March 22, 1955 J. SCHULTZ 2,704,392

ROLLERS FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

Filed Oct. 25, 1951 4 Sheets-Sheet 1

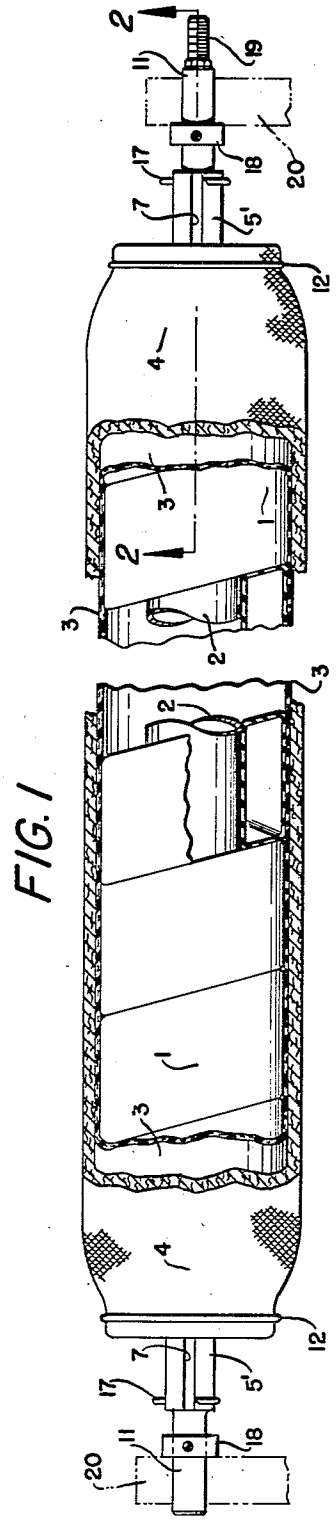


FIG. 1

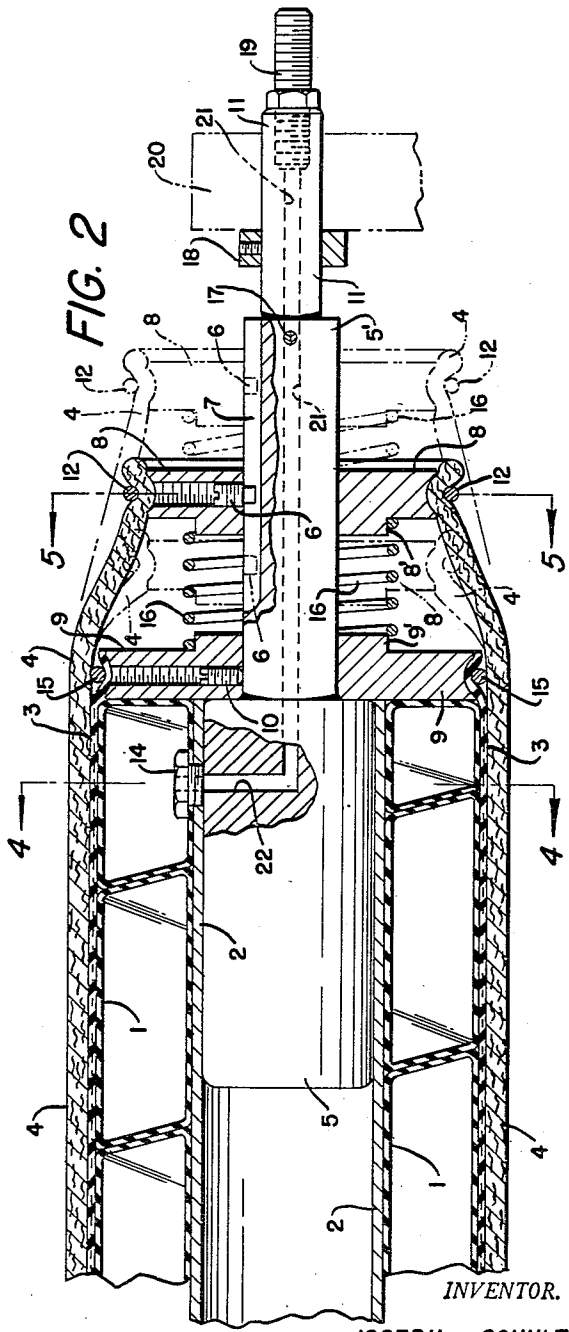


FIG. 2

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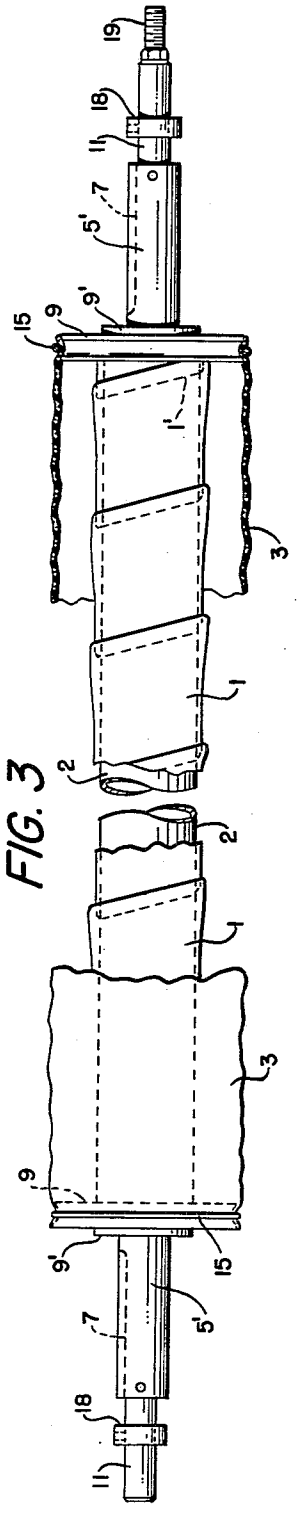


FIG. 3

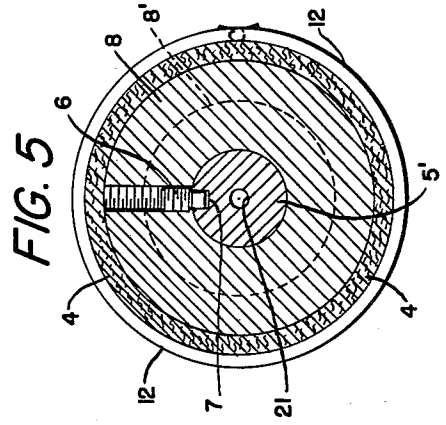


FIG. 5

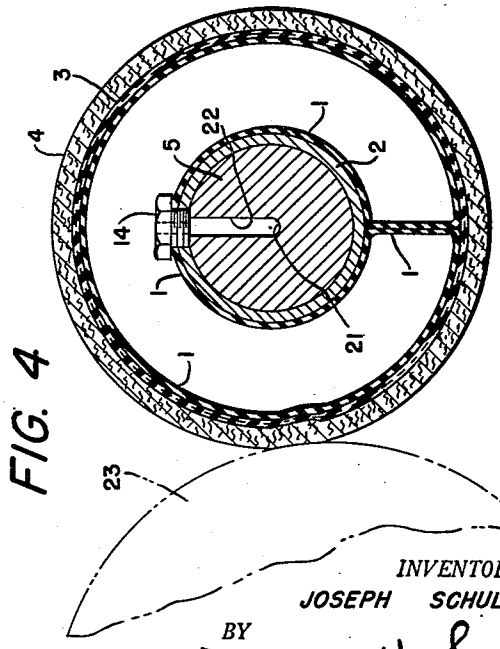


FIG. 4

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ROLLERS FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

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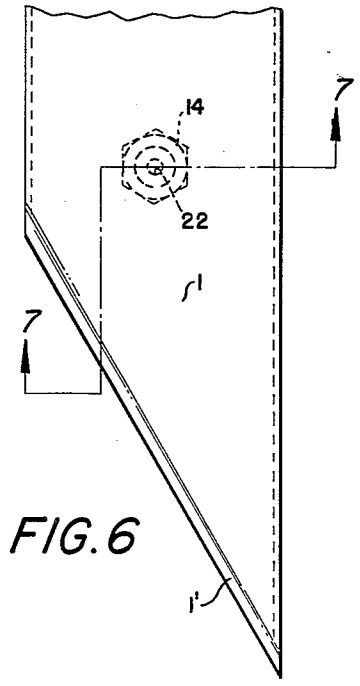


FIG. 6

FIG. 7

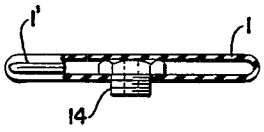
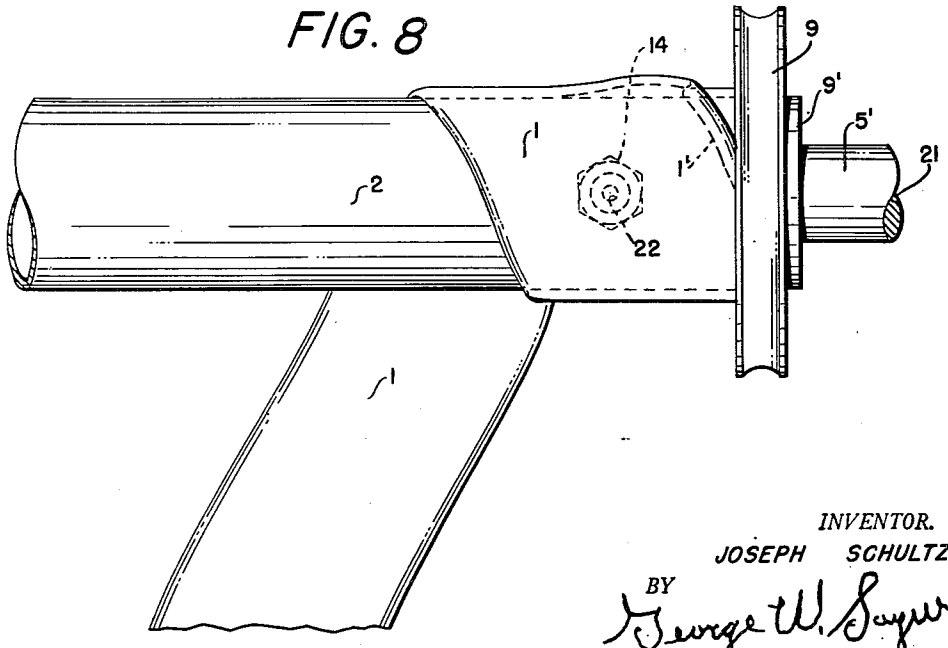


FIG. 8



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ROLLERS FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

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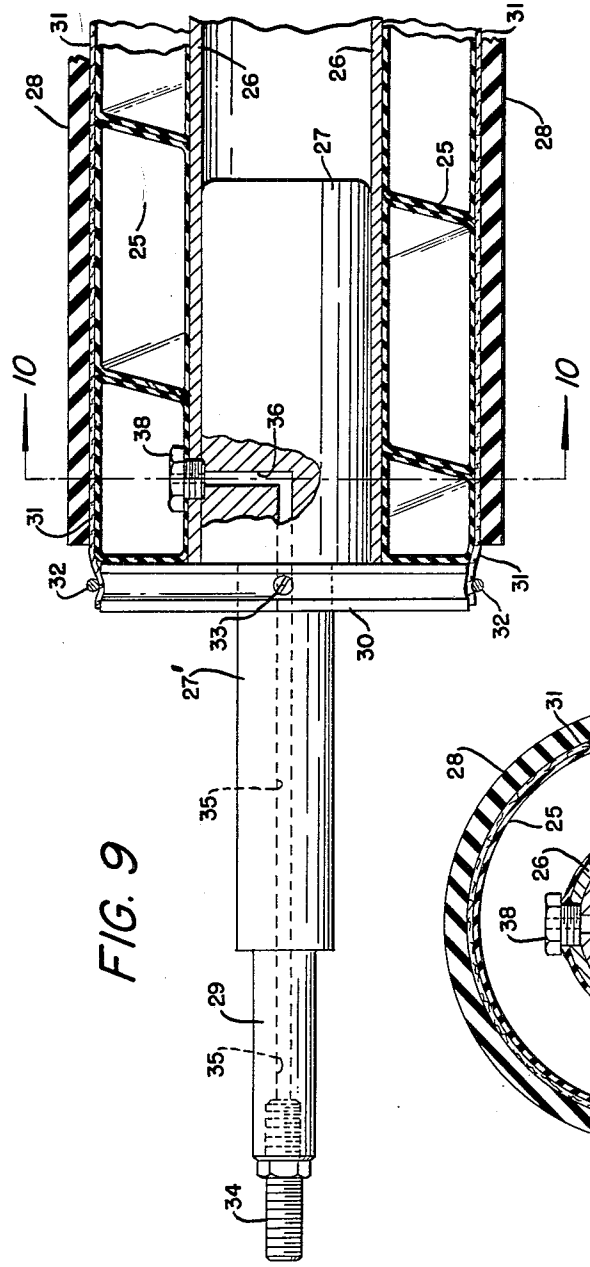


FIG. 9

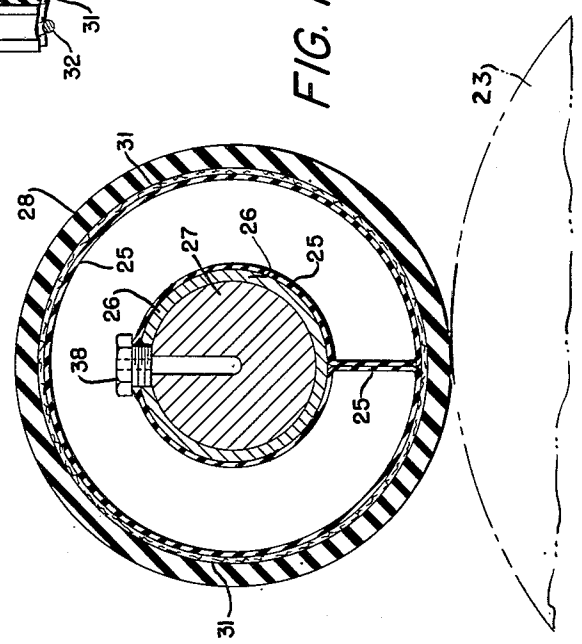


FIG. 10

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2,704,392

ROLLERS FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

Joseph Schultz, Shaker Heights, Ohio

Application October 25, 1951, Serial No. 253,102

7 Claims. (Cl. 29—113)

The invention relates to rollers for lithographic offset presses and the like, and particularly to rollers for dampening, and rollers for supplying ink to, the plate cylinder of a lithographic offset press. An improved dampening roller structure, and an improved inking roller structure are shown in the accompanying drawings and described hereinafter in detail.

The dampening medium may be water, or a dilute solution of gum arabic or other materials or combination of materials in water. The terms "water," "moisture," and "liquid" are herein interchangeably used to designate the dampening medium.

The invention herein presented contains improvements to the invention in Dampening Mechanism disclosed and claimed in my pending application Serial No. 225,368, filed May 9, 1951. The instant invention also presents improvements in inking mechanism.

Among the more important objects of the instant invention are:

The provision of an improved structure of dampening roller which resiliently contacts the plate cylinder and maintains a high order of water uniformity throughout the length of the molleton cover which constitutes the peripheral portion of the dampening roller structure; and

The provision of an improved structure of inking roller which is of a make-up such that it has a soft and resilient contact with the plate cylinder and yet is replaceable at a small fraction of the cost of the standard inking roller currently in use.

The annexed drawings and the following description set forth in detail certain means illustrating the improvements in rollers for lithographic offset presses and the like, such drawings and description showing, and setting forth, respectively, however, only two of the various forms in which the principle of the invention may be embodied.

In said annexed drawings:

Figure 1 is an elevation, partially broken away, of the improved dampening roller, parts of a press frame in which the roller is rotatably mounted being also suggested;

Figure 2 is an axial section, upon an enlarged scale, of one end of the dampening roller, the plane of the section being indicated by the line 2—2, Figure 1, the effect of certain molleton cover take-up mechanism being also shown by dot-and-dash positions of certain elements;

Figure 3 is a broken elevation of a partial assembly of a tubular core, an inflatable element, and a non-expanding sleeve for the latter, of the improved dampening roller, the inflatable element being a tube and being shown as wound on the core but as yet in non-inflated condition;

Figure 4 is a section taken in the plane of the line 4—4, Figure 2, the plate cylinder of the press with which the dampening roller has rolling contact being suggested;

Figure 5 is a section taken in the plane of the line 5—5, Figure 2, the showing being particularly that of take-up mechanism for a molleton cover forming part of the improved dampening roller;

Figure 6 is an elevation of the end portion of the inflatable tube showing the nature of the cutting thereof and also showing an air passage insert installed in the inflatable tube;

Figure 7 is a section and elevation taken in the planes indicated by the line 7—7, Figure 6, this figure showing the abutting ends of the tube material vulcanized together;

Figure 8 is a fragmentary elevation illustrating the manner of winding the inflatable tube on a tubular core;

Figure 9 is an axial section of one end of the improved inking roller forming part of the instant invention; and

Figure 10 is a section taken in the plane indicated by the line 10—10, Figure 9, this view also suggesting a plate cylinder of a press to which the ink is transferred from the inking roller.

Referring to the annexed drawings in which the several elements are designated by the same respective characters in the different views, and particularly referring first to the improved dampening roller structure shown in Figures 1 to 8, inclusive, a tube 1 of expansible material is wound helically and in collapsed condition upon a tubular core 2, Figure 8, to produce a formation shown in Figure 3. The tube 1 is wound so that the adjacent edges of successive turns thereof are superimposed, as shown in Figures 2, 3, and 8. Preferably, the tube 1 is made from an elastic rubber-like synthetic material such as "neoprene." The core 2 which preferably is made of aluminum is mounted upon steel end mandrels 5 having intermediate portions 5^1 of reduced cross-section extended outwardly from the core 2, and terminal end portions 11 of still further reduced cross-section. Secured by set screws 10 to the reduced mandrel parts 5^1, and abutting the end faces of the mandrel 5, are peripherally grooved collars 9. The tube 1 is wound between these collars 9.

Referring to Figures 4, 6, and 7, before the tube 1 is wound on the core 2, an air passage insert 14 is positioned in what will be the inner wall of the tube 1 so as to pass air therethrough from within the wound tube 1 to the interior thereof between the inner and outer walls. Then the bias-cut ends 1^1 of the tube 1, Figure 6, are vulcanized together, Figure 7.

Spaced from the wound deflated tube 1 and secured at its ends by removable cords 15 in the peripheral grooves of the collars 9 is a sleeve 3. This sleeve 3 is formed of suitable non-expanding material such as rubber with cloth integrated therewith.

Abutting and around the sleeve 3 is a soft outer cover 4 comprised of moisture-absorbent material such as molleton. This molleton cover 4, in press operation, receives the moisture from the water fountain and dispenses it to the plate cylinder 23, Figure 4.

The ends of the cover 4 are secured by removable cords 12 in the grooves of peripherally grooved annular disks 8 which are slidably mounted upon the extending reduced parts 5^1 of the mandrels 5. The collars 9 and the disks 8 have opposed shoulders 9^1 and 8^1, respectively, upon which are mounted the ends of springs 16 which hold the disks 8 in the outermost positions that the condition of the cover 4 permits, to maintain the cover 4 taut. In other words, the cover 4 is subject to the effect of different amounts of water content during press operation, as it receives and dispenses water, is subject to a drying out after initial installation, and to elongation as a result of use, and the springs 16 and disks 8 act as take-ups to compensate for these variations in the condition of the cover 4. The disks 8 are prevented from sliding off from the mandrel parts 5^1 by the pins 17 intersecting the intermediate mandrel parts 5^1 and projecting therefrom.

To provide for the sliding movements of the disks 8 on the reduced mandrel parts 5^1, the latter are formed with peripheral longitudinal keyways 7 into which project the dog-point ends of screws 6 engaging and projecting inwardly of the disks 8, Figures 2 and 5. The molleton cover 4 and the take-up mechanism is applied before the tube 1 is inflated; in other words, when the roller is in the assembly condition shown in Figure 3.

Controlled air is fed into the tube 1 for its inflation, and the means therefor shown in the accompanying drawings comprise an air valve 19 engaging an end part 11 of the mandrel 5 and communicating with one end of an axial hole 21 formed through the mandrel part 11 and the mandrel part 5^1 and communicating at its inner end with an end of the hole 22 intersecting the mandrel 5 transversely and communicating at its outer end with the air passage insert 14. Thus, provision is made for the passage of air from the valve 19 to the interior of the inflatable tube 1. The mandrel end parts 11 are journal members for the rotation of the dampening roller in press frame standards 20 in which standards the end parts 11 are maintained in desired position by wearing blocks 18 secured to the

end parts 11 and abutting the inside faces of the standards 20.

The superimposing of the edges of adjacent laps of the helical formation into which the tube 1 is wound provides for the increase in size of the tube 1 when it is expanded so that, in expanded condition, adjacent edges of the helical laps are in abutting relation.

The molleton cover 4 of the improved dampening roller hereinbefore described and shown in Figures 1 to 8, inclusive, of the accompanying drawings is designed to receive moisture selectively in different areas thereof throughout its length, and by automatically-actuated means, according to their moisture requirements. In other words, different portions of the cover 4 individually receive, when required, the amount of moisture which they respectively should have to maintain them in optimum moisture condition and to feed the proper amount of moisture to those parts of the plate which they serve. Mechanism for accomplishing this result is disclosed in said application Serial No. 225,368.

The improved dampening roller of the instant application preserves the water status of the different parts of the cover 4 throughout its length. This result is effected by the helical winding of the tube 1 on the rigid core 2. This helical winding materially limits pressure disturbances longitudinally of the tube 1, due to the different moisture conditions selected and maintained for the moistening operations which different portions of the molleton cover 4 perform. These moistening operations for different portions of the cover 4 are necessarily varied according to the requirements of different parts of the plate. High-speed presses subject the rollers to considerable stress. The tube having end connections only bends in an arc so that a considerable length of the intermediate part of the roller is often out of contact with the plate cylinder. The helical winding equalizes the stresses from the center of the tube 1 outwardly at all times regardless of the pressure since all parts of the tube 1 are equally interlocked with the same amount of air. Thus the inside of the tube 1 has throughout its length equal pressure or facial metal alignment. Therefore, the helical winding of the tube smooths out and equalizes any tendency to flutter and in effect produces a holding of the roller throughout its length. Thus, by the helical winding of the tube 1 each part of the molleton cover 4 is enabled to preserve its own optimum status of moistened condition with only minimum disturbance thereof occasioned by what may be taking place by reason of water take-up and water-dispensing by other parts of the cover 4.

The structure of dampening mechanism hereinbefore described provides a soft roller which greatly reduces the wear of the fine grain on the plate of the plate cylinder as compared with the wear on said grain effected by hard rollers now in use.

Furthermore, the soft dampening roller described results in less ink being taken off the plate and transferred to the molleton covered dampening roller. A hard dampening roller tends to carry more ink from the plate and pound it into the molleton cover of the dampening roller which results in making the molleton covering less efficient and necessitating its more frequent change.

An additional advantage of the described dampening roller results from the fact that it can be deflated, the deflation, for instance, being ½ inch O. D. Such structure greatly facilitates the removal of an old roller cover and the replacement thereof by a new cover. Many expedients have been tried to eliminate or greatly reduce the difficulties of old cover removal and new cover application, including the use of seamless cotton sleeves for such covers, but such expedients have not removed the difficulties.

The improved inking roller structure shown in Figures 9 and 10 comprises the inflatable tube 25 helically wound upon the tubular aluminum core 26 mounted at its ends upon the mandrels 27 having intermediate portions 27^1 of reduced cross-section, and end portions 29 of still further reduced cross-section. Vulcanized to the inner face of a tubing cover 28, of suitable material, is a non-expanding rubberized nylon sleeve 31 having extended end portions removably secured by strings 32 in the grooves of peripherally grooved collars 30 secured by set screws 33 to the intermediate mandrel members 27^1.

One suitable material for the tubing cover 28 is rubber and such tubing cover material is herein shown and described. Any soft ink-carrying substance capable of properly dispensing or transferring the ink to the plate cylinder 23, and of tubular formation, is suitable for the cover 28 for printing and lithographic presses. Such tubing cover material may be a suitable plastic, and also certain covers comprised of oils and chemicals are known to be desirable for ink-carrying and dispensing purposes. Such covers are generally known to have an affinity for ink and be also capable of properly transferring the ink.

The non-expanding rubberized nylon sleeve 31 and the inflatable tube 25 are applied as follows:

The nylon 31 is wound around the tubing 25 until a suitable thickness has been attained, and then the rubber cover 28 is wound until its desired suitable thickness has been attained. Then the end portions of the rubber cover 28 are stripped off so that the rubberized nylon 31 and the cover 28 which is vulcanized thereto can be tied by the cords 32 to the collars 30.

The reduced end portions 29 of the mandrel 27 constitute roller journal members and one of them carries an air valve 34. This air valve 34 communicates with an axial air passage 35 passing through the mandrel end portion 29 and the intermediate mandrel portion 27^1, this air passage 35 terminating somewhat within the mandrel body 27 and communicating at its inner end with one end of a transverse passage 36 which at its opposite end communicates with an air passage insert 38 secured in and intersecting the inner wall of the inflatable tube 25.

The outer cover 4 for the improved dampening roller, and the outer cover 28 for the improved inking roller, are both soft members and have impressionable rolling engagement with the plate cylinder 23. In addition to what has been hereinbefore stated regarding the merits of a soft roller, it need only be noted that the merits of outer molleton covers for dampening rollers are well known and that nothing further need be said about the desirability of such covers. The merits of the rubber tubing 28 which is utilized for the outer cover of the improved inking roller are due to the fact that it provides a soft outer cover which, in the assembly herewith presented, can be replaced at a very low comparative cost. In order to effect this replacement, it is necessary only to deflate the roller and unfasten the cords 32 which retain the ends of the non-expanding rubberized nylon sleeve 31, which latter is vulcanized to the inner face of the rubber tubing 28, and substitute another new rubber tubing cover 28 with its non-expanding rubberized nylon sleeve 31 vulcanized thereto.

What I claim is:

1. A dampening roller for a lithographic press having a rigid core, an inflatable tube helically wound on the core, a moisture-absorbent and moisture-dispensing outer cover, a non-expanding sleeve for the tube disposed interiorly of the cover, controllable air passages communicating with the tube, end extensions for the core, collars mounted on the core extensions, compression springs mounted on the extensions exteriorly of the collars, disks mounted on the outer end of the extensions, the ends of the springs abutting said collars and said disks, respectively, the sleeve being removably secured at its ends to the collars, and the outer cover being removably secured at its ends to the disks.

2. The device of claim 1, in which the extensions of the core are formed with end members of reduced cross section forming journal surfaces for mounting the roller, and in which the air passage comprises continuous axial conduits formed in the core, an extension thereof, and a journal member, respectively, and a conduit communicating with said core conduit and the interior of the tube.

3. The device of claim 1, in which the disks are mounted on the core extensions by bolts having inwardly extended ends, the core extensions being formed with axial grooves in which said bolt ends play.

4. The device of claim 1, in which the disks are of reduced diameter as compared with the collars, in which the sleeve is removably secured to the edges of the collars, and in which the cover is removably secured to the edges of the disks.

5. A roller for lithographic press having a rigid core, an inflatable tube helically wound on the core, a liquid-take-up and a liquid-dispensing molleton outer cover, a non-expanding sleeve for the tube disposed interiorly of the cover, controllable air passages communicating with the tube, end extensions for the core, collars mounted on the extensions and abutting the ends of the core, the collars having grooved peripheral edges, the sleeve being

removably secured at its ends in the edge grooves of the collars, and resilient take-up mechanisms mounted on the core extensions for movement therealong and connected to the ends of the molleton cover to maintain the latter taut irrespective of shrinkage or elongation thereof.

6. A dampening roller for a lithographic press having a rigid core, an inflatable tube helically wound on the core, a molleton outer cover, a non-expanding sleeve for the tube disposed interiorly of the cover, the core having a main body elongated at its ends beyond the tube and the non-expanding sleeve, disks mounted on the elongated ends of the core, to which disks the ends of the molleton cover are secured, collars mounted upon the core ends interiorly of the disks, to which collars the end of the non-expanding sleeve are secured, compression springs mounted on and bearing at their ends against the respective disks and collars, and controllable air passages communicating with the tube.

7. A dampening roller for a lithographic press having a rigid core, an inflatable tube helically wound on the core, a liquid-take-up and a liquid-dispensing soft outer cover, a non-expanding sleeve for the tube interiorly of

the cover, controllable air passages communicating with the tube, collars secured to the core, to which collars the ends of the non-expanding sleeve are secured, disks exteriorly of the respective collars, means for mounting the disks for longitudinal movement coaxially with the core, the ends of the outer cover being secured to the disks, and resilient take-up mechanisms bearing at their ends on the collars and disks to maintain the outer cover taut irrespective of shrinkage or elongation thereof.

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