J. A. PRINCE.

MACHINE FOR COATING SUN PRINT PAPER.

APPLICATION FILED MAY 16, 1902.

FIG. 2.

FIG. 3.

Witnesses:

[Signatures]

Inventor

[Signatures]

THE NOYES PRESS CO., PUBLISHERS, WASHINGTON, D.C.
MACHINE FOR COATING SUN-PRINT PAPER.


To all whom it may concern:

Be it known that I, JOHN A. PRINCE, a citizen of the United States, and a resident of New York city, county and State of New York, have invented certain new and useful improvements in Machine for Coating Sun-Print Paper, of which the following is a specification.

This invention relates to a machine for coating sun-print paper and for drying and cooling the paper. The machine is so constructed that it operates automatically and that at the commencement of the operation the outer end of the paper-web is carried through a drying mechanism and into engagement with the feed-roller without the necessity of first attaching an extra strip of paper to said end, as has heretofore been generally done. In this way the operation of the machine is simplified, time and labor are saved, and waste avoided.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine for coating sun-print paper; Fig. 2, a longitudinal section of the coating mechanism proper; Fig. 3, a front elevation thereof; Fig. 4, a side elevation, partly in section and partly broken away, of the drying mechanism; Fig. 5, a front elevation thereof, partly broken away; Fig. 6, a detail of the clamping-bar; Fig. 7, a section on line 7-7; Fig. 6, a detail of the adjustable scraper; and Fig. 9, a detail showing the attachment of the paper to the chains.

The machine is composed, essentially, of two sections, of which the first is designed to coat the paper with a sun-print solution, while the second is designed to dry, cool, and reel up the coated paper. The two sections of the machine are so connected that the paper after being treated in the coating-section is drawn into and out of the drying-section and into engagement with the receiving-reel.

The letter A represents the frame of the coating-section, and B the frame of the drying-section. Within bearings of the coating-section are hung, preferably, two coating rollers or rubbers a a', which receive continuous rotation in a direction opposite to the feed of the paper from shaft b by belts b b', pulley b b', shaft b', step-pulley b', belt b', step-pulley b', and belts b b'. The rollers a a' dip into the sun-print solution contained within reservoirs c. The web or paper D passes from either one of two delivery-reels e, hung in brackets d, over idler e', under idler e', over rubber a, over a fixed scraper f under idler e', over rubber a', under idler e', and thence upward and over idlers e', e' to the drying mechanism hereinafter described. Between the idlers e', e' the paper is engaged by a movable scraper f', Fig. 8, which is supported by a pair of forks f', turning on a fulcrum f' and provided with a laterally-projecting notched arm f', bearing the sliding weight f". By properly setting this weight the pressure of the scraper f' against the web may be adjusted. In order to carry the outer end of web D, after the same has cleared the idler e', through the drying-section of the machine, I employ an endless flexible conveyer, composed of a pair of endless chains or belts g, which are arranged in the plane of travel of the paper and slightly to the right and left of the same, Fig. 9. Each of the chains g passes from an idler g' of frame A around idlers g' g' g' g' g' g' g', sprocket-wheel h, tension-roller g', and idler g' of frame B back to idler g'. All the idlers g' to g' turn upon their axes independently of the paper-carrying idlers hereinafter described. The sprocket-wheels h, which serve to drive the chains, receive motion from shaft b by belt h b, pulley h b, shaft h b, pulley h b, belt h b, and fast and loose pulleys or couplings h b h b, mounted upon shaft h b of sprocket-wheels h. One of the chains g is provided at a suitable point of its length with a nose i, which is adapted to engage a belt-shifter j, that throws the belt h b from the fast pulley h b upon the loose pulley h b. In this way the chains are arrested as soon as the shifter j is tilted by the nose i and may be restarted by throwing the belt back upon the fast pulley by a hand-lever k.

The outer end of web D is adapted to be clamped to the chains g, which serve to convey it through the drying mechanism and toward the receiving-reel, as hereinafter described. In order to attach the web D to the chains, I employ a clamping-bar k, Figs. 6, 7, and 9, which extends transversely across the chains and is adapted to be clamped thereto by screws k'. The web D is attached
to the bar intermediate said screws in suitable manner—such, for instance, as a semi-circular clamping-plate $d$ and slides $e$. The paper thus taken along by the chains is carried by them up to the idler $g$, and from this point the ways of the paper and the conveyer part. The paper passes from idler $e$ of frame A over idlers $l$ $p$ $b$ $l$, feed-roller $p$, and idler $b$ to receiving-reel $f$ of frame B. The feed-roller $p$ is mounted upon and receives continuous rotating motion from shaft $l$. The receiving-reel is driven by a belt $b$ and is connected to its shaft $b$ by a friction-coupling $g$, so that the speed of the feed is rendered uniform and independent of the gradually-increasing diameter of the wound-up paper. Up to the shaft $h$ the web D is taken along and fed by the chains $g$; but after it has passed this shaft and also the idler $b$ it is no longer to be taken along by the chains, but is to be driven through the roller $p$. To this effect the bar $k$ is adapted to engage between the rollers $g'$ $g"$ the lower ends of a pair of freely-suspended latches $m$, fulcrumed to frame B at $m'$. The latches $m$ are notched at $m"$ to sustain a pair of arms $m'$, in which is hung a pressure-roller $m"$. When the latches $m$ are tilted through contact with bar $k$, the free ends of the arms $m'$ are liberated and the pressure-roller $m"$ drops upon roller $p$ to securely clamp the paper to the same. To lift the roller $m'$ off the feed-roller $p$, the arms $m'$ are connected by chains $m'$ to pulleys $m'\prime$, fast on the shaft $m'$, which may be rocked by hand-lever $m'\prime$.

Beneath the upper run of web D and intermediate chains $g$ I arrange an endless supporting-apron $n$, which prevents sagging of the web paper. This apron passes over the rollers $n$ $n'$, of which the roller $n'$ is mounted in a slidable and adjustable bearing in order to compensate for slack. The roller $n'$ is driven from shaft $b$ by belt $n$ and pulley $n'$. The frame B is provided with a chamber or box $B'$, which incloses the upper run of the chains and paper, but not their lower run. This chamber is heated above as well as below the paper, so as to rapidly dry both sides of the same. To dry the upper side of the paper, I arrange above the same a transversely-extending ejector or nozzle $o$, which receives a supply of hot air under pressure from heat-radiator $p$, through pipe $o'$, blower $o''$, and pipe $o'\prime$. The lower side of the paper is dried by a steam-radiator $p$, that receives the products of combustion and discharges it through exhaust $p'$. By means of this double heating arrangement on opposite sides of the paper the latter is thoroughly dried in its transit through the box $B'$. Near its rear end the bottom of box $B'$ is slotted, as at $B''$, for the egress of the chains and paper. The paper after passing out of the box must be rapidly cooled in order to be wound upon the receiving-reel at a normal temperature. The cooling is effected by means of a wind-crest $q$, arranged underneath the exposed lower run of the paper. This crest is charged with air under pressure by blower $q'$ through pipe $q''$, and discharges blasts of cold air against the paper through the ducts $e'$, which are inclined against the line of travel of the paper.

The operation is as follows: The delivery-reel $c$, carrying the roll of paper to be coated, is hung upon brackets $d$, and the outer end of the roll is drawn by hand over the coating-rollers $a$ $a'$ and around the idlers $e$ to $e'$. In this way the rollers $a$ $a'$, turning in a direction opposite to the feed of the paper, as above stated, coat the paper with the sun-print solution. The surplus solution is wiped off by scrapers $f$ and $f'$, the pressure of the latter being readily adjusted by shifting the weight $f''$. In order to coat the paper more or less heavily, according to its thickness or porosity, I may impart a higher or slower speed to the coating-rollers by the stop-pulleys $h$.

The web now passes over idler $l$, through chamber $B'$ to idler $l'$, being supported by apron $n$, that moves along at the same velocity. During this run the paper is dried by the hot air supplied by nozzle $o$ and by the steam-radiator $p$. Thence the chains, together with the dried and heated web D, leave chamber B'. Through slot $B'$, and the paper passes from idler $P$ over cold-air chest $q$ to idler $P'$, being thus cooled to a normal temperature. From idler $P'$ the paper is drawn by the chains over idler $l'$, feed-roller $P$, and idler $P$. The feed-roller $P$ receives continuous rotation by belt $h$ and has a surface velocity equal to the speed of the chains and paper. When the web D has thus advanced sufficiently far, it is laid by hand around the receiving-reel $P'$, that receives continuous motion from belt $b'$ by friction-coupling $l'0$, so that the web is now continuously wound up. The chains $g$, together with the bar $k$, continue to run forward until the bar $k$ has arrived near idler $e'$ of frame A. At this moment the nose $i$ will bear against shutter $i'$ and tilt it in order to throw belt $h'$ from the fast pulley $h'$ upon the loose pulley $h$. In this way the sprocket-wheels $h$, chains $g$, and
bar $k$ are arrested, while the web $D$ continues to be fed by feed-roller $P$ to the reel $P$. After the entire roll of paper has thus been coated and wound upon the receiving-reel the machine may be stopped in order to be re-charged.

It will be seen that by my invention the end of the paper is drawn positively from the coating-rollers through the drying and cooling section of the apparatus to the feed-roller by an endless conveyer and that after the paper has been properly engaged by the feed-roller the function of this conveyer ceases automatically. In this way the paper is conducted uniformly to the feed mechanism without incurring waste and without pasting to its end a piece of additional paper reaching from the coating-rollers to the feed mechanism, as was heretofore usually done. The operation of the machine is consequently simplified, the expense of extra strips of paper is avoided, and much labor and time are saved.

What I claim is

1. In a machine for coating sun-print paper, the combination of a drying-chamber, with an endless conveyer that extends through the drying-chamber, means for securing the paper to said conveyer, a feed-roller, and means for pressing the paper against said roller, substantially as specified.

2. In a machine for coating sun-print paper, the combination of means for drying the paper, with means for cooling the paper, a feed-roller, and means for pressing the paper against said roller, substantially as specified.

3. In a machine for coating sun-print paper, the combination of a feed-roller, with means for carrying the end of the paper to said roller, means for pressing the paper against the roller, and means for successively drying and cooling the paper before being engaged by said roller, substantially as specified.

4. In a machine for coating sun-print paper, the combination of a pair of endless chains, with a transverse rod, means for securing the rod to the chains, a clamping-plate, and slides connecting said plate to the rod, substantially as specified.

5. In a machine for coating sun-print paper, the combination of an endless conveyer, with a paper-feed roller, means for automatically arresting the conveyer, and means for automatically pressing the paper against the feed-roller, substantially as specified.

6. In a machine for coating sun-print paper, the combination of an endless conveyer, with a paper-feed roller, a pressure-roller adapted to engage the same, a roller-carrying arm supporting the pressure-roller, and means on the conveyer for tilting said arm, substantially as specified.

7. In a machine for coating sun-print paper, the combination of an endless conveyer, with a belt-shifter, a nose on the conveyer for operating said shifter, a paper-feed roller, a pressure-roller adapted to engage the same, and a releasing mechanism for said roller which is actuated by the conveyer, substantially as specified.

8. In a machine for coating sun-print paper, the combination of the following elements: a feed-roller, an endless conveyer, a drying-chamber through which the conveyer passes, means for automatically pressing the paper against the feed-roller, and means for automatically arresting the conveyer, substantially as specified.

Signed by me at New York city, New York, this 16th day of May, 1902.

JOHN A. PRINCE.

Witnesses:

WILLIAM SCHULZ,

F. V. BREISEN.