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Pugh et al.

[11] **3,824,927**

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[54] **LAMINATED MAGNETIC PRINTING ROLL ASSEMBLY**

[75] Inventors: **K. O. Pugh,** Atlanta; **Howard Ivey,** Austell; **C. A. Cobb,** Decatur, all of Ga.

[73] Assignee: **Ruralist Press, Inc.,** Atlanta, Ga.

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[21] Appl. No.: **110,874**

[52] **U.S. Cl.** ..... **101/378,** 101/382 MV, 101/395

[51] **Int. Cl.** **B41f 27/02**

[58] **Field of Search** ..... 101/382 MV; 40/142 A

[56] **References Cited**

UNITED STATES PATENTS

2,774,302	12/1956	Stromme	101/382 MV
2,902,930	9/1959	Hurlbut	101/269 X
3,093,919	6/1963	Holtz	40/142 A
3,180,259	4/1965	McKay	101/382 MV
3,217,641	11/1965	Goffredo	101/395
3,312,167	4/1967	Lash	101/382 MV
3,670,646	6/1972	Welch	101/382 MV

Primary Examiner—Clyde I. Coughenour
Attorney, Agent, or Firm—Mason, Fenwick & Lawrence

[57] **ABSTRACT**

A cylindrical printing roll is provided with a radial shoulder having a flexible magnetic material secured to its outer surface for maintaining a thin magnetically attractable printing plate on the outer surface of the magnetic material with a positioning pin extending from the shoulder into an aperture in the printing plate for maintaining the printing plate in desired aligned position on the roll.

14 Claims, 3 Drawing Figures

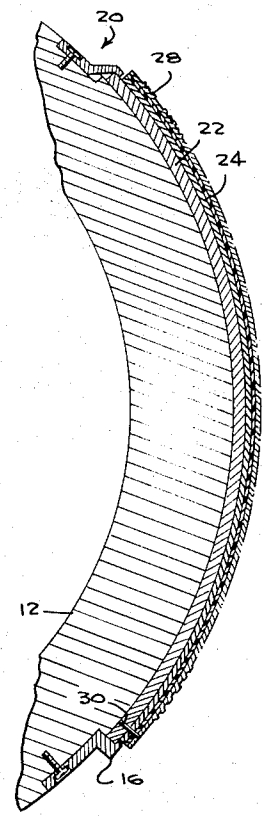


Fig-1

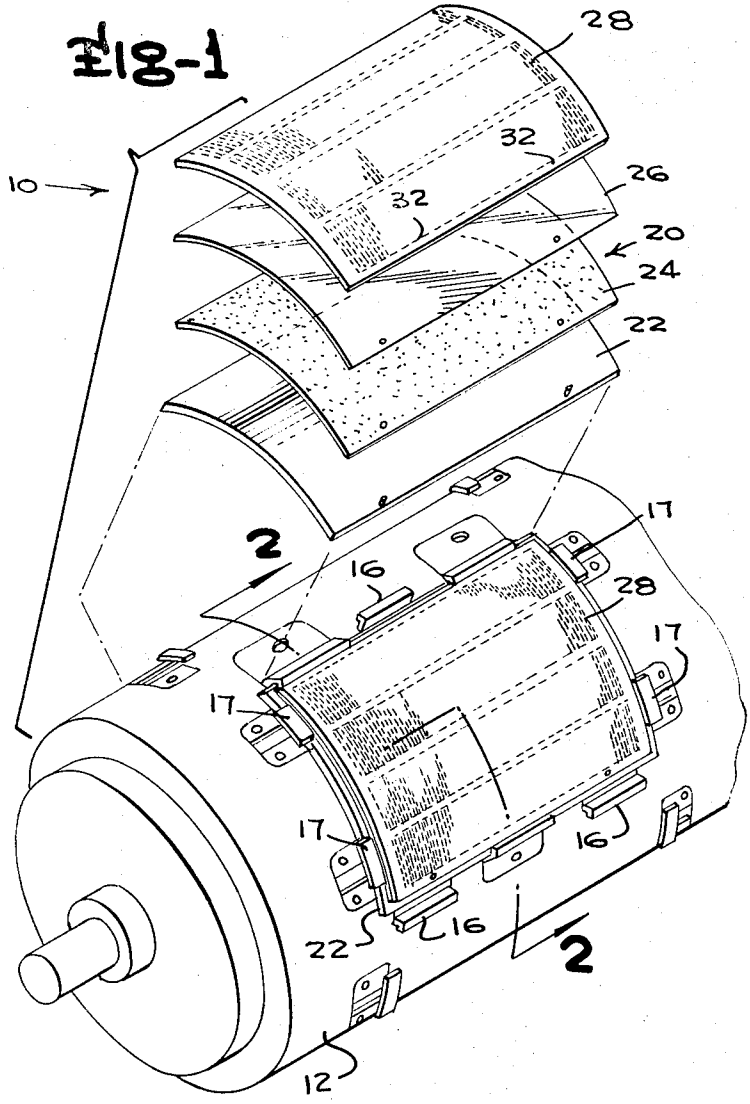
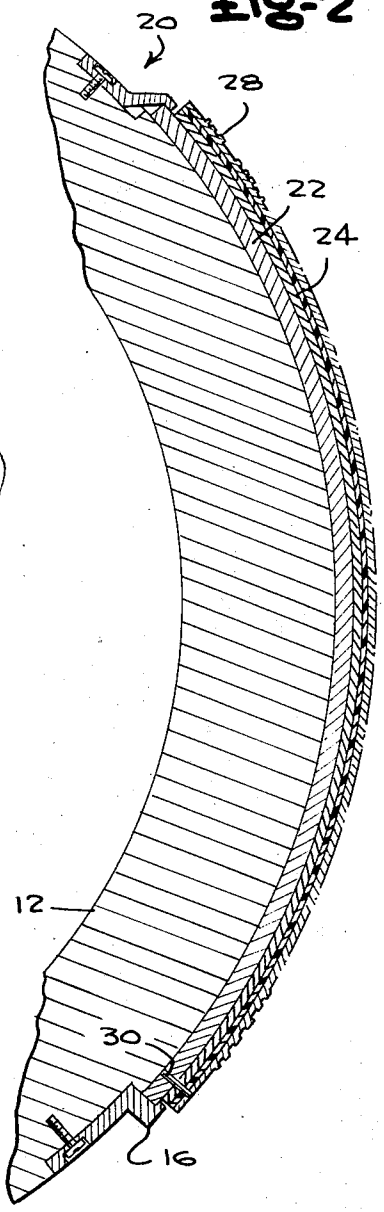


Fig-2



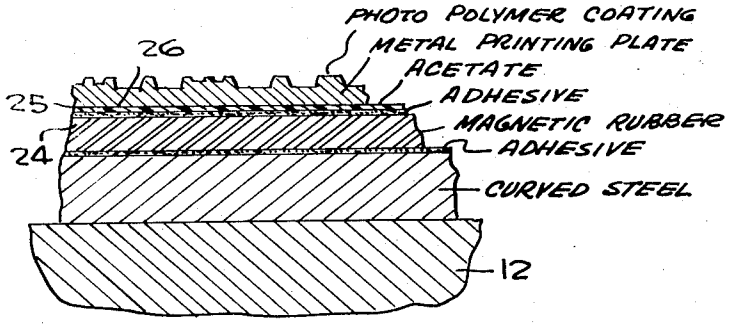


Fig-3

LAMINATED MAGNETIC PRINTING ROLL ASSEMBLY

This invention is in the field of printing and is specifically directed to the field of printing members and is even more specifically directed to the field of printing elements in which the printing member is held in position by magnetic force.

Numerous prior known systems have evolved for the purpose of attaching printing plates to rotary cylinders for use in subsequent printing operations. For example, there are many known devices in which mechanical connections provided by clamps, screws, brackets or the like are employed for retaining the printing member in position. Such devices are quite complicated and consequently expensive to manufacture and maintain.

Moreover, recent developments in the field of printing plates have included the development of new lightweight thin printing elements which cannot be easily secured to a conventional supporting roller by means of the clamps or other attachment means currently used on such rollers. While magnetic means have been employed for maintaining a printing element in position on specially designed supporting rolls previous to this invention, the prior known devices have not proven to be satisfactory in that they are frequently complicated, expensive and greatly lacking in versatility in that they can only be used with specific type printing members. For example, U.S. Pat. No. 2,788,743 illustrates a complicated printing roll assembly in which an electromagnetic means is provided on the interior of the roll for maintaining printing elements in position on the surface of the roll. The device of this patent is obviously quite complex and expensive to manufacture and maintain.

Other prior known systems such as that shown in U.S. Pat. No. 2,774,302 have employed a unitary combination of magnets and printing elements in the form of a composite member which is attached to the external surface of the printing roller. The unitary member including the magnets must be removed from the roller in order to remove the printing member and this fact greatly limits the versatility of the devices employing printing members of this type.

Still other printing devices have employed permanently embedded magnets in a roll for securing the external printing member to the exterior of the roll. U.S. Pat. No. 3,509,819 illustrates such a system. However, the devices of the last-mentioned type are obviously expensive to construct and also suffer from the shortcoming that the magnetic elements eventually lose their strength and must be replaced.

Previous attempts to provide satisfactory magnetic printing plate attachment means have resulted in the need for a complete modification of the printing roll with which the device is associated. Since there are literally thousands of conventional printing rolls employing clamps or other mechanical components for clamping a plate in position on the roll, it is obviously highly desirable that the owners of such rolls should be able to use any new magnetic printing plate attachment means on the rolls. However, this has not been possible with prior known magnetic plate attaching systems.

Therefore, there has remained an as yet unmet need for a magnetic type printing plate attachment means usable with a conventional printing roll which would be

inexpensive to manufacture and maintain and which would provide a reliable trouble-free service.

For these reasons, it is the primary object of this invention to provide a new and improved printing member in which the printing element is held in position on a conventional roll by magnetic means.

Obtainment of the object of this invention is enabled through the provision of a metal saddle connectable to a conventional roll by the plate clamps on the roll. A relatively thin flexible magnetic sheet is adhesively secured to the outer surface of the saddle. Additionally, a radially extending pin extends from the saddle for mating receipt in apertures in a flexible printing plate secured to the outer surface of the magnetic material by the magnetic force of the magnetic material. The pin maintains the printing plate in fixed position with respect to the cylinder and the magnetic material holds the plate in position on the cylinder. The saddle member is arcuately curved and of the same general configuration as conventional curved printing plates and is easily attached and removed from the roll in the same manner as the printing plates. Therefore, the device is easily convertible back to the conventional method of plate attachment and is completely versatile.

A better understanding of the invention will be understood when the following written description is considered in light of the attached drawings in which:

FIG. **1** is a perspective view of the preferred embodiment illustrating the exploded components of a laminated printing member and a unitary printing member attached to a printing roll;

FIG. **2** is a sectional view taken along lines **2—2** of FIG. **1**; and

FIG. **3** is an enlarged view of a portion of FIG. **2.**

The preferred embodiment, which is generally designated **10,** combinationally comprises a conventional printing roll **12** of cylindrical configuration. A plurality of end plate clamps **16** and side plate clamps **17** movable by conventional means are provided in the roll **12** for clamping printing plates or the like to the outer surface of the roll in a manner well-known to those skilled in the art. Any conventional plate clamp and actuating assembly can be employed in the cylinder with examples of such assemblies being found in U.S. Pat. Nos. 1,604,653; 1,860,916, 1,916,777 and 2,832,288. The particular clamp assembly and actuator means employed with the cylinder forms no part of the invention; however, it should be understood that the invention is usable with practically all conventional printing roll mounted gripper plates of the type normally used for gripping the relatively thick cast printing plates well-known to those skilled in the art.

A laminated magnetic printing plate support and assembly **20** is provided for attachment to the exterior of roll **12** and includes an arcuate metal saddle member **22** which is curved in the manner of the well-known rigid printing plates widely used in the industry and which is dimensioned in essentially the same manner as such plates so as to be held in position by means of the conventional plate clamps **16** and **17.** The saddle member **22** is easily removed from the roll **12** by merely releasing the clamps **16** in a manner which will be obvious to those skilled in the art.

A relatively thin sheet of flexible rubber-like magnetic material **24** is secured to the outer surface of the saddle member **22** by both magnetic attraction of the magnetic material to the saddle member and the em-

ployment of adhesive material **25** between the two elements. A protective sheet **26** formed of acetate or other synthetic material devoid of any magnetic shielding effect is adhesively secured to the outer surface of the sheet **24** of magnetic material for protecting sheet **24.**

Sheet **24** provides a magnetic field of force which operates on a thin plate element **28** having portions which are susceptible to magnetic attraction so that the element **28** is held in position on the outer surface of the sheet **24.** Plate element **28** is preferably a conventional member formed of a thin steel backing member having an outer periphery surface comprising a thin coating of photo-polymer material. Plates of this type have previously been secured to a support cylinder by means of adhesive material which has not been entirely satisfactory due to slippage and movement of the plate on the cylinder. The entire plate element **28** can be of magnetically attractable material if desired. Alignment pins **30** extend radially outward from the saddle member **22** through the magnetic material **24** and through alignment apertures **32** in plate **28** for insuring that the printing plate element **28** is in the proper position on the roll **12** in order that proper registry can be obtained and maintained.

It will be obvious that the printing plate **28** can be easily removed from the roll by exertion of a radial peeling force pulling it away from the magnetic sheet **24.** Moreover, the saddle member **22** can obviously be removed if it should be desired to use the roll for printing with the older conventional heavier plates of the type normally clampable in position by the plate clamps.

While the preferred embodiment employs adhesive for securing the magnetic sheet **24** in position, it should also be understood that in some instances the magnetic sheet could be secured solely by virtue of its magnetic attraction for saddle member **22.** These and other modifications will be obvious to those skilled in the art and it should be understood that the spirit and scope of the invention is to be limited solely by the appended claims.

We claim:

1. A printing means comprising a main support member having an outer surface, a saddle member connected to said outer surface, a magnetic member formed of a unitary flat flexible magnetic material secured to said saddle member and a magnetically attractable printing plate member magnetically adhered to said magnetic member by the magnetic force of the magnetic member.

2. The invention of claim **1** wherein said main support member comprises a conventional plate roll of cylindrical configuration.

3. The invention of claim **2** wherein said saddle member comprises a curved metal member secured to said plate roll.

4. The invention of claim **3** additionally including adhesive means securing said flexible magnetic member to said saddle member.

5. The invention of claim **4** additionally including aligning means extending from said saddle member for engagement with said printing plate member to accurately position said printing plate member with respect to said saddle member.

6. The invention of claim **5** wherein said aligning means comprises pin means.

7. The invention of claim **3** additionally including aligning means extending from said saddle member for engagement with said printing plate member to accurately position said printing plate member with respect to said saddle member.

8. The invention of claim **7** wherein said aligning means comprises pin means.

9. The invention of claim **1** additionally including adhesive means securing said flexible magnetic member to said saddle member.

10. The invention of claim **9** additionally including aligning means extending from said saddle member for engagement with said printing plate member to accurately position said printing plate member with respect to said saddle member.

11. A laminated printing means comprising a saddle member dimensioned to be clamped in a conventional printing roll by conventional plate clamps so as to enable the usage of the printing means in such a conventional printing roll, said saddle member having an outer surface, a flexible sheet of magnetic material attached to said outer surface and a magnetically attractable printing plate member magnetically adhered to said sheet of magnetic material by the magnetic force of said sheet of magnetic material.

12. The invention of claim **11** wherein said saddle member comprises an arcuately curved metal member.

13. The invention of claim **12** additionally including adhesive means securing said flexible magnetic member to said saddle member.

14. The invention of claim **13** additionally including aligning pin means extending from said saddle member for engagement with said printing plate member to accurately position said printing plate member with respect to said saddle member.

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