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DEVICE FOR SEAMLESS COATING OF PRINTING FORMS, ESPECIALLY OF PRINTING CYLINDERS

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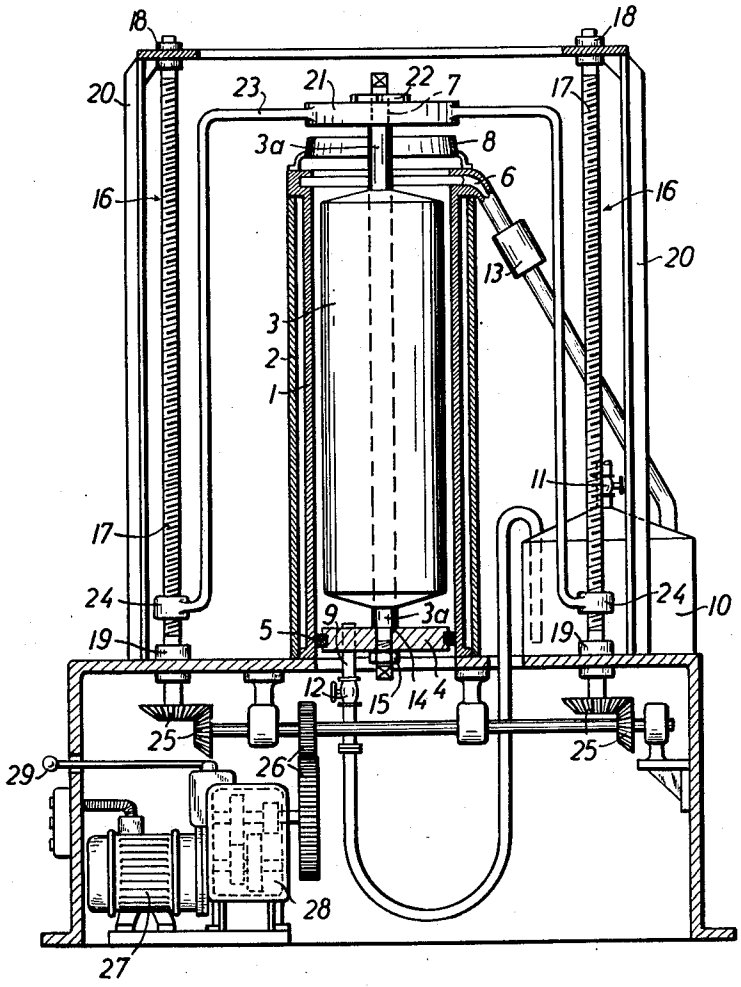

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DEVICE FOR SEAMLESS COATING OF PRINTING FORMS, ESPECIALLY OF PRINTING CYLINDERS

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6 Claims. (Cl. 118—58)

This invention relates to a device for seamless coating of printing forms, especially of printing cylinders or copper cylinders, with a photo-colloid-solution which is a layer sensitive to light.

Several methods are already known for providing copper cylinders with a seamless layer of photo-colloid. For instance, the layer has been applied upon a cylinder disposed within a horizontal centrifugal machine and rotating about its own axis. Further, it has heretofore been attempted to form the layer upon the cylinder rotating in a lathe by applying the overflowing colloid by means of a slide rest or the like. There is also known the use of a ring through which the cylinder is drawn. With the hitherto known methods a uniform thickness of the layer cannot be obtained. Besides, the result of the coating process depends largely on the ability of the operating person and a reliable operation cannot be assured. In printing cylinders which have to be used for endless printing of long sheets as, for instance, sheets of paper, it is necessary especially in multicolor printing that the layer is always even and uniform as otherwise displacements of the patterns in endless printing result.

The present invention has for its object the provision of a device which provides a completely uniform coating in a simple and reliable manner. The method according to the invention is esentially characterized in that the colloid solution in the container receiving the printing form is kept at a constant level and that the printing form is drawn up within the container in its longitudinal direction and is subjected at the free end thereof to the influence of heat. Preferably, the colloid solution is discharged from the container at the height of the solution level during drawing up the printing form from the container. Suitably, the layer applied to the printing form is progressively dried upon leaving the colloid solution. Further, it is of importance that wetting of the printing form by the colloid solution is effected in such a manner that the solution introduced into the container receiving the printing form is rising from the bottom of the container. The method according to the present invention offers the advantage that a completely even layer of uniform thickness is obtained. Troubles and damages by the formation of bubbles are prevented. The method assures a secure and clean operation.

The device for carrying out the method according to the invention is preferably formed in such a manner that the container is provided with a piston-like bottom which is moved simultaneously with the printing form drawn up from within the container. The container is provided with an overflow for keeping constant the level of the colloid solution. The printing form is guided on the one hand by the bottom of the container which is moved simultaneously with the printing form and on the other hand by an upper support. Preferably, the printing form may be drawn up from the container with adjustable speed. The variation of the speed influences the thickness of the applied layer. The supply of the colloid solution is

suitably effected through the movable bottom so that the colloid solution may rise into the container. Filling of the container with the solution is effected in this manner by a laminar current. The formation of bubbles is thereby prevented. Such a device assures a reliable and uniform result of the operation. Cleansing of the device is very simple.

The figure on the drawing illustrates by way of example one embodiment of the device according to the invention.

The container **1** which receives the colloid solution and the printing form to be coated, preferably the printing cylinder, is advantageously formed as a tube. It may be provided with a jacket **2** to keep the colloid solution within the tube **1** at a fixed temperature. The printing cylinder **3** is mounted in such a manner in the container **1** that it is movable in a longitudinal direction. The bottom **4** of the container is movable in tube **1** and it is suitably formed as a piston which closely seals tube **1** by means of the packing ring **5**. For keeping constant the level of the colloid solution, the container **1** is provided with an overflow **6** which is formed as an annular channel with a continuous slot or with single openings. The axle **3***a* of printing cylinder **3** is fixed thereto and is journaled in guide bearing **7**. The bearing is formed in such a manner that it may be moved in the direction of the longitudinal axis of the printing cylinder by means of a mechanical or an electrical drive. In the extension of the axis of container **1** a heating device **8** is suitably provided by means of which the applied colloid layer may be dried.

The colloid solution is suitably supplied to the container **1** through bottom **4**. The excess of the solution is taken by a storage container **10** from overflow pipe **6** into which is inserted a filtering device **13**. Supply pipe **9** opens into storage container **10** which is suitably arranged laterally from container **1**.

The drawing further shows the means for securing the cylinder **3** to the piston **4** comprising a shoulder **14** on the shaft **3***a*, on which the cylinder **3** is mounted. The end of the shaft **3***a* is provided with the thread upon which the nut **15** has been screwed.

The means for moving the printing cylinder consists of rods **16** provided with threads **17** on their whole length. The rods **16** are supported in journal bearings **18** and **19** of the frame **20**. The free end of the shaft **3***a* of the cylinder **3** is fastened with a plate **21** by nut **22**. The plate **21** is a part of the frame **23**, which ends in nuts **24** engaging the thread **17** of the rods **16**. The rods **16** are driven by means of the bevel gears **25** and the spur gears **26**, which are driven by the motor **27**. If the rods **16** are turned in one direction the frame **23** together with the cylinder **3** will be moved up. When turning the rods in the other direction the frame **23** and the cylinder **3** will be moved downwards.

The adjustable speed means consists of a transmission gearing **28**. The speed may be adjusted by the gear shift lever **29**.

The coating process according to the invention is effected as follows:

After insertion of the printing cylinder **3** into container **1**, the colloid solution is introduced from storage container **10** from below into container **1**, for instance, by means of compressed air which is supplied to the closed storage container by means of pipe **11**. The excess of the colloid solution returns into container **10** through overflow pipe **6**. Now valve **12** of supply pipe **9** is closed. After that, cylinder **3** is drawn up slowly from tube **1**, for instance, by means of a gear, the piston-like bottom **4** being moved simultaneously therewith. Pipe **9** may be interrupted beneath valve **12** or may consist of a sufficiently long flexible tube. The displaced colloid

solution is discharged through overflow pipe 6. The speed of the upward movement depends on the desired thickness of the layer. The heating device 8, preferably an electrical heating device, provides for rapid drying of the applied layer immediately upon the same leaving the colloid solution.

This application is a division of our prior copending application S. N. 433,246, filed May 28, 1954.

What is claimed as new, is:

1. A device for seamless coating of a printing cylinder, comprising an elongated cylindrical open-ended container for a colloid solution, said container being of a greater diameter than a printing cylinder, which is insertable therein so as to provide for free axial movement of the printing cylinder within the container during the coating operation, means for supplying a coating solution to the bottom of said container and overflow means for discharging the same from the top of said container, a piston securable to the bottom end of the printing cylinder, when the cylinder is inserted in the container, said piston also being provided with means for sealing off the bottom end of the container, and means for moving the printing cylinder and said piston upward and for withdrawing the printing cylinder from the container, whereby during said upward movement the lower level of the colloid solution will be moved upwardly proportionately to the upward movement of the printing cylinder and piston.

2. The device as set forth in claim 1 and further characterized in that the overflow means at the top of said container comprise a peripheral drain channel around said container having a horizontal overflow lip in the wall of the container for keeping the level of the colloid solution in the container constant during the upward movement of the printing cylinder as it is withdrawn from the container.

3. The device as set forth in claim 1 including means for moving the printing cylinder from said container at

adjustable speeds and wherein said piston is securable to the bottom end of the printing cylinder at the central portion thereof, whereby said piston will also act as a centering guide for the printing cylinder during the upward movement thereof, in the said container.

4. The device as set forth in claim 1 wherein said solution supply means include a passage through said piston.

5. A device for coating a printing cylinder comprising a cylindrical container, open at one end for receiving said printing cylinder, a piston closing the other end of the container and rigidly securable to the one end of the printing cylinder when the cylinder is disposed within the container, means including conduit means carried by said piston for supplying a colloid solution to said container, means for moving said printing cylinder axially upwardly within said container, as the wall of the cylinder is coated by said solution, overflow means for portions of the solution displaced by the movement of the piston as the printing cylinder is withdrawn from the container and conduit means connected to said overflow means for returning the displaced portions of the solution from said overflow means to a source of solution supply.

6. The device as set forth in claim 5 including cylindrical heating means disposed in axially spaced relation to the first mentioned end of the container for receiving said printing cylinder and for drying the coating on the printing cylinder after the printing cylinder has been withdrawn from the said container.

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