

No. 879,787.

PATENTED FEB. 18, 1908.

J. B. MORROW.
PAPER COATING MACHINE.

APPLICATION FILED MAY 1, 1907

2 SHEETS—SHEET 1.

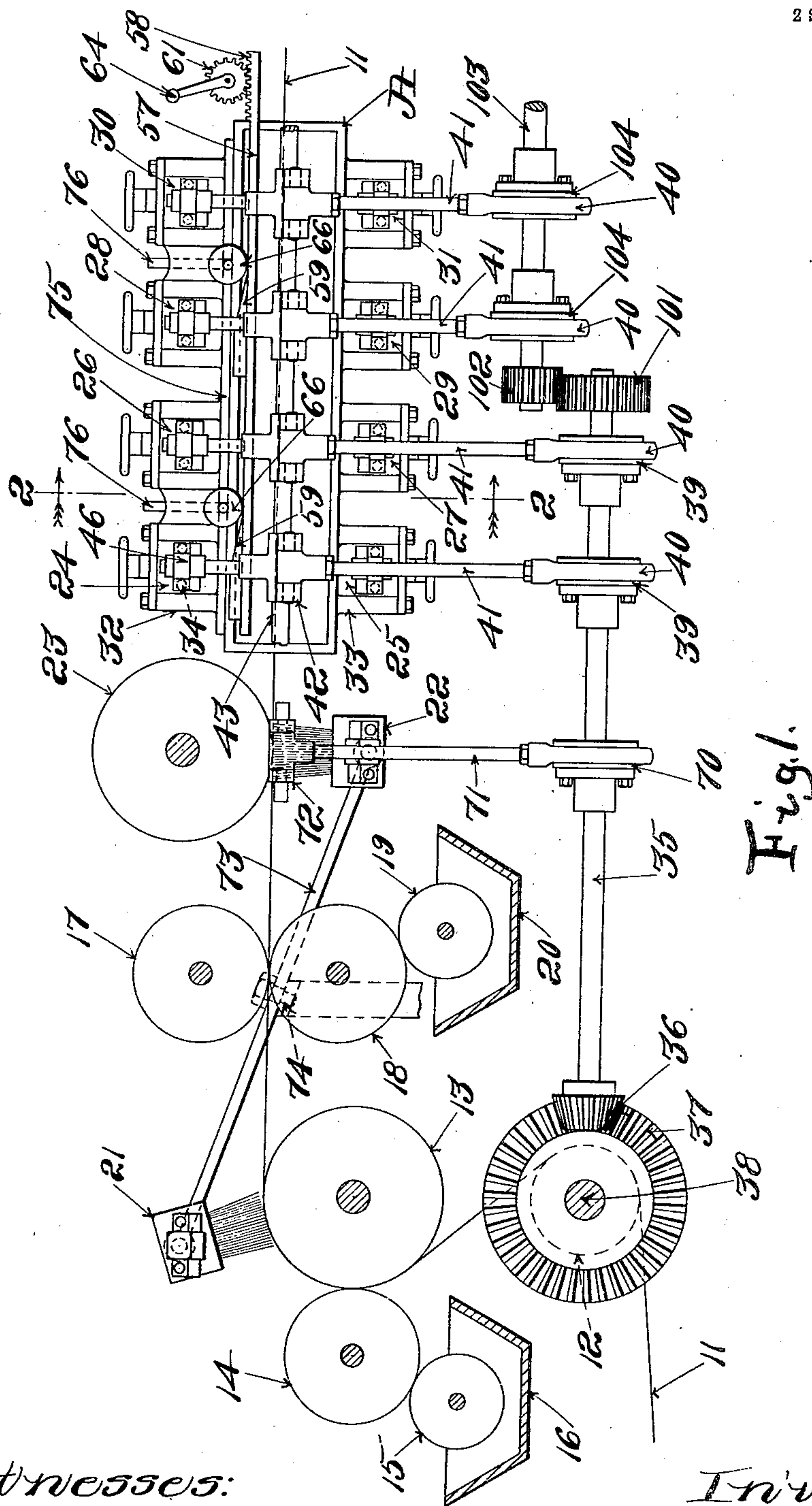


Fig. 1.

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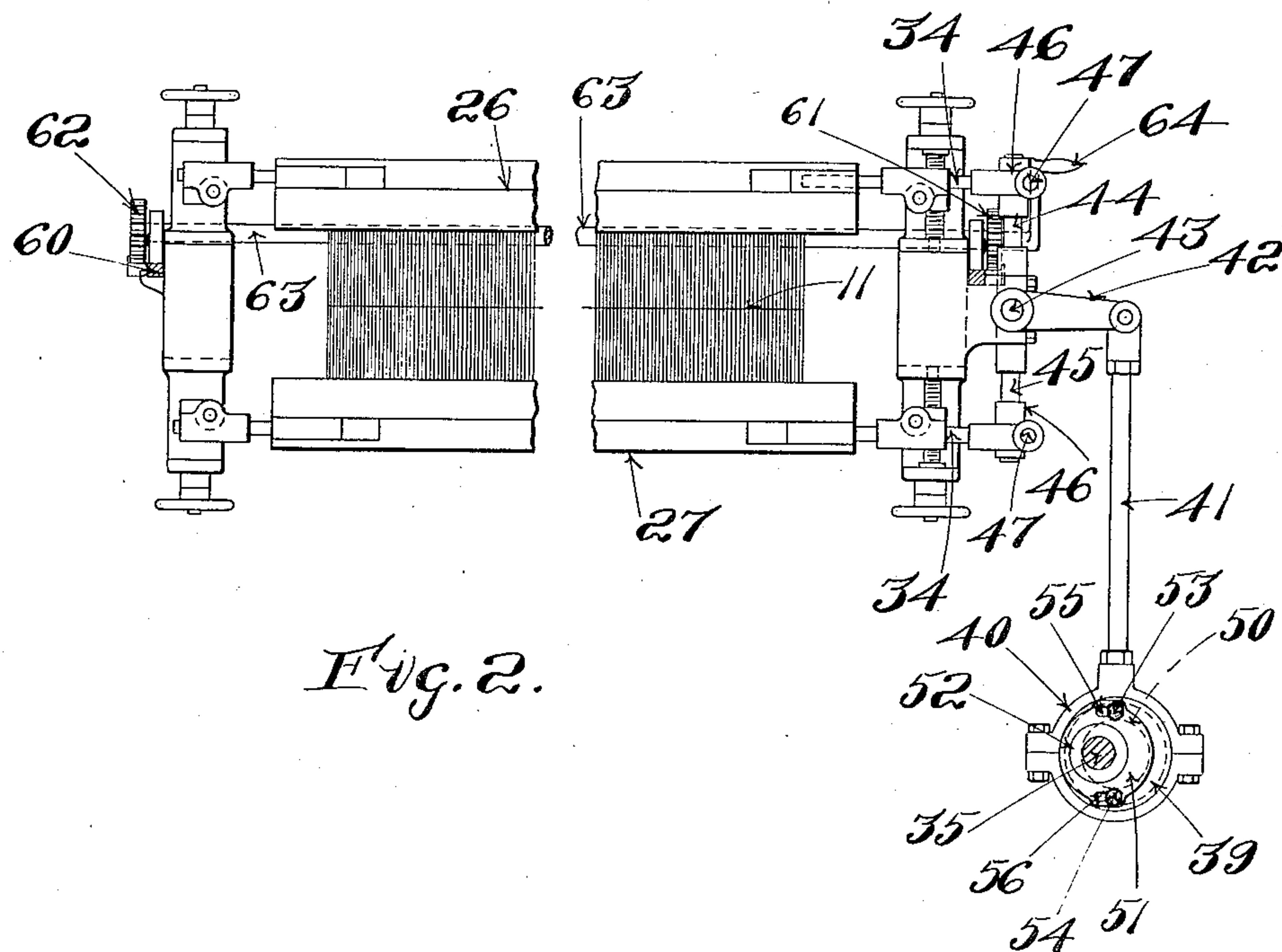


Fig. 2.

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UNITED STATES PATENT OFFICE.

JOHN B. MORROW, OF EAST PEPPERELL, MASSACHUSETTS, ASSIGNOR TO PEPPERELL CARD & PAPER COMPANY, OF PEPPERELL, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PAPER-COATING MACHINE.

No. 879,787

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed May 1, 1907. Serial No. 371,232.

To all whom it may concern:

Be it known that I, JOHN B. MORROW, citizen of the United States, residing at East Pepperell, county of Middlesex, State of Massachusetts, have invented a certain new and useful Improvement in Paper-Coating Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 My invention relates to machines for coating paper by means of which a coating liquor is applied to the surface of the paper to give it the finish desirable for certain purposes, such, for instance, as half-tone printing and the like.

15 The invention relates particularly to a machine which coats both sides of a web of paper successively without the paper being dried between the application of the coating to the two sides of the paper, as distinguished from machines in which one side of the paper is coated, after which the paper is dried, and the paper is returned to the coating machine to be coated upon the other side.

20 The invention will be fully understood from the following description taken in connection with the accompanying drawings, and the novel features thereof are pointed out and clearly defined in the claims at the close of the specification.

30 In the drawings,—Figure 1 is a side view, partly in diagram, of a machine embodying my invention. Fig. 2 is a section on line 2—2, Fig. 1, showing the means employed to operate the jigger-brushes.

35 Referring now to the drawings and more particularly to Fig. 1,—the web of paper is indicated at 11 and passes around a roll 12, over a rotating support 13, where it receives the coating on the upper side from the coating roll 14 and wallower roll 15 which runs in the trough 16 containing the liquor. From the rotating support 13, it passes under a second rotating support 17, where it receives a coating on the under side from a second set of coating instrumentalities comprising the coating roll 18, the wallower roll 19 and liquor trough 20. After passing the rolls which apply the coating, the paper passes scrub-brushes 21 and 22 which distribute the coating or color evenly over the surface of the paper. It then goes through the jigger brushes which work the mixture into the surface of the paper, leaving it in a smooth and evenly distributed condition.

These brushes also work out the brush marks left by the scrub-brushes. The jigger brushes consist of pairs of horizontal brushes on the upper and under sides of the paper respectively, said brushes being caused to reciprocate transversely of the paper with different speeds and lengths of stroke.

The scrub brush 21 operates on the upper side of the paper at the point where the paper is supported by the roll 13 and just beyond the point where the coat for the upper side of the paper is applied. The second brush 22 is located on the lower side of the paper opposite a supporting roll 23. The said scrub brushes 21 and 22 are supported in suitable brackets or guides, and are caused to reciprocate transversely of the sheet of paper by means which will be described later.

The jigger brushes are arranged in pairs 24 and 25, 26 and 27, 28 and 29, 30 and 31, and slide in guides 32 and 33 in the frame of the machine. The said jigger brushes are operated in pairs, each brush of a pair being caused to reciprocate transversely of the web of paper in the direction opposite to its mate and with an equal stroke. If the motion of each brush of the pair of jigger brushes is not exactly opposite and equal to the motion of the other brush of the pair, it tends to push the paper sidewise in the machine. Great difficulty has heretofore been found in obtaining the desired motion because in the old forms of machines the slipping of an eccentric frequently disturbs the adjustment. The length of stroke of the various pairs of brushes is different and also the different pairs of brushes are caused to reciprocate at different speeds, the brushes at the back of the machine being given the shortest stroke and greatest speed. The pairs of brushes are given this opposite reciprocation in the following manner and by a mechanism which insures that the stroke of the two brushes of a pair be always opposite and equal. A shaft 35 driven by a bevel gear 36 meshing with a bevel gear 37 on the end of the shaft 38 has upon it two eccentrics 39, one for each of the first two pairs of jigger brushes and at its other end a gear 101 meshing with a smaller gear 102 on a shaft 103 which has upon it the eccentrics 104 which operate the remainder of the jigger brushes. It will be seen that the first two pairs of brushes are given fewer strokes per minute than the last two pairs. The eccentric straps 40 are con-

5 nected by means of connecting rods 41 to a bell crank lever arm 42 pivoted at 43 to a fixed portion of the frame of the machine. The said bell crank lever is provided with two arms 44 and 45 which extend upwardly and downwardly from the pivot 43, and each engages a sliding connection 46 pivoted at 47 to the end of the brush supporting rods 34.

10 It will be seen that as the arm 42 is alternately moved up and down by the eccentric, the upper and lower jigger brushes of any given pair will be moved transversely of the paper for equal distances, the said collars 46 sliding up and down on the arms 44 and 45 of the bell crank lever and at the same time swinging slightly about the pivots 47. As both brushes of a pair are operated from a single eccentric by the arms of a single bell crank lever, all danger of different adjustment between the brushes of a pair and the inconvenience resulting therefrom is wholly obviated. The means provided for the operation of the jigger brushes also permits the jigger brushes to be given a large number of strokes per minute, thus permitting the paper in the machine to run at a speed which is greater than that at which paper machines have heretofore been run.

30 In order that the length of stroke of the various pairs of jigger brushes may be varied as desired without providing a different eccentric for each pair, I employ eccentrics which are adjustable to give a greater or less throw, as desired, within certain limits. The eccentric 39, working within the strap 40, has a large hole 50 in its center, through which the shaft 35 passes, the said hole being considerably larger than the shaft. A face plate 51 having a bearing 52 for the shaft 35 is bolted to the eccentric 39 by bolts 53 and 54, which are received in slots 55 and 56, so that the eccentric 39 may be moved toward or away from the center to increase or decrease the eccentricity, as desired.

45 The two scrub brushes 21 and 22, by means of which the coating or color is spread, are operated by an eccentric 70 on the shaft 35. The eccentric rod 71 is connected to one arm of a two armed bell crank lever 72 whose other arm is pivotally connected to the second scrub brush 22. The other end of the said scrub brush 22 is connected to a lever 73 pivoted in its middle at 74 to the frame of the machine, and having its other end connected to the first scrub brush 21.

55 It will be seen that the reciprocation of the scrub brush 22 moves the said lever 73 and causes the other scrub brush to reciprocate with an opposite and equal stroke, the arms of the lever 73 being of equal length.

60 In machines of the kind described in this specification, it is frequently required that all the jigger-brushes be lifted simultaneously away from the paper, as for instance, when there has been a break in the paper, or when

the machine is being started. In the accompanying drawings, means for lifting all the upper jigger-brushes simultaneously are shown. As has been previously stated, the sliding connections 46, to which are attached the jigger-brush frames, are free to slide up or down on the arms 45. The guides 32 in which the jigger-brushes slide horizontally are a part of an upper frame 75 which is separate from the main frame A of the machine and is free to be lifted upward a slight distance carrying with it the upper jigger-brushes and thus disengaging them from contact with the paper. The upward movement of the upper frame 75 is guided upon guide pins 76 fast to the main frame A of the machine. A wedge bar 57 provided at its rear end with rack teeth 58 and sliding in the main frame A of the machine carries two or more wedges 59. A similar wedge bar 60 is provided on the other side of the machine (see Fig. 2) and the two bars are caused to slide longitudinally by pinions 61 and 62 on a shaft 63 which may be caused to revolve by the crank 64. The movement of the wedges 59 brings them beneath abutments or rolls 66 attached to frame 75, thereby lifting the frame until it contacts with the ends of the jigger-brush frame, when, by its continued upward movement, the jigger-brushes are lifted out of contact with the paper. The rolls then pass onto a flat portion of the said wedges, so that the brushes will not drop down until released by the reverse rotation of the crank 64.

What I claim is:

1. In a paper coating machine, the improved operating means for jigger-brushes in pairs whose members lie on opposite sides of the paper, comprising a three arm bell crank lever, to one arm of which the upper jigger-brush is connected and to the lower arm of which the lower brush is connected, and operating means connected to the third arm of the said bell crank lever to cause the same to reciprocate, whereby the said jigger-brushes are given simultaneous movements in opposite directions.

2. In a paper coating machine, the improved operating means for jigger-brushes in pairs which consists of a three arm bell crank lever to the upper arm of which the upper jigger-brush is pivotally connected by means of a collar slidably mounted on the said upper arm and to the lower arm of which the said lower jigger-brush is pivotally connected by means of a collar also slidably mounted on the said lower arm of the said bell crank lever, and operating means connected to the third arm of the said bell crank lever, whereby the said jigger-brushes are given simultaneous movements in opposite directions.

3. In a paper coating machine, jigger-brushes in pairs and operating means for the said pairs of jigger-brushes, comprising a

three arm bell crank lever for each pair, to the upper arms of which the upper jigger-brushes of the pairs are pivotally connected and to the lower arms of which the said lower
5 brushes are pivotally connected, a shaft provided with eccentric having different throws, and connecting means between the said eccentrics and the third arm of the said bell crank levers, whereby the said pairs of jigger-
10 brushes are given different lengths of strokes, according to the throws of the eccentrics which operate them.

4. In a paper coating machine, jigger-brushes in pairs and operating means for the
15 said pairs of jigger-brushes, comprising a three arm bell crank lever for each pair to the upper arms of which the upper jigger-brushes of the pairs are pivotally connected and to the lower arms of which the said lower
20 brushes are pivotally connected, shafts running at different speeds provided with eccentrics having different throws, and connecting means between said eccentrics and the third arm of the said bell crank lever, whereby the
25 said pairs of jigger-brushes are given different lengths of stroke and different speeds according to the throws of the eccentrics which operate them and the speeds of the shafts upon which the said eccentrics are located.

5. In a paper coating machine, the combination with an upper and lower set of jigger-brushes in pairs and operating means therefor, of lifting means operating upon one set of jigger-brushes to move simultaneously the
35 brushes comprising the said set out of contact with the paper passing between the said two sets of jigger-brushes.

6. In a paper coating machine, the combination with jigger-brushes in pairs and operating means therefor, of lifting means for
40 simultaneously lifting the upper brushes of the said pairs, comprising a frame in which the said jigger-brushes reciprocate and having abutments thereon, wedges contacting

with the said abutments, and means for moving all the said wedges simultaneously to lift the said frame and the said jigger-brushes. 45

7. In a paper coating machine, the combination with jigger-brushes in pairs and operating means therefor comprising bell crank
50 levers to the upper arms of which the upper jigger-brushes of the said pairs are pivotally connected by collars sliding on the said upper arms of the said bell crank levers, of lifting means for simultaneously lifting the upper
55 brushes of the said pairs, comprising a frame in which the said jigger-brushes reciprocate and having abutments thereon, a wedge bar each side of the machine provided at their ends with rack teeth, wedges attached to the
60 said wedge bars and contacting with abutments on the said frame, a cross-shaft, pinions on the said cross-shaft engaging the said rack teeth, whereby the said wedge bars are caused to slide longitudinally and force the
65 said wedges beneath the abutments on the frame.

8. In a paper coating machine, the combination with jigger-brushes in pairs and operating means therefor, of lifting means for
70 simultaneously lifting the upper brushes of the said pairs, comprising a frame in which the said jigger-brushes reciprocate and having abutments thereon, wedges terminating in a horizontal surface and contacting with
75 the said abutments, and means for moving all the said wedges simultaneously, whereby the said upper jigger-brushes are lifted simultaneously and are maintained in their lifted position when the said abutment is upon the
80 said horizontal surface of the wedge.

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

JOHN B. MORROW.

Witnesses:

GEORGE P. DIKE,
JOHN H. PARKER.