United States Patent [19]

Bray

[11] **3,745,626**

[45] **July 17, 1973**

[54] **COATING ROLL**

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[73] Assignee: **Magna-Graphics Corp.**, Dayton, Ohio

[22] Filed: **Dec. 27, 1971**

[21] Appl. No.: **212,452**

[52] **U.S. Cl.** **29/129**

[51] **Int. Cl.** **B21b 31/08**

[58] **Field of Search** 29/118, 129, 130, 29/129.5

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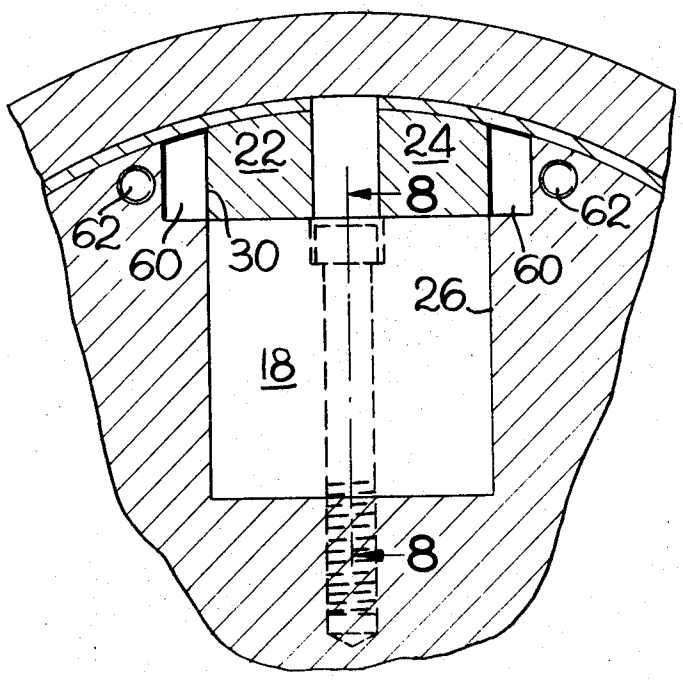
Primary Examiner—Alfred R. Guest

Attorney—James E. Nilles

[57] **ABSTRACT**

A coating roll including a cylinder having permanent magnetic holding members seated in slots provided in the cylinder and having magnetizable bars on each end of the mat and a flexible magnetizable backing sheet. The mat is held on the cylinder by the magnetic force of the magnetic members. A pair of adjusting wedges are provided to register the first magnetizable bar on the cylinder and a second pair of tightening wedges are provided to wedge the second magnetizable bar toward the first magnetizable member.

18 Claims, 12 Drawing Figures



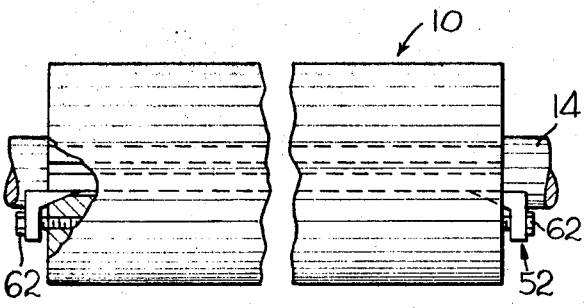


FIG. 1

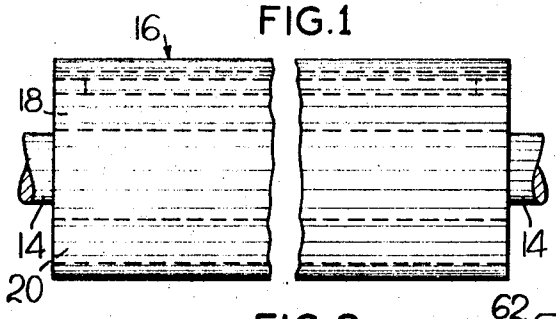


FIG. 2

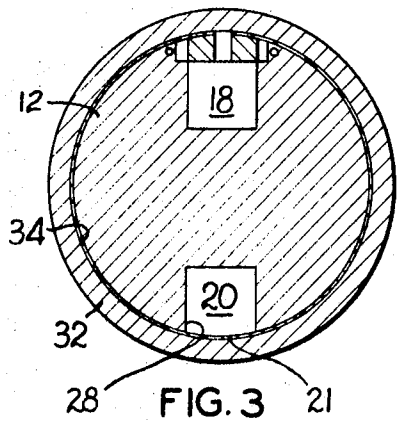


FIG. 3

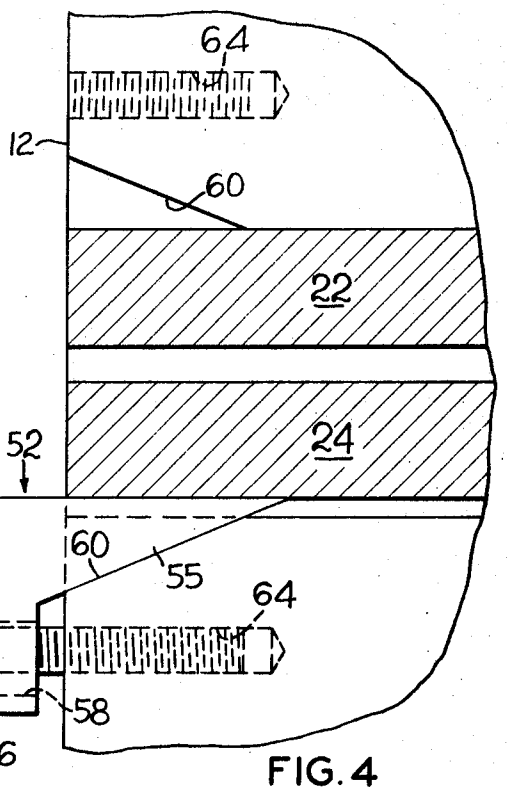


FIG. 4

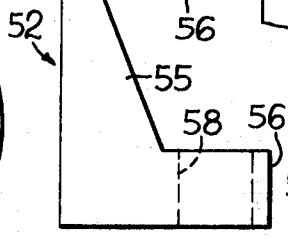


FIG. 6

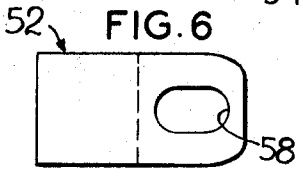


FIG. 7

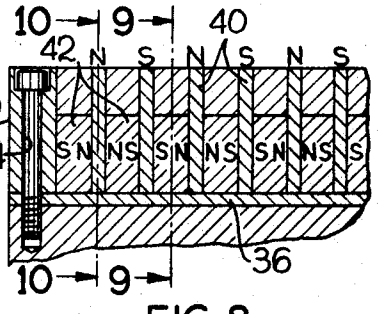


FIG. 8

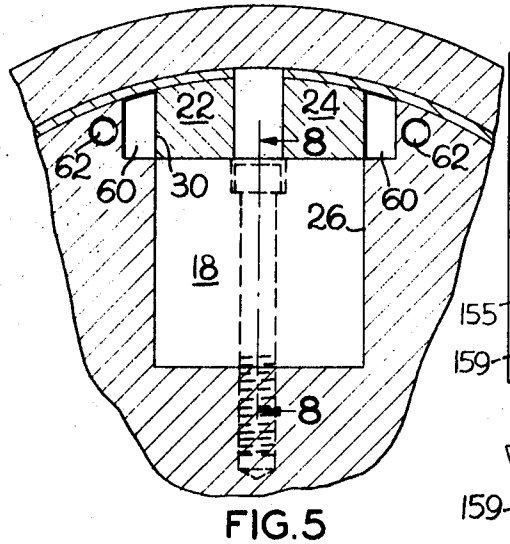


FIG. 5

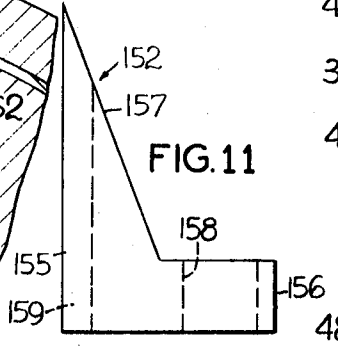


FIG. 11

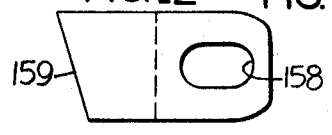


FIG. 12

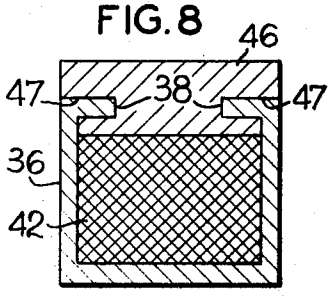


FIG. 9

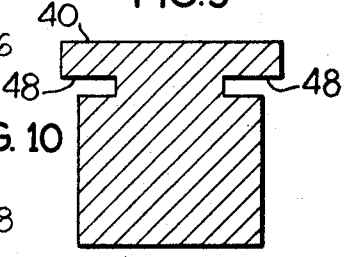


FIG. 10

COATING ROLL

BACKGROUND OF THE INVENTION

In my copending application U.S. Ser. No. 157,182, filed June 28, 1971, entitled "Coating Mat," which issued as U.S. Pat. No. 3,714,692 on Feb. 6, 1973, magnetic members were provided at each end of the coating mat to magnetically secure the mat to the cylinder. Since the mats have a comparatively short life, the cost of the mat is of primary importance. Although the system disclosed therein has operated successfully, the time required to assemble the mat on the cylinder, to register the mat on the cylinder as well as the cost of the mat made that system economically impractical.

SUMMARY OF THE INVENTION

The coating mat of the present invention overcomes the above disadvantages by providing permanent magnetic members in slots on the cylinder to magnetically hold the mat in position on the cylinder. The coating mats are provided with low cost magnetizable bars on each end which are positioned within the slot for one of the permanent magnetic members. Assembly of the mat on the cylinder is simplified by providing a second permanent magnetic member on the opposite side of the cylinder to magnetically hold a flexible magnetic sheet provided on the back of the coating mat. A substantial part of the weight of the coating mat is held by a second magnetic member making it easier to wrap the remaining portion of the mat around the other side of the cylinder. Registration of the mat is simplified by merely using wedges to cam the magnetizable bars on the mat to a predetermined position in the slot in the cylinder. The mat is locked on the cylinder by a second pair of wedges which are used to squeeze the magnetizable bars together in the slot. With this arrangement a mat can be replaced on a cylinder with a minimum of down time and at a substantial reduction in cost of the mat.

Other objects and advantages will become apparent from the following description of the invention when read in connection with the accompanying drawings.

THE DRAWINGS

FIG. 1 is a side view in elevation of the coating roll of this invention with a coating mat in position on the cylinder;

FIG. 2 is a top view of the coating roll of FIG. 1 with the registering and adjusting wedges removed;

FIG. 3 is an end view of the coating roll showing the location of the permanent magnetic members and the magnetizable members on the coating mat;

FIG. 4 is an enlarged view of a section of one end of the cylinder showing the slot arrangement with one of the wedges shown in a position to be drawn into the slot;

FIG. 5 is an enlarged view of a portion of the cylinder roll showing the magnetizable members on the ends of the coating mat positioned within the slot in the cylinder;

FIG. 6 is a top view of one of the wedges used to adjust and tighten the magnetizable members on the coating mat in the slot in the cylinder;

FIG. 7 is an end view of the wedge shown in FIG. 6;

FIG. 8 is a section view taken on line 8—8 of FIG. 5 showing a portion of one of the magnetic members which are provided in the slots in the cylinder;

FIG. 9 is a section view taken on line 9—9 of FIG. 8 showing one of the permanent magnets;

FIG. 10 is taken on line 10—10 of FIG. 8 showing the shape of the pole pieces and end spacer;

FIG. 11 is a view of an alternate form of the wedge having two tapered surfaces; and

FIG. 12 is an end view of the wedge of FIG. 11.

DESCRIPTION OF THE INVENTION

Referring to FIGS. 1, 2 and 3 of the drawings, the coating roll 10 generally includes a cylinder 12 having axially extending mounting shafts 14 located on each end and a coating mat 16 wrapped around the outer circumference of the cylinder 12. The coating mat 16 is held on the outer periphery of the cylinder by means of magnetic member 18 provided in a slot 26 in the cylinder 12 and by means of a pair of magnetizable bars 22, 24 provided on the ends of the coating mat 16. The members 22 and 24 are inserted into slot 26 and are held therein by the magnetic field of the magnetic member 18. The weight of the mat 16 is supported during assembly on the cylinder 12 by means of a second permanent magnetic members 20 provided in a slot 28 as more fully described below.

ROLL CYLINDER

More particularly the cylinder 12 is provided with a slot 26 on one side, a second slot 28 can be provided on the diametrically opposite side. The permanent magnetic member 18 is seated and registered in the slot 26 with the magnetic member 18 recessed inwardly from the outer periphery of the cylinder 12 to leave a space 30 for the magnetizable members 22 and 24. The second permanent magnetic member 20 is seated in the second slot 28 with the outer surface 21 machined to the same curvature as the surface of cylinder 12.

COATING MAT

The coating mat 16 includes a flexible rubber mat 32 bonded to a flexible magnetizable metallic sheet 34. The magnetizable members or bars 22 and 24 are secured to the metallic sheet 34 by spot welding or the like. The sheet 34 and members 22 and 24 can be formed of any magnetic material. The coating mat 16 is formed by mounting the mat 34 with the magnetizable bars 22 and 24 attached on a dummy cylinder and molding the rubber coating mat 32 directly onto the outer surface of the magnetic sheet 34.

MAGNETIC MEMBERS

Referring to FIGS. 8, 9 and 10, a portion of one end of the magnetic members 18 and 20 is shown. The magnetic members are substantially similar to the magnetic members which were disclosed in my copending application, Ser. No. 157,183 for a "Magnetic Printing Cylinder." In this regard the magnetic member is formed of a channel piece 36 having inwardly extending flanges 38 at the top. Alternately arranged within the channel member 36 are spacers 40 and permanent magnets 42. The permanent magnets 42, as seen in FIG. 9, are made of a ceramic permanent magnetic material and are held in position by separator 46 having slots 47. The magnets 42 are embedded within a low-shrink epoxy to hold the magnets in position within the channel piece 36. It should be noted that the magnets 42 are alternately reversed so that the N poles are adjacent N poles and S poles are adjacent S poles. The

spacers 40 are provided with slots 48 which cooperate with the flanges 38 to hold the spacers within the channel members. End pieces 50 are provided at each end of the channel member 36 and are of substantially the same configuration as the permanent magnets 42 but have a greater thickness to accommodate a bolt 52 which is inserted through a hole 54 in the end piece to hold the channel member 36 in position in the slots 26 and 28 in the cylinder.

REGISTRATION WEDGES

Means are provided for registering the coating mat 16 on the cylinder 12. Such means is in the form of a pair of registering wedges 52 of the type seen in FIG. 6 and 7. Each of the registering wedges 52 include a tapered section 55 and a mounting flange 56 having a slot 58. The wedges 52 are mounted on the end of the cylinder 12 as seen in FIG. 4, and are positioned to engage tapered surfaces 60 provided at each end of the slot 26 provided in cylinder 12. The wedges 52 are drawn inwardly toward the cylinder 12 by means of bolts 62 threadedly received in threaded openings 64 in the end of the cylinder 12. The slot 58 allows the wedge 52 to move laterally as the wedge is drawn up on the tapered surface 60.

Means are provided for locking the members 22 and 24 tightly within the slot 26 in the cylinder. Such means is in the form of a pair of locking wedges 52 which are identical to the adjusting wedges 52. After the members 22 and 24 have been inserted into the slot 26 and registered, the locking wedges 52 are inserted into corresponding tapered surfaces 60 and drawn into the slots by means of bolts 62.

In assembly, the cylinder 12 is held in a fixed position with the slot 26 on the top and the slot 28 on the bottom. The mat 16 is positioned and registered on one side of the cylinder 12 with magnetizable bar 22 positioned in the space 30 in the slot 26. The adjusting wedges 52 are positioned in the tapered slots 60 and the bolts 62 are drawn tight to move the bar 22 to the preset or registration position with respect to the cylinder 12. The mat 16 is then pulled around the bottom of the cylinder to bring the magnetizable sheet 34 into engagement with the magnetic member 20 provided in slot 28. A substantial portion of the weight of the mat is then held by the magnetic member 28 and the mat then wrapped around the other portion of the cylinder and the magnetizable bar 24 inserted into the space 30 in the slot 26. The locking wedges 52 are then aligned with the corresponding tapered surfaces 60 and drawn up tightly by bolts 62 to lock the bars 22 and 24 tightly within the slot 26.

MECHANICAL HOLD DOWN

In some instances, it may be desirable to mechanically lock the mat in position on the cylinder 12. This can be accomplished by means of a tapered wedge 152 as seen in FIGS. 11 and 12. In this regard, the wedge 152 includes a tapered section 155 and a mounting flange 156 having a locking slot 158. A tapered wedging surface 157 is provided on one side and a tapered locking surface 159 is provided on the other side of the tapered section 155. The bars 22 and 24 should be provided with tapered surfaces corresponding to the tapered surface 159 on the wedges. When wedge 152 is inserted into the tapered section 62, the tapered surface 157 can be used to register the bar 22 or wedge the bar 24 toward bar 22. The tapered surface 157 will mechanically engage the adjacent surface on the bar 22 or 24 and will draw the bar downward into tight engagement with the cylinder. It should be noted that a magnetic hold down is not required when a mechanical locking wedge is used.

RESUME

The coating roll of this invention is provided with a coating mat which can be quickly and easily replaced when worn at an economical cost. The coating mat has a magnetizable bar at each end that cooperates with a permanent magnetic member to securely hold the mat in position. The weight of the mat is reduced during assembly by providing a magnetizable backing sheet on the coating mat that is held against the cylinder by a second magnetic member on the cylinder roll.

I claim:

1. A coating roll for a die cutting or coating machine, said roll comprising a cylinder having an axially extending slot in the outer surface, a permanent magnetic member positioned in said slot in a spaced relation to the surface of said cylinder, a resilient coating mat wrapped around the outer periphery of said cylinder and first magnetizable means on one end of the mat positioned in said slot and held therein by the magnetic force of said permanent magnetic member.

2. The roll according to claim 1 including means for registering said one end of the mat with said cylinder.

3. The roll according to claim 1 including second magnetizable means on the other end of said mat, said second means being positioned in said slot and held therein by the force of said magnetic member.

4. The roll according to claim 1 wherein said cylinder includes a second slot in the surface of said cylinder and a second permanent magnetic member positioned in said second slot, the outer surface of said second magnetic member being flush with the surface of said cylinder and said coating mat including a flexible magnetizable sheet on the back of said mat to engage said second magnetic member.

5. The roll according to claim 4, wherein said mat includes a second magnetizable means on the other end of said mat, said second magnetizable means being positioned in said first slot and held therein by the force of said magnetic member.

6. The roll according to claim 5 including first means positioned to engage said first magnetizable means for registering said first magnetizable means in said slot.

7. The roll according to claim 6 including second means positioned to engage said second magnetizable means for locking said first and second magnetizable means in said slot.

8. The roll according to claim 7 wherein said first and second means each include a tapered locking surface positioned to engagedthe magnetizable means to mechanically lock the mat to the roll.

9. A coating roll for a die cutting or coating machine, said roll comprising; a cylinder having axially extending slots on diametrically opposite sides of said cylinder, one of said slots being deeper than the other said slot, a permanent magnetic member in each of said slots, one of said permanent magnetic members having an outer configuration conforming to the outer surface of said cylinder and the other of said permanent magnetic members being recessed inwardly from the outer surface of said cylinder, a resilient coating mat mounted

on the outer surface of said cylinder and a magnetizable bar on each end of said mat, said magnetizable bars being positioned in the deeper of said slots and held therein by the force of the permanent magnetic member therein.

10. The roll according to claim **9** including means for registering one of said magnetizable bars with respect to the surface of said cylinder.

11. The roll according to claim **9** including a second means for locking said magnetizable bars in said slot.

12. The roll according to claim **9** wherein said mat includes a magnetizable backing sheet, said one of said permanent magnets holding said backing sheet against the surface of said cylinder.

13. The roll according to claim **9** wherein said deeper of said slots includes outwardly tapered surfaces at each end, a pair of adjusting wedges positioned to slide on said tapered surfaces and means for moving said wedges inwardly into engagement with one of said bars to adjust the angular position of said bar with respect to the surface of said cylinder.

14. The roll according to claim **12** including a second set of wedges positioned to slide on the oppositely disposed tapered surfaces and means for moving said second wedges inwardly to lock said bars in said slot.

15. The roll according to claim **14** wherein said first and second sets of wedges each include a tapered locking surface for mechanically engaging and locking said magnetizable bars in said slot.

16. A coating roll for a die cutting or coating machine, said roll comprising:

a cylinder having an axially extending slot in the outer surface,

a permanent magnet member in said slot,

a resilient coating mat mounted on the outer surface of said cylinder,

a bar secured to each end of said mat and being positioned in said slot,

said bars being formed from a magnetizable material whereby said bars are held in said slot by the magnetic force of said bar,

first means within said slot for registering said mat on said cylinder,

and second means within said slot for mechanically locking said bars in said slot.

17. The roll according to claim **16** wherein said mat includes a magnetic layer on the surface adjacent said cylinder and a second slot on the diametrically opposite side of said first slot and a second permanent magnetic member in said second slot, whereby the magnetic force of said second magnetic member will attract the layer of magnetic material on said coating roll.

18. The roll according to claim **16** wherein said first registering means comprises a wedge having a tapered surface positioned to engage the side wall of said slot and said second locking means comprises a tapered surface on said wedge positioned to engage said bar.

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