Jan. 17, 1961 P. A. PETERSON 2,968,279

PAPER COATING MACHINE

Filed Feb. 26, 1959 2 Sheets-Sheet 1

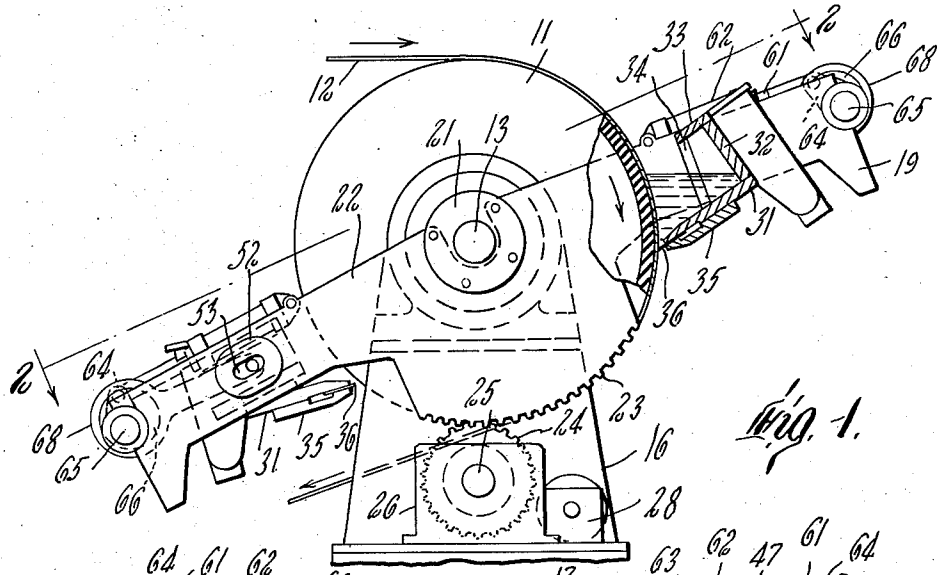


Fig. 1.

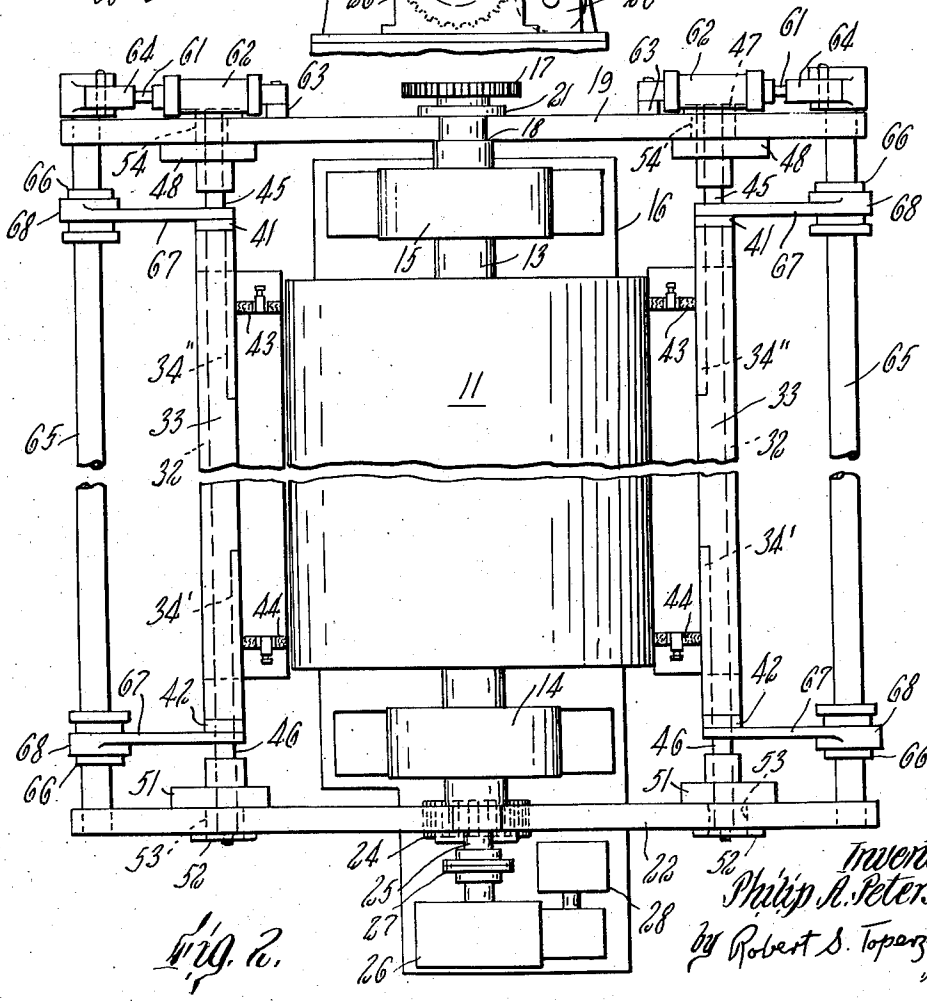


Fig. 2.

Inventor
Philip A. Peterson
by Robert S. Topazer Atty.

Jan. 17, 1961 P. A. PETERSON 2,968,279

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Filed Feb. 26, 1959 2 Sheets-Sheet 2

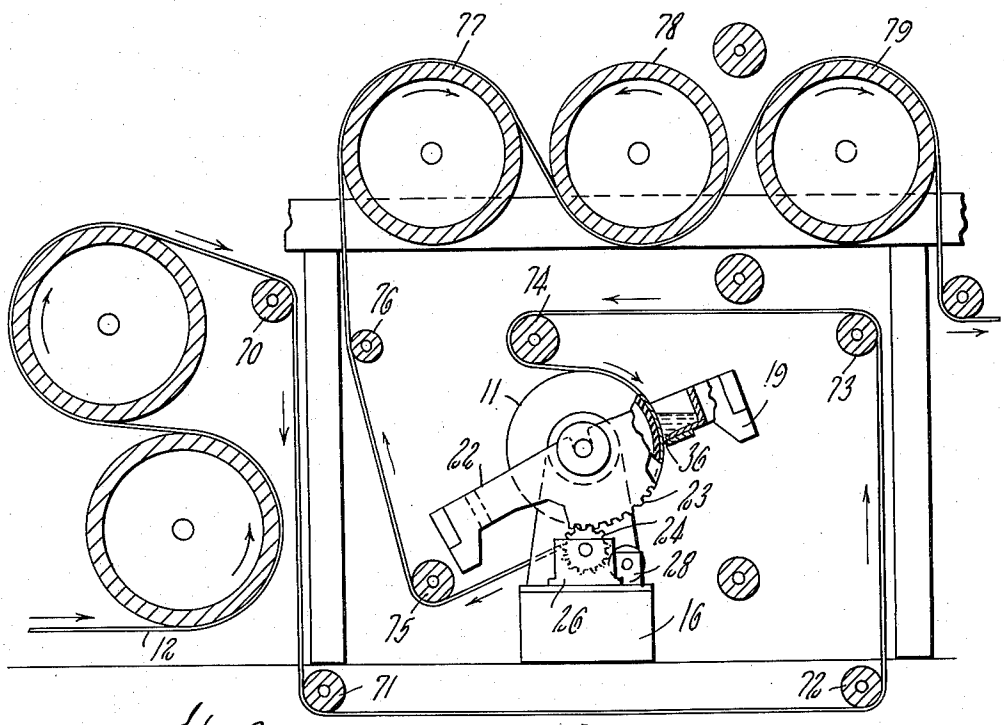


Fig. 3.

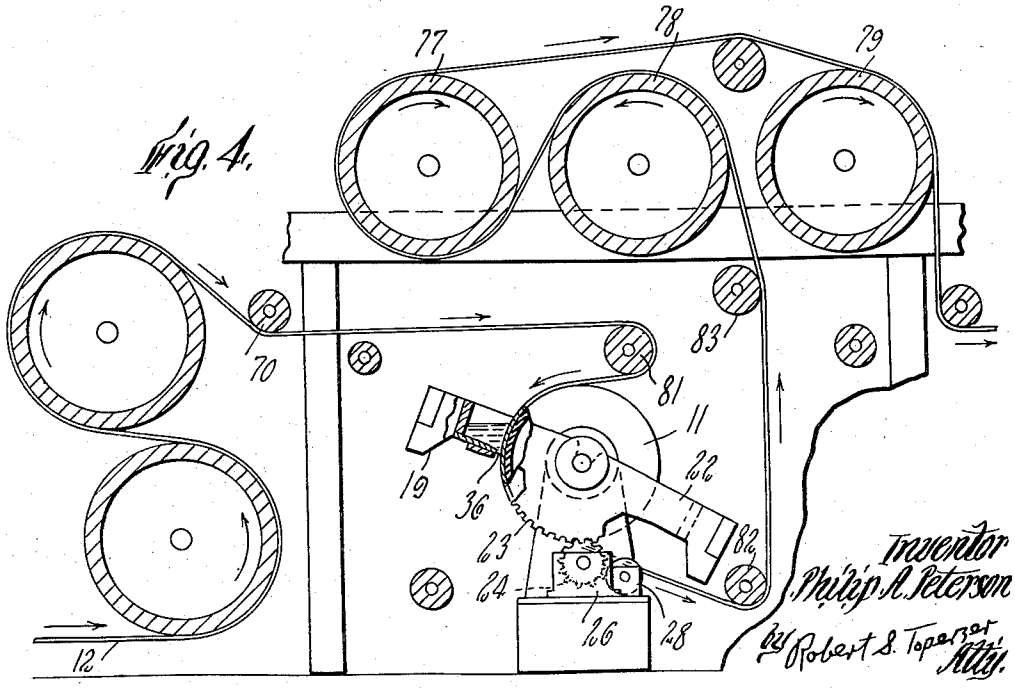


Fig. 4.

Inventor
Philip A. Peterson
By Robert S. Toperzer
Atty.

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PAPER COATING MACHINE

Philip A. Peterson, 350 Salisbury St., Worcester, Mass.

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3 Claims. (Cl. 118—407)

This invention relates to machines for coating webs of paper and the like, and more particularly it concerns a novel trailing blade coating machine especially adapted to coat both sides of a web of paper.

As is well known to those skilled in the art, one type of machine used for applying a liquid coating to a web of paper to enhance its quality is a trailing blade coating machine. In a machine of this type, the web of paper to be coated is passed over a resilient roll and a sharp blade is pressed against it. The coating liquid is located immediately above the blade in a trough-like reservoir having one side open to expose the liquid to the web. Both the blade and the reservoir form a part of the same assembly which includes a precision positioning mechanism for the blade and adjustable end panels or dykes for the reservoir whereby the machine can be adapted to accommodate webs of different widths.

With such a machine as this, the web must be led around the coating roll in one direction only, because the leveling action of the blade must come at the end of the coating process. This has made it awkward, if not impossible, to set up for optionally coating either side of the web depending upon the kind of paper wanted. Hitherto, the alternative has been to provide two coating machines. This requires an unduly large investment, however, because of the high unit cost of each machine and also it is wasteful of floor space. A still further disadvantage is that the systems of feed and guide rolls which lead the web to and from a coating station must be duplicated.

An object of the present invention, therefore, is to provide a trailing blade coating machine which can be set up to coat either side of a web of paper with a minimum of effort.

A more specific object is to provide a coating machine having two separate head assemblies that are adapted to be used selectively according to the direction in which the web is led around the backing roll.

The novel features of the invention together with further objects and advantages thereof will become apparent from the following detailed description and the drawing to which it refers.

Fig. 1 is a view in elevation of the machine according to the invention;

Fig. 2 is a sectional view of the machine taken on the line 2—2 of Fig. 1;

Fig. 3 is a diagrammatic view showing a system of guide rolls suitable for use with the machine according to the present invention when it is desired to coat the felt side of a web of paper, and

Fig. 4 is a diagrammatic view showing another system of guide rolls suitable for use when it is desired to coat the wire side of a web of paper.

As shown in Figs. 1 and 2 of the drawing, the numeral 11 designates a backing roll around which is passed a web 12 to be coated. The body of the backing roll is made of metal such as cast iron but its surface is covered with a resilient material such as rubber. There is a rigid

shaft 13 that extends from either end of the roll 11 and to rotatably mount the shaft there are provided a pair of pillow blocks 14 and 15. The pillow blocks in turn are fastened to the base of the machine 16 and there is a gear 17 on one end of the shaft 13 for driving the roll.

In the region between the gear 17 and the pillow block 15 there is a reduction in diameter of the shaft 13 so as to form a shoulder 18. Abutting the shoulder is a head support member 19 which is adapted to be supported pivotally by the shaft and yet free to remain stationary while the shaft and the roll rotate. To this end, support member 19 is provided with a U-shaped slot to receive the shaft and there is a bearing flange 21 on the shaft to which the support member is bolted.

At the other end of the shaft, outboard of the pillow block 14, a head support member 22 is mounted on the shaft in like manner. Support member 22 is similar to support member 19 except that it has a segment gear 23 formed as an integral part thereof adjacent to the roll. In mesh with the segment gear is a spur gear 24 carried by a shaft 25. Shaft 25 is rigidly connected to the output shaft of a gear box 26 by a coupling 27. The gear box, in turn, is driven by a hydraulic motor 28 which, like the gear box, is fastened to the base of the machine 16.

As best shown in Fig. 1, a pair of head assemblies are carried by opposite ends of the support members, each of the head assemblies comprising in the main, panels 31 through 34 which form the reservoir for the coating liquid, and a jaw 35 to clamp a blade 36 and holder therefor in position immediately beneath the panel or member 31. This latter panel together with panels 32 and 33 extend in an unbroken line parallel and adjacent to the face of the roll, terminating just short of the head supporting members where they are joined to end plates 41 and 42. Panel 34 on the other hand is formed in two separate sections 34′ and 34″. Between each section and the roll proper are dykes 43 and 44 which prevent the coating liquid from flowing out the ends of the reservoir. The dykes are also laterally adjustable so that the machine can be adapted to accommodate webs of different widths. These, as well as other details of the head assembly, are shown more in detail in my copending application Serial No. 771,778, jointly with John P. Munton filed on November 4, 1958, now U.S. Patent No. 2,918,899, and the copending application Serial No. 771,888 of John P. Munton and Milton Dentch filed on the same day.

Rigidly joined to each of the plates 41 and 42 are shafts 45 and 46 whereby each head assembly is mounted for linear movement with respect to the support members. More particularly, guide blocks 47, 48 and 51, 52 having horizontal slots therein to receive the shafts 45, 46 are fastened to either side of the support members, the latter being provided with mating slots 53, 54. This permits the head assembly to be moved toward and away from the backing roll so that the blade can be disengaged therefrom at will. Pneumatic linear actuators or pistons 61 are employed to move the head assemblies, and each piston has associated therewith a cylinder housing 62 which is pivotally connected to the member 19 by an arm 63. The pistons themselves are pivotally connected to arms 64 which, in turn, are keyed to a shaft 65 so as to form cranks. Shaft 65 is journaled between the members 19 and 22, and mounts a pair of eccentric cams 66 which, as shown, are located approximately opposite the plates 41, 42 respectively. By means of straps 67 the followers 68 of the cams are operatively connected to the shaft 65.

With reference now to Fig. 3, it will be observed that the heads are oriented angularly in the same manner as in Figs. 1 and 2 and that the web is led around the

roll in a clockwise direction, with the felt side out. To guide the web in this mode of operation there is provided in association with the machine a series of guide rolls 70 through 79. As shown, the web comes from the dryers at the left of the drawing, traverses a pair of paper rolls and is passed around the first of these guide rolls 71. From guide roll 70 there is a vertical traverse of the web downward to the roll 71 which is located below the level of the coater proper, and then a horizontal traverse to the roll 72. The web then feeds upwardly once more around the roll 73 to the roll 74, which is located above and slightly to the left of center of the backing roll axis. Roll 74 serves to lead the web around the backing roll in a clockwise direction, and rolls 75 and 76 serve to lead it away. Thereafter, the web traverses a series of drying cylinders, as is conventional. In connection with this mode of operation it will be understood, of course, that the right-hand head assembly will have been moved into its operative position by means of its associated cylinder, while the left-hand head assembly will have been disabled in like manner.

To coat the opposite side of the web, that is the wire side, the left-hand head assembly is moved into operative position while at the same time the right-hand head assembly is made inoperative. In addition, the hydraulic motor is employed to pivot the support members in a clockwise direction until the heads are caused to assume an angular orientation, as shown in Fig. 4. This places the head generally and especially the blade in the proper angular position to apply the coating. To lead the web around the backing roll in a counterclockwise direction as is necessitated by this arrangement of the heads, the web is first fed under the guide roll 70 to an additional guide roll 81. The latter is located above and slightly to the right of the axis of the backing roll and serves to lead the coating web thereto. After the web has traversed the backing roll, it passes around a roll 82, undergoes a vertical traverse to a roll 83, from which it is fed to the drying cylinders. As shown, the manner in which the web is threaded through the drying cylinders is somewhat different in this case for reasons of convenience but this is not at all a critical requirement as regards the invention. For that matter, various systems of rolls can be employed, it being of the essence only that the web be led around the backing roll in the appropriate direction according to the side of the web it is desired to coat.

Various modifications of this nature will no doubt occur to those skilled in the art and therefore the invention should not be deemed to be limited to the details of what has been described herein. Rather, the invention should be deemed to be limited only to the combination as claimed.

What is claimed is:

1. A machine for coating webs of paper and the like comprising a backing roll mounted for rotation in a selected direction which depends upon the side of the web it is desired to coat, means to lead the web around the roll in said selected direction, a pair of coating heads disposed astride said roll in diametric opposition to one another, each of said heads including a reservoir exposing coating liquid to the surface of the web and a blade to level the coating liquid as the web emerges therefrom, a single support means for said coating heads adapted for angular movement about the axis of said roll, said heads being constrained to move in concert with said support means and said heads movably mounted on said support means, means to move said support means to a selected angular position which depends upon the direction of rotation of said roll, means selectively to move said heads toward and away from said roll while said support means remains stationary, thereby to enable one of said heads to cooperate with said roll and to disable the other of said heads, and means to produce rotation of said roll in said selected direction.

2. A machine for coating webs of paper and the like comprising a backing roll mounted for rotation in a selected direction which depends upon the side of the web it is desired to coat, means to lead the web around the roll in said selected direction, a pair of coating heads disposed astride said roll in diametric opposition to one another, each of said heads including a reservoir exposing coating liquid to the surface of the web and a blade to level the coating liquid as the web emerges therefrom, a pair of support members for said heads mounted for rotation about the axis of said roll adjacent its ends, said heads being constrained to move angularly with said support members and free to move linearly independently thereof, a segment gear formed as an integral part of one of said support members, a motor, a mechanism operatively connecting said motor to said segment gear to move said support means to a selected angular position which depends upon the direction of rotation of said roll, means selectively to move said heads toward and away from said roll while said support means remains stationary, thereby to enable one of said heads to cooperate with said roll and to disable the other of said heads, and means to produce rotation of said roll in said selected direction.

3. A machine for coating webs of paper and the like comprising a backing roll mounted for rotation in a selected direction which depends upon the side of the web it is desired to coat, means to lead the web around the roll in said selected direction, a pair of coating heads disposed astride said roll in diametric opposition to one another, each of said heads including a reservoir exposing coating liquid to the surface of the web and a blade to level the coating liquid as the web emerges therefrom, a pair of support members for said heads mounted for rotation about the axis of said roll adjacent its ends, said heads being constrained to move angularly with said support members and free to move linearly independently thereof, a segment gear formed as an integral part of one of said support members, a motor, a mechanism operatively connecting said motor to said segment gear to move said support means to a selected angular position which depends upon the direction of rotation of said roll, a pair of fluid actuators each having a cylinder and a piston adapted for linear movement with respect thereto, means to pivotally connect each cylinder to one of said support members, a pair of crank shafts mounted between said support members, means to pivotally connect said pistons to the respective crank shafts, eccentric cam mechanisms operatively to connect said heads to said crank shafts for selective movement of said heads toward and away from said roll, and means to produce rotation of said roll in said selected direction.

No references cited.