Jan. 12, 1954 R. L. RICHMOND ET AL 2,665,662

COATING MACHINE FOR SHEET MATERIAL

Filed June 13, 1951

4 Sheets-Sheet 1

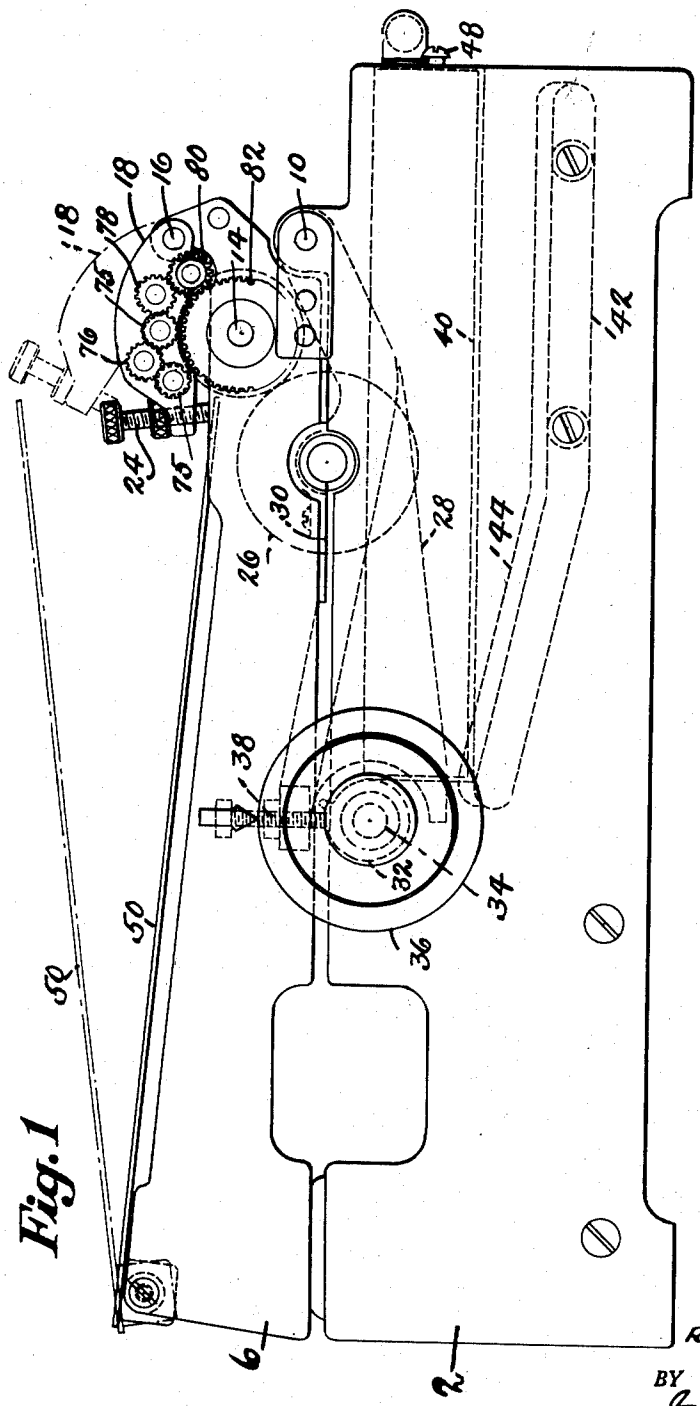


Fig. 1

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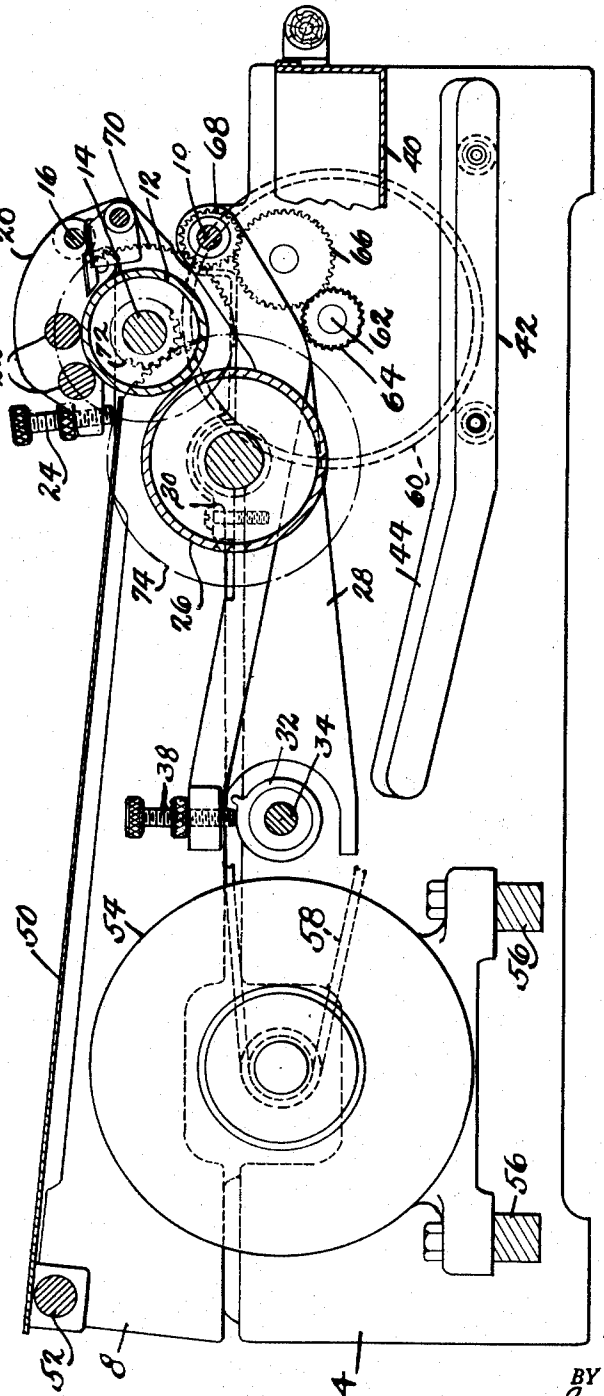
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Fig. 2



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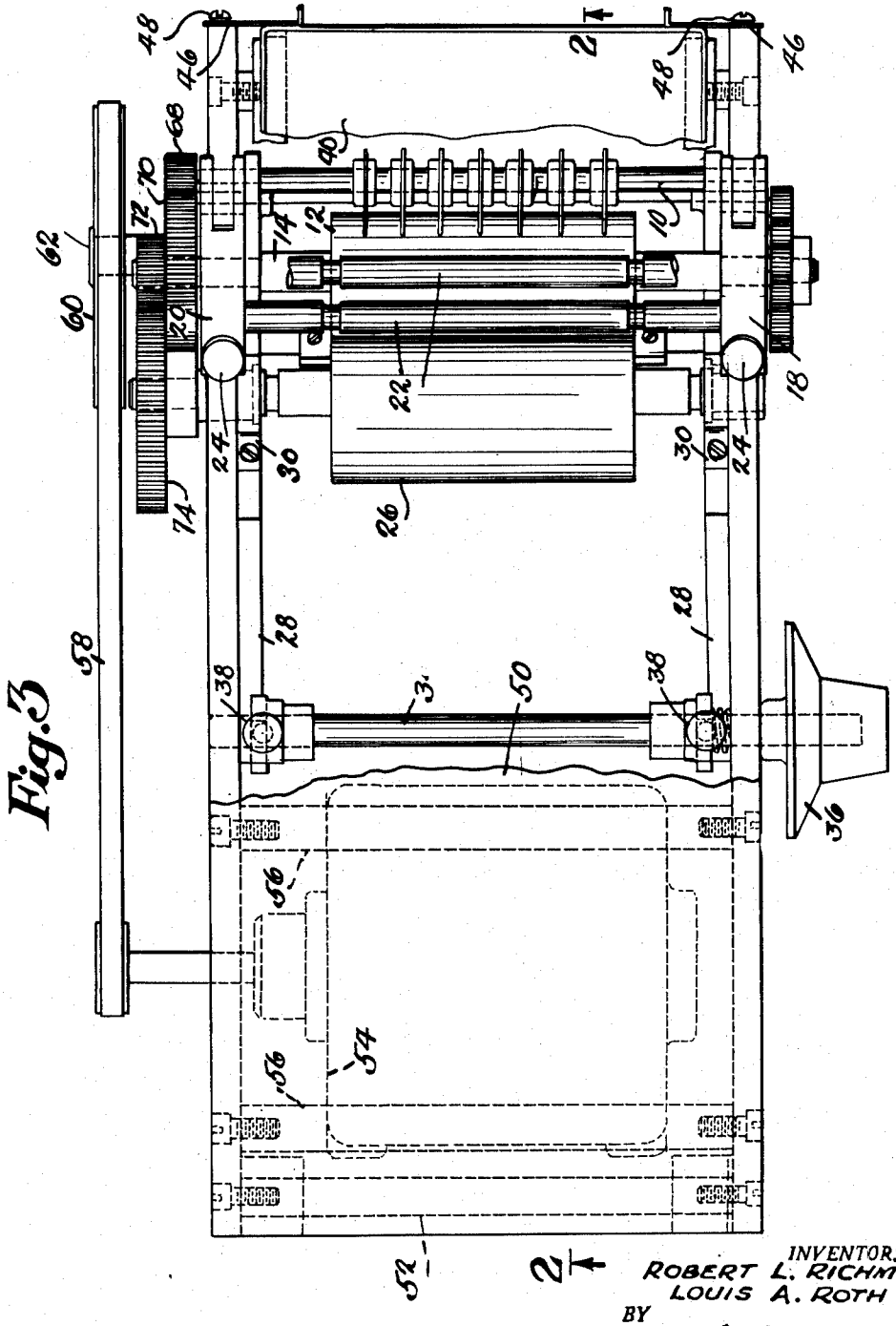


Fig. 3

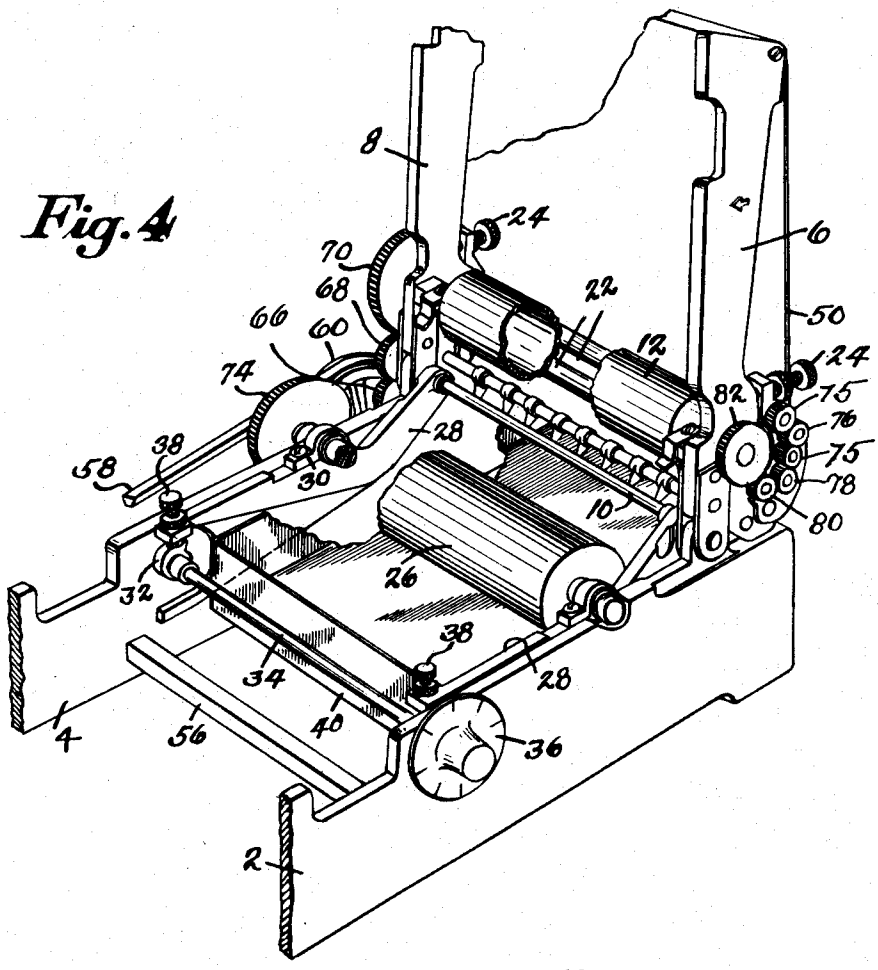
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COATING MACHINE FOR SHEET MATERIAL

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Fig. 4



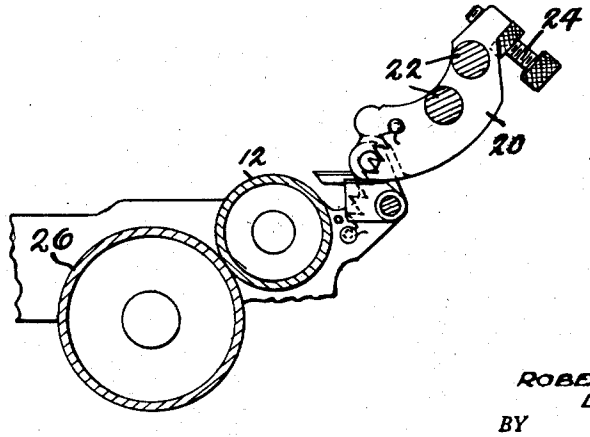


Fig. 5

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UNITED STATES PATENT OFFICE

2,665,662

COATING MACHINE FOR SHEET MATERIAL

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Application January 13, 1951, Serial No. 205,844

7 Claims. (Cl. 118—246)

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This invention relates to an improvement in coating machines for glue, latex, varnish, lacquer, etc. and has for one of its objects to provide a coating machine which is of such simple construction that the same may be efficiently operated by unskilled labor to produce the finest coatings over the entire area of the material being coated.

The machine is operable with equal facility with either hot or cold coating materials and is adapted to apply coatings accurately to sheets of various sizes and shapes.

Another important feature of our improved machine is the novel construction employed whereby the time required for clean-up is reduced to a minimum.

In general, our improved machine comprises a machine frame or supporting frame, which carries a readily removable coating tank, which may be slipped into and out of the machine without disturbing any other parts of the machine.

The tank roller is mounted in bearings in a pair of arms pivoted to the machine frame at the rear of the machine, means being provided for quickly and accurately adjusting the position of these arms whereby the amount of coating material applied to the cooperating coating roller may be readily regulated, so that the tank roller, in effect, is a combined tank and ductor roller.

Means are provided whereby the tank roller arms may be adjusted independently of each other, to secure accurate parallelism with the cooperating coating roller when this is desired, or to set the tank roller out of parallelism with respect to the coating roller when it is desired to apply a thin coat of coating material along one side of the surface of the material being coated and a thicker coating over the remainder of the surface.

The feed table is journalled at the front end of the machine, so that it may readily be raised to expose the tank roller.

The coating roller is disposed immediately adjacent the tank roller, so as to receive coating material therefrom. The machine frame is divided lengthwise into upper and lower sections, the upper sections being pivoted at the rear of the machine to the lower sections. The coating roller is mounted in fixed bearings in the upper frame sections, so that there is no adjustment of these bearings relative to the upper frame sections.

The feed rollers are journalled in two brackets at the rear end of the machine, these brackets being pivoted on the two arms constituting the upper part of the machine side frames.

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With the construction just briefly described, it will be appreciated that, by swinging the brackets carrying the feed rollers rearwardly of the machine, the coating roller will be exposed, and that, by swinging the arms constituting the upper sections of the machine frames upwardly, the combined tank and ductor roller will be exposed. These features all contribute to making the machine parts readily accessible for cleaning and impart to the machine as a whole the flexibility and accessibility so desirable in coating machines in general.

In the accompanying drawings,

Fig. 1 is a side elevation of a coating machine embodying our invention;

Fig. 2 is a section along the line 2—2 of Fig. 3;

Fig. 3 is a plan view;

Fig. 4 is a perspective view in part section of the machine with the upper section of the machine in raised position; and

Fig. 5 is a fragmentary view showing the feed rollers swung rearwardly.

Referring to the drawings in detail, 2 and 4 designate the lower sections of the side frames and 6 and 8 the upper sections of the side frames of the machine.

The upper sections 6 and 8 of the side frames are pivoted at their rear ends to the rear ends of the lower frame sections 2 and 4, so that they constitute a pair of arms overlying the lower frame sections and extending to the front of the machine and capable of being swung from a horizontal to a vertical position about rod 10, which, in effect, constitutes a tie rod.

12 designates the coating roller, and it is mounted on shaft 14, which is journalled in fixed bearings in the upper frame sections 6 and 8 above the tie rod 10.

Pivoted at 16 to the upper side frames or coating roller arms 6 and 8 are brackets 18 and 20. The feed rollers 22 are journalled in these brackets. As will be brought out later, the feed roller gears are carried by one of these brackets and swing rearwardly when the brackets are swung from the position shown in Fig. 2, for example, to the position shown in Figs. 4 and 5.

The setting of the feed rollers with respect to the coating roller 12 is controlled by a stud 24 threaded through the free end of each bracket, its inner end engaging the edge of the arms 6 and 8.

Through the construction so far described it will be seen that the feed rollers may be swung rearwardly to expose the coating roller, and that the latter may be swung rearwardly to expose the tank roller 26.

The tank roller 26 is journalled in a pair of arms 28, pivoted at their rear ends upon the rod 10. These tank roller arms extend along the inside of the lower frame sections 2 and 4. The bearings for the tank rollers are capped, as seen at 30, so that, by removing these caps, the roller may readily be lifted out of its bearings.

The forward end of each of the tank roller arms 28 is forked or bifurcated, and these forks straddle a cam 32, which is provided on each end of an adjusting rod 34, which bridges the side frame sections 2 and 4, this rod being rotatable through calibrated knob 36. By providing the forked arms 28, straddling cams 32, the arms 28 are limited in motion and the tank roller will not rise with the coating roller should the adhesive being used have the tendency to cement the rollers together when the adhesive is dry.

A stud 38 is threaded through the upper fork of each of the arms 28 and bears upon the cams 32. By adjusting these studs, the tank roller may be adjusted into exact parallelism with the coating roller, and the amount of coating material transferred to the coating roller may be precisely regulated. It will be appreciated also that this construction provides for setting the tank roller out of parallelism with the coating roller, whereby a heavier coating may be applied along one side or edge of a material being coated than over the remainder of the material. This is often desirable.

The tank for the coating material is designated 40. This tank or pan may be inserted into the machine or removed therefrom without disturbing the rest of the machine parts.

To the inner face of each of the lower side frame sections 2 and 4, we rigidly affix tank guides 42. These guides are horizontal throughout part of their length and then extend upwardly at a slight angle, as seen at 44. The tank or pan is simply slipped into the rear end of the machine with its end resting upon the guides 42 and then pushed inwardly; then its rear end is raised and the clips or brackets 46 are slipped behind the heads of the screws or pins 48, provided for this purpose on the rear ends of the side frame sections 2 and 4.

The pan is then supported horizontally, with its inner end resting upon the guides 44 and its outer end supported by the pins 48.

The feed table for the machine is designated 50. It is pivoted at its front end on rod 52, which spans the upper sections 6 and 8 of the machine frame and is capable of being raised either with the arms or frame sections 6 and 8, as illustrated in Fig. 4, or independently thereof. In Fig. 1, the table is shown in broken lines partially raised.

The driving motor for the machine is designated 54. This motor is mounted on supports 56, which are secured between the lower frame sections 2 and 4 near the front of the machine. Belt 58 transmits power from the motor to the main drive pulley 60.

The main drive pulley 60 is mounted on a stud 62, mounted on the lower side frame section 4, and this stud carries a gear 64, meshing with gear 66, in turn meshing with gear 68. The gear 68 meshes with gear 70 on the shaft of the coating roller to drive the coating roller. On the shaft 14 of the coating roller is pinion 72, adapted, when the upper side frame sections or arms are in lowered position, to mesh with gear 74 on the tank roller shaft to drive the tank roller.

The gear train just described is at one side of the machine.

The drive for the feed rollers 22 is at the opposite side of the machine. This drive comprises pinions 75 on the feed roller shafts, gears 76 and 78, and gear 80 meshing with 76. These gears are all carried by the bracket 18 and swing with the bracket.

The gear 80 meshes with a gear 82 on the shaft of the coating roller when the brackets 18 are in operative position.

It will be quite apparent from all of the foregoing that our invention provides a coating machine of simple construction, wherein the coating roller and feed rollers may be swung out of position to expose the tank roller and tank, enabling the machine to be cleaned in a matter of minutes. The tank obviously is quickly removable, and the upper frame sections may be lifted or raised to permit easy access to or removal of the tank roller.

It will be appreciated that the adjustability of the tank-ductor roller permits precision coating over the entire sheet, whether the coating is to be of the same thickness over the entire surface of the material or thicker along one side or edge than over the remainder of the surface.

It will also be appreciated that all of the necessary adjustments of this machine may be accomplished while the machine is running and without the use of tools. In order to make a machine truly versatile, it must have a wide range of adjustment. The increment of adjustment as represented by lines or numbers on dial or knob 36 must not be too fine to be practical for the average operator, but by use of the adjustable thumb screws 38 we are able to set the opening between the ductor roller and coating roller for any practical coating requirement and regulate that coating within given limits by means of the adjustment of the cam 32.

Also by means of the adjusting screws for the feed rollers, we can set them to feed very thin paper or fabric and to feed heavy cardboard or similar material, such as shoe soles.

It is to be understood that changes may be made in the details of construction and arrangement of parts within the purview of our invention.

What we claim is:

1. A coating machine comprising, in combination, a pair of opposed side frames; a pair of arms pivotally mounted at their rear ends on said frames; a tank roller removably journalled in said arms intermediate the ends of the arms, the outer ends of each arm being forked; a cam at the outer end of each arm straddled by the forked end of the arms whereby abnormal raising of the roller is prevented; means for independently adjusting the said arms relatively to their respective cams and means for rotating said cams simultaneously thereby to effect a bodily raising or lowering of the tank roller.

2. A coating machine comprising, in combination, a pair of lower side frames, a pair of upper side frames pivotally attached thereto, a pair of arms pivoted to the lower side frames on the axis of pivot of the upper side frames, a tank roller removably journalled in said arms, a coating roller journalled in the upper side frames, and a feed table pivoted to the upper side frames at the end remote from the point of attachment of the upper and lower side frames to each other, whereby, as the upper side frames are pivoted away from the lower side frames, the coating roller and feed table will move with them to expose the tank roller.

3. A coating machine comprising, in combination, a pair of opposed side frames; a tank roller between the frames; a tank insertible between the side frames at one end of the machine; tank guides along the inner face of the side frames, said guides toward their rear ends inclining upwardly toward the tank roller; and means at the rear ends of the side frames for supporting the outer end of the tank level with the inner end of the tank.

4. A coating machine comprising, in combination, a pair of opposed side frames, a pair of pivoted arms carried thereby, a tank roller journalled in said arms, a coating roller cooperating with the tank roller, cam means for adjusting said pivoted arms to adjust the tank roller relatively to the coating roller, and a feed roller cooperating with the coating roller, said coating roller being pivotally mounted so as to be swingable away from the tank roller to expose the tank roller, and the feed roller being pivotally mounted so as to be swingable away from the coating roller to expose the coating roller.

5. A coating machine comprising, in combination, a pair of opposed lower side frames; a pair of opposed upper side frames, pivoted at one end to the corresponding end of the lower side frames; a tank roller carried by the lower side frames; a coating roller carried in the upper side frames; feed rollers cooperating with the coating roller; and a pair of opposed brackets carrying the said rollers and pivoted to the said upper side frames, pivoting of the upper side frames relatively to the lower side frames carrying the coating roller away from the tank roller to expose the same, pivoting of said brackets away from the coating roller carrying the feed rollers away from said coating roller to expose the same.

6. A coating machine comprising, in combination, a pair of opposed lower side frames; a pair of opposed upper side frames, pivoted at one end to the corresponding end of said lower side frames; a tank roller carried by the said lower

side frames; a coating roller carried in the upper side frames and cooperating with said tank roller; feed rollers cooperating with the said coating roller; a pair of opposed brackets pivoted to the upper side frames and carrying the said feed rollers; and a gear train for the feed rollers carried by one of said brackets; pivoting of the upper side frames away from the lower side frames carrying the coating roller, the feed rollers and the brackets away from the tank roller to expose the same, and pivoting of said brackets away from the coating roller carrying the feed rollers and the gear train therefor away from the coating roller to expose the same.

7. A coating machine comprising, in combination, a tank roller, bearings therefor, a coating roller, bearings therefor, a feed roller, and bearings therefor; the coating roller and its bearings being pivotally mounted so as to be swingable away from the tank roller to expose the same, the feed roller and its bearings being pivotally mounted so as to be swingable away from the coating roller to expose the same, the said pivoting of the feed roller being independent of the said movement of the coating roller.

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