April 23, 1935. L. T. A. ROBINSON 1,999,109

PRINTING CYLINDER

Original Filed March 6, 1931 3 Sheets-Sheet 1

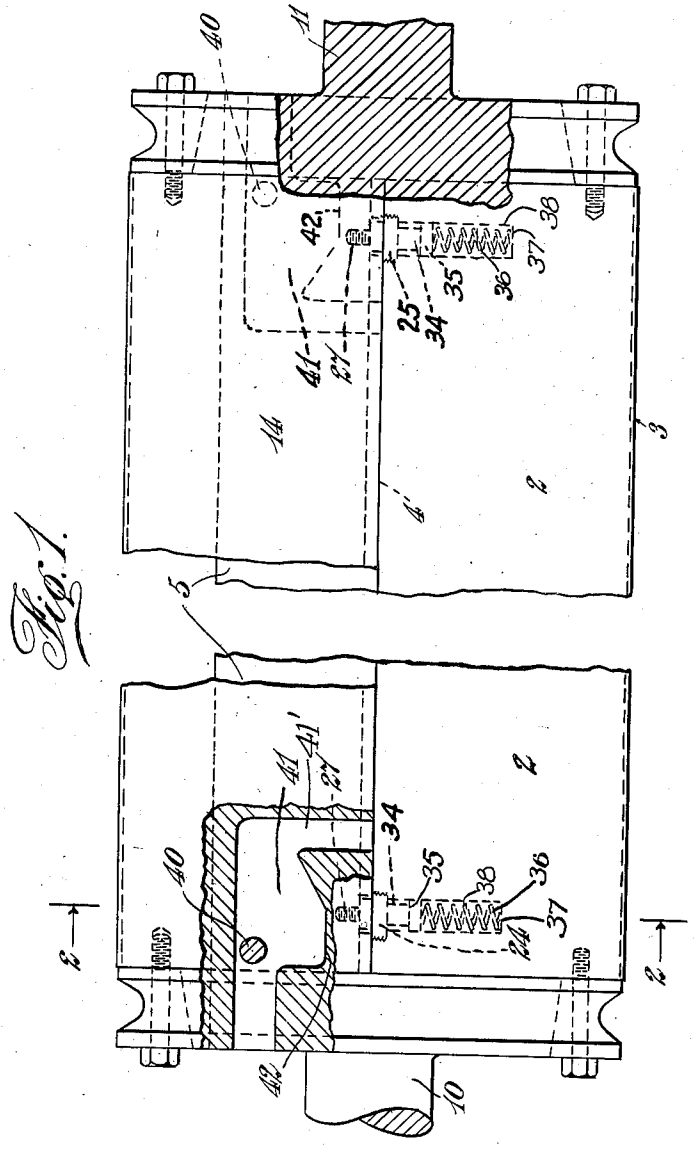


Fig. 1.

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Original Filed March 6, 1931 3 Sheets-Sheet 2

Fig. 2.

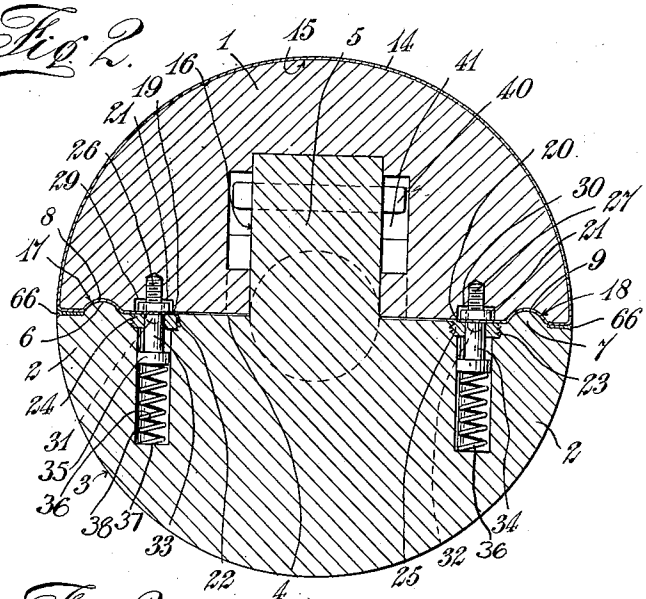


Fig. 3.

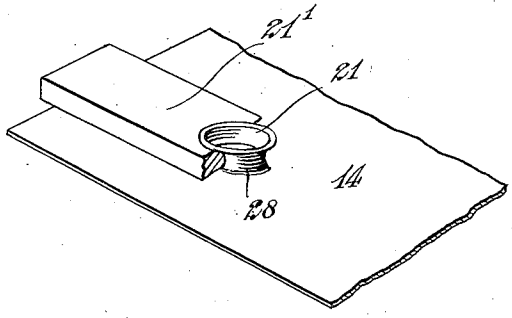
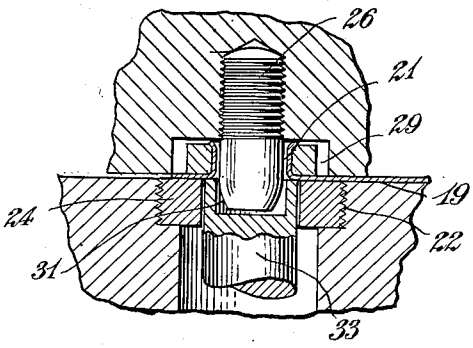


Fig. 4.



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Fig. 6.

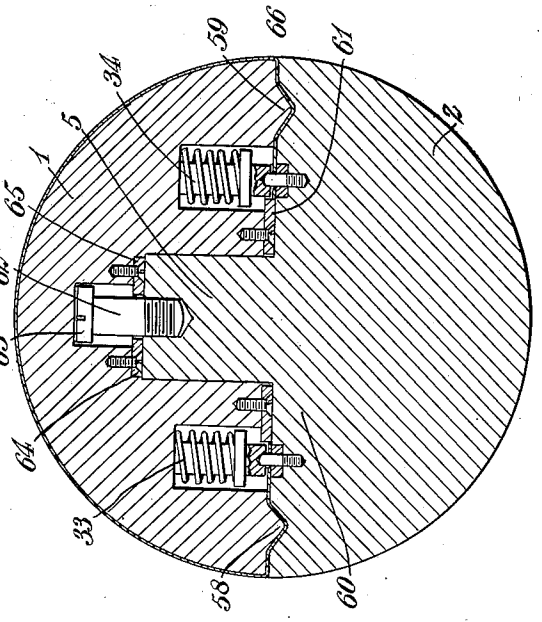
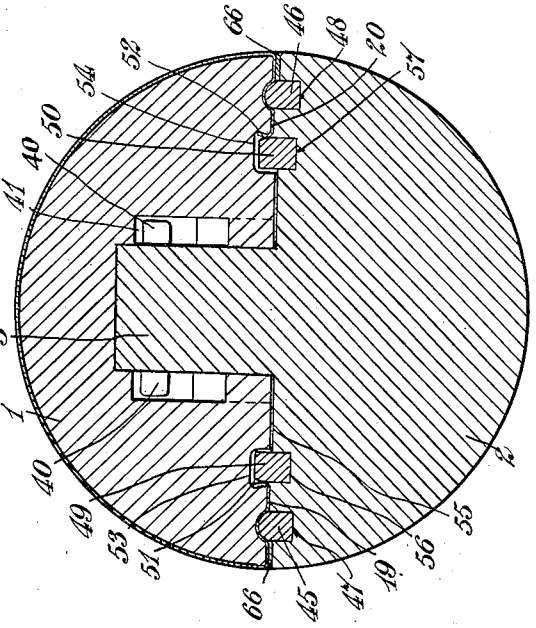


Fig. 5.



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UNITED STATES PATENT OFFICE

1,999,109

PRINTING CYLINDER

Leslie Thomas Albert Robinson, London, England

Application March 6, 1931, Serial No. 520,631.
Renewed May 16, 1933. In Great Britain October 15, 1930

15 Claims. (Cl. 101—415.1)

This invention relates to printing cylinders for use in printing machines and more particularly rotary intaglio printing machines and photogravure machines and has for its object to provide an improved construction of printing cylinder and improved means which are adapted to place the design sheet under tension.

A printing cylinder which is split longitudinally into two segments is adapted to carry one or more than one design sheet the ends of which according to the present invention extend inwardly of and between the separating faces of the cylinder segments the said ends being bent therebetween in such manner as to shorten the design sheet or each design sheet by the superimposition of the cylinder segments on each other so as to tension the design sheet or design sheets. Obviously one or more than one design sheet may be used if found convenient. During tensioning of the design sheet or design sheets the ends of each design sheet are rigidly held in position between the separating faces of the cylinder segments so that the said ends form a resistance to spreading apart of the two ends of any one design sheet during assembly of the segments and the design sheet or design sheets during such assembly can therefore be tensioned by shortening the arcuate length of the sheet or each sheet due to deformation of the ends thereof between the separating faces of the cylinder segments. The invention is hereinafter described with reference to a printing cylinder having only one design sheet applied thereto.

In order that the invention may be clearly understood and readily carried into effect reference is made to the accompanying drawings which show diagrammatically and by way of example constructions of printing cylinders in accordance with the present invention.

Figure 1 is a side elevation partly in section of a printing cylinder in accordance with the present invention.

Figure 2 is a section on the line 2—2, Figure 1.

Figure 3 is a view of the end of a design sheet showing one hole therein.

Figure 4 drawn to an enlarged scale shows the method of securing the design sheet ends in position between the cylinder segments.

Figure 5 is a cross section of a modified form of printing cylinder also in accordance with the present invention.

Figure 6 is a cross section of a further modified form of printing cylinder also in accordance with the present invention.

Referring to Figures 1 and 2 of the accompanying drawings, a printing cylinder according to the present invention is made in two segments 1, 2 or parts. One of the segments namely 2, or parts may be a casting of any suitable metal or it may be a built up member of different metals or all the built up portions thereof may be of the same metal and the peripheral surface 3 thereof may be polished or unpolished as found more convenient. 4 indicates the plane of section of the aforesaid segments or parts one of which is formed with a shaft 5 of a rectangular or suitable form and two other projections 6, 7 one on each side of the central projection. The two projections 6, 7 are of arcuate convex form outwardly of the segment as shown at 8, 9 in Figure 2 and these three projections namely, 5, 6, 7 extend the full length of the separating face 4 on the cylinder segment or part 2. Each end of either segment for example the segment 2 may be provided with a circular or other shaped projection 10, 11 which when assembled with the cylinder segment 1 may form the cylinder shaft or such parts may be machined or otherwise treated to form suitable journals. The other cylinder part 1 which carries a design sheet 14 overlying the peripheral surface 15 of the segment 1 may be a casting or a built up member and may be made of any suitable metal or material. Centrally of the separating face 4 or the plane of section between the cylinder segments 1 and 2 and in the segment 1 is a rectangular recess 16 corresponding in form to the rectangular projection 5 on the cooperating cylinder segment 6. To each side of the rectangular recess 16 is provided a recess 17, 18 of an arcuate concave form each of which corresponds to the respective arcuate convex projections 6 and 7 on the separating face of the cylinder segment 2. The design sheet 14 which in the arrangement shown overlies the peripheral surface 15 of the cylinder segment 1 only is arranged with its ends 19, 20 extending inwardly of and between the cylinder segments and these ends are provided with holes 21 a suitable formation of which is shown in Figure 3. The cylinder segment 2 is provided in its separating face with recesses 22, 23 carrying inserts 24, 25 of any suitable material and the ends 19, 20 of the design sheet are superimposed on these inserts. Into the cylinder segment 1 are screwed or otherwise secured pins 26, 27 (see more particularly Figure 4) which engage in the holes 21, in the ends of the design sheet. The holes 21, in the design sheet may be provided with flanges 28 as shown in Figure 3 and these flanges are

clinched against the respective strips 21' to which the design sheet ends are secured. The strips 21' engage in recesses 29, 30 in the separating face of the cylinder segment 1. Obviously however the holes 21 in the ends of the design sheet may be pin holes instead of being flanged holes. The holes 21 in the design sheet ends are engaged by the pins 26, 27 the outer ends of which engage in recesses 31, 32 in the ends of spring pressed plungers 33, 34. To each of these plungers is secured a collar 35 the actuating springs 36 being disposed between the collars 35 and the bottoms 37 of recesses 38 in the cylinder segment 2. The inserts 24, 25 act as guides for the spring pressed plungers 33, 34. The rectangular projection 5 is provided with cross pins 40 which engage in recesses 41 one of which latter is disposed at each end of the segment 1. The recesses 41 may be arranged and of the shape shown in Figure 1. Such an arrangement limits the drop of the segment 2 when disassembling the segments because the pins 40 fall with the segment 2 and rest on the faces 42 of the recesses 41 so that during disassembly of the segments the segment 2 is upheld by reason of the pins 40 bearing on the faces 42 of the recesses 41. The recesses 41 are provided with slots 41' at their inner ends to allow of lateral displacement of the segment 1 in either direction (right or left) and subsequent removal of the segment 1 from the segment 2 by lifting the segment 1 off the segment 2. During the aforesaid removal of the segment 1 the pins 40 engage in the recesses 41' and thus allow of separation of the two segments by lifting the segment 1 off the segment 2. The slots 41' extend from the recesses 41 to the separating face of the segment 1. In the modified constructional form shown in Figure 5 the projections 6, 7 shown in Figure 2 are replaced by half round bars 45, 46 which may be rigidly secured to the cylinder segment 2 or loosely disposed in recesses 47, 48 therein. Further in this construction the ends 19, 20 of the design sheet are gripped between wedges or wedge shaped bears 49, 50 and the undercut or slightly bevelled sides 51, 52 of the recesses 53, 54 formed in the separating face 55, of the cylinder segment 1. The wedge like bars 49, 50 may be loosely positioned in their recesses 56, 57 in the separating face of the cylinder segment 2 or the said wedge like bars 49, 50 may be rigidly secured therein, or they may be formed as integral parts of the cylinder segment 2.

In the modified form shown in Figure 6 the projections on the separating face of the cylinder segment 1 are of V-shaped form as shown at 58, 59. In this arrangement the spring pressed plungers 33, 34 are prevented from leaving their recesses by cover plates 60, 61 secured by screws or other suitable means to the separating face of the cylinder segment 1. The cylinder segment 2 is prevented from falling apart from the cylinder segment 1 by set screws 62 arranged at intervals along the length of the rectangular projection. The pins 62 are provided with heads 63 which on separating the cylinder segments 1, 2 abut against bars 64, 65 and thus prevent the cylinder segments 1, 2 falling apart. It will be seen from Figure 6 that the ends 19, 20 of the design sheet assume the form of the V shaped projections 58, 59 when assembling the ends of the design sheet between the cylinder segments. It will also be observed that only one design sheet is applied in the construction shown in Figures 1, 2, 5 and 6. When assembling the cylinder segments 1, 2 the holes in the ends 19, 20 are engaged with the respective pins. Pressure is then applied to the cylinder segments so as to force the ends of the design sheet into their respective recesses by the projections on the co-operating separating face of the other cylinder segment. This imparts the necessary tension to the design sheet and the cylinder segments may then be retained in assembled position by rings which are secured to the ends of the segments by set screws or other suitable means.

In the construction shown in Figures 1, 2 5 and 6 it is preferred that filling material such as 66 be inserted between the ends of the design sheet and the adjacent face of the co-acting cylinder segment. Such filling material may be constructed arranged and of the material described and claimed in my co-opending application filed March 11, 1931, Serial #521,839.

A printing cylinder such as hereinbefore described is particularly applicable for use in a flat bed or other type of printing machine especially where the sheets are fed into the machine one at a time but it should be clearly understood that the invention is not limited to such use as a printing cylinder formed as hereinbefore described may be used in any type of printing machine to which it may be applicable. The design sheet may be carried by either cylinder part but it should be clearly understood that only one segment or part of the cylinder segments or parts carries a design sheet and that the other segment or part may be of steel or any other suitable kind of metal and the peripheral surface thereof may be polished, matt or plated if so desired.

What I claim is:—

1. A printing cylinder divided longitudinally into two segments, with one of which a design sheet is designed to cooperate, means carried by one of the meeting faces of the segments to rigidly secure the ends of the design sheet thereto, and projections carried by such meeting face for distorting the plate to tension that surface thereof overlying the segment.

2. A printing cylinder divided longitudinally into two segments, one of the segments being arranged to support a design sheet, means carried by the meeting faces of the segments to rigidly secure the respective ends of the design sheet, and projections carried by one of the meeting faces of the segments to cooperate with the design sheet when the segments are arranged in cylinder-forming relation to stretch the design sheet tightly over the printing area of the cylinder.

3. A printing cylinder according to claim 1, wherein the design sheet engaging projections on one separating face are formed integral with the said cylinder segments.

4. A printing cylinder according to claim 1, wherein the design sheet engaging projections on one separating face are separate members retained in position in recesses in the said separating face.

5. A printing cylinder according to claim 1, wherein each fixed end of the design sheet is retained in position on pins by a spring pressed plunger suitably disposed in a recess in the separating face of the respective cylinder segment.

6. A printing cylinder according to claim 1, wherein each end of the design sheet is retained in position between the cylinder segments by wedges adapted to engage in recesses in the cylinder segment which carries the design sheet, the ends of the said design sheet being disposed be-

tween the outer faces of the wedges and outer angled faces of the said recesses.

7. A printing cylinder according to claim 1, wherein the design sheet engaging projections on one cylinder segment are of outwardly arcuate convex form and adapted to cooperate with correspondingly formed recesses in the separating face of the other cylinder segment.

8. A printing cylinder according to claim 1, wherein the design sheet engaging projections on one cylinder segment are of V-shaped form adapted to cooperate with correspondingly formed recesses in the separating face of the other cylinder segment.

9. A printing cylinder according to claim 1, wherein spring pressed plungers are held in recesses by plates secured to the separating face of the cylinder segment which carries the respective spring pressed plungers, the said plates projecting outwardly over the said recess to a distance sufficient to form an abutment for plates carried by the spring pressed plungers and between which and the bottom of the recesses the plunger operating springs are arranged.

10. A printing cylinder according to claim 1, wherein one cylinder segment is mounted on a centrally arranged and longitudinally extending rectangular projection or rectangular shaft having pins secured thereto and displaced one at each end thereof, the said pins being arranged to coact with horizontally arranged recesses in the other cylinder segment.

11. A printing cylinder according to claim 1, wherein a horizontally arranged recess is formed at each end of one segment and is formed with a recess extending between the horizontally arranged recess and the separating face of the said segment.

12. A printing cylinder according to claim 1, wherein each end of the design sheet is provided with a metallic strip extending crosswise of the design sheet end and beyond the edges thereof, each of the said strips having holes therethrough to engage pins or flanged holes in the design sheet ends so as to fix the design sheet in position, the said strips being arranged or disposed in recesses in one separating face of the said cylinder segment.

13. A printing or other cylinder comprising a plurality of segments superimposable on each other and on a shaft providing for radial and longitudinal displacement of one segment relatively to the other segment, a flexible design sheet on one segment, means removably mounted in one segment and adapted on cooperation with the other segment to tension the flexible design sheet by deformation of the ends thereof, said latter means being held against rocking in tensioning movement.

14. A printing cylinder comprising a plurality of segments superimposable on each other, a flexible design sheet superimposable on and removably secured with respect to one segment, and means to effect deformation of the design sheet ends between the segments.

15. A printing or other cylinder comprising two segments superimposable on each other to form a composite cylinder, a flexible metallic design sheet on one segment with the ends thereof positioned between the segments, and means carried by one segment and cooperating with the other segment to engage the end portions of the design sheet between the segments to tension said design sheet, said tensioning means being operable on the superimposing of one segment on the other and being held against rocking during tensioning movement.

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