Dec. 15, 1931. J. K. VANATTA 1,837,084

MARKING ROLL

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Fig. 1

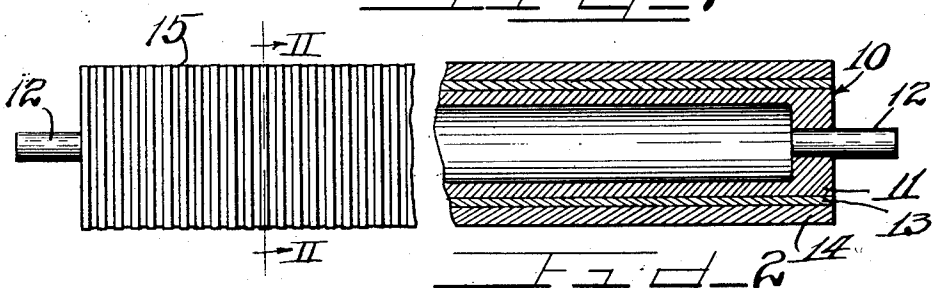


Fig. 2

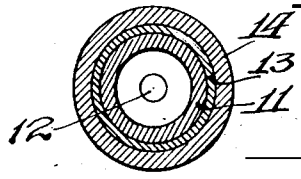


Fig. 3

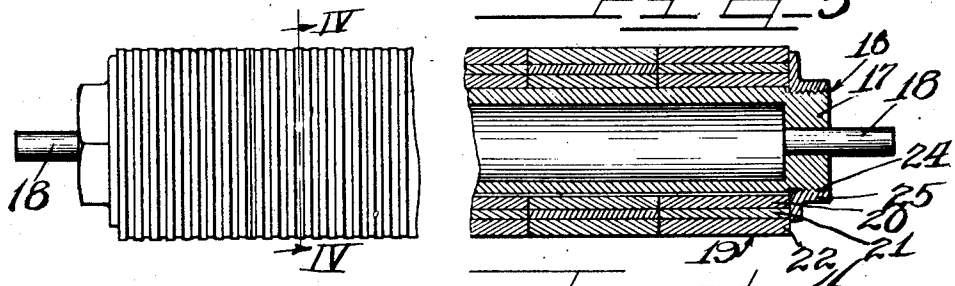


Fig. 4

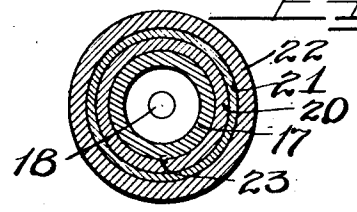
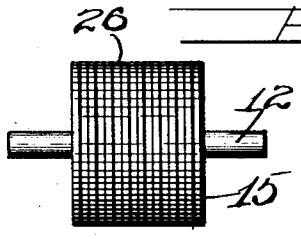


Fig. 5



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Fig. 6

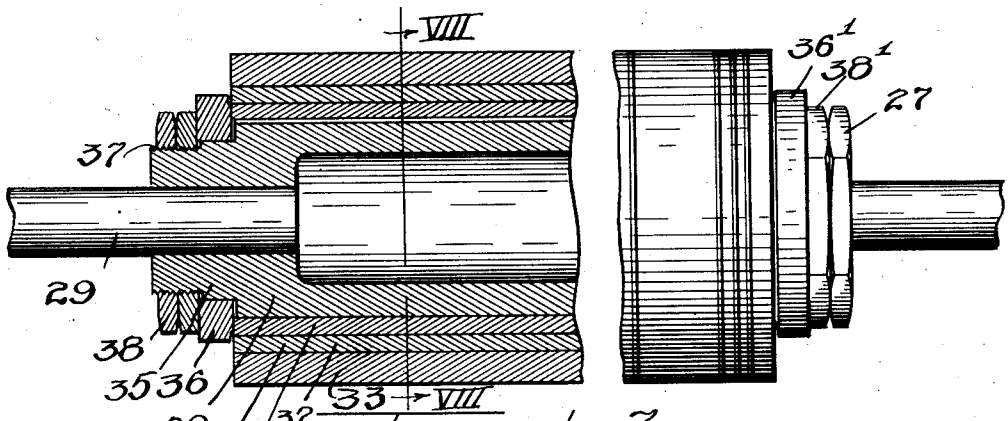


Fig. 7

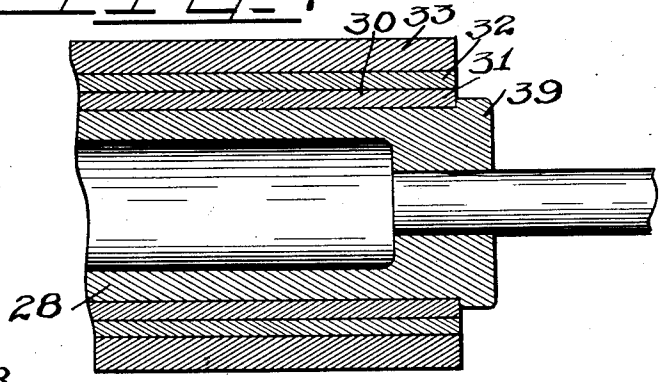
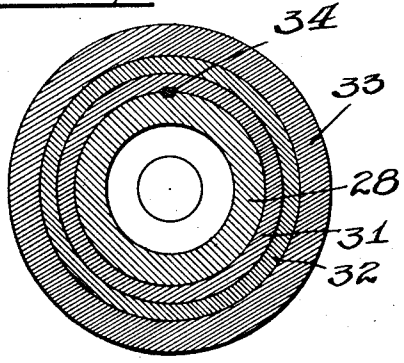


Fig. 8



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Patented Dec. 15, 1931

1,837,084

UNITED STATES PATENT OFFICE

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MARKING ROLL

Application filed November 14, 1930. Serial No. 495,594.

The present invention relates to marking rolls used in paper making machinery for watermarking paper, and more particularly to an improved construction of such marking rolls of the type having an outer layer of resilient material bearing an engraved marking design.

In practice two distinct types of marking rolls are in use. In the one type the marking roll comprises a metal roll upon the surface of which are secured metal plates or stereotypes bearing the design to be reproduced upon the paper. It has been the practice to wrap the surface of the marking roll with one or more layers of muslin-like fabric through which the impression of the type or plate is delivered. This is objectionable because the fabric is speedily worn out or torn so that it is necessary to frequently rewind or rewrap the rolls.

Another type of marking roll used in paper making machines comprises a roll upon the periphery of which is secured a layer of resilient material having an engraved marking surface. Such rolls usually comprise endless bands of soft rubber to which bands of hard rubber bearing the engraved design are vulcanized. Heretofore in the making of such rolls it has been found impossible to vulcanize or otherwise secure the soft rubber onto the surface of the metal core so that the soft rubber base will not slip or creep under the strain or force created when effecting the impression on the paper web.

It is a particular object of the present invention to overcome such difficulty by securing the soft cushioning layer directly to the metal roll by a process of cementing.

This and further objects of this invention will be apparent from the disclosures from the specification and the accompanying drawings. This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side elevational view partly in section of a roll embodying my invention.

Figure 2 is a sectional view taken on the line II—II of Figure 1.

Figure 3 is a side elevational view partly in section of a modified form of roll.

Figure 4 is a sectional view taken on the line IV—IV of Figure 3.

Figure 5 is a side elevational view of a small size roll embodying the present invention.

Figure 6 is a side elevational view partly in section of another modified form of roll.

Figure 7 is a longitudinal sectional view of the roll shown in Figure 6, and showing a modified form of end structure.

Figure 8 is a sectional view taken on the line VIII—VIII of Figure 6.

As shown on the drawings:

The marking roll 10 comprises a metal shell or closed cylinder 11 provided with pressed in trunnions 12 for supporting the roll. The metal cylinder 11 is covered with a full length layer of soft cushioning rubber 13 forming a continuous sleeve around the cylinder.

The soft rubber layer 13 is cemented to the metal cylinder 10 by a process of cementing which consists in treating the rubber and metal surfaces which are to be joined together with an application of a rubber cement such as used in the Vulca-lock process. The cement coated surfaces are allowed to dry in the air for a considerable time, care being taken not to touch them. After the surfaces have been dried, the rubber is rolled and pressed against the metal surface and the whole is subjected to a heating period. In this process, steel and several other metals can be used and there is no restriction as to the density or hardness of the rubber used. The adhesion is such that there will be actually no creeping of the rubber layer under the heaviest strain, the resistance to separation at the joint being over 500 lbs. per sq. in.

A hard rubber sleeve 14 is vulcanized to the soft rubber layer 13. The sleeve 14 is provided with a suitable engraved design such as shown at 15.

In the modification shown in Figures 3 and 4 marking roll 16 comprises a shell or closed cylinder 17 provided with pressed in trunnions 18 for supporting the roll. The roll 16 is provided with a number of marking sections

19, each section comprising a metal cylinder 20 to which is cemented a layer of soft rubber 21 in the manner described above. A hard rubber layer or sleeve 22 is vulcanized to the soft rubber sleeve and forms the marking surface of the section.

The sections 19 are splined to the metal shell 17 as shown at 23. The inside diameter of the section is substantially the same as the external diameter of the cylinder or shell to insure a snug fit.

The metal shell or cylinder is provided at its ends with screw threads 24 for receiving nuts 25 to hold the sections in place thereon.

In the modification shown in Figures 6, 7 and 8 the marking roll 27 comprises a closed cylinder 28 provided with pressed in trunnions 29 for supporting the roll. The roll 28 is provided with a single sleeve or marking section 30 comprising a metal cylinder 31 to which is cemented a layer of soft rubber 32 in the manner previously described. The hard rubber layer or sleeve 33 is vulcanized to the soft rubber sleeve and forms the marking surface of the roll.

The inside diameter of the sleeve 30 is substantially the same as the external diameter of the cylinder 28 to insure a snug fit. The shell may be splined to the cylinder as shown at 34 in Figure 8.

The cylinder 28 has a reduced end portion 35 at one end thereof. A collar 36, the outside diameter of which is greater than the outside diameter of the cylinder, is fitted onto the reduced end of the cylinder. The reduced end of the cylinder is threaded as shown at 37 to receive one or more nuts 38.

The other end of the cylinder 28 may be provided with a similar reduced portion on which is mounted a collar 36′ and nut 38′ similar in all respects to the previously described end construction.

In the alternate construction shown in Figure 7 one end of the cylinder is provided with an integral shoulder 30—39 against which the sleeve 30 abuts. The sleeve 30 is forced against the shoulder 39 by means of collar 36 and nut 38 as previously described.

In Figure 5 there is shown a marking roll 26 which is formed similar to that shown in Figure 1. The marking roll is of smaller size and is used where the watermark is to be imprinted on a narrow section of the paper. The small size roll shown on Figure 5 could also be constructed in the manner of the modification shown in Figures 6, 7 and 8.

In practice the marking roll is located in the paper making machine at a suitable point between the couch roll and the calenders of the machine. The web passes between the marking roll and a hard smooth surface such as that of the drying cylinder and the design of the marking roll is impressed on the web. The cushioning roll is composed of rubber having a penetration of 55 to 60 units on a Pusey and Jones Plastometer. The outer layer has a penetration of 9 to 11 units on the same scale.

The roll may be formed as shown in Figure 1 or with the number of marking sections as shown in Figure 3, the advantage of the latter being that if parts of the design are in any way damaged or altered, or if one section wears down more than another section, a new section can be added without resurfacing the roll or substituting a new roll. Also, only a small part of the roll body could be provided with engraved sleeves to run small orders or several designs could be run on different orders covering the same grade of paper.

In using the modified construction of Figures 6, 7 and 8 only one roll is needed for each paper machine, and a series of sleeves having different marks could be kept in stock which could be readily removed or applied as the user desired.

As shown in Figure 4, the spline prevents relative movement of the marking sections, however, it is contemplated that the sections may be provided with recesses and locked together by dowel pins to accomplish this purpose.

In the use of marking rolls of the metal face type, it has been found necessary to wrap the rolls with muslin in order to provide the necessary resiliency. In the rubber surface marking roll, a soft rubber layer is provided underneath the hard rubber sleeve to provide resiliency. However, it has heretofore been impossible to secure the soft rubber to the metal. Consequently, it has heretofore been found necessary to use one or more layers of hard rubber between the metal cylinder and the soft rubber layer. By securing the soft rubber to the metal shell in the manner herein disclosed, the use of other layers is obviated and a cheaper and better marking roll is produced.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. A marking roll for marking paper comprising a metal body, a layer of soft rubber directly adhering thereto and incapable of separation therefrom by a force of less than 500 pounds per square inch, and an outer layer of hard rubber securely vulcanized to said soft rubber layer and having indicia thereon for marking paper.

2. A marking roll for marking paper comprising a metal shell, a layer of soft rubber of between 55 and 60 density securely cemented directly to said metal shell and an outer layer of hard rubber of between 9 and 11 density

vulcanized directly to said soft rubber layer and having integral marking indicia on its outer surface.

In testimony whereof I have hereunto subscribed my name at Port Edwards, Wood County, Wisconsin.

JEAN K. VANATTA.