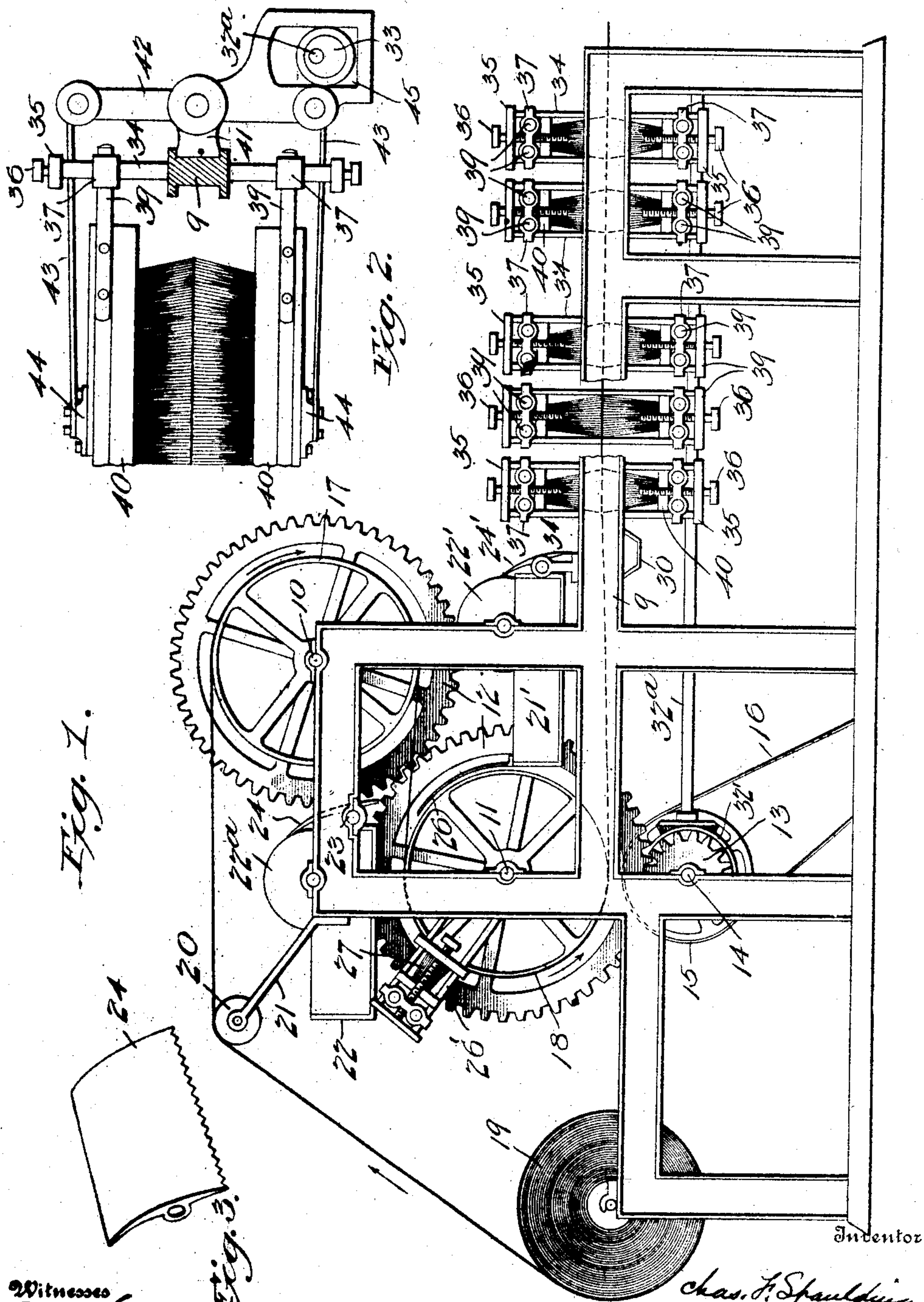


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C. F. SPAULDING.
PAPER COATING MACHINE.

APPLICATION FILED NOV. 16, 1907.



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PAPER-COATING MACHINE.

No. 883,359.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES F. SPAULDING, a citizen of the United States, residing at Tarrytown, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Paper-Coating Machines, of which the following is a specification.

This invention relates to apparatus of that class employed in the manufacture of coated paper.

In the manufacture of double coated paper, that is to say, paper having a film or coat of color or other material on each side, a number of serious difficulties have been experienced. In some of the earlier processes a coating was first placed on one side of the paper and then dried by heating it, after which the process was repeated for the opposite side, but the double heating is injurious to the paper; the coloring of the two sides lacks uniformity, and the process is expensive. In other cases, and, as at present generally practiced, the coating is applied to both sides of the paper by brushes or equivalent devices, and one of the surfaces while still moist passes over a roll or cylinder, the adhesive nature of the coating being utilized as a means for transmitting motion from the web of paper to the roll, but in a short time the cylinder becomes coated, smearing the surface of the paper. The cylinder-coating, moreover, will harden in spots forming a rough surface that is injurious to the paper. A further disadvantage in this form of machine is that during stops the softened paper webs will adhere to the roll and break when the machine is again started. It is further found that a sufficient and well distributed coating cannot be successfully applied by rotating brushes or like means, owing to the clogging of the bristles at different points and the difficulty encountered in keeping the bristles from adhering together in bunches.

The present invention aims to overcome all of these disadvantages and to provide a machine by which both sides of the paper may be effectually coated during a single passage and in which only a single drying operation is necessary.

A further object of the invention is to provide a machine in which gravity coating-distributing members are employed to deliver the coating to both sides of the web,

while the guiding devices are so arranged that they will engage only the uncoated portion of the webs.

A still further object of the invention is to provide a machine in which positive driving or feeding movement is imparted to the webs from driven drums or cylinders that engage only the raw or uncoated surface of such webs.

A still further object of the invention is to provide a novel form of distributing plate in which the discharge edge of the plate is divided into a plurality of flat collecting and dripping points to insure uniformity of discharge throughout the entire width of the plate.

A still further object of the invention is to provide an improved means for mounting and actuating the jiggers or distributing brushes.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the forms, structure and proportions of parts may be made without departing from the invention.

In the accompanying drawing: Figure 1 is a side elevation, partly in the nature of a diagram, illustrating a coating machine constructed in accordance with the invention. Fig. 2 is a detail view showing the mechanism for actuating the jiggers or distributing brushes. Fig. 3 is a detail perspective view of one of the gravity distributing plates.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawing.

The working parts of the machine are supported in a suitable frame 9 having bearings for the reception of a pair of shafts 10, 11, the axes of which are disposed in different vertical and horizontal planes. These shafts carry intermeshing gears 12 of uniform diameter and the teeth of the lower gear are engaged by a pinion 13 on a main shaft 14 also journaled in the frame.

The shaft 14 is provided with a belt wheel 15 over which passes a belt 16 driven from any suitable source of power.

Secured to the shafts 10 and 11 are drums or cylinders 17 and 18, respectively, these cylin-

ders being of the same diameter and driven at the same surface speed.

At one end of the frame are supports for a paper roll 19 from which is fed the webs of paper to be coated, the webs passing up over a preliminary guiding roller 20 that is supported by brackets 21 on the main frame and being thence guided around the cylinders 17 and 18 in the course indicated by the arrows. Between the upper and lower cylinders the webs are guided in a horizontal or approximately horizontal plane and after passing below the lower cylinder are guided in a second and lower horizontal plane to any suitable take up mechanism (not shown), the webs being held under such tension that the cylinders will act as feeders until said webs pass from engagement with the lowermost cylinder.

Mounted above the cylinder 18 is a box or trough 22 arranged to contain the coloring or other material with which the paper is to be coated and dipping into this coating box is a wallower or fountain roll 22^a which may be revolved in any suitable manner and at a speed dependent upon the character of the work to be performed.

Journaled in the frame is a spindle 23 that is disposed in front of the coating box and carries a doctor or distributing plate 24. The upper edge of this plate is perfectly straight and smooth and it may be adjusted relatively to the roller 22 by turning the spindle 23 on its axis. The function of the plate 24 is to scrape off the film of color or coating material which adheres to the surface of the roll 22; and this coating material flows down the plate by gravity and falls upon the upper surface of the web of paper as the latter is passing between the two cylinders 17 and 18.

In the devices of this general class the distributing plates are usually provided with numerous parallel grooves for the purpose of dividing the film of coating material into a large number of minute streams that fall on the paper. These grooves, however, frequently become choked or clogged and uniform distribution of the material becomes impracticable. In the present instance the plate is perfectly plain and smooth down to the lower edge and this edge is serrated or divided into numerous teeth or tines each of which acts as a collecting and dripping point for the coating material. The quantity of liquid used is such that there will be no tendency to flow between the teeth, but the liquid will flow down and collect at the points or teeth and if one is full, the liquid will seek another so that all will be kept supplied and the distribution will be uniform throughout the entire width of the plate. The coating material drops onto the webs and if there is any surplus, the excess will flow over the sides of the webs and will be caught by a

curved collecting plate 26 and directed into a lower coating box 21'.

Extending radially from the axis of the shaft 11 is a frame 26' which supports a brush 27 engaging the coated surface of the web. This brush is reciprocated transversely of the direction of travel of the web and serves to more fully distribute the coating over the surface. It will be noted that the web does not receive any coating until it passes beyond the upper cylinder 17, and that the uncoated side of the web remains in contact with the lower cylinder 18, so that both cylinders are kept clean and free from accumulations. As the web passes around the lower cylinder it is turned, the coated face being below and the uncoated face above. This uncoated face receives a coating from the box 21'. Within the box is a roller 22' against which bears a distributing plate 24' of the same construction and operating in the same manner as the upper plate. Any excess coating from the lower box will flow over the edge of the web into a trough 30 from whence it may be directed into any suitable receptacle. The web of paper, coated on both sides, is now led between a number of sets of brushes or "jiggers" 31 which reciprocate in planes transverse to the direction of travel of the web and spread the coating. The jiggers are operated from the main shaft 14 through miter gears 31, a shaft 32 and cams 33, there being as many cams as there are sets of brushes.

Projecting from one of the side bars of the frame 10 are pairs of spaced vertical posts 34 united at their upper and lower ends by cross bars 35, and each cross bar has a central opening for the passage of a screw 36. The cross bars serve as guides for cross heads or blocks 37 having threaded openings for the passage of the screws, so that by turning the latter the blocks may be vertically adjusted. Each block has guiding openings for the reception of a pair of arms 39 projecting from the end of a brush head 40 and the brushes are arranged to reciprocate, their bristles engaging the opposite faces of the coated web.

Projecting from the side bar of the frame is a bracket 41 to which is pivoted a lever 42; and in the upper and lower ends of this lever are pivoted the outer ends of a pair of arms 43. The inner ends of the arms are secured to blocks 44 on the brush heads so that as the lever oscillates, the brushes will be moved in opposite directions. The lower arm of the lever is enlarged and is provided with an opening 45 for the reception of the cam 33, the cam being in the nature of an eccentric and the space between the side walls of the opening being the same as the diameter of the eccentric so that there will be positive movement in both directions.

Having thus described my invention what I claim is:—

1. In a coating machine, a plurality of

web turning and guiding means arranged to engage only the uncoated portion of the web, and a pair of gravity coating-distributing members under which the two sides of web are successively directed in substantially horizontal planes as it leaves the turning and guiding means.

2. In a coating machine, a pair of gravity coating-distributing members, means for guiding one side of the web to be coated under one of said members, and means for turning the web and guiding the opposite side thereof under the other member, reciprocating brushes for acting on both coated surfaces all of said web turning and guiding means being arranged to engage only the uncoated surfaces of the web said surfaces being thereby kept free from contact until acted on by the brushes.

3. In a coating machine, a web turning member around which the under surface of the web is guided uncoated from an upper horizontal plane to a lower horizontal plane, and a pair of gravity coating-distributing members disposed one above that portion of the web in the upper plane and the other above that portion of the web in the lower plane.

4. In a coating machine, a frame, a pair of web guiding cylinders having their axes in different horizontal and vertical planes and both arranged to engage the uncoated portion of the web, means for revolving the cylinders to feed the web from the lower portion of the upper cylinder to the uppermost portion of the lower cylinder, a gravity coating-distributor above the lower cylinder and a second gravity coating-distributor beyond the discharge side of said lower cylinder.

5. In a coating machine, a pair of web feeding cylinders arranged to engage only the uncoated surface of the web, and guiding it in successively descending planes means for driving said cylinders and a pair of gravity coating distributing members oper-

ating beyond the discharge sides of the cylinders respectively.

6. In a coating machine, a frame, a pair of shafts journaled therein and having their axes in different horizontal and vertical planes, cylinders on said shafts, gears connecting the shafts, a driving pinion intermeshing with one of said gears, and gravity coating-distributors located beyond the discharge side of each cylinder respectively.

7. In a coating machine, a pair of shafts, gears connecting the shafts, cylinders mounted on the shafts, a driving pinion intermeshing with one of the gears, coating boxes arranged in different horizontal planes, means for delivering the coating material from the boxes onto the web, means for directing the excess material from the upper box into the lower box, and a reciprocatory brush arranged to engage the coated surface of the web beyond the first box.

8. In a coating machine, a coating box, a roller therein, an adjustable plate having its upper edge engaging said roller, said plate having a smooth outer surface for the gravitational flow of the film removed from the roller, the lower edge of the plate being divided into a series of collecting and dripping points.

9. In a coating machine, a frame, a pair of reciprocatory brushes, spaced vertical posts carried by the frame, vertically adjustable blocks on said posts, bars projecting from the brushes and extending through guiding openings in said blocks, a rocking lever carried by the frame and provided with a cam receiving opening, an operating cam arranged therein, and operating bars connecting the brushes to the lever.

In testimony whereof I affix my signature, in presence of two witnesses.

CHAS. F. SPAULDING.

Witnesses:

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