June 24, 1941. J. M. GOULDING 2,246,976

PRINT ROLL

Filed July 1, 1938

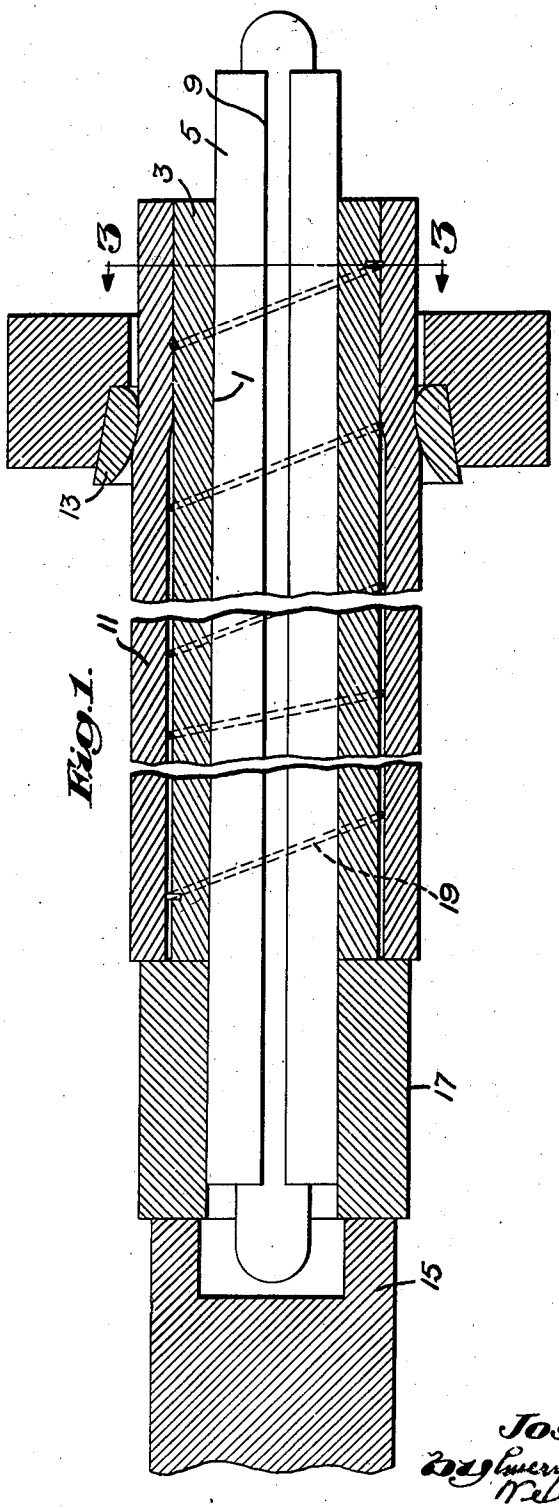


Fig. 1.

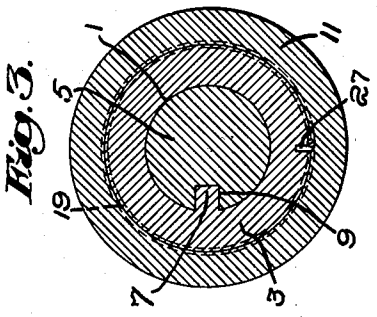


Fig. 3.

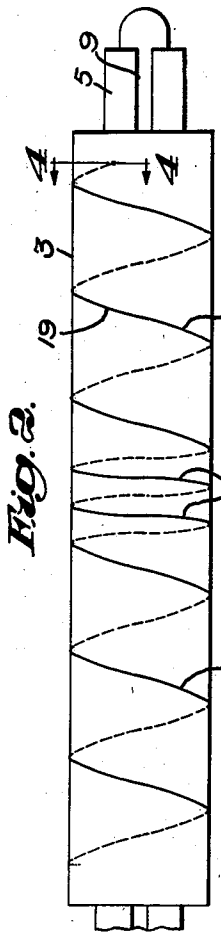


Fig. 2.

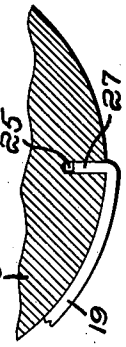


Fig. 4.

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Patented June 24, 1941 2,246,976

UNITED STATES PATENT OFFICE

2,246,976

PRINT ROLL

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Application July 1, 1938, Serial No. 217,048

5 Claims. (Cl. 101—375)

My invention relates to rolls and methods of making the same, and is particularly concerned with building up a worn print roll such as, for example, is used for printing textiles.

The invention will be best understood from the following descriptions of embodiments of a print roll according to the invention and a method of making the same according to the invention, the scope of the invention being more particularly pointed out in the appended claims.

In the drawing—

Fig. 1 is a longitudinal section of a partially completed print roll according to the invention in the process of being formed, with associated mechanism for forming it;

Fig. 2 is a more or less schematic view illustrating a step in the process of forming the print roll;

Fig. 3 is a section on the line 3—3 of Fig. 1; and

Fig. 4 is a section on the line 4—4 of Fig. 2 on an enlarged scale.

Print rolls of the character described are commonly formed of an elongated sleeve of copper or copper alloy mounted on a supporting shaft or mandrel. The cylindrical surface of the roll is etched with the desired pattern to be printed on the textile or other web. In practice from time to time, either on account of wear or for the purpose of substituting a new pattern, the cylinder is turned down and new patterns are etched upon it. This results in the print roll in time being so reduced in diameter that it must be replaced with a new roll. Commonly the internal bore 1 of the sleeve 3 constituting the roll, which latter is indicated as a worn roll in Fig. 2, is slightly tapered for making a proper fit with the mandrel or print roll shaft 5 received by that bore, the sleeve being formed with an integral key 7 fitting a keyway 9 in the shaft.

According to the present invention the worn sleeve 3 is built up by placing over it a second sleeve 11 (Fig. 1) of preferably the same material, and pressing it into intimate contact with the worn sleeve 3, say by forcing the two sleeves through the opening of a stationary die 13. Preferably the mandrel 5 is within the sleeve 3 during this operation so as to prevent any possibility of the bore 1 being deformed or having its diameter reduced. As shown, the print roll is forced through the die by use of a hydraulic ram, the reciprocating head of which is indicated at 15. Conveniently a suitable spacing sleeve 17, of exterior diameter not greater than that of the die opening, is removably mounted on the adjacent projecting end of the shaft 5 to transmit the effort of the ram to both sleeves.

According to the invention, spaced bonding parts are interposed between the two sleeves before they are drawn or the outer sleeve otherwise pressed into contact with the inner sleeve. These bonding parts preferably are angularly disposed to the adjacent surfaces of the sleeves so as to bond the sleeves together against both relative longitudinal and relative circumferential movement. As illustrated in the drawing, this bonding means is in the form of a wire 19, the several turns of the wire constituting the spaced angularly disposed bonding parts. When the sleeves are forced through the die 3 to press their adjacent surfaces into contact the wire will be embedded in both surfaces to lock the sleeves against relative longitudinal and circumferential movement.

Preferably the wire is wrapped about the sleeve 3, either in one length or in sections, before the sleeve 11 is placed over it. For preventing any possibility of the sleeve 3 tending to screw off the sleeve 11 when the parts are in use under the enormous pressures commonly used in printing textiles as, for example, 60 to 100 tons' pressure between the rolls of the pair constituting the printing couple, the wire preferably is irregularly wrapped about the sleeve 3. For example, several closely spaced turns 21 may be made at the center portion of the sleeve so as to insure that the turns 23 at one end portion of the sleeve are positioned relative to the turns 23 at the opposite end portion in such way that they are not part of the same helix. The ends of the wire, and, if desired, points along the wire, may be secured to the sleeve 3 in any suitable manner as, for example, by brazing or welding. Preferably, however, drilled holes 25 are made in the sleeve 3, and the end of the wire 19 bent at right angles, as indicated at 27 (Fig. 4), and inserted in these holes.

The wire or other bonding means employed preferably is somewhat harder than the material of the sleeves. For example, but without limitation thereto, with sleeves having a scleroscope hardness of 10 to 12 excellent results will be secured with a wire having a scleroscope hardness of 17 to 18, the wire being about $\frac{3}{32}$'' in diameter. The wire usually may be of copper or brass, or, where the sleeves are of relatively hard copper-base alloy such as a silicon bronze, may be of steel of requisite hardness.

It will be understood that within the scope of the appended claims wide deviations may be

made from the forms of the invention described without departing from the spirit of the invention.

I claim:

1. A cylindrical print roll comprising an outer sleeve adapted for contact with the work, an inner sleeve for supporting said outer sleeve, which sleeves have closely fitting, contacting surfaces circular in cross-section; and means for positively interlocking said sleeves against relative axial and rotative movements comprising spaced parts separate from the sleeves and positioned between them and respectively relatively deeply embedded in both.

2. A cylindrical print roll comprising an outer sleeve adapted for contact with the work, an inner sleeve for supporting said outer sleeve, which sleeves have closely fitting, contacting surfaces circular in cross-section; and means for positively interlocking said sleeves against relative axial and rotative movements comprising elongated, angularly disposed bonding parts separate from the sleeves and positioned between them and respectively relatively deeply embedded in both, which parts are relatively narrow and relatively widely spaced to cause the inner sleeve to contact with and directly support the outer sleeve without material interruption.

3. A print roll according to claim 2 in which the elongated, relatively narrow bonding parts are formed of bent wire.

4. A cylindrical print roll comprising an outer sleeve adapted for contact with the work, an inner sleeve for supporting said outer sleeve, which sleeves have closely fitting, contacting surfaces circular in cross-section; and, between said sleeves and relatively deeply embedded in both, a coiled wire having its adjacent turns predominantly in relatively widely spaced, non-contacting relation to cause the inner sleeve to contact with and directly support the outer sleeve between such adjacent turns, the wire being non-uniformly coiled so as positively to interlock said sleeves against relative rotative movement as well as relative axial movement.

5. A cylindrical print roll comprising an outer sleeve adapted for contact with the work, an inner sleeve for supporting said outer sleeve, which sleeves have closely fitting, contacting surfaces circular in cross-section; and, between said sleeves and relatively deeply embedded in both, a coiled wire, of circular cross-section and of harder material than that of each of said sleeves, having adjacent turns predominantly in relatively widely spaced, non-contacting relation to cause the inner sleeve to contact with and directly support the outer sleeve between such adjacent turns, the wire being non-uniformly coiled so as positively to interlock said sleeves against relative rotative movement as well as relative axial movement.

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