Feb. 3, 1953 W. F. HUCK ET AL 2,627,230

BLANKET TENSIONING MEANS

Original Filed May 26, 1945 4 Sheets-Sheet 1

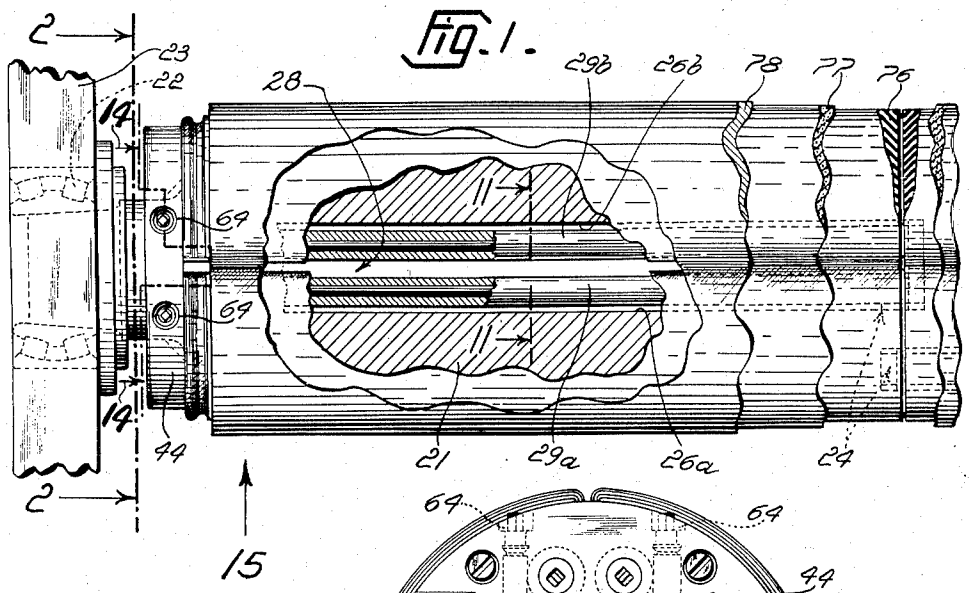


Fig. 1.

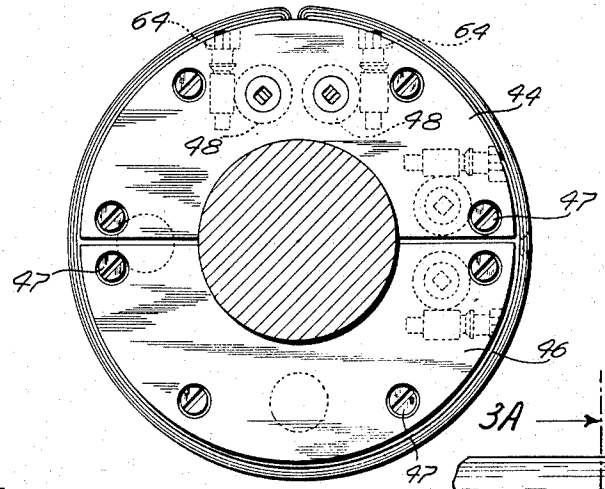


Fig. 2.

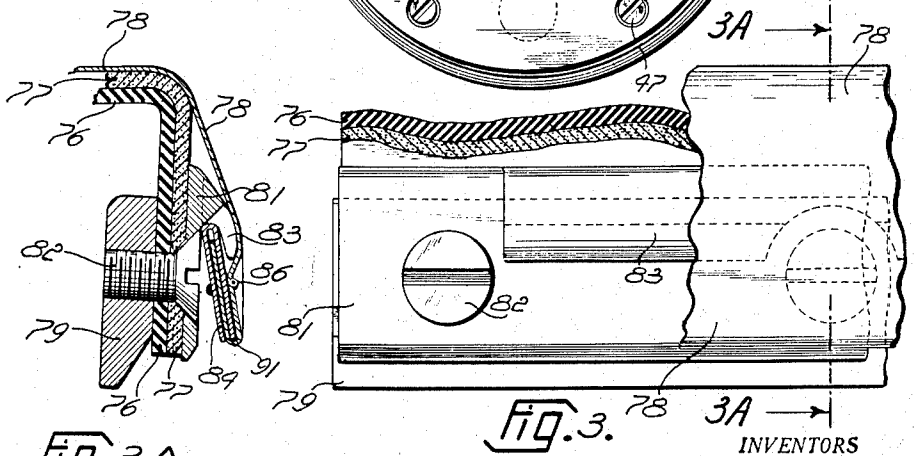


Fig. 3A.

Fig. 3.

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Fig. 4.

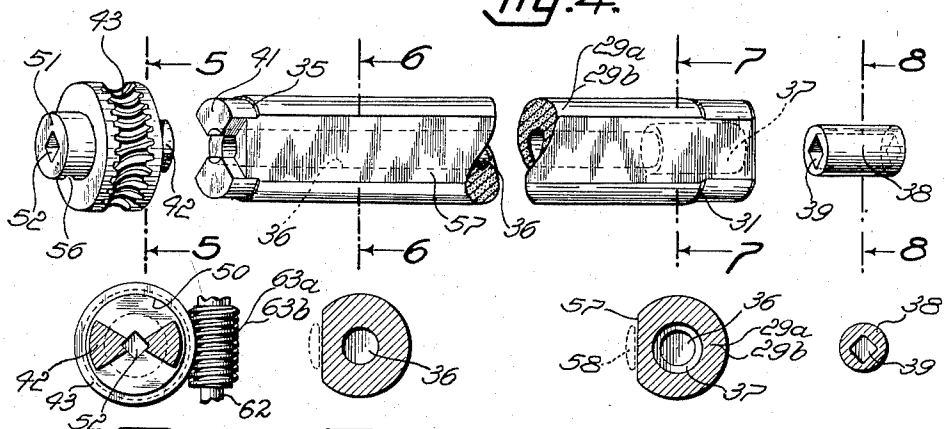


Fig. 5. Fig. 6. Fig. 7. Fig. 8.

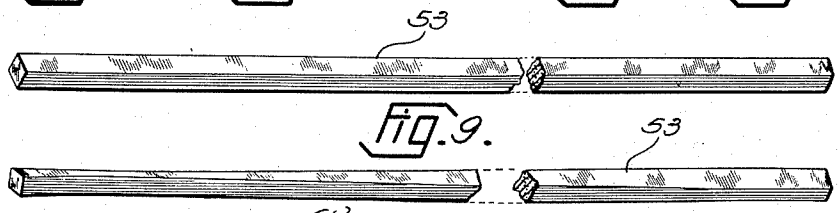


Fig. 9.

Fig. 10.

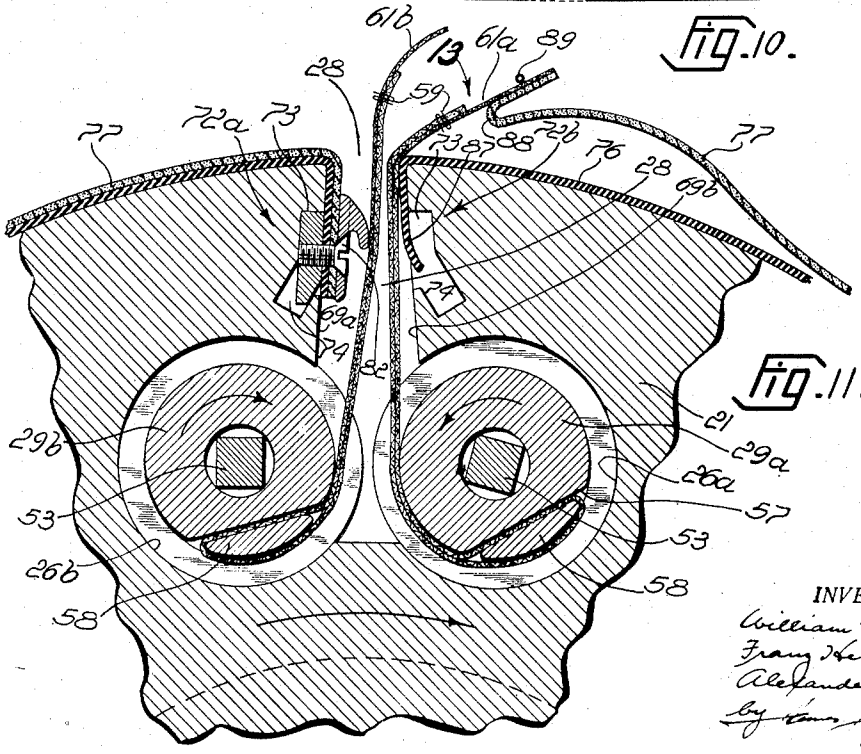


Fig. 11.

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Fig. 12.

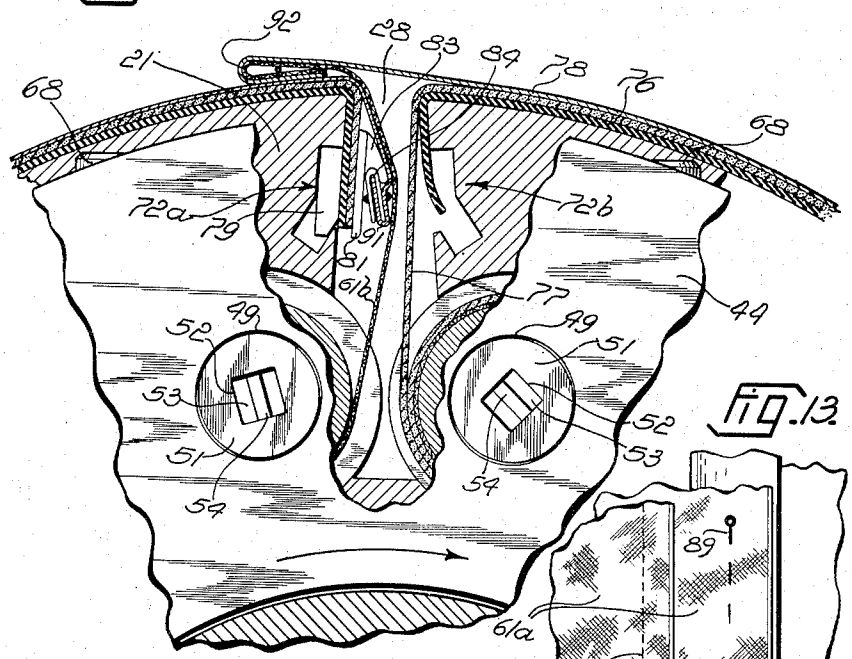


Fig. 13.

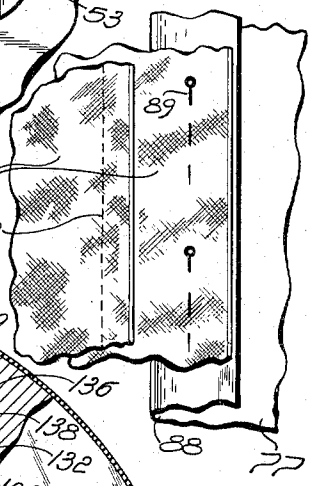


Fig. 16.

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BLANKET TENSIONING MEANS

Original Filed May 26, 1945 4 Sheets-Sheet 4

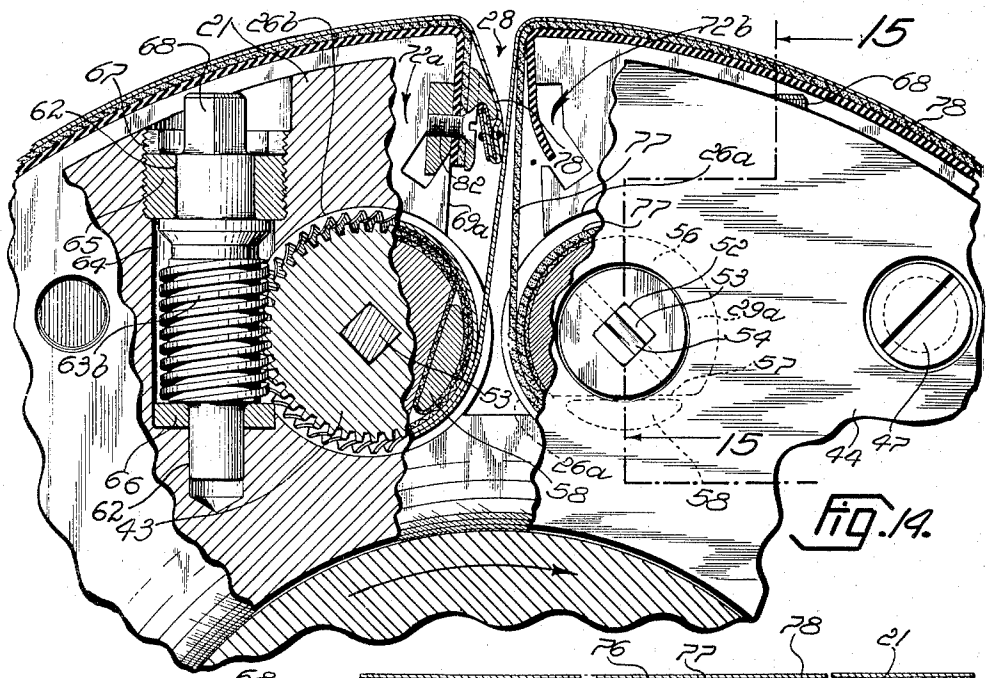


Fig. 14.

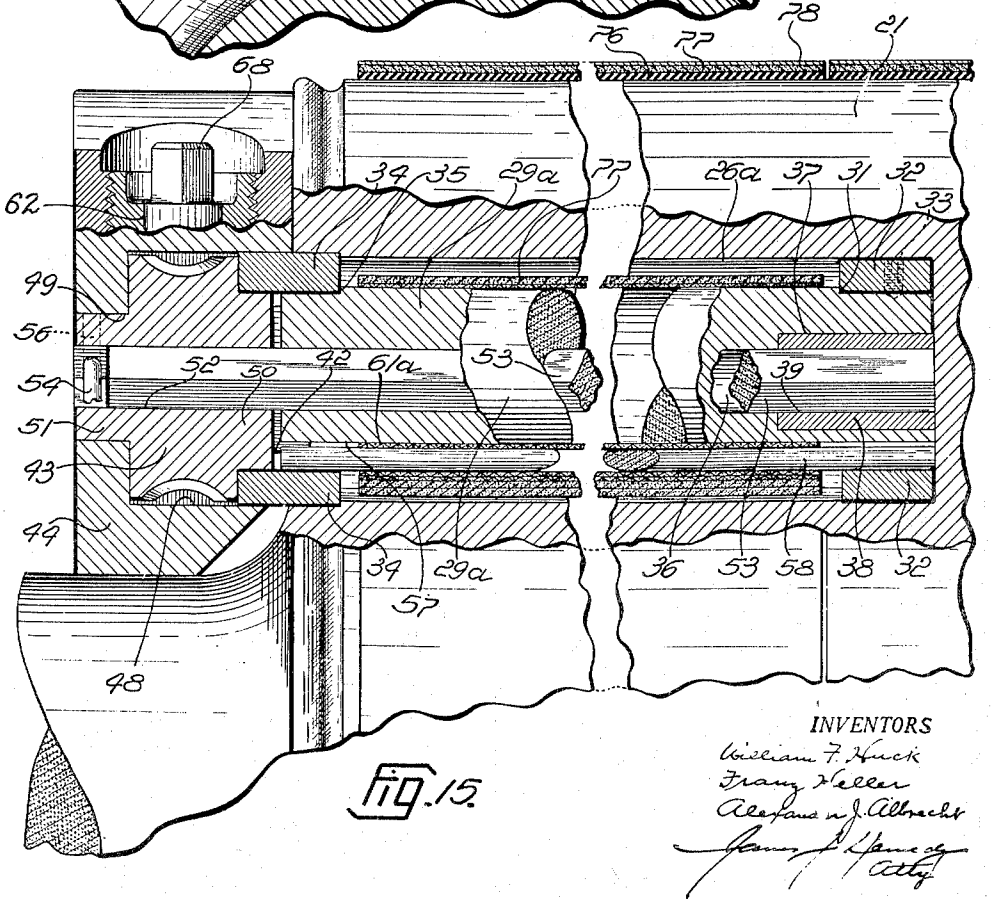


Fig. 15.

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UNITED STATES PATENT OFFICE

2,627,230

BLANKET TENSIONING MEANS

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Original application May 26, 1945, Serial No. 595,898. Divided and this application January 6, 1951, Serial No. 204,802

1 Claim. (Cl. 101—415.1)

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This invention relates to printing machines and more particularly to a method and means for installing and tensioning press blankets and cylinder packing on printing cylinders thereof.

One object of the invention is to provide a new and improved method and means for installing and tensioning packing sheets and blankets on cylinders of printing machines.

Another object of the invention is to provide a new and improved means for spring tensioning press blanket clamping devices whereby any slack developing in the blanket will be taken up by the tensioning means.

It is also an object of the invention to provide a new and improved blanket tightening device of generally improved construction, whereby the device will be simple and durable, as well as convenient, practical, serviceable and efficient in its use.

A preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of one end of an impression cylinder of a newspaper printing machine with portions broken away to show parts within the cylinder;

Figure 2 is an end view of the impression cylinder as seen on the line 2—2 of Figure 1, and in the direction of arrows 2;

Figure 3 is an enlarged fragmentary view showing a portion of a clamping device for holding one end of a draw sheet used with cylinder packing;

Figure 3A is a sectional view on the line 3A—3A of Figure 3 and as seen in the direction of arrows 3A;

Figure 4 is an exploded perspective view of a reel rod and associated parts;

Figures 5, 6, 7 and 8 are sectional views on the lines 5—5, 6—6, 7—7 and 8—8 respectively, of Figure 4 and as seen in the direction of the respective arrows;

Figure 9 is a perspective view of a spring rod used in connection with the reel rod shown in Figure 4;

Figure 10 is a perspective view of the spring rod shown in Figure 9 but showing the rod under torsion;

Figure 11 is a sectional view of a portion of the impression cylinder shown in Figure 1, on the line 11—11 of that figure and as seen in the direction of arrows 11;

Figure 12 is a view of a portion of the cylinder as shown in Figure 2, partly broken away and showing parts in section;

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Figure 13 is a top view showing a method of fastening the end of a blanket to the tightening device, as seen in the direction of the arrow 13 of Figure 10;

Figure 14 is a sectional view generally similar to Figure 12, broken away and partly in section, as seen on the broken line 14—14 of Figure 1;

Figure 15 is a sectional view on the broken line 15—15 of Figure 14, as seen in the direction of the arrows; and

Figure 16 shows a modified form of the invention.

The present application is a division of application Ser. No. 595,898, filed May 26, 1945, and matured into Letters Patent No. 2,541,254, issued February 13, 1951, for Blanket Tensioning Means, the present application being directed more particularly to the invention as embodied in the form illustrated in Fig. 16 of the drawing.

Referring to the drawings, the invention is shown as applied to an impression cylinder 21, that may cooperate with a plate cylinder (not shown) to form a printing couple in a printing machine. The impression cylinder is rotatably supported by anti-friction bearings, one of which is shown at 22, carried by a frame member 23.

Each end of the cylinder is provided with a longitudinally disposed gap 24 (Figures 1, 11, 12 and 14) having communicating bores 26*a* and 26*b*, and a slot 28 connecting the bores with the surface of the cylinder. Reel rods 29*a* and 29*b* (Figures 14 and 15) are positioned in the bores and each has a shoulder 31 (Figures 4 and 15) against which a bushing 32 abuts and is held in place by a set screw 33. The bushings 32 are journaled in the inner end of the bores 26*a* and 26*b*, and thereby rotatably support the inner end of the reel rods 29*a* and 29*b*. Second bushings 34, pressed into the outer ends of the bores 26*a* and 26*b*, and abutting shoulders 35, rotatably support the outer ends of the reel rods.

The reel rods have axially positioned cylindrical bores 36, the inner ends of which are enlarged as at 37 (Figure 4) to receive bushings 38. The bushings 38, which as herein shown have axially disposed square holes 39 extending through them, are forced into the enlarged portions 37 and are preferably secured by welding. The outer end of reel rod 29*a* and 29*b* have pairs of oppositely disposed segmental jaws 41, that cooperate respectively with pairs of oppositely disposed segmental jaws 42 (Figure 5) formed integral with worm wheels 43.

The jaws 41 and 42 are preferably circular sectors of 60° and when in cooperative position, a

back lash, or lost motion of 60° exist between the worm wheels 43 and the reel rods 29. Arcuate plates 44 and 46 (Figure 2) are secured to each end of the cylinder 21 by bolts 47, and have bores 48 for receiving the worm wheels 43 and a portion of the bushings 34, that project beyond the end of the cylinder. Holes 49 (Figures 15) coaxial with the bores 48 extend through the plate 44 and provide bearings for hubs 51 of the worm wheels 43, the inner hubs 50 of the worm wheels being journaled in the bores of the bushings 34. Square holes 52 extend axially through the worm wheels 43 and receive square spring rods 53, that extend through the bores 36 in the hollow reel rods 29*a* and 29*b*, and into the square holes 39 in the bushings 38. Pins 54, positioned in radially disposed holes 56 in the worm wheels retain the rods 53 in the positions shown. The reel rods 29*a* and 29*b* have flattened surfaces 57 extending lengthwise thereof, and segmental blanket holders 58 have their ends (Figure 15) held adjacent the surfaces 57 by the bushings 32 and 34.

Canvas strips 61*a* and 61*b* are secured to the reel rods by having their inner ends wrapped around the blanket holders 58 and sewed to the body of the strip as at 59. The free ends of the strips extend through the slot 28 beyond the surface of the cylinder 21. Worm wheels 43 are driven by worms 63*a* and 63*b* located in radial bores 64. Thrust washers 66 located toward the bottom of the bores 64, and bearing bushing 65 screwed into threaded portions 67 of the bores 64, rotatably support the worms 63*a* and 63*b*, that have wrench engaging portions 68 by which the worms may be rotated.

The radially disposed longitudinally extending slot 28 (Figure 14) has walls 69*a* and 69*b* that incline toward one another as the surface of the cylinder 21 is approached. Walls 69*a* and 69*b* are provided with longitudinally extending recesses 72*a* and 72*b* respectively, having open portions 73 and inclined embedded portions 74. As herein shown the cylinder 21 carries inner and outer blankets 76 and 77 and a top sheet or draw sheet 78, but it will be understood that cylinder packing having a greater or lesser number of plies of any suitable material may be used.

As herein shown, a blanket bar 79 (Figure 3A) and a hook bar 81, that are approximately one half the length of the impression cylinder 21, are fastened together by a plurality of screws 82 and thereby form a clamp to secure one end of the inner blanket 76 and one end of the outer blanket 77 together. The bar 81 is provided with a longitudinally extending hook-shaped member 83, for engaging a V-shaped drawsheet clip 84 that is secured at each end by rivets 86 to the drawsheet 78 that is folded at 91.

If it is assumed that the impression cylinder 21 is to be used for clockwise rotation as seen in Figures 11, 12 and 14, and if the canvas strips 61*a* and 61*b* are in place and secured to the reel rods 29*a* and 29*b*, then the blankets 76 and 77, and the draw sheet 78 may be applied to the impression cylinder as follows:

Assuming that the outer ends of the blankets are cut square with the side edges, one end of the outer blanket 77 is placed in line with one end of the inner blanket 76, and the two are clamped together between the blanket bar 79 and the hook bar 81 by means of the screws 82. Then the bar 79 is inserted in the recess 72*a*, the cylinder 21 rotated clockwise as shown in Figure 11, and the blankets 76 and 77 are thus wrapped around the cylinder and the free end of the inner blanket 76 is tucked in the slot 28 as shown at 87. The free end of the outer blanket 77 is folded back as shown at 88, and is pinned to the free end of the canvas sheet 61*a* by pins 89. Then by means of a suitable wrench (not shown) the worm 63*a* is operated to turn its worm wheel in a counterclockwise direction. This turns the spring rod 53, rotating bushing 38 and the reel rod 29*a* counter-clockwise to wind up the canvas strip 61*a*. The strip 61*a* pulls the end of the outer blanket 77 into the gap 24 and draws it tight against the cylinder. When the middle sheet has become tight enough to stop rotation of the reel rod 29*a*, continued turning of its worm 63*a* produces torsion in the spring rod 53 (Figure 9). The torsion, that may thus be produced, is limited by the amount of lost motion provided between the jaws 41 and 42. When these jaws engage, a continued turning of the worm 63*a* and its worm wheel 43, stretches the blanket 77 without further distortion of the rod 53. After the jaws 41 and 42 engage, the reel rod 29*a* is driven from both ends, part of the turning force being applied by the spring 53 and part by the jaws 42. This decreases the amount of torsion that would have developed in the reel rod 29*a* had it been driven from only one end. The torsion produced in the rod 53 maintains strain on the blanket and takes up any stretch that may develop therein.

The draw sheet 78, one end of which has previously been riveted to the U-shaped draw sheet clip 84, is then secured to the cylinder 21 as follows: (Figures 3, 3A and 12). The clip 84 on the end of the sheet 78 is inserted into the slot 28 so as to engage the hooked member 83. The cylinder 21 is again rotated and the draw sheet is wrapped around the cylinder over the blankets, and its free end is pinned to the free end of the second canvas strip 61*b* (Figure 12) in much the same manner as that previously described for the blanket 77 and canvas strip 61*a*. Thereafter the strip 61*b* and sheet 78 are folded as at 92 (Figure 12), and the wrench is used to turn the worm 63*b*. This turns its worm wheel 43 and also the spring rod 53, bushing 38 and the reel rod 29*b* in a clockwise direction, and winds up the draw sheet 78 and pulls it tight against the cylinder. Continued turning of the worm 63*b* torsions the spring rod 53 and tensions the draw sheet 78 in the same manner as described for the blanket 77.

The operation of an impression cylinder against a plate cylinder often causes the blanket and the draw sheet to "creep" and stretch. In the mechanism herein described, any looseness due to stretching of the blanket 77 or the draw sheet 78 will be immediately taken up by the spring rods 53.

It should be noted that the cylinder 21 is symmetrical in that both walls 69*a* and 69*b* are provided with similar recesses 72*a* and 72*b* and that the reel rods 29*a* and 29*b* are symmetrically placed in the symmetrical gap 24. By this arrangement the blankets and draw sheet can be applied to the cylinder in a reverse manner to that shown in the drawings, if it is desired to operate the machine with the printing cylinders rotating in the opposite direction.

A modified form of the invention is shown in Figure 16, wherein a single blanket or sheet 101 is spring tensioned on a printing cylinder 102 by a coiled spring 103 acting on a worm 104. The cylinder 102 is provided with a longitudinally disposed gap 106 having communicating bores 107 and 108 and a slot 109 having

walls 111 and 112 extending from the bores to the surface of the cylinder. A rod 113, rotatably positioned in the bore 107, carries a clamp 114 located in the slot 109 and secured to the rod 113 by screws 116. A radial bore 117, has a threaded portion 118 into which is screwed a nut 119, having a threaded hole 121. A screw 122, equipped with a snap ring 123 and a screw driven slot 124, is screwed into the hole 121 and engages an upper face of an arm 126, that extends radially from one end of the rod 113. The lower face of the lever 126 is engaged by a spherical end of a pin 127, that is biased toward the lever by a spring 128. The clamp 114, clamps one end of the blanket 101 or other packing used against the wall 111, when the screw 122 is turned to force the arm 126 against the compression spring 128. When the screw 122 is turned in the opposite direction the clamp 114 is opened by the spring.

A reel rod 131, that carries a worm wheel 130 is rotatably mounted in the bore 108 and provided with means (not shown) but preferably such as is shown in Figure 11, by which the free end of the blanket 101 can be secured thereto. The worm 104, positioned in a radial bore 132 has a wrench engaging head 133 and gudgeons 134 and 136, that are rotatably supported in bushings 137 and 138 respectively. The bushing 137 is pressed into the bottom of the bore 132, and the bushing 138 is screwed into a threaded portion 139 thereof.

A blanket or other packing may be applied to the cylinder 102 as follows: loosening the screw 122 allows the spring pressed pin 127 to move the arm 126 and the rod 113 in a clockwise direction. This moves the clamp member 114 away from the wall 111 and provides space for insertion of one end of the blanket 101. After the end is in place, the screw 122 is tightened to rotate the arm 126 and the rod 113 counterclockwise to clamp the blanket against the wall 111. The cylinder 102 is then rotated clockwise wrapping the blanket thereabout and its free end is attached to the reel rod 131, after which, the worm 104 and reel rod 131 are rotated by a wrench applied to the head 133 to tighten the blanket. Continued turning of the worm 104, after the worm wheel 130 has come to a stop, causes the worm to move axially into the bore 132 against the compression spring 103. If the blanket stretches during operation of the machine, the spring 103 will move the worm 104 outwardly and rotate the worm wheel 130 and rod 131 and keep the blanket tight on the cylinder.

While the invention as herein disclosed is applied to a newspaper printing machine in which relatively soft blankets are used on an impression cylinder, it will be understood that the invention may be used on impression cylinders of magazine presses, which use paper, cardboard, or relatively hard cylinder packing, and it is also applicable to the blanket cylinders of planographic off-set printing machines in which the impression is transferred from a printing plate to a printing blanket carried on a blanket cylinder, and then again transferred to a web or sheet. In fact, the invention is applicable to any machine having a blanket or the like, that is wrapped about a cylinder and which it is necessary to keep under tension while running. Hence, the word blanket as herein used, is intended to include any flexible material that is wrapped about a cylinder and held under tension in a machine operating on webs or sheets.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being made to the claim rather than to the foregoing description for an indication of the scope of the invention.

What we claim is:

A printing machine cylinder having a mechanism for securing blankets on the cylinder, the securing mechanism including a means for attaching one end of the blanket to the cylinder, a reel rod rotatably mounted in the cylinder and to which the other end of the blanket may be attached, a worm wheel for rotating the reel rod, a worm for rotating the worm wheel, bearings for rotatably supporting the worm and allowing the worm to move axially therein, and a spring for biasing the worm in one direction in the said bearings.

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