April 4, 1950 R. KRASUCKI 2,502,795

ROLLER COATING MACHINE

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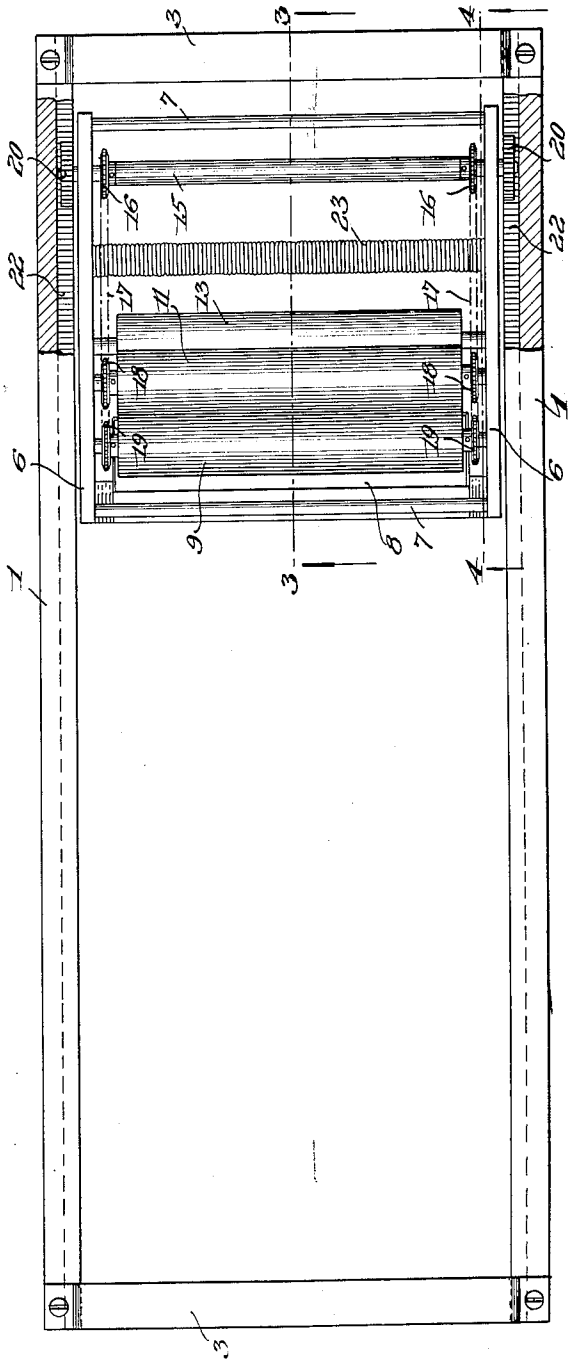


Fig. 1

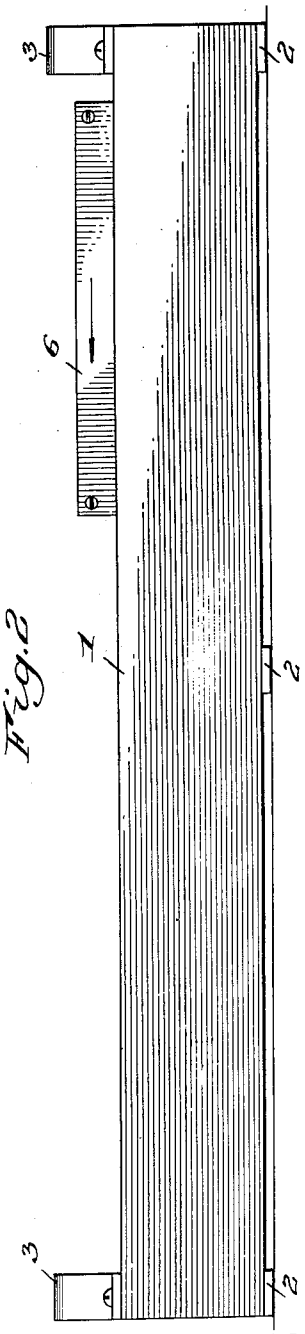


Fig. 2

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Fig. 3

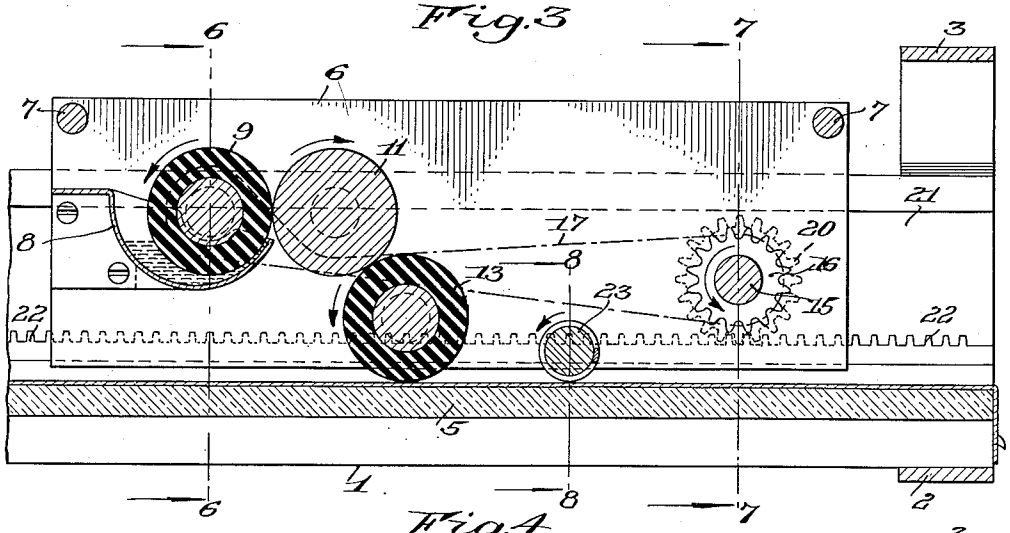


Fig. 4

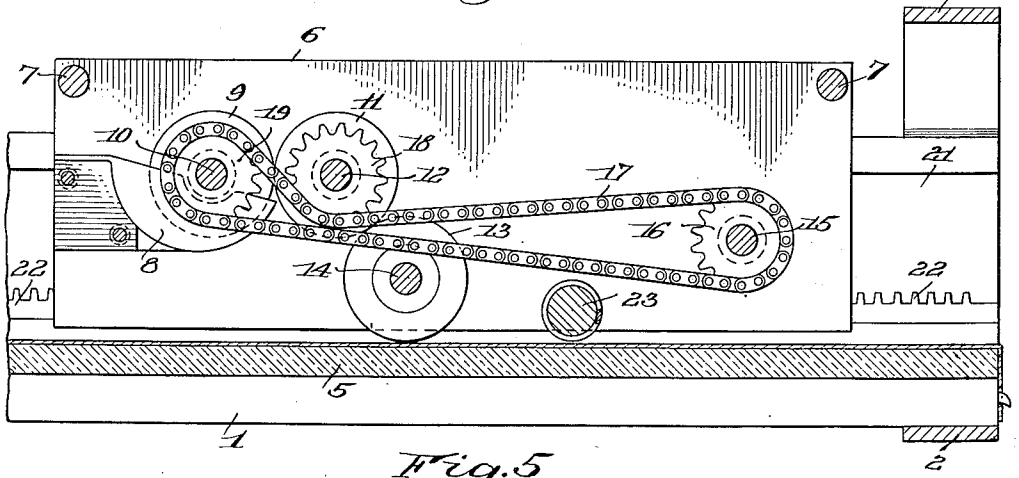
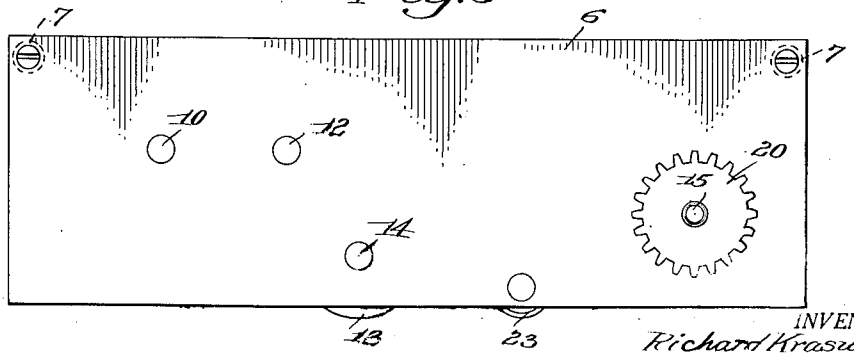


Fig. 5



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Fig. 6

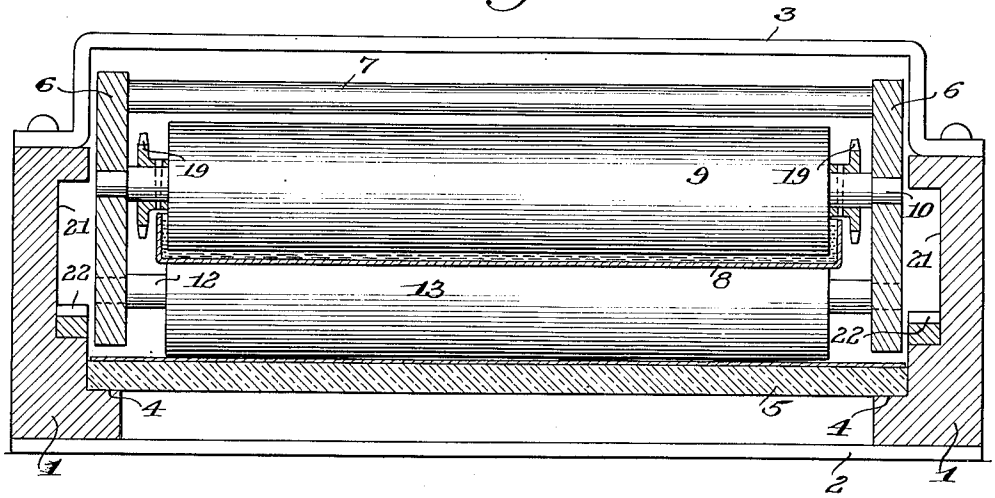


Fig. 7

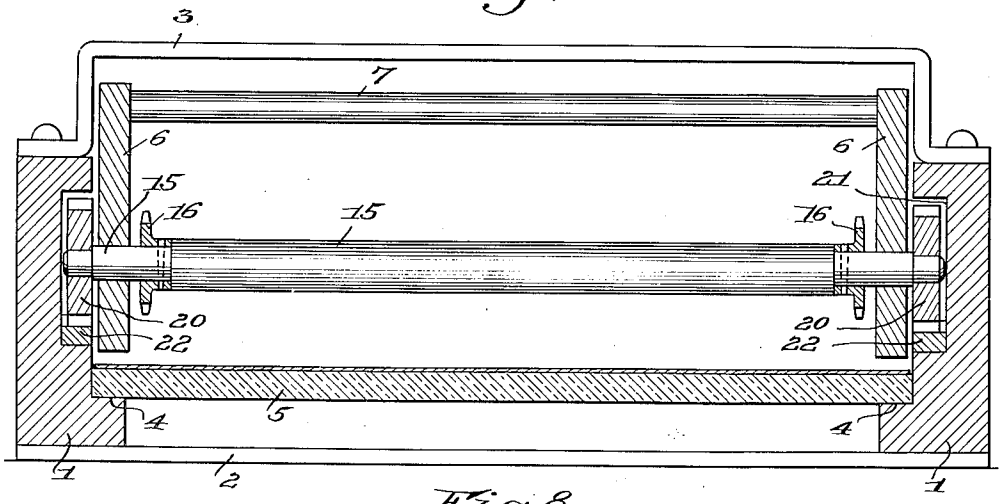
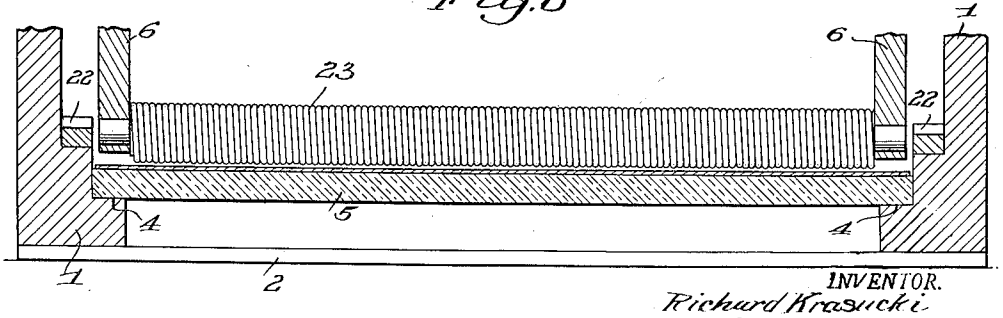


Fig. 8



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UNITED STATES PATENT OFFICE

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ROLLER COATING MACHINE

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Application December 18, 1947, Serial No. 792,377

10 Claims. (Cl. 91—33)

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This invention relates to a coating machine, and has for its purpose to afford a simple, compact, and practical construction for use in laboratory coating where it is frequently desirable to coat with different materials for experimental purposes.

The usual practice in laboratory coating is to employ a motor-driven production coating machine which must be thoroughly cleaned after each operation to remove all of the coating material from the rolls and to prepare the machine for use with another coating material which requires considerable time, and the present invention is designed to avoid this objection by providing a structure that can be quickly cleaned, enabling the machine to be used for coating but one or two sheets after which it can be easily cleaned and quickly made ready for coating with another material.

More specifically, the invention is intended to provide a structure in which the coating material and roll mechanism that must be cleaned are all mounted in a unit assembly that can be easily removed from the frame of the machine and immersed in a suitable liquid for cleaning purposes when it becomes necessary to remove the coating material from the rolls.

Another purpose of the invention is to afford a coating machine in which the roll mechanism unit is removable from the machine, and the rolls are operated to apply coating material to a sheet of paper or other material by means of driving mechanism that is automatically actuated by movement of the coating unit over the table of the machine.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Fig. 1 is a plan view of a machine constructed in accordance with a preferred embodiment of the invention;

Fig. 2 is a side elevation of the same;

Fig. 3 is a longitudinal vertical sectional view, somewhat enlarged and partially broken away, on the line 3—3 of Fig. 1;

Fig. 4 is a longitudinal vertical sectional view on line 4—4 of Fig. 1;

Fig. 5 is a view in side elevation of the roll mechanism unit removed from the machine;

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Fig. 6 is a transverse vertical sectional view on the line 6—6 of Fig. 3;

Fig. 7 is a transverse vertical sectional view on the line 7—7 of Fig. 3, and

Fig. 8 is a transverse vertical sectional view on the line 8—8 of Fig. 3.

Referring more particularly to the drawings in which like reference numerals refer to the same parts throughout the several views, the invention according to a preferred embodiment includes a frame consisting of side rails 1 connected by transverse bottom cross-bars 2 and top cross-bars 3. The side rails 1 are recessed at the bottom to provide shoulders 4 to support a table or base plate 5 of glass or other suitable material, which may be attached to the supporting shoulders 4 in any suitable manner, and afford a surface on which the paper or other sheet to be coated is positioned during the coating operation, the sheet being fixedly secured to the table 5 by suitable clamps or in any other preferred manner.

The frame just described may be positioned on any suitable base or support for a coating operation, and is provided with a removable roll mechanism unit that can be quickly arranged in operative position within the frame and moved endwise thereof manually, such endwise movement of the roll mechanism unit over the table and sheet being coated acting automatically to cause the necessary turning of the rolls to effect coating of the paper or other sheet, and the roll mechanism unit including the parts by which it is supported on the frame so as to effect turning of the rolls will now be described in detail.

The roll mechanism unit includes two side walls 6 which are connected by the transverse brace rods 7, and it will be understood that the roll mechanism unit is arranged between the side rails 1 and over the table 5 in the manner shown in Figs. 6 to 8.

Mounted between the side walls 6 is a receptacle or pan 8 within which the coating material, for instance emulsion, clay solution, wax, paint or other dope, is poured and held during the coating operation, the coating material being carried from the receptacle 8 by a rubber feed roll 9 that is mounted on a shaft 10 suitably journalled in the side walls 6. The rubber feed roll 9 rotates within the receptacle 8 and extends above the outer edge of the latter, as shown in Fig. 3 in contact with a stainless steel transfer roll 11 that is mounted on a shaft 12 which is likewise journalled in the side walls, 6 while 13 designates a

rubber applicator roll mounted on a shaft 14 which in turn is journalled in the side plates 6.

The rubber applicator roll 13 rests upon the paper or other sheet on the table 5, being held thereagainst by the weight of the roll mechanism unit, and as the latter is moved endwise of the table, the roll 13 rotates over the sheet to which the coating is to be applied and furnishes to the surface of the latter the coating material from the transfer roll 11, feed roll 9, and receptacle 8. To this end, the applicator roll 13 is mounted for frictional engagement with the stainless steel transfer roll 11 and the latter is in frictional engagement with the rubber roll 9, the rolls 9 and 11 being positively driven in opposite directions while the applicator roll 13 preferably rotates solely by frictional engagement with transfer roll 11 and with the sheet on the table 5.

To effect rotation of the rolls 9 and 11, a shaft 15 is journalled in the side plates 6 and has fixed thereon adjacent to the side plates 6 and between the latter the sprocket wheels 16, while 17 designates sprocket chains travelling around the sprocket wheels 16, sprocket wheels 18 mounted on shaft 12, and sprocket wheels 19 mounted on shaft 10, as shown in Fig. 4, so that when the shaft 15 is rotated, the rolls 9 and 11 are positively driven in opposite directions by the sprocket chains 17 through the sprocket wheels 19 and 18 respectively.

In order to drive shaft 15 when the roll mechanism unit is moved endwise of the table, the shaft 15 is provided with pinions 20 fixed thereon outwardly from the side plates 6. The pinions 20 extend into recesses 21 formed in the rails 1 and extending endwise thereof, the pinions 20 engaging and resting on the toothed racks 22 which are fixed to the bottoms of the recesses 21. Thus when the roll mechanism unit is manipulated endwise of the table, the pinions 20 travelling on the racks 22 effect rotation of the shaft 15 and thereby through the sprocket chain 17, as already described, feed the coating material and apply it from rubber roll 13 to the surface of the sheet being coated.

It is desirable to remove any surplus of coating material from the sheet and to insure a uniform thickness of the coating thereon, and to effect this, there is provided a cylindrical, spirally wire wound stainless steel roll 23 journalled in the side plates 6 and located behind the rubber roll 13 in parallel relation thereto. The roll 23 is maintained in predetermined relation to the sheet being coated in order to regulate the thickness of the coating, and as the roll mechanism unit is moved along over the table, the wire wound roll 23 rotates in engagement with the coating material, following behind roll 13, and pushes in front of it and to one side any surplus and thus effects a uniform thickness and even spread of the coating material.

The operation of the mechanism briefly is as follows: The roll mechanism unit is first removed from the machine by sliding it endwise of the table and immersed in any suitable cleaning liquid so that all of the previously used coating material is removed, and thereupon the roll mechanism unit is inserted in the machine by positioning the side plates 6 between the rails 1, see Fig. 6, with the pinions 20 in engagement with the toothed racks 22, see Fig. 7. In this initial position, the roll mechanism unit is supported by the pinions 20 resting on the toothed racks 22 and by the rubber roll 13 resting on the sheet to be coated which is first clamped to the table 5 and fixedly held by any suitable and convenient means. The selected coating material is then poured into the receptacle 8 and the operator, by engaging the cross-rod 7 or side plates 6, moves the roll mechanism unit endwise over the table 5, causing rotation of the rolls as already described, and thus effecting a uniform application of the coating material and distribution thereof in predetermined thickness over the surface of the sheet. The roll mechanism unit can then be removed from the outlet end of the machine and reinserted at the inlet end for coating a second sheet if desired, or when the required number of coating operations have been completed, the roll mechanism unit can be removed and cleaned in the manner already described, ready for further use with other coating material when desired.

The invention affords an economical and extremely practical mechanism for laboratory use in making experimental coatings, and effects a substantial saving of time where frequent coating operations are required with different materials and necessitate cleaning of the machine after the use of each coating material. While the invention has been described with reference to certain details of construction, it is not confined to the particular arrangement shown, and this application is intended to cover such modifications and departures as may come within the purposes of the improvements and the scope of the following claims.

I claim:

1. In a coating machine, the combination with a frame including a table, of toothed racks extending endwise of the table at both sides thereof, a roll mechanism unit movable endwise of the frame and table on said racks, said unit including a coating material receptacle, a positively driven feed roll mounted to turn in said receptacle, a positively driven transfer roll engaging the feed roll, a freely turning applicator roll engaging said transfer roll and a sheet on the table, said roll mechanism unit being removable endwise of the table from either end thereof, the table and racks being free of obstructions at both ends in the path of said roll mechanism unit permitting removal of the roll mechanism unit from one end of the table and insertion at the other end thereof, and means actuated by said racks when said roll mechanism unit is moved thereover acting to turn said positively driven rolls.

2. In a coating machine, the combination with a frame including a table, of a roll mechanism unit movable endwise of said frame and table, said unit including a coating material receptacle, a feed roll mounted to turn in said receptacle, a transfer roll engaging the feed roll, an applicator roll engaging the transfer roll and a sheet on the table, and a wire wound roll behind said applicator roll engaging said sheet frictionally, said roll mechanism unit being removable from the frame.

3. In a coating machine, the combination with a frame including a table, of a roll mechanism unit movable endwise of said frame and table, said unit including a coating material receptacle, a feed roll mounted to turn in said receptacle, a transfer roll engaging the feed rolls, an applicator roll engaging the transfer roll and a sheet on the table, a wire wound roll behind said applicator roll and engaging the sheet frictionally, said roll mechanism unit being removable from the frame, toothed racks at the sides of the frame, the table and racks being free of obstructions at

both ends in the path of said roll mechanism unit permitting removal of the roll mechanism unit from one end of the table and insertion at the other end thereof, a shaft carried by said roll mechanism unit and having pinions engaging said racks, and driving means connecting said shaft and one of said rolls.

4. In a coating machine, the combination with a frame including a table, of a roll mechanism unit movable endwise of said frame and table, said unit including side walls, a coating material receptacle supported between said side walls, a feed roll journalled in said side walls and turning within said receptacle, a transfer roll journalled in said side walls and engaging said feed roll, an applicator roll journalled in said side walls and engaging said transfer roll and a sheet on the table, a wire wound roll behind said applicator roll and engaging the sheet frictionally, said roll mechanism unit being removable from the frame, toothed racks at the sides of said frame, the table and racks being free of obstructions at both ends in the path of said roll mechanism unit permitting removal of the roll mechanism unit from one end of the table and insertion at the other end thereof, a shaft journalled in said side walls and having pinions engaging said racks, and driving means connecting said shaft and the feed and transfer rolls and moving them in opposite directions.

5. In a coating machine, the combination with a frame including a table, of a roll mechanism unit movable endwise of said frame and table, said unit including side walls, a coating material receptacle supported between said side walls, a feed roll journalled in said side walls and turning within said receptacle, a transfer roll journalled in said side walls and engaging said feed roll, an applicator roll journalled in said side walls and engaging said transfer roll, said applicator roll engaging the sheet and transfer roll frictionally, a wire wound roll journalled between said side walls behind said applicator roll and engaging the sheet frictionally, said roll mechanism unit being removabe from the frame, toothed racks at the sides of the frame, a shaft carried by the roll mechanism unit and having pinions engaging said racks, and driving means connecting said shaft and said feed roll in the receptacle.

6. In a coating machine, the combination with a frame including a table, of a roll mechanism unit movable endwise of the frame and table, said unit including side walls, a coating material receptacle supported between said side walls, a feed roll journalled in said side walls and turning within said receptacle, a transfer roll journalled in said side walls and engaging said feed roll, an applicator roll journalled in said side walls and engaging said transfer roll and a sheet on the table, said roll mechanism unit being removable from the frame, toothed racks at the sides of the frame, the table and racks being free from obstructions at both ends in the path of said roll mechanism unit permitting removal of the roll mechanism unit from one end of the table and insertion at the other end thereof, a shaft carried by the roll mechanism unit, pinions on said shaft outside said side walls engaging said racks, sprocket wheels on the shaft between said side walls, sprocket wheels on said feed and transfer rolls between said side walls, and drive chains connecting said sprocket wheels on the shaft with the sprocket wheels on the feed and transfer rolls.

7. In a coating machine, the combination with a frame including a table, of a roll mechanism unit movable endwise of the frame and table, said unit including side walls, a coating material receptacle supported between said side walls, a feed roll journalled in said side walls and turning within said receptacle, a transfer roll journalled in said side walls and engaging said feed roll, an applicator roll journalled in said side walls and engaging said transfer roll, said applicator roll engaging the sheet and transfer roll frictionally, a wire wound steel roll journalled between said side walls behind said applicator roll and engaging the coated surface frictionally, said roll mechanism unit being removable from the frame, toothed racks at the sides of the frame, a shaft carried by the roll mechanism unit, pinions on said shaft outside said side walls engaging said racks, sprocket wheels on the shaft between said side walls, sprocket wheels on said feed roll between said side walls, and drive chains connecting said sprocket wheels on the shaft with said sprocket wheels on the feed and transfer rolls.

8. In a coating machine, the combination with a frame including a table, of a roll mechanism unit movable endwise of said frame and table, said unit including an applicator roll engaging a sheet on the table, and a wire wound roll behind said applicator roll engaging said sheet frictionally, the table being free of obstructions at both ends in the path of the roll mechanism unit permitting removal of the roll mechanism unit at one end and insertion at the other end thereof.

9. In a coating machine, the combination with a frame including a table, of roll mechanism movable endwise of said frame and table including an applicator roll, toothed racks at both sides of the table extending endwise thereof, the table and racks being free of obstructions at both ends in the path of the roll mechanism permitting removal of the roll mechanism at one end and insertion at the other end thereof, a shaft carried by said roll mechanism having pinions engaging said racks, a wire wound roll behind said applicator roll for engaging a coated surface frictionally, and driving means connecting said shaft and said roll mechanism.

10. In a coating machine, the combination with a frame including a table, of toothed racks extending endwise of the table at both sides thereof, a roll mechanism unit supported on said racks for movement endwise of the frame and table, said roll mechanism unit including an applicator roll, and a wire wound roll behind said applicator roll for engaging a coated surface frictionally, the table and racks being free of obstructions at both ends in the path of the roll mechanism unit permitting removal of the roll mechanism unit at one end and insertion at the other end thereof.

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