

Oct. 17, 1939.

E. G. DALEY

2,176,418

COATING MACHINE

Filed May 9, 1938

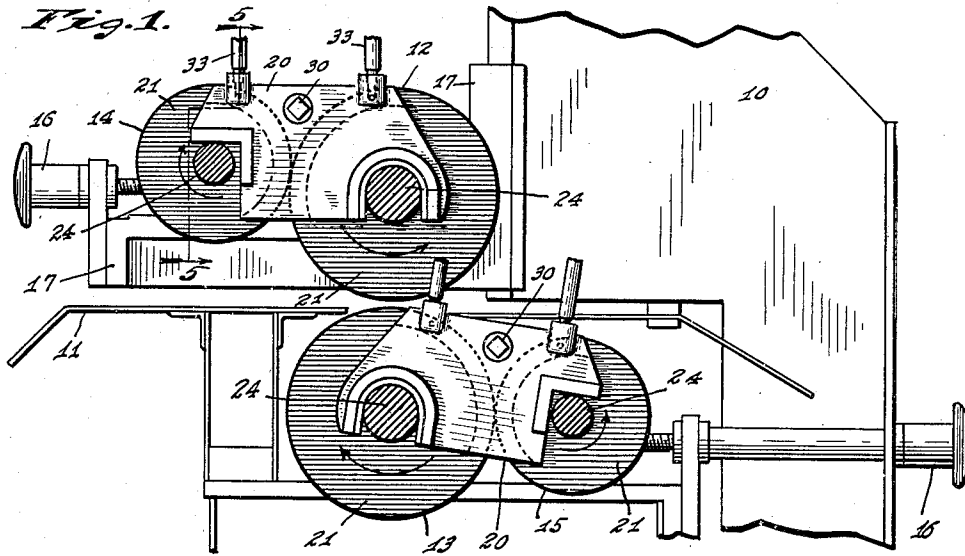


Fig. 2.

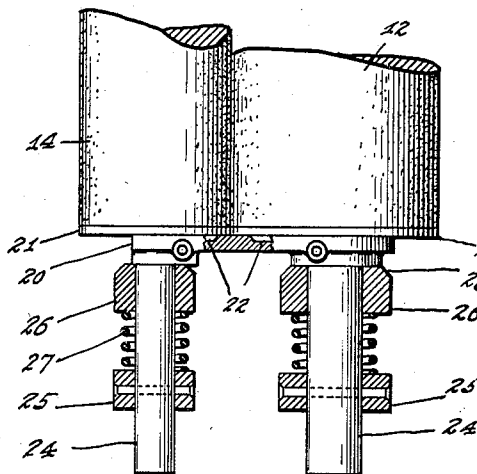


Fig. 3.

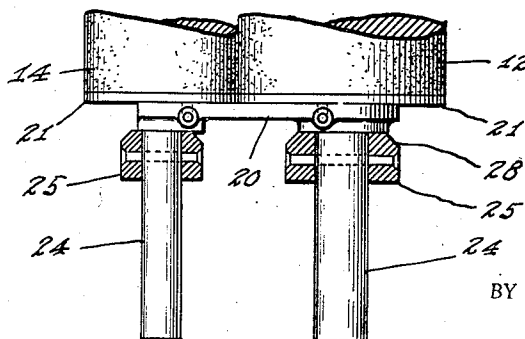


Fig. 4.

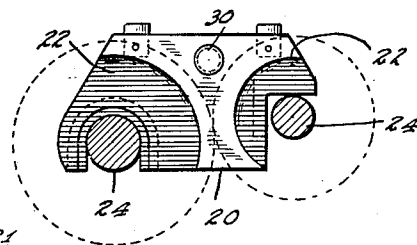
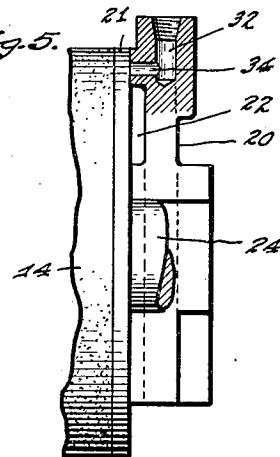


Fig. 5.



INVENTOR.

EUGENE G. DALEY.

BY

Shelby Smith
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,176,418

COATING MACHINE

Eugene G. Daley, Rushville, Ind., assignor to
Chas. E. Francis Co., Rushville, Ind., a corporation of Indiana

Application May 9, 1938, Serial No. 206,735

5 Claims. (Cl. 91—48)

My invention relates to coating machines, and especially to machines of the type in which a supply of liquid coating material, such as glue, lacquer, or the like, is contained in a trough-like space formed by co-operating applicator and doctor rolls, the applicator roll conveying the coating material as a film on its surface from the supply to the work and the doctor roll regulating the thickness of such film. In such a machine, the coating material in the trough-like space between the applicator and doctor rolls must be confined between the ends of those rolls, and it is the object of the present invention to provide an improved form of confining means for use at such points. More specifically, it is my object to confine the coating material at the ends of the doctor and applicator rolls by means which is readily demountable in order to facilitate cleaning of the machine.

In carrying out my invention, I provide at each end of the trough-like space between an applicator roll and its associated doctor roll a removable plate which bears against the end surfaces of the rolls to prevent the escape of coating material. These plates may rest on the roll shafts and may be held axially against the ends of the roll by any suitable means. The plates do not cover the entire ends of the rolls but instead cover only the portions adjacent the trough-like space in which the supply of coating material is maintained, and they are desirably relieved so as to make contact with the ends of the rolls only at points adjacent the periphery of the rolls. With such a construction, the resultant of the frictional forces between the rolls and each end plate is generally downward and tends to keep the end plates seated upon the roll shafts.

The accompanying drawing illustrates my invention: Fig. 1 is a fragmental side elevation of a coating machine with parts thereof broken away to illustrate the construction more clearly; Fig. 2 is a fragmental plan view of an associated applicator roll and doctor roll; Fig. 3 is a view similar to Fig. 2 but illustrating a slightly modified form of construction; Fig. 4 is an elevation showing the inner face of one of the end plates; and Fig. 5 is a section on the line 5—5 of Fig. 1.

In Fig. 1, there is illustrated a fairly common type of coating machine embodying a frame 10, a table 11, and upper and lower applicator rolls 12 and 13. These rolls have respectively associated with them doctor rolls 14 and 15, each doctor roll being placed at the side of its associated applicator roll so as to form between the rolls and

trough-like space in which a supply of coating material is maintained. At their approximate point of tangency, the peripheral portions of the applicator and doctor rolls of each pair move downwardly, each doctor roll regulating the thickness of the liquid-film which is permitted to remain on the surface of the associated applicator roll, and the applicator rolls carrying their respective films into contact with boards or other objects which pass across the table 11. Means for driving the rolls are not shown, as my invention is not concerned with any particular form of roll-driving means. The thickness of the film is regulated by adjusting each doctor roll toward or away from its associated applicator roll, as by means of adjusting screws 16; and the machine is adapted for different thicknesses of work by raising or lowering the adjustable head 17 in which the rolls 12 and 14 are journaled.

To confine the supply of coating material at the ends of the rolls, I employ end plates 20. One of such end plates is located at each end of each pair of rolls and bears against the end surfaces of the associated rolls to prevent the escape of coating material. If the bodies of the rolls are constructed of resilient material, such as gelatine or soft rubber, I find it desirable to face the end surfaces with bearing plates 21 of metal or similar material.

Since the only function of the end plates is to confine the supply of liquid coating material between each applicator roll and its associated doctor roll, it is unnecessary for the end plates to cover the entire end surfaces of both rolls. All that is required is for the end plates to bridge that portion of the space between the rolls which is occupied by the liquid supply.

Desirably, the end plates are relieved as indicated at 22 so as to bear against the ends of the rolls only near the respective peripheries thereof. In their lower edges, the end plates are provided with notches for the reception of the shafts 24 of the respective rolls. These notches may take any desired form, and serve to locate each end plate in the common plane of the two shafts 24 with which it is associated.

Various means may be employed for holding each end plate in contact with the ends of its associated rolls. In Fig. 2, I have shown each of the shafts 24 as provided with a fixed collar 25 and a sliding collar 26 located between the collar 25 and the roll on the shaft 24. A compression spring 27 acting between the collars 25—26 on each shaft serves to force the collar 26 toward the associated roller and to hold against the face

of the associated roll the end plate 20, which is interposed between the rolls and the collars 26.

In Fig. 3, the collars 26 and springs 27 are omitted, the collar 25 being spaced from the adjacent roll-ends a distance equal to the thickness of the associated plate 20. Whether the plate-engaging collars are fixed as in Fig. 3 or axially movable as in Fig. 2, their inner edges are desirably beveled as indicated at 28 to facilitate insertion of the end plates.

Because of the shape of the end plates and because of the relieved portions 22, each end plate bears against its associated rolls only near the respective peripheries thereof and only over portions of such peripheries which are moving in a generally downward direction. As a result, friction between the rolls and each plate aids the weight of the plate in holding it firmly seated on the shafts 24 while the machine is in operation. When it is desired to remove the plates for purposes of cleaning the machine or for any other reason, it is necessary only to lift them vertically. Replacement of the plates is equally simple, as it is necessary only to insert each plate between the roll-ends and the plate-engaging collars on the shafts 24.

It is sometimes desirable to circulate the coating material confined between each applicator roll and its associated doctor roll; and to provide for connection with a circulating system, each of the end plates may be provided with a removable screw-plug 30. It may also be desirable in certain situations to lubricate the engaging surfaces of the end plates and rolls. For the application of such lubricant, which would usually be a solvent for the liquid coating material confined between the rolls, the end plates may be provided near their upper edges with recesses 32 adapted for connection at their upper ends to pipes 33, through which the lubricant may be supplied, and communicating at their lower ends with lateral passages 34 which terminate in the roll-engaging faces of the plates.

I claim as my invention:

1. In a coating machine, an applicator roll, a doctor roll, said rolls being supported in side-by-side relation to define between them a space for containing a supply of liquid coating material, shafts upon which said rolls are respectively mounted, said shafts projecting beyond the ends of said rolls, a plate for closing each end of the liquid-containing space between the rolls, each of said plates being notched in its lower edge for the reception of said shafts and being supported thereby, and means mounted on said shafts for holding each of said plates against the adjacent ends of said rolls, the inner surfaces of said plates being shaped to engage the end surfaces of the rolls only near portions of the peripheries thereof which move generally downwardly during roll-rotation.

2. In a coating machine, an applicator roll, a doctor roll, said rolls being supported in side-by-side relation to define between them a space for containing a supply of liquid coating material,

shafts upon which said rolls are respectively mounted, said shafts projecting beyond the ends of said rolls, a plate for closing each end of the liquid-containing space between the rolls, each of said plates being notched in its lower edge for the reception of said shafts and being supported thereby, and means mounted on said shafts for holding each of said plates against the adjacent ends of said rolls, the inner surfaces of said plates being shaped to engage the end surfaces of the rolls only near portions thereof which move generally downwardly during roll-rotation, said plate-holding means comprising collars mounted on said shafts for rotation therewith and springs acting between said collars and said plates.

3. In a coating machine, an applicator roll, a doctor roll, said rolls being supported in side-by-side relation to define between them a space for containing a supply of liquid coating material, shafts upon which said rolls are respectively mounted, said shafts projecting beyond the ends of said rolls, a plate for closing each end of the liquid-containing space between the rolls, each of said plates being notched in its lower edge for the reception of said shafts and being supported thereby, and means for holding each of said plates against the adjacent ends of said rolls, the inner surfaces of said plates being shaped to engage the end surfaces of the rolls only near portions of the peripheries thereof which move generally downwardly during roll-rotation.

4. In a coating machine, an applicator roll, a doctor roll, said rolls being supported in side-by-side relation to define between them a space for containing a supply of liquid coating material, shafts upon which said rolls are respectively mounted, said shafts projecting beyond the ends of said rolls, a plate for closing each end of the liquid-containing space between the rolls, each of said plates being notched in its lower edge for the reception of said shafts and being supported thereby, and means mounted on said shafts for holding each of said plates against the adjacent ends of said rolls, said means comprising collars fixed to said shafts and rotatable therewith.

5. In a coating machine, an applicator roll, a doctor roll, said rolls being supported in side-by-side relation to define between them a space for containing a supply of liquid coating material, shafts upon which said rolls are respectively mounted, said shafts projecting beyond the ends of said rolls, a plate for closing each end of the liquid-containing space between the rolls, each of said plates being supported on said shafts, and means mounted on said shafts for holding each of said plates against the adjacent ends of said rolls, said means comprising collars fixed on said shafts for rotation therewith and spaced from the adjacent ends of the respective rolls a distance equal to the thickness of the associated plate, each of said plates being removably received between the ends of the rolls and the associated collars.

EUGENE G. DALEY.