing witnesses.

CHARLES B. WOODWARD. [L. s.]

Witnesses:

H. D. NEALY,
STANLEY STONER.