

April 2, 1935.

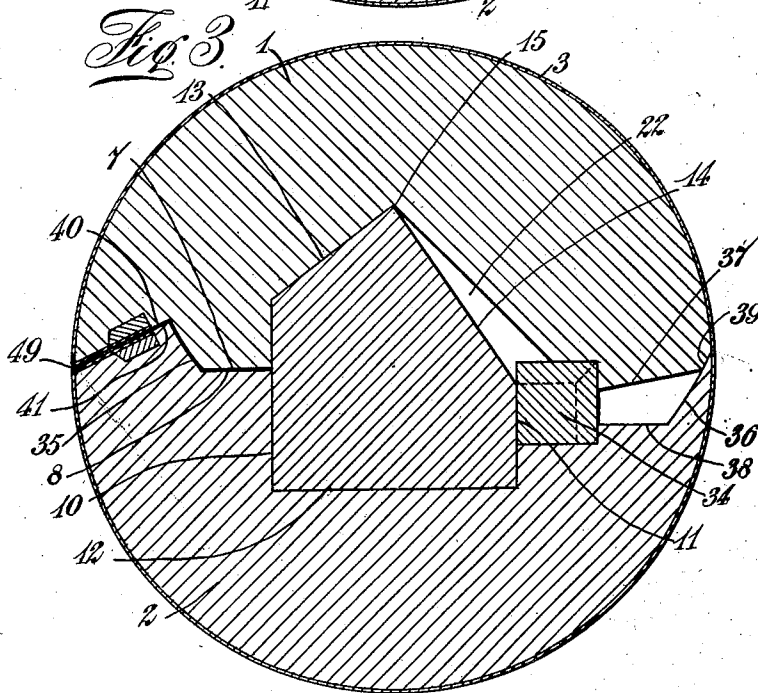
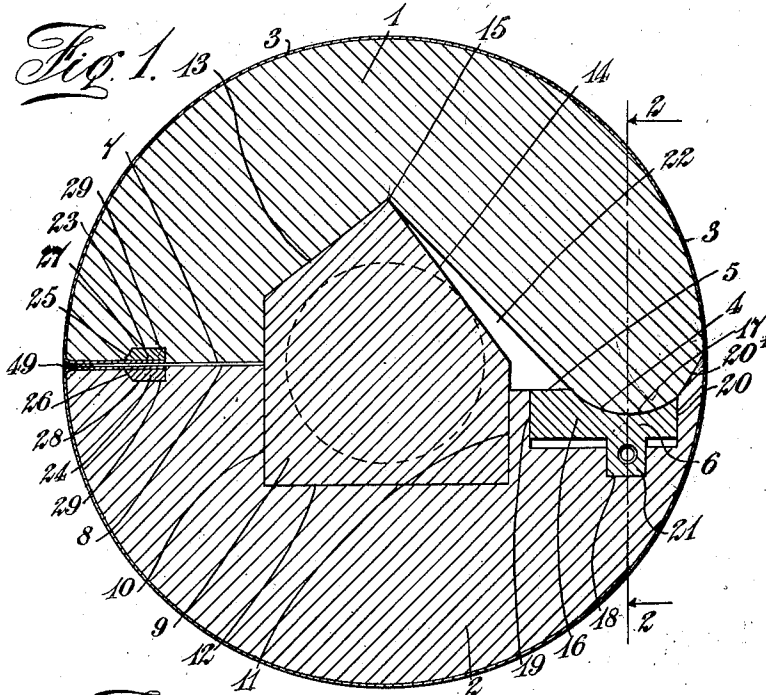
L. T. A. ROBINSON

1,996,348

PRINTING CYLINDER AND DESIGN SHEET FOR USE THEREWITH

Filed March 11, 1931

2 Sheets-Sheet 1



INVENTOR
L. T. A. ROBINSON
BY *Julius*
ATTORNEY

April 2, 1935.

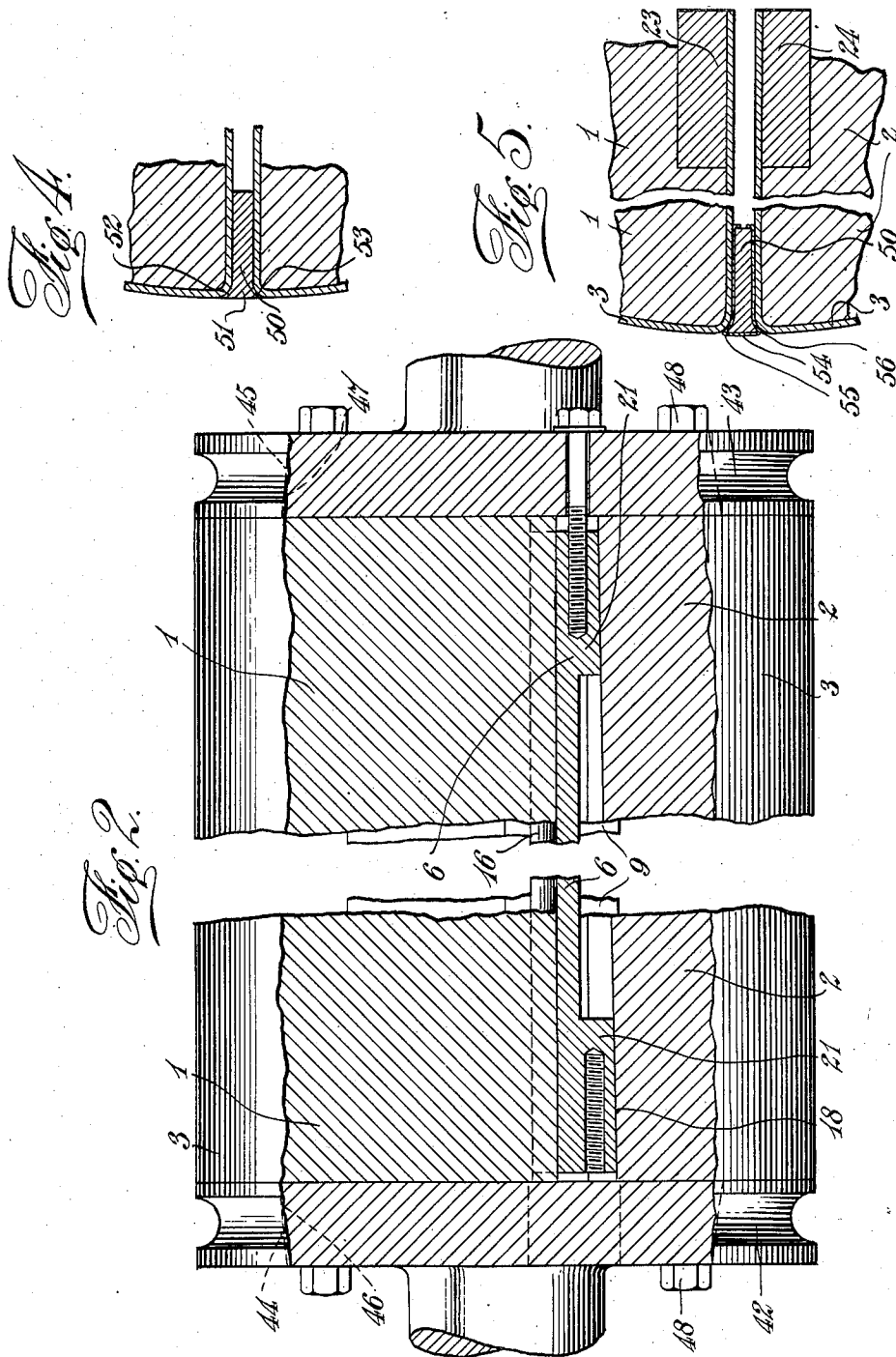
L. T. A. ROBINSON

1,996,348

PRINTING CYLINDER AND DESIGN SHEET FOR USE THEREWITH

Filed March 11, 1931

2 Sheets-Sheet 2



INVENTOR
L.T.A. ROBINSON
BY *Johnnie*
ATTORNEY

UNITED STATES PATENT OFFICE

1,996,348

PRINTING CYLINDER AND DESIGN SHEET
FOR USE THEREWITH

Leslie Thomas Albert Robinson, London, England

Application March 11, 1931, Serial No. 521,839
In Great Britain September 12, 1930

21 Claims. (Cl. 101—415.1)

This invention relates to longitudinally split printing cylinders and design sheets for use therewith and more particularly to printing cylinders and design sheets for use in rotary intaglio and/or photogravure printing machines, and has for its object to provide an improved form of printing cylinder and an improved form of design sheet as well as improved means whereby to apply the said design sheet under tension to the cylinder segments.

According to the present invention a longitudinally split printing cylinder is provided with means insertible between the separating faces on one side of the cylinder axis and longitudinally displaceable therebetween so as to force the said separating faces of the segments apart in order to cause the separating faces on the other side of the cylinder axis to approach each other and thus apply tension to a design sheet the ends of which extend inwardly of and between the latter separating faces of the cylinder segments. The aforesaid means are adapted to be slidably displaced in opposite directions between the relevant separating faces of the cylinder segments and the said means may be in the form of a channel shaped wedge or a wedge having at least one arcuate surface to form a pivotal surface for a superimposed segment. If desired a modified form of wedge may be used in the form of a plane faced wedge adapted to be displaced in an axial direction or in a direction parallel to the axis of the cylinder into and out of operative position between the relevant cylinder separating faces and in contact therewith. During tensioning of the design sheet the ends thereof are unyieldingly held by means of metallic strips to which the said ends are secured the said strips during the tensioning action being engaged in recesses in the opposed relevant separating faces.

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 segmental printing cylinders in accordance with the present invention.

Figure 1 is a cross section of a printing cylinder in accordance with the present invention.

Figure 2 is a part sectional elevation the section being taken on the line 2—2 Figure 1.

Figure 3 is a cross section of a modified form of printing cylinder also in accordance with the present invention.

Figure 4 drawn to an enlarged scale is a section showing gap or joint filling means.

Figure 5 is a detail view hereinafter described.

Referring to Figure 1, 1 and 2 represent two segments of a printing cylinder. 3 indicates a design sheet overlying the peripheral surfaces of the cylinder segments 1, 2. Between the separating faces 4, 5 of the cylinder segments and on one side of the cylinder axis means such as a channel shaped wedge 6 is disposed the said wedge being adapted to be displaced in an axial direction or in a direction parallel to the axis of the cylinder so as to apply tension to the design sheet 3. The separating faces 7, 8 on the other side of the cylinder axis may as shown in Figure 1 be disposed in the same plane as the separating faces 4, 5 of the cylinder segments 1, 2 respectively. The two cylinder segments are mounted on a shaft 9 which may be formed with five sides two 10, 11 of which are at right angles to an interconnecting third side 12 which as shown may be parallel to the plane of separation of the cylinder segments. The remaining two sides 13, 14 of the shaft 9 form a V shaped portion extending the full length of the shaft and the apex 15 of the V shaped portion of the shaft forms a pivotal point about which one of the segments namely the segment 1 is adapted to be rocked in order to apply tension to the design sheet 3. The channel shaped wedge 6 which preferably forms a continuous member extending the full length of and between the cylinder segments 1, 2 has a straight arcuate inner surface 16 of suitable radius which co-operates with a correspondingly shaped surface 17 on the superimposed cylinder segment 1. The lower face 18 of the channel shaped wedge is preferably flat and the inner side face 19 of the wedge 6 is approximately at right angles to the lower face 18 of the wedge. The outer face 20 of the wedge is perpendicular to the lower face 18 and the outer face 20' of the arcuate portion 17 is struck from the apex 15 of the V shaped shaft portion. The wedge 6 as shown may be formed in one piece or it may be formed in two pieces and the lower face 18 of the channel shaped wedge is provided preferably with a rectangular projection 21 which may extend the entire length of the wedge 6. If desired however there may be a rectangular projection at each end of the wedge. The rectangular projection 21 if extending the whole length of the wedge 6 is bored and tapped at each end. If, however, the rectangular projection 21 is made in two parts one disposed at each end of the wedge 6 with or without a centrally arranged part then the two end parts are bored and tapped so as to permit of the wedge 6 being displaced longitudinally of the cylinder by suitable cap screws engaging the

tapped ends of the projections 21 and operable against fixed resistances not shown. The projection (or projections) 21 tapers in thickness from one end to the other of the cylinder as shown in Figure 2 and the curved inner face 16 extends the entire length of the wedge. The segment 1 is provided with a V shaped recess 22 of a somewhat greater angle than that included by the sides 13, 14 of the V shaped portion of the shaft 9 so as to allow of the segment 1 rocking on the pivotal point 15 of the V shaped portion of the shaft 9. To facilitate positioning and subsequent tensioning of the design sheet each end thereof is provided on its inner face with a thin strip 23, 24 or wedge like strip of metal which is riveted to the respective end of the sheet, or the sheet ends may be secured to the strips 23, 24 by flanging the holes in the sheet as by stamping up the holes and subsequently clinching or expanding the ends of the flanged holes on the rear faces of the strips 23, 24. The strips 23, 24 may be of approximately rectangular form or the outer face of each strip 23, 24 may be bevelled or chamfered as at 25, 26 and the two strips 23, 24 are disposed in recesses 27, 28 formed in the separating faces 7, 8 of the cylinder segments. If convenient the inner faces of the strips 23, 24 may be bevelled or chamfered in a somewhat similar manner as the outer faces. The bevelled faces assist the entry of the strips 23, 24 into the recesses 27, 28. Each strip as shown abuts against the bottom of its respective recess with a flat face 29 so that the plain flat side of the strip is secured direct to the end of a design sheet. Each of the recesses 27, 28 extend longitudinally the full length of the respective cylinder segment and the channel shaped wedge 6 may be displaced in opposite directions by cap screws. The cap screws engage in the tapped holes in the projection or projections 21 so that by slackening back one cap screw and screwing up the cap screw at the other end the wedge 6 can be displaced in one direction and by reversing the operation the wedge 6 can be displaced in the opposite direction thus tensioning or detensioning the design sheet 3.

In the modified form shown in Figure 3 the wedge in this arrangement is a plane faced wedge as shown at 34. In this arrangement the separating faces of the cylinder segments are cut in a particular manner. The cylinder segment 2 is formed with two arcuate faces 35, 36 which are struck from the pivotal point 15. As in the arrangement shown in Figure 1 the separating faces 7 and 8 may abut when the segments are assembled, but the separating faces on the opposite side of the cylinder are spaced apart as at 37, 38 and the outer corner of the cylinder segment 1 is curved as at 39 to the same curvature as the curved face 36. The ends of the design sheet 3 in this arrangement are suitably connected to strips 23, 24 as by rivets or flanged holes in the design sheet ends but the recesses into which the strips 23, 24 are placed are formed in faces 40, 41 which are at an angle to the plane of the faces 7 and 8 the reason being so as to decrease the friction on the strips when closing the segments and to provide a better leading edge for the usual steel doctor to wipe over as well as to provide a better lead-in for the copper sheet. The design sheet ends may be connected to the strips 23, 24 in the manner shown, described and claimed in my co-pending application Serial No. 520,631, filed March 6, 1931. The meeting plane of the faces 40, 41 are at such an angle that if the said

plane be extended it will pass through the pivotal point 15.

The cylinder segments 1, 2 when assembled in position may be retained in that position by rings 42, 43 Figure 2, having conical bores 44, 45 which fit on to correspondingly cone shaped projections 46, 47 on the ends of the cylinder segments. These rings are secured in place by cap screws 48 which screw into the ends of the cylinder segments. By removing the cap screws from engagement with the rockable segment the latter can be rocked removed and/or replaced when desired and the said rings may form the fixed resistances to allow of the requisite displacement of the wedge by the use of cap screws passed through the said rings and into the tapped bores in the projection or projections on the rear face of the wedge 6 so that the latter can be displaced in either direction of two opposite directions. In order to remove the wedge in the arrangement shown in Figures 1 and 3 it is only necessary to remove the rings 42, 43 then place a U shaped piece of metal of a suitable thickness over but not in contact with the wedge ends. Thereafter a cap screw is passed through the U shaped member into the tapped hole in the wedge end and by rotating the cap screw in the proper direction against the resistance offered by the U shaped member the wedge 6 can be removed. A reverse operation at the other end adjusts the wedge to its proper position between the segments. Either ring 42 or 43 at the thin end of the wedge may be bored to take a cap screw for pulling the wedge into position between the segments. In order to prevent entry of ink through the joint or gap 49 Figures 1, 3 and 4 the said gap or joint is closed by filling material 50. The latter may consist of asphalt, leather, balata, gutta percha, pitch, tar, bitumen, resin, horn, in powdered or solid form or any combination of such materials inserted either as a premoulded piece or inserted in a hot condition and then allowed to cool. Thereafter the outer surface 51 of the insert 50 may be ironed under pressure either by hand or mechanically by a roller or heated roller and if desired subsequently burnished. Alternatively the filling material may be a piece of copper preformed to the requisite shape and having horns 52, 53 as shown in Figure 4, or if so desired the filling piece 50 may be copper type metal or other suitable metal injected or blown in under pressure when in a fluid or semi-fluid condition. The filling piece may be of such a nature that it can be superficially charred or hardened and/or burnished by the application of heat and pressure. The filling may be provided on its outer surface 51 with a coating or thin layer of metal by dipping, blowing the metal on, or by compacting a thin sheet of metal with the said surface by pressure or by electrolytical deposition of the metal thereon. Further as shown in Figure 5 the filling piece may be enclosed wholly or partly in a casing 54 of metal such as sheet copper or other suitable metal. In such an arrangement however it is preferred that the filling material be of a plastic nature so that under pressure the material 50 will expand and form the horns 55, 56 and thus efficiently close the gap or joint between the sheet ends.

Assuming that the design sheet has been placed around the cylinder segments and that the respective strips have been engaged with the corresponding recesses in the separating faces of the cylinder segments and the filling

piece and the wedge placed in position then the wedge is forced inwardly and between the cylinder separating faces on one side of the cylinder axis. This causes the recessed separating faces carrying the aforesaid strips on the other side of the cylinder axis to move towards each other so that the two ends of the design sheet abut against the filling material and the strips are forced into their recesses thus not only securely holding the design sheet, but applying tension to the design sheet during the pivotal movement of one cylinder segment on the apex of the triangular or V shaped part of the cylinder shaft. Obviously suitable clearance or play is allowed between the sides of the V shaped recess in the one segment and the adjacent sides of the triangular or V shaped part of the shaft to permit of such pivotal movement of the latter to effect the desired purpose.

What I claim is:—

1. A longitudinally split printing cylinder comprising in combination a shaft having an acute angled fulcrum forming edge, a plurality of segments mounted on the said shaft, one of such segments being mounted on and movable relative to said fulcrum-forming edge, a design sheet superimposed on and overlying the said segments, and means to effect tilting movement of the fulcrum-supported segment in order to tension the design sheet.

2. A printing cylinder comprising in combination a shaft having an acute angled edge, a plurality of segments mounted on the said shaft, one of the segments being mounted on and movable relative to said acute angled edge, a tensionable design sheet superimposed on and overlying the cylinder segments, means to retain the design sheet ends against outward displacement from between the segments, and means between the said segments to rock one segment on the acute angled edge of the shaft so as to tension the design sheet.

3. A printing cylinder comprising in combination a shaft, an acute angled edge on the said shaft, said cylinder being made up of segments together mounted on the shaft, one segment rockable on the said acute angled edge of the shaft, a tensionable design sheet superimposed on and overlying the segments, means to restrain the design sheet ends against outward displacement from between the segments, and means adapted to rock the rockable segment on the acute angled edge of the shaft so as to tension the said design sheet.

4. A printing cylinder comprising in combination a shaft, an acute angled edge thereon, a segment rockably mounted thereon, a further segment disposed below the rockable segment, a design sheet surrounding the said segments, means disposed on one side of the shaft and adapted to resist tensioning action applied to the design sheet, and means disposed between the cylinder segments and on the other side of the shaft to force the said segments apart so as to apply tension to the design sheet.

5. A printing cylinder comprising in combination a shaft, an acute angled edge thereon, a segment rockably mounted thereon, a further segment disposed below the rockable segment, a tensionable design sheet surrounding the segments, means disposed on one side of the shaft and adapted to resist tensioning action applied to the design sheet, and a wedge-shaped member disposed between the cylinder segments and on the other side of the shaft to force the said seg-

ments apart so as to apply tension to the design sheet.

6. A printing cylinder comprising in combination a shaft, an acute angled edge thereon, a segment rockably mounted thereon, a further segment disposed below the rockable segment, a tensionable design sheet surrounding the said segments, bars rigidly secured to the ends of the said design sheet and seated in recesses in the segments and adapted to act when so seated as resistances against tensioning action applied to the design sheet, and means to move the two segments relatively so as to apply tension to the design sheet.

7. A printing cylinder comprising in combination a shaft having an acute angled edge thereon, a segment mounted on the said edge, a further segment disposed therebelow and rigidly secured to the said shaft, a tensionable design sheet surrounding the segments, bars disposed on one side of the shaft and between the cylinder segments and engageable in recesses therein, and a wedge-shaped member disposed between the cylinder segments and on the other side of the shaft and adapted by longitudinal displacement between the cylinder segments to apply tension to the design sheet.

8. A printing cylinder comprising in combination, a shaft, a segment tiltably mounted on a V-shaped edge on the said shaft, a second segment rigidly secured to the shaft, a tensionable design sheet surrounding the segment, means disposed between the segment to resist tensioning of the said sheet, and means to force the segments apart so as to tilt the rockable segment on the V-shaped edge of the shaft and thereby apply tension to the design sheet.

9. A printing cylinder comprising in combination a multi-sided shaft having a V-shaped edge formed by two contiguous sides, a segment rockably mounted on the V-shaped edge, a further segment disposed therebelow and mounted on a rectangular part of the shaft, a tensionable design sheet surrounding the segments, means on one side of the shaft operative as resistances against tensioning action imparted to the design sheet, and means operative to force the segments apart on one side of the shaft so as to tension the design sheet.

10. A printing cylinder comprising in combination a shaft, a V-shaped edge on the shaft, a segment rockably mounted thereon, a further segment rigidly secured to the said shaft, resistance means on one side of the shaft and disposed between the segments, and means in abutting contact with the shaft and adapted when displaced longitudinally to move the rockable segment so as to tension the design sheet.

11. A printing cylinder comprising in combination a shaft having a V-shaped edge, a cylinder made up of segments, one segment tiltable the shaft, resistance bars disposed on one side of the shaft and engageable in recesses in the separating faces of the segments, and a wedge having an arcuate face adapted to cooperate with a correspondingly curved face on the rockable segment and a flat longitudinally tapered face adapted to cooperate with a correspondingly formed surface on the other segment so that on longitudinal displacement of the wedge the rockable segment is tilted and caused to tension the design sheet.

12. A printing cylinder comprising in combination a shaft, a plurality of segments mounted thereon, a tensionable design sheet superimposed

on and overlying the segments, resistance means connected with the design sheet ends on one side of the shaft disposed between the segments and engageable in recesses in the separating faces thereof, and a wedge having a bore disposed at each end, the said bores being screw-threaded of opposite hands to receive means to effect longitudinal displacement of the wedge so as to force the segments apart and consequently apply tension to the design sheet.

13. A printing cylinder comprising in combination a shaft, a V-shaped edge formed by contiguous sides of the said shaft, a segment mounted on the said V-shaped edge, a further segment disposed therebelow and mounted on a rectangular portion of the shaft, a tensionable design sheet surrounding the segments, resistance means disposed between the segments on one side of the shaft and connected with the design sheet ends, and a member tapering in thickness and displaceable longitudinally so as to tilt the rockable segment on the V-shaped edge of the shaft and thereby apply tension to the design sheet.

14. A printing cylinder comprising in combination a shaft, a V-shaped edge formed by contiguous sides of the said shaft, a segment mounted on the said V-shaped edge, a further segment disposed therebelow and mounted on a rectangular portion of the shaft, a tensionable design sheet surrounding the segments, resistance means disposed between the segments on one side of the shaft and connected with the design sheet ends, and a member movable in contact with the shaft and adapted when displaced longitudinally between the segments to force the latter apart at one side so as to tension the design sheet.

15. A printing cylinder comprising in combination a shaft, a V-shaped edge formed by contiguous sides of the said shaft, a segment mounted on the said V-shaped edge, a further segment disposed therebelow and mounted on a rectangular portion of the shaft, a tensionable design sheet surrounding the segments, resistance means disposed between the segments on one side of the shaft and connected with the design sheet ends, a member having two sides arranged at right angles to each other and two sides tapering longitudinally of the said member, and means to effect longitudinal displacement of the latter member while in butting contact with the shaft so as to cause the two longitudinally tapering sides of the said member to effect tilting movement of one segment so as to tension the design sheet.

16. A printing cylinder comprising in combination a shaft, a V-shaped edge extending longitudinally of the said shaft, a rockable segment mounted thereon, the said segment having a plurality of separating faces, two of which faces embrace an obtuse angle, a further segment disposed below the rockable segment, a tensionable design sheet surrounding the said segments, means disposed on one side of the shaft and between the separating faces of the segments and adapted to restrain the design sheet ends against outward displacement, and means to cause relative tilting movement of the segments to apply tension to the design sheet.

17. A longitudinally split printing cylinder comprising in combination a shaft, a plurality of segments mounted thereon, a design sheet superimposed on and overlying the said segments, means to effect relative tilting movement of the segments in order to tension the said design sheet, and means secured to the ends of the cylinder segments and embracing the shaft ends to retain the

cylinder segments and design sheet in the assembled position.

18. A longitudinally split printing cylinder comprising in combination a shaft having a V-shaped edge extending longitudinally thereof, a rockable segment mounted on the said V-shaped edge, a further segment disposed therebelow, a tensionable design sheet surrounding the segments, inclined opposed separating faces contiguously arranged on the two segments, the inclination of the said faces being in a plane which when extended passes through the pivotal point of the rockable segment, means disposed between the said inclined faces and connected to the design sheet ends to restrain the said ends against outward displacement from between the inclined separating faces, and means displaceable longitudinally of and between the cylinder segments to effect relative tilting of the segments in order to tension the design sheet.

19. A longitudinally split printing cylinder comprising in combination a shaft having five sides, two of which are disposed at right angles to an interconnecting third side, a V-shaped edge formed by the other two sides and extending the full length of the cylinder shaft, a segment rockable on the said V-shaped edge, a further segment disposed therebelow, a tensionable design sheet surrounding the segment and having its ends extending inwardly of and between the separating faces of the segments on one side of the shaft, means to retain the design sheet ends in assembled position, and means to effect relative tilting movement of the segments to apply tension to the design sheet.

20. A longitudinally split printing cylinder comprising in combination a shaft having a V-shaped edge, a rockable segment mounted thereon, a further segment disposed therebelow, a tensionable design sheet surrounding the segments, the meeting faces on one side of the shaft presenting angularly related portions and arcuate contacting portions, the arcuate contacting portions having their radii struck from the V-shaped edge on the shaft, means in the angularly arranged separating faces to retain the design sheet in assembled position, and means disposed between these segments on the other side of the shaft and adapted by longitudinal displacement between the segments to apply tension to the design sheet.

21. A longitudinally split printing cylinder comprising two cylinder segments, a shaft having a V-shaped edge disposed between and supporting the said segments, one of the latter being rockable on the V-shaped edge of the shaft, a tensionable design sheet surrounding the segments and having its ends extending inwardly therebetween, resistance members disposed between the segments and connected with the design sheet ends, a wedge disposed between the segments on the other side of the shaft and having a curved surface adapted to cooperate with a correspondingly curved surface on the rockable segment, the curved surface on the latter extending into a surface of different curvature disposed adjacent to the peripheral surface of the tiltable segment and having its radius struck from the V-shaped edge on the shaft, and means to effect displacement of the wedge to tilt the rockable segment so as to tension the design sheet.