May 15, 1945. E. NORDSTROM ET AL 2,375,812

COATING MACHINE

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Fig. 1

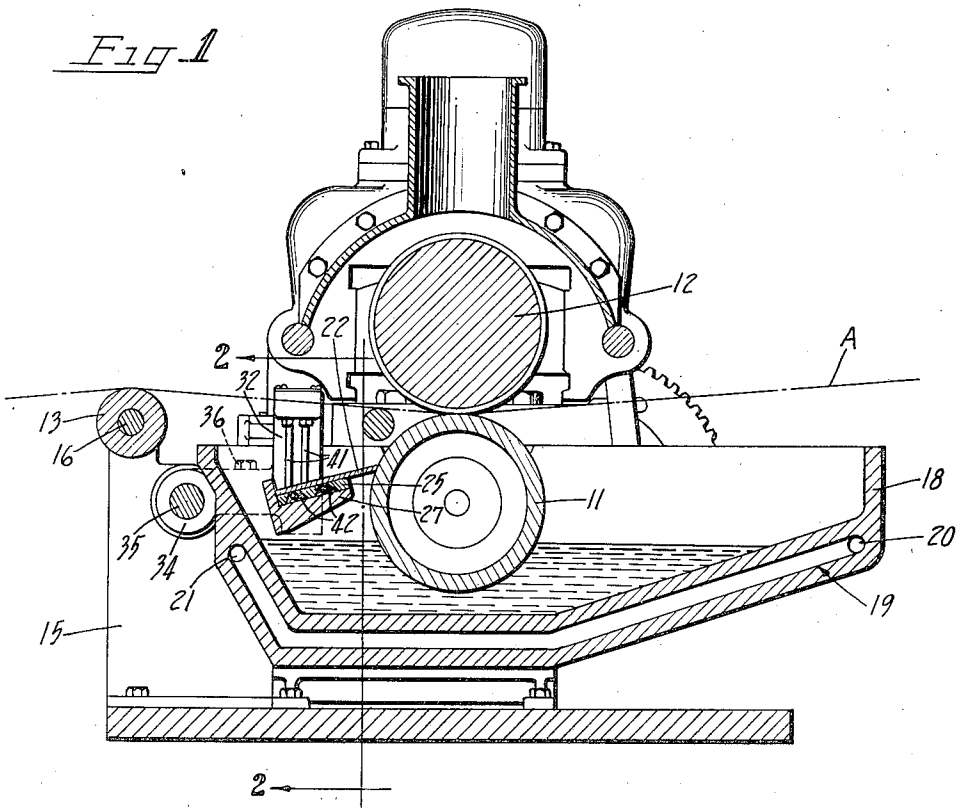
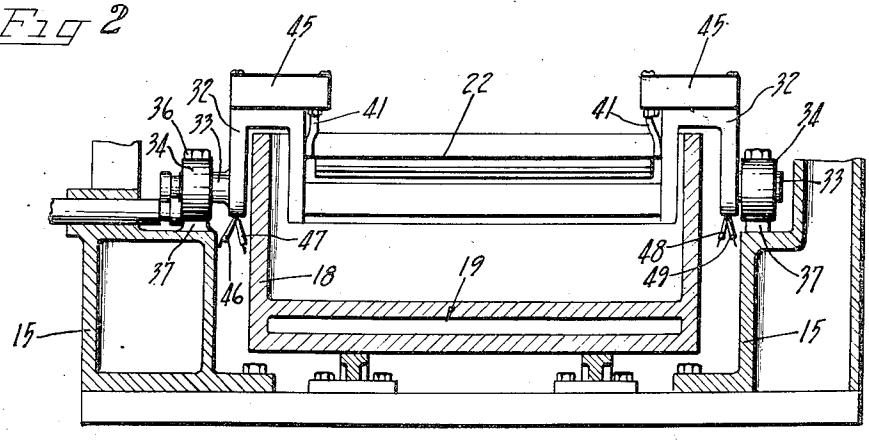


Fig. 2



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Fig 3

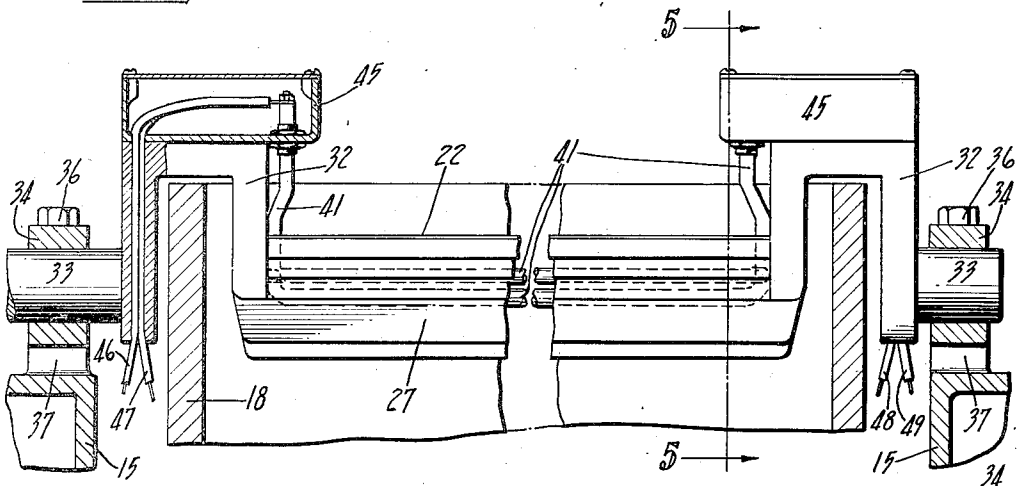


Fig 4

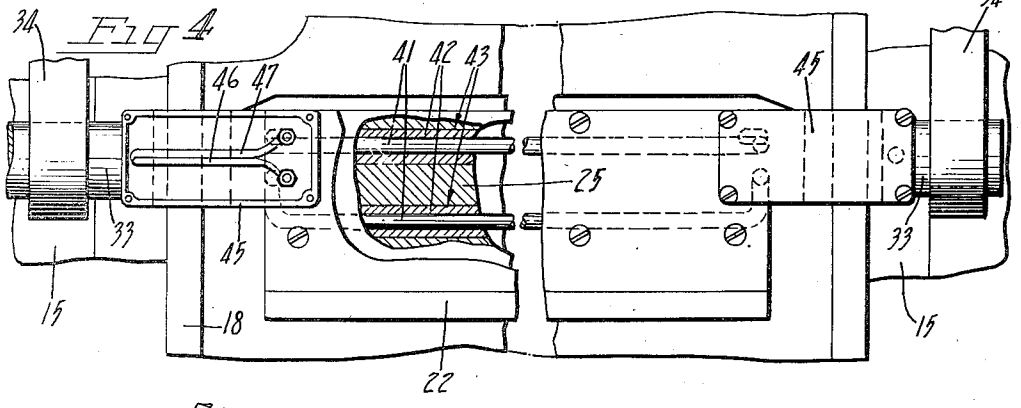
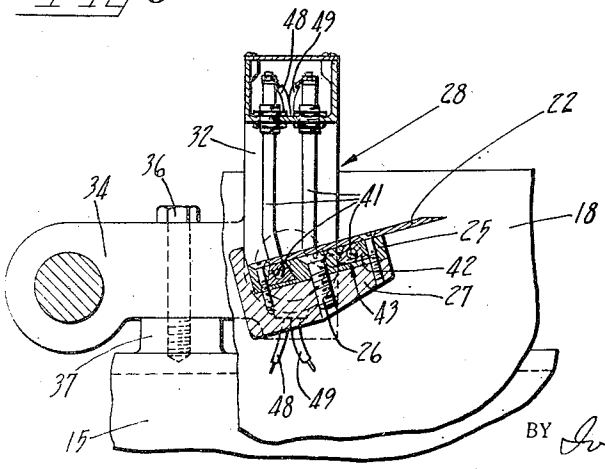


Fig 5



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UNITED STATES PATENT OFFICE

2,375,812

COATING MACHINE

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Application October 3, 1941, Serial No. 413,522

1 Claim. (Cl. 91—51)

The present invention relates to a coating machine having a roller and a doctor blade for applying a film of fluid coating substance to a web of material passed over the roller and has particular reference to heating the doctor blade to facilitate application of the coating substance to the web.

In the manufacture of certain containers such as those made of fibre and the like, a coating substance is sometimes applied in a design or predetermined configuration to the flat stock or web from which the containers are made. In such container or can making practice the coating substance is usually applied by an intaglio roller which rotates in a bath of the coating substance. The rotating roller picks up the coating substance and a doctor blade which bears against the roller scrapes off all the substance excepting that which is disposed in the intaglio pockets or recesses of the roller. It is this retained coating substance that is applied to the web of container material.

Some coating substances may be heated to maintain them in a fluid condition while being applied to the web of material. In order to facilitate the application of such coating substances the instant invention contemplates heating the doctor blade so that the coating substance scraped off the roller will be prevented from being chilled and thereby will be prevented from adhering to the blade.

An object therefore of the invention is the provision of a coating machine having an intaglio applying roller and a doctor blade wherein the doctor blade is heated to maintain in a liquid condition the coating substance scraped off the roller so that the coating substance will be prevented from adhering to the blade.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a longitudinal section through a coating machine embodying the instant invention;

Fig. 2 is a transverse section taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a view similar to Fig. 2 showing the doctor blade on an enlarged scale, with parts broken away and shown in section;

Fig. 4 is a top plan view of the doctor blade shown in Fig. 3, with parts broken away; and

Fig. 5 is a transverse section taken substantially along the line 5—5 in Fig. 3.

As a preferred embodiment of the invention the drawings illustrate a coating machine in which a strip A (Fig. 1) of web material, such as fibre or the like, is imprinted preferably with a thermoplastic adhesive applied in a desired pattern as the web is advanced through the machine. The strip or web may be substantially continuous and may be fed into and away from the machine in any suitable manner.

While in the machine, the web is fed by upper and lower cooperating rollers between which the web passes. These rollers constitute an adhesive applying roller 11 (Fig. 1) and a pressure roller 12. The pressure roller 12 presses the moving web against the applying roller 11. During its travel through the machine the web is held taut by an idler roller 13.

The applying roller 11 preferably is hollow so that a fluid heating medium such as steam, hot water, hot oil or the like may be circulated therethrough if desired to maintain the roller in a heated condition. This roller together with the pressure roller 12 are formed with trunnions which are journaled in suitable bearings in a pair of side frames 15 which constitute the main frame of the machine. The idler roller 13 is supported on a shaft 16 which is carried in the machine frames 15.

The applying roller 11 is of intaglio character and rotates in a bath of heated thermoplastic adhesive maintained in a liquid condition in an open top tank, receptacle or reservoir 18. The tank is located between the machine side frames 15. The bottom of the tank is formed with a heating chamber 19 through which a suitable heating medium such as steam, hot water, hot oil, or the like is circulated by way of inlet and outlet pipes 20, 21 to maintain the adhesive in the tank in a liquid condition.

As the applying roller rotates in the bath of thermoplastic adhesive, a quantity of the adhesive is picked up by the roller and carried toward the web. All of this picked up adhesive except that contained within the pockets or intaglio recesses of the roller is scraped off by a doctor blade 22 having a wiping edge which bears upon the periphery of the intaglio roller. It is this retained adhesive that is applied to the moving web in the pattern laid out on the surface of the intaglio roller.

The doctor blade 22 extends across the machine and is located in the tank 18 above the bath of liquid adhesive contained therein. The

blade is secured to a spacer block 25 (Figs. 4 and 5) which in turn is fastened by screws 26 to a base 27 of a movable carriage generally indicated by the numeral 28. At each end, the carriage merges into an inverted U-shaped arm 32 (Figs. 2 and 3) which extends up out of the tank, over the top, and down adjacent the outside wall of the tank. At the outer terminal ends, the arms are formed with trunnions 33 which are carried in the inner ends of a pair of swing arms 34 (Figs. 1 and 5). The outer ends of the swing arms are mounted on a stationary pivot shaft 35 which is carried in suitable bearings formed in the machine frames 15.

When the doctor blade 22 is in its normal operating position in contact with the intaglio roller 11, the swing arms 34 are held down by bolts 36 which are threaded into bosses 37 on the machine frames 15. This holds the carriage 28 against vertical movement. When it is desired to remove the carriage and blade from the tank, the bolts are loosened or taken out and the unit thereupon may be swung upwardly and outwardly with the swing arms 34 rocking on the pivot shaft 35.

Provision is made for heating the doctor blade 22, as hereinbefore mentioned. This is brought about by a pair of electric heating elements 41 (Figs. 3, 4 and 5) which are imbedded in a rapid heat conductor, such as aluminum packing 42, disposed in longitudinal grooves 43 in the spacer block 25. The ends of the heating elements project out from the ends of the spacer block 25 and extend up alongside the U-shaped arms 32 where they terminate in electric inlet and outlet boxes 45. There are two of these boxes and they are secured to the top of the arms.

Inside the boxes 45, the heating elements connect with lead wires 46, 47, 48, 49 which lead to and from any suitable source of electric energy. It is this electric energy that flows through the heating elements 41 and thereby creates sufficient heat in the spacer block 25 to maintain the doctor blade 22 at a desirable elevated temperature.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

We claim:

In a machine for applying adhesive in fluid form to web material, the combination of a receptacle for the adhesive, a roller rotatably mounted in the receptacle for removing adhesive therefrom and applying it to the web of material passed over said roller, a doctor blade unit movably mounted in said receptacle including a carriage mounted for pivotal movement relative to the receptacle and a doctor blade on said carriage having its wiping edge bearing against the surface of said roller for scraping surplus adhesive therefrom, an elongated electrical heating element disposed adjacent and extending longitudinally of said doctor blade for maintaining the latter at a desirable elevated temperature, said heating element being completely encased within a heat conducting metallic material for rapidly transmitting heat from said element to the wiping edge of the doctor blade, and electrical inlet and outlet boxes respectively mounted on opposite ends of said pivotally mounted carriage for housing means for conducting electrical energy to and from opposite ends of said completely encased elongated heating element.

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