June 22, 1943. C. W. MAYER 2,322,533

COATING MACHINE

Filed Oct. 17, 1941 3 Sheets-Sheet 1

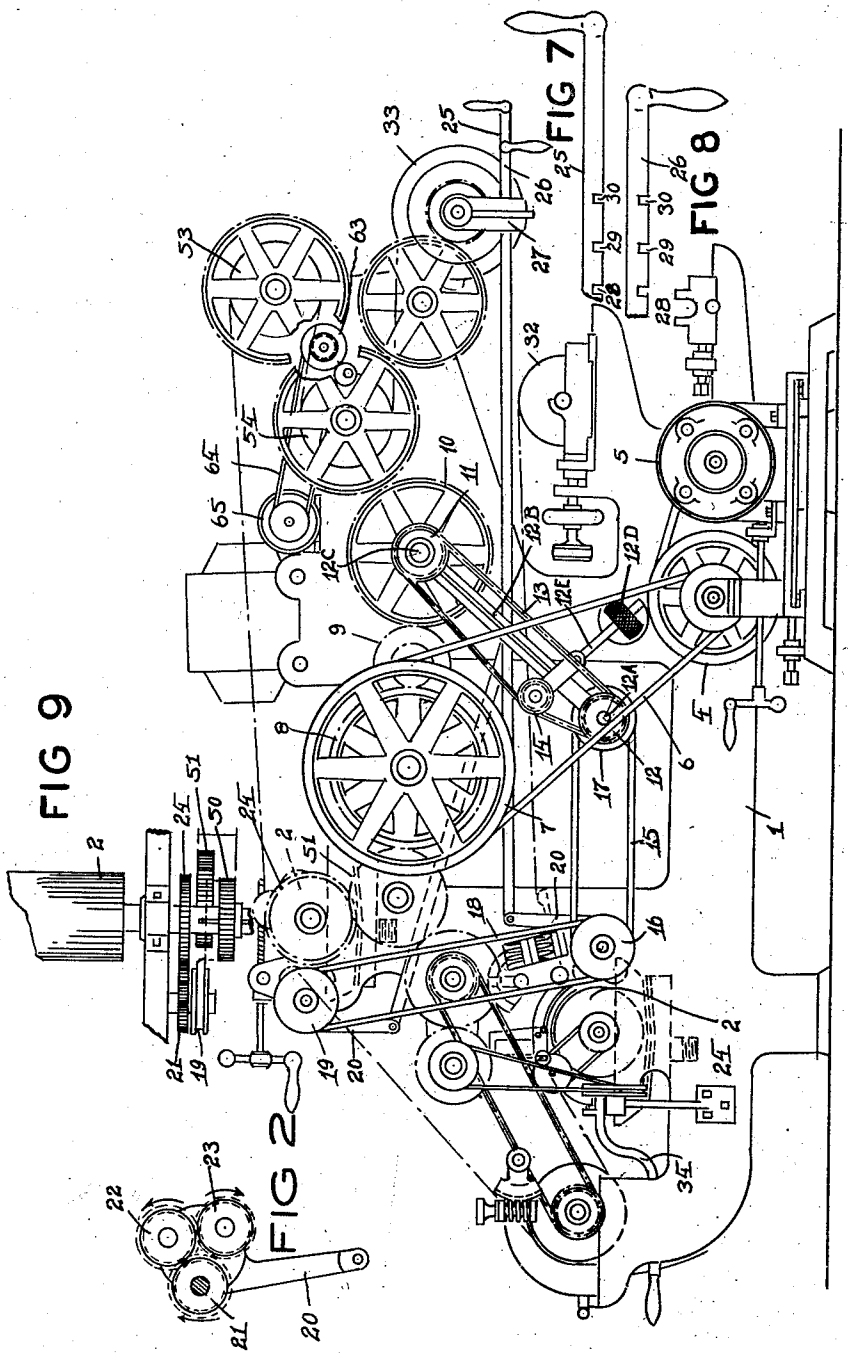


FIG 1

FIG 2

FIG 7

FIG 8

FIG 9

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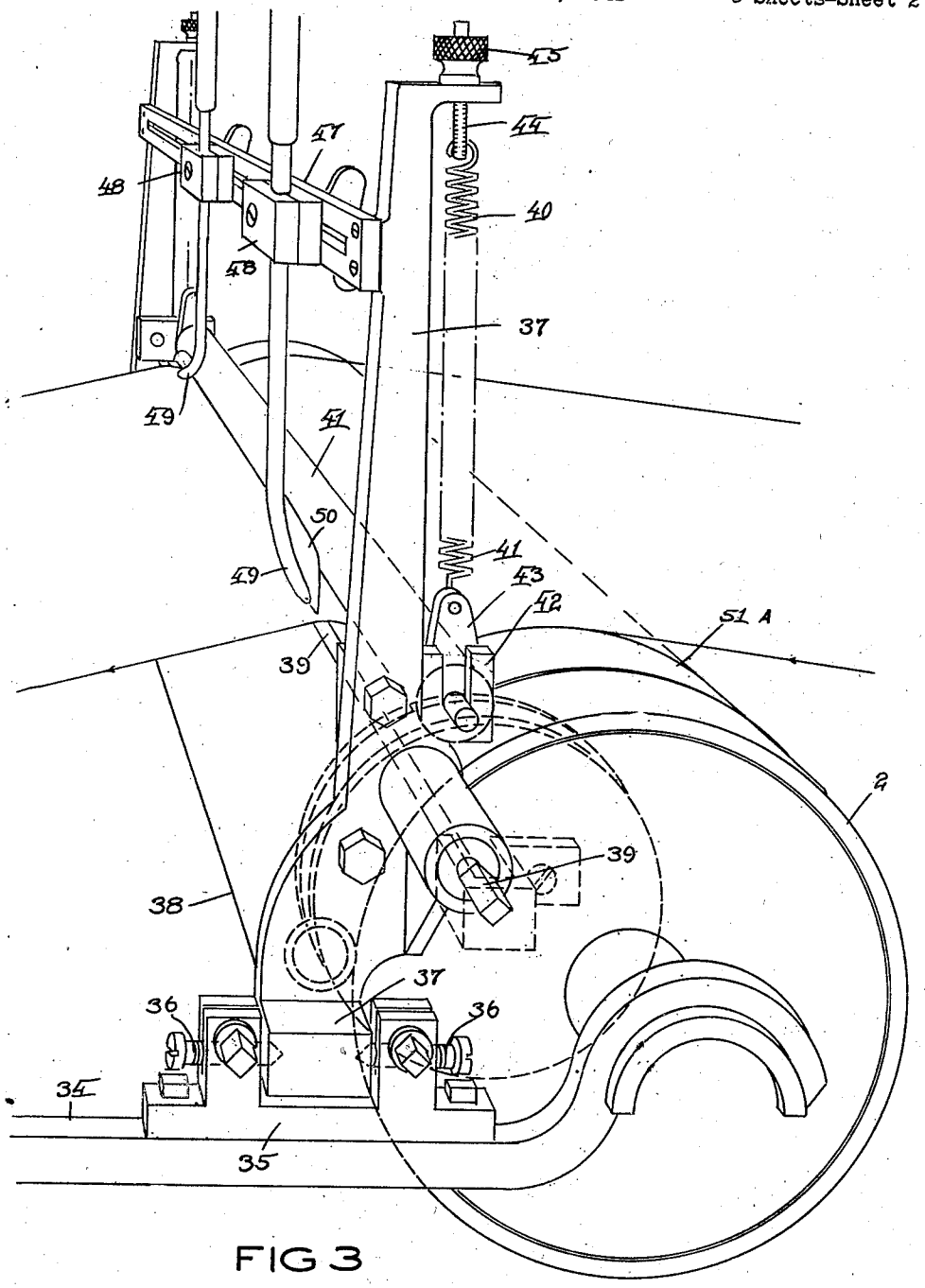


FIG 3

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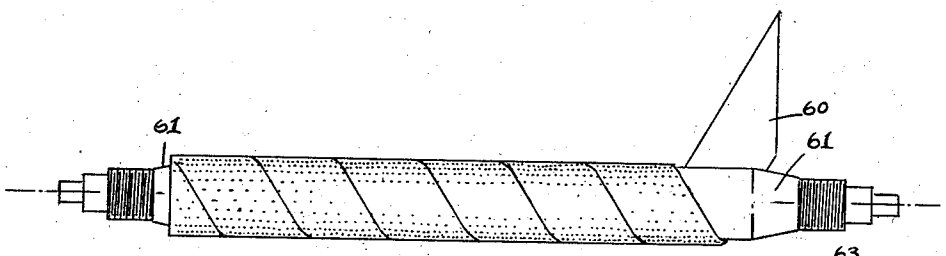


FIG 6

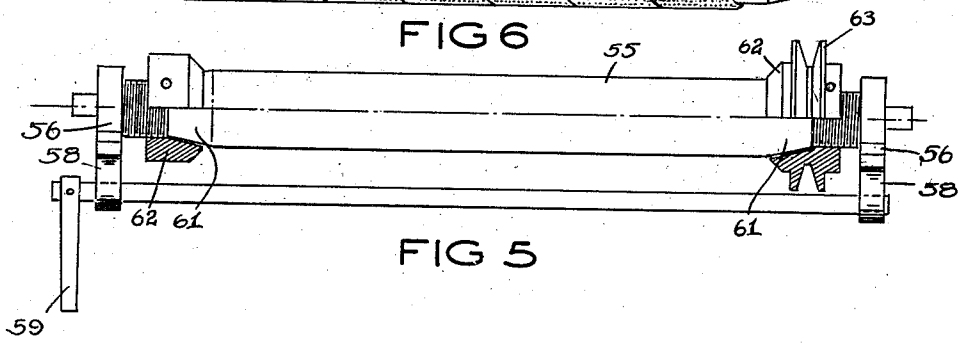


FIG 5

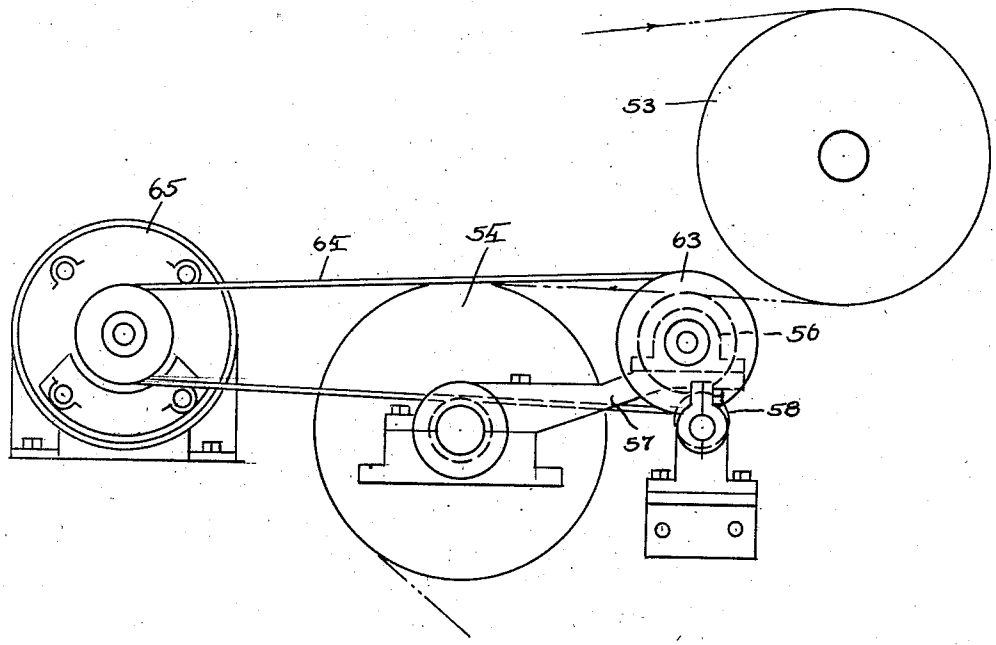


FIG 4

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COATING MACHINE

Charles W. Mayer, Rochester, N. Y.

Application October 17, 1941, Serial No. 415,437

8 Claims. (Cl. 91—18)

This invention relates to coating machines and more particularly to machines for applying a liquid coating to one or both sides of a continuous web of paper or similar material as it is fed from a supply roll thru the machine onto a rewind shaft.

The primary object of the invention is to provide a machine of this character with a novel driving mechanism which permits each coating roll to be rotated at variable speeds, reversed or held freely rotating at will for efficient regulation of the amount of dope carried by the coating rolls in coating the web as it is being fed thru the machine.

Another object of this invention is to provide the coating mechanism with novel means for smoothening and leveling the paper web prior to the coating operation.

A further object of this invention is to provide the coating machine with a novel buffing mechanism for buffing the coating applied to the web.

Still another object of this invention is to provide the coating machine with means whereby the support for the equalizer may be independently adjusted at each end thereof.

All these and other objects and attendant advantages of this invention will become more readily apparent from the detailed description thereof which follows, reference being had to the accompanying drawings in which

Figure 1 is a side elevation of the coating machine embodying my invention.

Figure 2 is a detail side elevation of one of the levers and train of gears for regulating the rotation of the coating rolls.

Figure 3 is a detail perspective view of one of the coating rolls and the mechanism associated therewith.

Figure 4 is a detail side elevation of the buffing mechanism with which the coated surface of the web is buffed or polished.

Figure 5 is a detail front elevation with parts in section of the buffing roller without its buffing material and part of the fastening means for the buffing material illustrated in section.

Figure 6 is a detail elevation of the buffing roller with the buffing material illustrated in process of mounting thereon.

Figure 7 is an enlarged detail view of the end of the link for regulating the rotation of one of the coating rolls of the machine.

Figure 8 is an enlarged detail view of the end of the link for regulating the rotation of the other coating roll of the machine.

Figure 9 is a top plan view of a portion of the upper coating roll and its driving mechanism.

As illustrated in the several figures of the drawings, the coating machine mechanism forming the subject matter of my present invention is mounted in a suitable frame 1 and includes a pair of coating rolls 2, 2 which are suitably journaled in the frame. Rotation for the coating rolls is provided by the transmission gearing which comprises the variable drive 4 driven by the motor 5. A belt 6 connects the variable drive with the driving pulley 7 for the rotation of the gear 8 which in turn operates a train of gears which include the gears 9 and 10. The latter has rotating with it the sprocket 11 which is connected with the sprocket 12 by means of a sprocket chain 13. A sprocket 12 is mounted on the shaft 12A which is journaled in a bearing at the end of the arm 12B. The latter is pivotally mounted on the shaft 12C so as to swing thereon. Movement of the arm 12B is effected by the rotation of the nut 12D which moves the stud 12E to swing the arm in the desired direction. A belt 15 drives a pair of pulleys 16, 16 from the "hi-lo" variable drive pulley 17 which is keyed to the shaft 12A so that movement of the arm 12B changes the effective diameter of the pulley 17 to increase or decrease the driving speed of the belt 15 to the pulley 16. Another belt 18 drives the pulley 19 from one of the pulleys 16. The pulley 16 and the pulley 19 are mounted to rotate on a lever 20 and have keyed thereto a pinion 21. Also carried by the lever 20 are two more pinions 22 and 23, of which pinion 22 is in mesh with pinion 21 and 23. Each of the coating rolls carries a driving gear 24 and each of the levers 20 is mounted to swing relative to one of these driving gears so that movement of the lever will bring either pinion 22 or pinion 23 in mesh with the driving gear. With pinion 22 in mesh with the driving gear, the roller is driven in the direction of movement of the web as it is being coated, while pinion 23 in mesh with the driving gear will cause the coating roll to be driven in the reverse direction.

One of the levers 20 has the link 25 pivotally connected thereto and the other of these levers has the link 26 pivotally connected. These levers are slidably supported on the bracket 27 and in the bottom edge of each of the levers are provided three notches 28, 29 and 30 which are adapted to move into locking engagement with a lug on the bracket 27. Movement of the links 25 or 26 by means of their handles 31 for engagement with notch 28 or 30 thus operates to move

and hold the lever 20 connected thereto so as to bring either pinion 22 or pinion 23 into mesh with the driving gear 24 and thus cause rotation of the coating roll in either clockwise or counterclockwise direction, while movement of the links into engagement with notch 29 will move and hold their lever so that both pinions 22 and 23 are out of mesh with the driving gear 24 to permit its coating roll to rotate freely in its bearings. In this way the coating rolls may be operated to jointly rotate in the same direction or one coating roll may be rotated in one direction and the other in the reverse direction, or one coating roll may be positively rotated while the other is allowed to idly rotate in the operation of the machine. In addition the variable drive, above described, provides for any desired variation in the rotative speed of the coating rolls.

Having the coating rolls stand still with the web threaded thru the machine is of great advantage because it permits agitation of the dope in the dope pans for mixing purposes and keeps the dope from the web until it is ready for coating. In this way large quantities of valuable material and time is saved in coating the web.

The web of paper is taken from the supply roll 32 and in its path to the finished roll 33 passes over the coating rolls and suitable chilling and feed or draft rolls, the functions of which form no part of the present invention. However, when the upper coating roll is not used for coating the paper it may be given the same peripheral speed as the chilling and draft rolls in order to operate as a draft roll. For this purpose the coating roll shaft has a sliding gear 50 splined thereon so that it can be brought into mesh with the gear 51 which is driven directly from the gear 8. In this case the variable drive for the coating roll is disconnected by holding the pinions 22 and 23 out of mesh with the gear 24.

In connection with the coating rolls the machine is provided with novel means which insure further proper distribution of the coating on the paper web. This mechanism is supported on a pair of lever brackets 34, 34 which are pivotally supported in a groove in the sleeve extension of the journal boxes of the trunnions on each side of the coating roll. Each of the brackets 34 carries a bearing block 35, in each of which is pivotally supported between the adjustable pivot pins 36, 36 a supporting bracket 37. The brackets 37 are provided at each end of a hollow shoe 38 which is adapted to be heated by steam.

The equalizer rod 39 is mounted so as to rotate counterclockwise in the direction of the movement of the paper in the upper edge of the shoe 38 so as to have the web of paper travel thereover after it leaves the coating roll and cause the dope to be evenly distributed on the web before it has a chance to harden thereon.

Suspended from the top of the bracket 37 by means of the tension springs 40, 40 is the smoothening roll 41. The latter has a suitable trunnion at each end which is adapted to rotate and adjust itself vertically in a slot provided in each of the brackets 42. For the suspension of each end of the roll 41 a link 43 is pivotally anchored to the trunnions to provide for the attachment thereto of the lower end of the suspension spring 40. The upper end of the suspension springs is anchored to a nonrotating threaded stud 44 which extends thru a suitable hole in the bracket 37. An adjusting nut 45 is threaded on the stud to provide for its adjustable movement for the purpose of raising and lowering the smoothening roller to vary its floating weight on the top of the paper web. The smoothening roll is spaced from one-half to three-fourths of an inch from the equalizer rod and is located between this rod and the coating roll so that the weight of the smoothening roll will efficiently act to smoothen any unevenness in the paper in the web in its travel from the coating roll to the equalizer rod and before it reaches the latter.

The brackets 37 are connected by a slotted link 47 which carry the clamping blocks 48 for lateral adjustment thereon. A nozzle 49 is adjustably clamped in place in each of the blocks 48 to have air under pressure blow against the edge of the web and force any excess coating material therefrom. A shield 50 on the nozzle keeps the coating material from being blown onto the smoothening roll 41.

The fact that the brackets 37 are pivoted so as to swing laterally, permits either of the lever brackets 34 to be raised or lowered relative to the other to provide for proper alignment of the equalizer rod relative to the coated web as it leaves the coating roll.

For the purpose of keeping the edge portion of the web uncoated, the machine is provided with the salvage or stripping guards 51A which comprise a strip of flexible light weight sheet metal or semi-spring steel which is held in contact with the surface of the rolls by suitable weights and thus holds the edges of the web which slide thereover out of contact with the coating surface of the rolls.

The buffing mechanism of the coating machine is located between the draft rolls 53 and 54 and comprises the buffing shaft 55 which is rotatably supported in suitable bearings 56 at each end thereof. These bearings are carried on the end of the swinging arms 57 which are pivoted on the bearing sleeves of the draft roller 54. The brackets are adjustable by means of the cams 58 which engage the bottom of the bracket and when rotated by the lever 59 are adapted to raise or lower the brackets and with them the buffing shaft supported between them.

The buffing material in the form of a strip 60 is spirally wound over the buffing shaft from one end to the other and its ends are clamped to the shaft between the tapered shoulders 61 thereof and the correspondingly tapered clamping sleeves 62. The latter are threaded to the buffing shaft by means of left handed threads which keep these sleeves tightened on the shaft in the rotation of the buffing roll against or with the movement of the web. The buffing material is wound on the shaft so that rotation of the clamping sleeves, when being threaded onto the shaft, will cause the strip to be drawn taut against the perimeter of the shaft so that no further fastening means are necessary in the attachment of the buffing material to the shaft.

One of the clamping sleeves 62 carries a pulley 63 which is driven by the belt 64 from the electric motor 65.

I claim:

1. In a driving mechanism for a web coating machine having a pair of coating rolls carrying a gear for the rotation thereof, the combination of a driving pinion for each of said rolls, a lever mounted for rotation in axial alignment with each of said driving pinions, an idle pinion carried by each of said levers in constant mesh with the driving pinion, a second idle pinion in mesh with said first idle pinion arranged on said lever relative to said first idle pinion to provide for in-

dependent driving engagement between each of said idle pinions and said gear on the movement of said lever, and means for simultaneously causing rotation of said driving pinions.

2. In a driving mechanism for a web coating machine as set forth in claim 1 including a link connected to each of said levers and arranged for movement relative to each other, and means carried by each of said links for holding said levers with the pinions in selective driving engagement with said coating roll gears.

3. In a web coating machine the combination of a coating roll, an equalizing rod cooperating with said coating roll for the distribution of the coating material onto the under side of the paper web traveling over the coating roll in coating contact therewith, a straightening roller yieldingly suspended for floating contact against the top of the web intermediate the coating roll and the equalized rod.

4. In a web coating machine the combination of a coating roll, a supporting axle for rotatably supporting said roll, a bracket on each side of said roll held for engagement and radial support on said supporting axle, a pair of trunnion bearings on each of said brackets and arranged substantially axially radial to said supporting axle, a bracket pivotally mounted in each of said pair of trunnion bearings for radial movement of the supporting brackets on each side of said coating roll, and an equalizer rod supported between said pivotally mounted brackets.

5. In a web coating machine the combination as set forth in claim 4 including a guide member supported between said pivotally mounted brackets, and a nozzle adjustably supported on said guide member for directing a blast of air against an edge portion of the web in its movement over the equalizer rod.

6. In a coating machine the combination of a coating roll, a trunnion bearing on each end of said coating roll for rotatable support thereof, an arm rotatably supported on said trunnion bearings, one at each end of said coating roll, a bracket pivotally supported on each of said arms for movement transversely thereto, a shoe supported between said bracket, and an equalizer rod rotatably mounted at the top of said shoe.

7. In a coating machine having a plurality of coating rolls, and draft rolls, the combination of driving means for variably rotating said coating rolls, means for uniformly driving said draft rolls and means discontinuing the variable driving means of one of said coating rolls and connecting said coating roll with the uniform driving means of said draft rolls.

8. In a coating machine having a pair of draft rolls, a buffing roller rotatably mounted intermediate said draft rolls axially parallel thereto, a pair of arms pivotally supported on each side of one of said draft rolls, a bearing on the end of each of said arms, a buffing roll revolvably supported in said bearings, a cam supporting said arms and means for operating said cam to swing said arms for movement of said buffing roller relative to said draft rolls.

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