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COATING MACHINE

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Fig. 3.

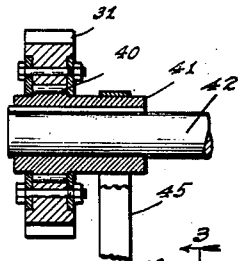


Fig. 1.

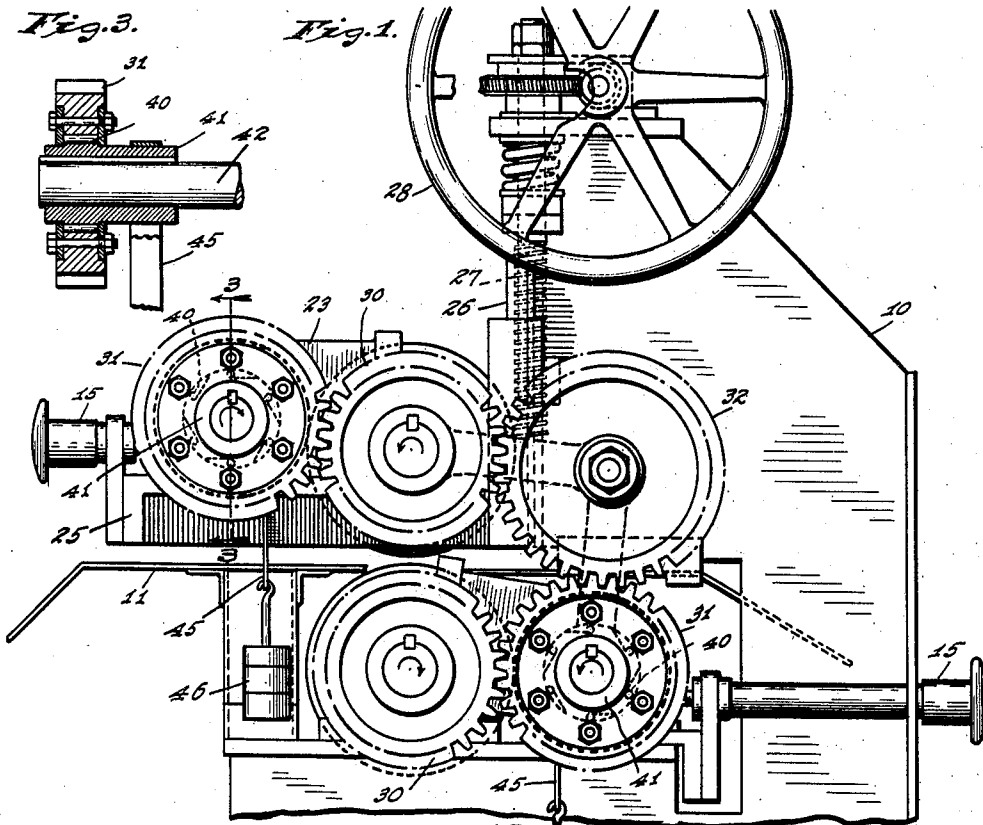
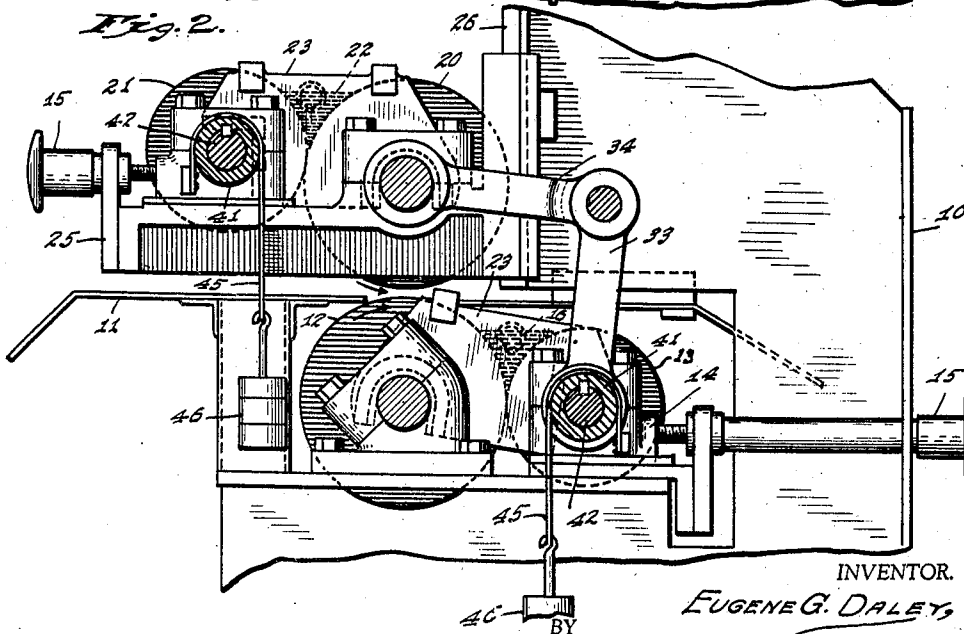


Fig. 2.



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COATING MACHINE

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5 Claims. (Cl. 91—48)

My invention relates to glue-spreading machines of the type in which glue or other coating material is transferred on the surface of a roll from a supply to the board or other object which is to be coated. In such machines, it is common to regulate the quantity of glue applied by means of a scraper roll or doctor roll which is associated with the spreading roll and which limits the thickness of the glue-film thereon to the distance between the rolls.

For best results in such a machine, it is advisable to drive the doctor or scraper roll in the opposite direction to the glue-applying roll and at a somewhat slower peripheral speed. As the doctor roll is adjustable toward or away from the spreader roll to vary the amount of glue applied to the work, there is a possibility that the surfaces of the two rolls, moving at different speeds, may come into contact with each other; and any such contact might damage the rolls, especially if they are provided with yielding surfaces such as of rubber or gelatin compositions.

It is the object of my invention to prevent the possibility of such damage to the co-operating surfaces of the spreader and doctor rolls in machines where both rolls are positively driven at different peripheral speeds. A further object of my invention is to secure this result without the necessity for extensive changes in the construction of the glue-spreading machine.

In carrying out my invention, I drive one of the rolls from the other through gearing which will cause the adjacent portions of the two rolls to move in the same general direction with the surface of the spreader roll moving at a higher velocity than the surface of the doctor roll, and I connect the doctor roll to such gearing through an over-running clutch so arranged as to permit the doctor roll to rotate at a more rapid speed than that at which it would be driven by the gearing mentioned. Ordinarily, there will be sufficient resistance to rotation of the doctor roll to insure that it will not overrun except under conditions where its surface is in contact with or dangerously close to the surface of the scraper roll; but to prevent the possibility of any such undesired overrunning and to insure that the surface of the doctor roll will normally move at a lower rate of speed than the surface of the spreader roll, I may apply to the doctor roll a frictional brake which will always impose a slight resistance to rotation.

The accompanying drawing illustrates my invention: Fig. 1 is a fragmental side elevation of a glue-spreading machine; Fig. 2 is a somewhat similar view but with parts of the machine broken away; and Fig. 3 is a section on the line 3—3 of Fig. 1.

The machine illustrated comprises a frame 10 having a table 11 over which the boards or other

material to be coated with glue are passed. Beneath a transverse opening in this table there is rotatably supported from the frame 10 a lower spreader roll 12 which, at its top, projects a slight distance above the upper surface of the table 11 to insure contact with the lower surface of any object passed across the table. The lower spreader roll 12 has associated with it a scraper roll or doctor roll 13 which is rotatably mounted in suitable bearings on a carriage 14. The carriage 14 is slidably supported from the frame 10 for movement toward or away from the associated scraper roll 13, the position of the carriage being controlled as by a suitable adjusting screw 15.

If desired, the doctor roll 13 may be of such a diameter and so located relatively to the roll 12 as to provide between them a space within which a supply of glue 16 may be maintained. While such an arrangement is illustrated in the drawing, it is not essential to my invention, as it is possible to employ any arrangement in which the doctor roll 13 is so located as to limit the thickness of the glue-film carried by the spreader roll from the source of supply to the point of application to the work.

In order to adapt the machine to the coating of both sides of a board or similar article, a second spreader roll 20 is mounted above the spreader roll 12 and has associated with it a scraper or doctor roll 21. As in the case of the lower rolls 12 and 13, the rolls 20 and 21 may be arranged to provide between them a trough-like space containing a supply of glue 22. The quantities 16 and 22 of glue are confined and prevented from escaping at the ends of the rollers by plates 23 which bear against the ends of the rolls.

To adapt the machine for the application of glue or other coating material to the opposite sides of work of varying thickness, the upper rolls 20 and 21 are mounted on a head 25 which is supported for vertical sliding movement from the frame 10, as by being mounted on vertical ways 26. A screw 27 operated by a hand wheel 28, may be employed in the vertical adjustment of the head 25.

Each scraper roll and its associated doctor roll are interconnected by a pair of meshing gears 30 and 31, these gears being so proportioned that the peripheral speed of the doctor roll is somewhat less than that of the spreader roll. Desirably, all the rolls are operatively interconnected and driven from a common source of power (not shown). To this end there may be provided an idler gear 32 which meshes with the gear 31 of the lower doctor roll and with the gear 30 on the upper spreader roll; and to maintain the driving connection in any vertical position of the head 25, the idler gear may be

mounted co-axially with the pivotal interconnection of two swinging links 33 and 34 the respective outer ends of which are pivoted co-axially with the upper spreader roll 20 and lower doctor roll 13.

The machine as so far described is not novel. In its operation, the boards or other objects to be coated are passed across the table 11 between the spreader rolls 12 and 20 which engage the upper and lower surfaces of the work and apply the coating material thereto. The thickness of the films of coating material applied to the work is regulated by suitable adjustment of the screws 15 which control the distance between each spreader roll and its associated doctor roll. As previously pointed out, the rolls are frequently formed of soft material such as rubber or a gelatin composition which might be damaged if the two rolls of either pair are brought into contact while moving at different peripheral speeds. In practicing my invention to prevent the possibility of such damage, I connect each of the doctor rolls 13 and 21 to the gear which drives it through an overrunning clutch. This overrunning clutch may take any suitable form, that shown in the drawing being merely illustrative.

As will be apparent from Figs. 1 and 3, the clutch shown is of the roller type and comprises a plurality of clutch rollers 40 each mounted in a notch in a sleeve 41 which is rigid with the shaft 42 that carries the associated doctor roll. The rollers 40 are disposed within the bore of the gear 31, and the notches in which the rollers are received have inner surfaces inclined to cause the rollers to be wedged between them and the bore of the gear when the gear is driving the roll.

With a clutch such as that described, and with gears 30 and 31 proportioned as indicated, each doctor roll normally operates at a somewhat lower peripheral speed than does its associated spreader roll. However, should the doctor roll be brought into engagement with the scraper roll while the machine is operating, friction between the two rolls will tend to cause the doctor roll to rotate at a speed greater than normal. When this condition occurs, the rolls 40 are released from their wedging action and moved toward the deeper ends of the notches in which they are respectively located, thus breaking the operative connection between the doctor roll and the gear 31 which normally drives it and permitting the doctor roll to rotate freely with the same peripheral speed as that of the associated spreader roll. When contact between the doctor and spreader rolls is broken, the overrunning clutch is again engaged and the gear 31 drives the doctor roll at its normal speed.

Ordinarily, there will be sufficient resistance to rotation of the doctor roll to prevent it from overrunning except when there is actual contact between it and the associated spreader roll. In applying relatively viscous coatings, there may be sufficient adhesion at the point of approximate tangency between the doctor and scraper rolls to overcome the normal frictional resistance to rotation of the doctor roll and to cause it to rotate at the same peripheral speed as the spreader roll. As such a result would interfere with the application of a smooth coating of even thickness, it may in some instances be desirable

to apply a friction brake to each doctor roll in order to insure that nothing short of actual contact between the doctor and scraper rolls will cause the former to rotate more rapidly than at its normal speed. The brake indicated in the drawing comprises a strip 45 of flexible material which has one end secured to the adjustable bearing 14 and which, after passing over the sleeve 41, has a weight 46 or other tension-creating means connected to its opposite end.

It is to be understood that while the machine described has been referred to as a glue spreader my invention can be used in similar machines applying other coating materials.

I claim as my invention:

1. In a machine for applying a liquid coating material to a surface, a spreader roll rotatable in contact with a supply of coating material to convey the coating material from the supply to such surface in the form of a film, a scraper roll associated with said spreader roll to limit the thickness of such film, gearing normally interconnecting said rolls and proportioned and arranged to cause said scraper roll to rotate in a direction opposite to that of said spreader roll and at a lower peripheral speed, and an overrunning clutch acting between said gearing and said scraper roll to permit the latter to rotate at greater than its normal speed.

2. In a machine for applying a liquid coating material to a surface, a spreader roll rotatable in contact with a supply of coating material to convey the coating material from the supply to such surface in the form of a film, a scraper roll associated with said spreader roll to limit the thickness of such film, means for driving said rolls in opposite directions, said means being arranged to cause the scraper roll normally to rotate at a lower peripheral speed than said spreader roll, and an overrunning clutch disposed operatively between said driving means and said scraper roll.

3. In a machine for applying a liquid coating material to a surface, a spreader roll rotatable in contact with a supply of coating material to convey the coating material from the supply to such surface in the form of a film, a scraper roll associated with said spreader roll to limit the thickness of such film, power-transmitting means for driving said scraper roll from said spreader roll, said means operating to drive said scraper roll in a direction opposite to and at a lower peripheral speed than said spreader roll, and an overrunning clutch in said power-transmitting means.

4. In a machine for applying a liquid coating material to a surface, a spreader roll rotatable in contact with a supply of coating material to convey the coating material from the supply to such surface in the form of a film, a scraper roll associated with said spreader roll to limit the thickness of such film, means for driving said rolls in opposite directions, said means being arranged to cause the scraper roll normally to rotate at a lower peripheral speed than said spreader roll, said means including a clutch automatically releasable to permit said scraper roll to rotate at a speed greater than normal.

5. The invention set forth in claim 4 with the addition of a friction brake associated with said scraper roll and opposing rotation thereof.

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