March 1, 1966 L. S. FAGG, JR 3,237,558

PRINTING BLANKET AND FASTENER MEANS THEREFOR

Filed June 4, 1962 2 Sheets-Sheet 1

FIG. 1

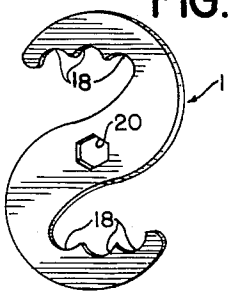

FIG. 2

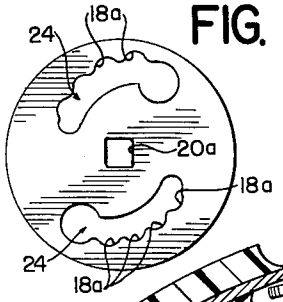

FIG. 3

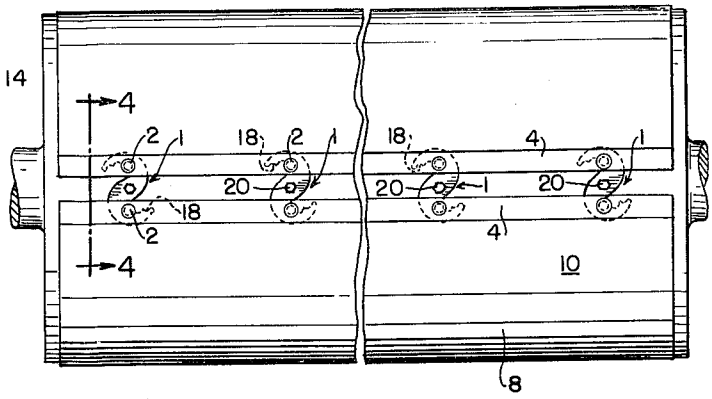

FIG. 4

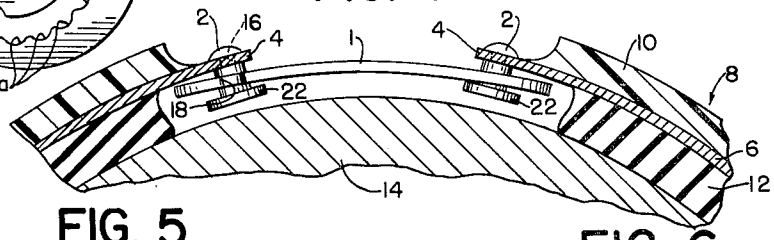

FIG. 5

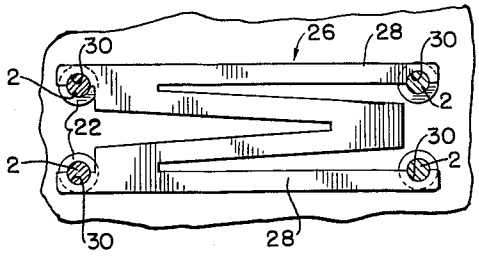

FIG. 6

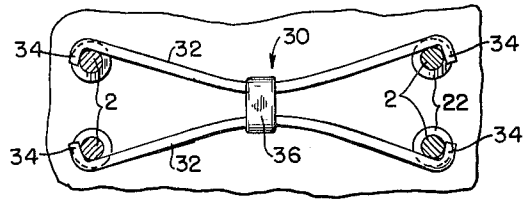

FIG. 7

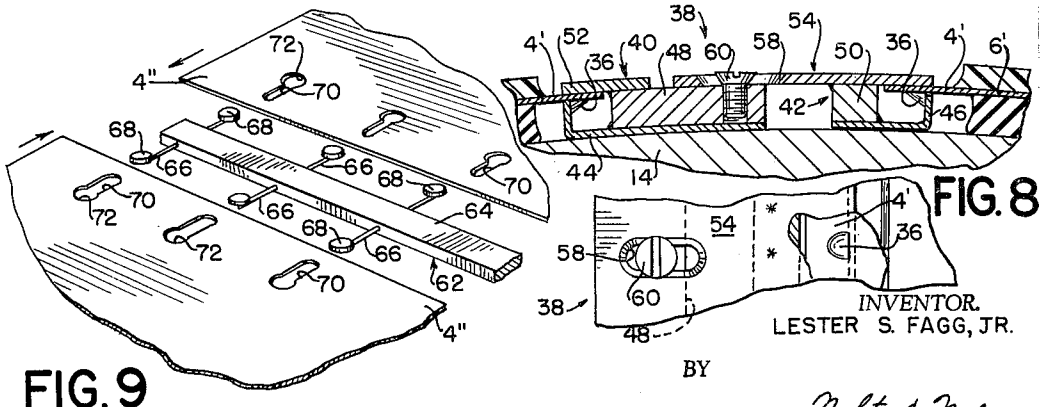

FIG. 8

FIG. 9

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FIG. 10

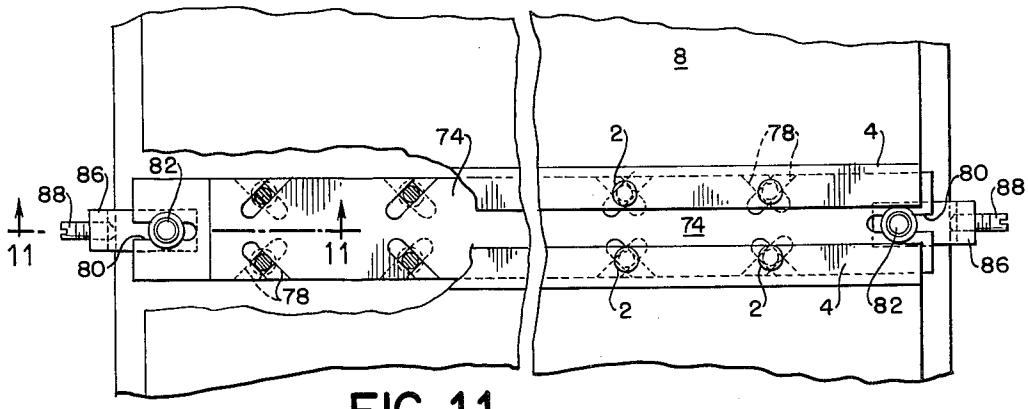


FIG. 11

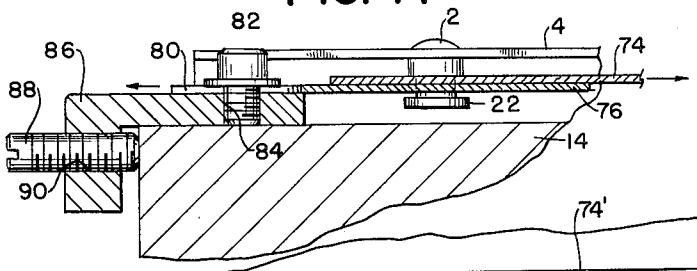
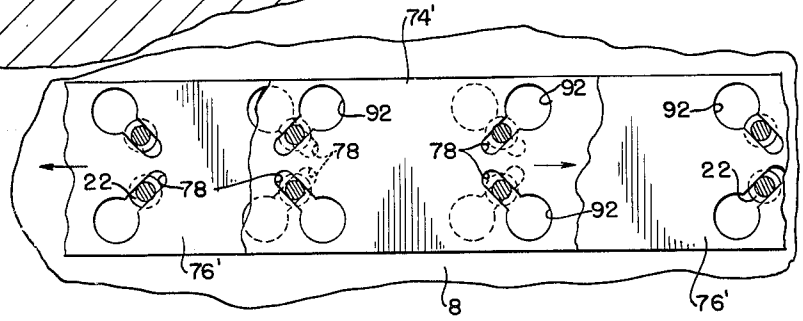


FIG. 12



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United States Patent Office 3,237,558 Patented Mar. 1, 1966

3,237,558
PRINTING BLANKET AND FASTENER MEANS THEREFOR

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Filed June 4, 1962, Ser. No. 199,853
25 Claims. (Cl. 101—415.1)

This application is a continuation-in-part of an application, Serial No. 176,689, filed on March 1, 1962, and now abandoned for a Device.

This invention relates to fasteners and more particularly to fasteners for the attachment and tightening of offset printing blankets onto printing rolls.

In lithograph and offset printing techniques, various methods are known for tightening the printing blanket over the offset cylinder and maintaining it fastened thereon. According to one known method, a groove is provided within the cylinder and after the blanket has been tightened thereon by the aid of special tightening devices, the edges of the blanket are tucked in the groove, which is formed as a keyway complementary to a key wedge insert, keeping the edges of the printing blanket tightly wedged in the keyway. This method has several disadvantages. The tucked-in metal edges of the blanket are always permanently deformed after the wedging operation. Furthermore, external tightening devices are needed and the process still results in a non-uniform tightening and possible buckling or other unevenesses of the printing blanket.

According to another known method, snaps have been provided for tightening and snapping the loose ends of the printing blanket onto each other. The inherent disadvantage of this method is that the locations of the snaps are fixed and consequently, the applied stretch has also to be a fixed value, resulting in uneven tightening due to high manufacturing tolerances for such fixed modes of attachments.

In another known device, a tightening roller is built right into the printing cylinder, the edges of the printing blanket are attached to the tightening roller which subsequently is rotated in a direction to impart tightening throughout the blanket. This method, besides having the disadvantage of being an involved and complicated device, and although applying uniform tension throughout the width of the blanket on the cylinder, does not take into consideration any differences in length and stretchability throughout the blanket, and provides no means for compensating for such differences.

It is an object of the present invention to provide a novel, simple device and method for the attachment and tightening of printing blankets onto printing cylinders. The invention is also useful for general fastening applications.

Accordingly, a printing blanket is provided, adapted to be tightened around a printing cylinder. The printing blanket consists of an upper printing layer adapted to print or transfer indicia onto a printing web, such as paper, a lower, elastic layer for disposition directly on the surface of the printing cylinder and which acts as a resilient tightening cushion for the upper printing layer, and an intermediate layer, preferably a metal sheet, having ends extending past the ends of the upper and lower printing layers. The opposing edges of the intermediate layer are provided with opposed spaced locking portions throughout the width of the printing blanket and locking means are provided whereby the opposing spaced locking portions of the intermediate layer edges are engaged and drawn tightly together to tighten the printing blanket on the printing cylinder. The spaced locking portions can

alternatively be rivets, apertures or retainer openings stamped from the intermediate layer edges, depending on the fastener embodiment to be used.

Further features and advantages of the invention are to be explained in greater detail in the following detailed description, reference being made to the appended drawing wherein:

FIG. 1 is an elevational view of one embodiment of the fastening means according to the invention;

FIG. 2 is a plan view of another embodiment of the fastening means similar to the one shown in FIG. 1;

FIG. 3 is an elevational view of a printing blanket attached onto a printing cylinder by fastening means shown in FIG. 1;

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 3;

FIGS. 5 and 6 are plan views of other embodiments of the fastening means according to the invention;

FIG. 7 is a cross-sectional view of yet another fastening means embodiment of the invention, disposed on a printing cylinder shown partially broken away;

FIG. 8 is a broken away elevational view of the embodiment shown in FIG. 7;

FIGS. 9 and 10 show other alternative embodiments of fastening means according to the invention;

FIG. 11 is a cross-sectional view taken along line 11—11 of FIG. 10; and

FIG. 12 is a slightly modified embodiment of the fastening means shown in FIGS. 10 and 11.

The embodiment of the invention shown in FIGS. 1, 3 and 4 is a substantially S-shaped fastener 1 adapted to cooperate with rivets 2 disposed within an overhanging metal edge 4 of an intermediate layer 6 of printing blanket 8 according to the invention.

The printing blanket 8 is best shown in FIG. 3, and includes an upper, or printing layer 10. The layer 10 can be made of any suitable printing or offset material (e.g., a special photo-sensitive nylon printing material) which can be cemented or attached by any other suitable means to the intermediate layer 6 which is preferably made of metal. The intermediate layer 6 is disposed on, or bonded to a lower, or cushioning layer 12, made of an elastic material such as rubber, or the like, and it imparts elasticity to the blanket 8 when it is tightened over a printing cylinder 14.

The intermediate layer 6 is provided with overhanging edges 4 at both ends, the edges 4 extending beyond the overlapping edges of the layers 10 and 12. In the embodiment presently being discussed, rivets 2 are disposed within equally spaced bores 16 along the transverse width of the intermediate layer adjacent the overhanging edge 4. On the opposite edge 4 another row of similarly spaced rivets are provided.

The S-shaped fastening member 1 is formed with a plurality of snap-on recess portions 18 on its interior end surfaces, which snap over the shanks of the opposing rivets 2. A hexagonal opening 20 is formed substantially in the center of the fastener 1 and an Allen-type wrench, not shown, is positioned in the opening 20 to impart the tightening rotation of the member 1.

The snap recess portions 18 can be disposed in any manner along the interior end surfaces of the S-shaped fastening member 1, as long as the adjacent recesses in each end portion are located at a progressively greater distance from the opening 20 as one proceeds from the innermost recess 18 towards the ends of the fastener 1.

The rivets are preferably formed with a wider bottom portion 22, to avoid scratching the surface of the printing cylinder 14 when the blanket 8 is tightened, and retain the fastener 1 on the rivet shank.

In FIG. 2 a fastener 1*a* is shown, operating on the

same principle as the fastener 1, except instead of being S-shaped it is a disc having cutout portions 24 therein. The cutout portions 24 are formed at their radially outward surfaces with snap-on recessed portions 18*a*, for a purpose similar to the recesses 18 in the member 1. The radially outer ends of the cutout recesses 24 are enlarged so that the heads of the rivets 2 can be introduced in the recesses 24. Instead of the hexagonal locking opening 20, in the embodiment shown in FIG. 2 a rectangular opening 20*a* is shown which could also be used in the construction of FIG. 1 in place of the hexagonal opening, and in which case as in the construction of FIG. 2, a square wrench is needed to impart the rotary loosening or tightening motion to the fastener.

In applying the printing blanket 8 onto the printing cylinder 14, the blanket is positioned on a mounting support surface with its cushioning layer facing upwardly. Subsequently, the printing cylinder is positioned on the exposed cushioning layer surface and the printing blanket 8 is bent upward at its ends to substantially surround the cylinder.

If the S-shaped fasteners 1 are used, they are placed onto the surface of the printing cylinder 14. If the disc-shaped fasteners 1*a* are used, they are snapped onto the shanks of opposing rivets 2 through the enlarged portions of the recesses 24. After all locking members are positioned adjacent or in relationship with opposing rivets 2, the printing blanket 8 is tightened onto the cylinder 14 by a suitable wrench or similar tool by gradually rotating the fastener so that the opposing rivets 2 will snap into successively inwardly disposed snap-recess portions 18, 18*a*. Uniform stretch can be applied to the blanket 8 by tightening the different fasteners to a desired different degree, if necessary.

Another embodiment of the fastener (not shown) according to the invention could include a hook-like formation provided at one end with recesses similar to the recesses 18 of FIG. 1, and pivoted at its other end from the edge 4 of the printing blanket 8.

In FIG. 5 another embodiment of a fastener according to the invention is shown. The fastener 26 comprises a plurality of zig-zagging resiliently formed metal legs 28, each of the outer legs 28 being provided at both of their ends with substantially semi-circular recesses 30, adapted to fit over the shanks of rivets 2. The resiliency of the stamped or cutout sheet metal fastener 26 tends to draw the opposing edges 4 of the printing blanket 8 together.

An effect similar to the one illustrated in FIG. 5 can be obtained by the fastener 30 shown in FIG. 6, the fastener 30 comprising two resilient rods 32 provided at their free ends with bent portions 34 adapted to engage the shanks of rivets 2 disposed in the overhanging edge 4. The resilient rods 32 are clamped together substantially at their respective centers by a permanent clamp 36 which cooperates with the resiliency of the members 32 to pull the opposed edges 4 of the printing blanket 8 together.

In the embodiment of the fastening and tightening device shown in FIGS. 7 and 8, the overhanging edges 4' of the intermediate layer 6' are not provided with opposing rivets as in the previously discussed embodiments, but rather with spaced, opposing stamped-out retaining shoulders 36 extending toward the cylinder 14 and adapted to be drawn together by a locking device 38. Individual locking devices, not shown, can be provided for each set of opposing retaining shoulder 36 or, in the preferred embodiment, the locking device 38 is a unitary elongated member providing fastening means for including all the opposing retaining shoulders 36 simultaneously. Accordingly, the locking device 38 consists of two main portions, 40 and 42, adapted to slidingly engage each other. Each of the portions 40 and 42 includes substantially L-shaped retaining pieces 44 and 46 adapted to engage the respective adjoining retaining shoulders 36. The retaining pieces 44 and 46 are, in the preferred embodiment, made of flat spring-steel, each spot-welded to a respective connecting block 48 and 50. The connecting blocks 48 and 50 are also spot-welded to retaining plates 52 and 54, each of which forms a slot for the overhanging edge 4' in cooperation with the upstanding portions of the respective L-shaped retaining pieces 44 and 46. This slot prevents the locking piece from accidentally disengaging from the retaining shoulders 36. The retaining plates 52 and 54 are spot-welded or fastened by other means to the respective connecting blocks 48 and 50. A part of the retaining plate 54 is in a sliding overlapping relationship with the connecting block 48, having an elongated slot 58 to lock the retaining plate 54 and its associated portion 42 to the connecting block 48 and its associated portion 40.

To tighten a printing blanket around a printing cylinder 14 with the locking device 38, the locking screw 60 is loosened and after the blanket has been wrapped around the cylinder 14, the locking device 38 is slid over the overhanging edges 4' of the intermediate layer 6' through the slots provided between the L-shaped retaining pieces 44 and 46 and their respective retaining plates 52 and 54. The opposing overhanging edges 4' can be drawn together by, e.g., a suitable steel wrap-around cinch-up strap (not shown) and after the locking screws have been tightened, the cinch-up strap can be removed.

In FIG. 9 an elastic locking strip 62 is shown. The locking strip 62 can be molded of a single piece and in the preferred embodiment is made of a suitable elastic rubber. The locking strip 62 consists of a center strip 64 having molded thereto spaced opposing retaining arms 66 each having retaining buttons 68 molded to their free ends. The overhanging metal edges 4'' of the intermediate layer of the printing blanket are formed with elongated apertures 70 having enlarged openings 72 at their remote ends so that the retaining buttons 68 can be fitted through the aperture 70. The center strip 64 can also be separate from or even made from another material than the retaining arms 66 with their retaining buttons 68, in which case a bore can be provided in the strip for each arm.

An opposite tightening-strip blanket fastening and tightening method and apparatus required therefor is shown in FIGS. 10–12. In the embodiment shown in FIGS. 10 and 11 two blanket-tightening strips 74 and 76 are provided, being of substantially the same length as the width of the blanket 8. The blanket-tightening strips 74 and 76 are substantially identical, each formed with spaced, substantially 45° slots 78 being disposed substantially at 90° relative to opposing slots 78. The spacing of slots 78 is identical to the spacing of the rivets 2 in the overhanging edge 4 of the blanket 8. The blanket tightening strips 74 and 76 are formed with fastening slots 80 at one end of the strip, the fastening slots being disposed in the longitudinal axis of each strip. The blanket tightening strips 74 and 76 are disposed on top of each other in an opposing relationship so that the fastening slot 80 of the below-disposed strip 76 is facing in one direction while the fastening slot 80 of the top fastening strip 74 is facing in the opposite direction. Consequently, the respective slots 78 of the blanket tightening strips 74 and 76 are opposed to each other in a diagonal relationship.

As a rivet 2 is first inserted in a slot 78 of the top strip 74 and subsequently in another slot 78 of the lower strip 76, and the strips 74 and 76 are pulled in opposing directions, the opposing rivets 2 in the edges 4 of the blanket 8 are drawn together, resulting in a tightening of the blanket around the printing cylinder 14. After an initial, coarse tightening of the blanket by the strips 74 and 76 in the opposite direction, a fastening screw 82 which is passed through the fastening slots 80 of the respective blanket tightening strips 74 and 76 is tightened, to maintain the strips in their initial, coarse, taut condition.

The fastening screw 82 is tightened within a threaded bore 84 of an L-shaped stretch-adjusting member 86 slid-

ingly disposed on the printing cylinder 14 at each end thereof. A cross-sectional view of the tightness-adjusting member 86 and its associated parts is best shown in FIG. 11. The member 86 is adapted to slide on the printing cylinder 14, and the fine adjustment of the blanket tightening strips 74 and 76 is accomplished by means of an adjusting screw 88 threaded through a bore 90 in the shorter leg of the tightness adjusting member 86. By theading the screw 88 into its bore 90, the member 86 is moved in the direction of the left arrow, whereby further pull is exerted onto the blanket tightening strip 76 resulting in a relative sliding motion between the member 86 and the surface of the printing cylinder 14.

In FIG. 12 a fastening device, similar to the ones shown in FIGS. 10 and 11, is shown, with the exception that the slots 78, part of the embodiment shown in FIG. 12, are not open all the way to the edge of the blanket tightening strips 74' and 76' in this embodiment, but they are provided with enlarged holes 92 to provide passage for the wider bottom portions 22 of the rivets 2.

It is to be understood that the embodiments shown and described are only exemplary illustrations of the invention, the scope of which is to be interpreted from the appended claims.

What I claim is:

1. A flexible printing blanket for use with a printing roll, comprising a printing layer, an elastic cushion layer spaced from and substantially overlapping said printing layer, an intermediate layer between said printing layer and said cushion layer, said intermediate layer having edges overhanging said overlapping printing and cushion layers in two opposing directions, and fastener-anchoring means disposed along substantially the entire length of each of said overhanging edges, whereby when said blanket substantially envelopes said roll the fastener-anchor means of one of said overhanging edges are aligned with the fastener-anchoring means in the other overhanging edge, and each of said fastener-anchoring means comprises a rivet.

2. The combination of a flexible printing blanket and a fastener according to claim 1, wherein said external printing layer is made of photo-sensitive nylon.

3. A fastener for connecting opposing longitudinal edges of a composite flexible printing blanket to each other, wherein said blanket includes an anchor layer and an external printing layer, said anchor layer including a plurality of fastener-anchoring means spaced along substantially the entire length of each of said edges, said blanket being disposed substantially around the entire printing roll so that the fastener anchor means along one of said edges is aligned with the fastener-anchor means along the other of said edges, said fastener comprising first fastening means for gripping the fastener-anchoring means in one of the edges of the printing blanket, second fastener means for gripping the fastener-anchoring means in the other edge of the printing blanket, and connecting means for joining said first and second fastener means, said fastener-anchoring means comprising spaced rivets disposed in the opposing edges of the printing blanket, said fastener including at least two strips disposed on each other in a partially overlapping opposing relationship, said first and said second fastening means in each strip including elongated apertures disposed at oblique angles relative to the longitudinal axis of said strips and at substantially right angles relative to each other, the spacing of said apertures substantially corresponding to the spacing of the rivets, the fastener further including means for fastening said strips each at opposing ends for maintaining said strips in a desired partially overlapping relationship.

4. A fastener according to claim 3, wherein each one of said elongated apertures is open at the adjacent edge of the strip, whereby a corresponding one of said rivets passes into its respective aperture.

5. A fastener according to claim 3, wherein each strip further includes enlarged apertures disposed adjacent to and in communication with the ends of each elongated aperture adjoining the adjacent longitudinal edge of the strip for passing said enlarged aperture around a respective rivet.

6. A fastener according to claim 3, wherein said strip fastening means each includes a fastening block, a coarse fastener adapted to fasten a respective strip to the fastening block, and an overlap adjuster in said fastening block adapted to adjust the strips in their final desired overlapping relationship.

7. The combination of a flexible printing blanket for use with a printing roll and a fastener to secure said blanket to said roll, said printing blanket comprising an anchor layer and an external printing layer, said anchor layer including a plurality of fastener-anchoring means spaced along substantially the entire length of each of said edges, said blanket being disposed substantially around the entire printing roll so that the fastener anchor means along one of said edges is aligned with the fastener-anchor means along the other of said edges, the fastener comprising first fastening means for gripping the fastener-anchoring means in one of the opposing edges, second fastening means for gripping the fastener-anchoring means in the other one of the opposing edges, and connecting means for joining said first and second fastening means, said fastener-anchoring means comprising spaced rivets disposed in the opposing edges of the printing blanket, said fastener including at least two strips disposed on each other in a partially overlapping opposing relationship, said first and said second fastening means in each strip including elongated apertures disposed at oblique angles relative to the longitudinal axis of said strips and at substantially rectangles relative to each other, the spacing of said apertures substantially corresponding to the spacing of the rivets, the fastener further including means for fastening said strips each at opposing ends for maintaining said strips in a desired partially overlapping relationship.

8. A fastener according to claim 7, wherein each one of said elongated apertures is open at the adjacent edge of the strip, whereby a corresponding one of said rivets passes into its respective aperture.

9. A fastener according to claim 7, wherein each strip further includes enlarged apertures disposed adjacent to and in communication with the ends of each elongated aperture adjoining the adjacent longitudinal edge of the strip for passing said enlarged aperture around a respective rivet.

10. A fastener according to claim 7, wherein said strip fastening means each includes a fastening block, a coarse fastener adapted to fasten a respective strip to the fastening block, and an overlap adjuster in said fastening block adapted to adjust the strips in their final desired overlapping relationship.

11. A printing blanket and fastener combination adapted to be secured to an imporforate continuous printing roller, said blanket having a tension layer adapted to extend around the roller, a printing layer on said tension layer having a printing surface, said layer falling short of the ends of the tension layer, fastening means for engaging the tension layer adjacent the ends at spaced points along substantially the entire length of said ends, said fastening means lying entirely between the printing surface and the roller surface and urging the ends of the tension layer toward each other.

12. A fastener according to claim 11, wherein said fastener-anchoring means comprises spaced rivets in the opposing edges of the printing blanket, at least said first fastening means including a plurality of adjacent protrusions defining adjacent recesses, and rotating means for the rotation of said fastener, said recesses each being disposed at dissimilar distances from said rotating means.

13. A fastener according to claim 12 comprising a

substantially S-shaped body wherein said adjacent protrusions are disposed along the inner surfaces of the opposite end-arms of said S-shaped body and said rotating means is disposed substantially in the center of said connecting means which comprises a polygonal hole adapted to be engaged for rotation for drawing the opposing edges of the printing blanket progressively towards each other.

14. A fastener according to claim 12, comprising a substantially disc-shaped body wherein said first and second fastening means include at least two slotted apertures having a predetermined radially inward slant in said disc, said adjacent protrusions being disposed on the radially outward side of said slanting apertures, enlarged apertures adjacent to and in communication with the radially outward ends of said slanting apertures for passing said enlarged apertures around the rivets, and said rotating means is disposed substantially in the center of said connecting means and comprises a polygonal hole adapted to be engaged for the rotation of the disc for drawing the opposing edges of the printing blanket progressively towards each other.

15. A fastener according to claim 11, wherein said fastener-anchoring means comprises rivets in the opposing edges of the printing blanket and said first and second fastener means each comprises a leg formed at each end thereoef with a portion adapted to engage adjacent rivets in the same edge of said blanket for resiliently drawing the opposing edges of the blanket towards each other.

16. A fastener according to claim 15, wherein said legs are resilient rods, said portions adapted to engage the rivets being bent at the ends of said resilient rods, and said connecting means comprises a firm connection adapted to pull the rods towards each other substantially at their respective centers.

17. A flexible printing blanket according to claim 11, wherein said printing layer is made of photo-sensitive nylon.

18. A printing blanket and fastener combination adapted to be secured to an imperforate continuous printing roller, said blanket having an inner cushion layer, an intermediate tension layer and an outer printing layer, said printing layer having a printing surface, said printing layer and said cushion layer falling short of the ends of the tension layer, fastening means for engaging the tension layer beyond the cushion and printing layers at spaced points substantially entirely along the length of the ends of the tension layer, said fastening means lying entirely interior of the printing surface and exterior of the printing roller and urging the ends of the tension layer towards each other.

19. A printing blanket for use on a continuous imperforate printing roller comprising a lower cushioning layer, an intermediate tensioning layer and an upper printing layer, adapted to be wrapped around the printing rollers with the ends of the tensioning layer in opposed spaced relation, said cushioning layer and said printing layer falling short of the ends of the tensioning layer, whereby the exposed portions of the tension layer may be engaged by fastening means to urge the ends towards each other.

20. A flexible printing blanket for use with a printing roll comprising a printing layer, an elastic cushion layer spaced from and substantially overlapping said printing layer, an intermediate layer between said printing layer and said cushion layer, said intermediate layer having edges overhanging said overlapping printing and cushion layers in two opposing directions, and fastener-anchoring means comprising elongated apertures disposed along substantially the entire length of each of said overhanging edges, whereby when said blanket substantially envelopes said roll, the fastener anchoring means of one of said overhanging edges are aligned with the fastener-anchoring means of the other overhanging edge.

21. A printing blanket and fastener combination adapted to be secured to an imperforate continuous printing roller, said blanket having a tension layer adapted to extend around the roller, a printing layer on said tension layer having a printing surface, said layer falling short of the ends of the tension layer, fastener anchoring means disposed in said tension layer, fastening means for engaging the fastener anchoring means of the tension layer adjacent the ends at spaced points along substantially the entire length of said ends, said fastening means lying entirely between the printing surface and the roller surface and urging the ends of the tension layer toward each other.

22. A fastener according to claim 21, wherein said fastener-anchoring means comprises spaced rivets in the opposing edges of the printing blanket, at least said first fastening means including a plurality of adjacent protrusions defining adjacent recesses, and rotating means for the rotation of said fastener, said recesses each being disposed at dissimilar distances from said rotating means.

23. A fastener according to claim 22, comprising a substantially S-shaped body wherein said adjacent protrusions are disposed along the inner surfaces of the opposite end-arms of said S-shaped body and said rotating means is disposed substantially in the center of said connecting means which comprises a polygonal hole adapted to be engaged for rotation for drawing the opposing edges of the printing blanket progressively towards each other.

24. A fastener according to claim 22, comprising a substantially disc-shaped body wherein said first and second fastening means include at least two slotted apertures having a predetermined radially inward slant in said disc, said adjacent protrusions being disposed on the radially outward side of said slanting apertures, enlarged apertures adjacent to and in communication with the radially outward ends of said slanting apertures for passing said enlarged apertures around the rivets, and said rotating means is disposed substantially in the center of said connecting means and comprises a polygonal hole adapted to be engaged for the rotation of the disc for drawing the opposing edges of the printing blanket progressively towards each other.

25. A fastener according to claim 21, wherein said fastener-anchoring means comprises rivets in the opposing edges of the printing blanket and said first and second fastener means each comprises a leg formed at each end thereof with a portion adapted to engage adjacent rivets in the same edge of said blanket for resiliently drawing the opposing edges of the blanket towards each other.

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