May 31, 1932. G. T. BALDWIN 1,860,765

PRINTING AND OTHER CYLINDER AND MEANS FOR SECURING SHEETS THERETO

Filed Dec. 3, 1929 2 Sheets-Sheet 1

Fig. 1.

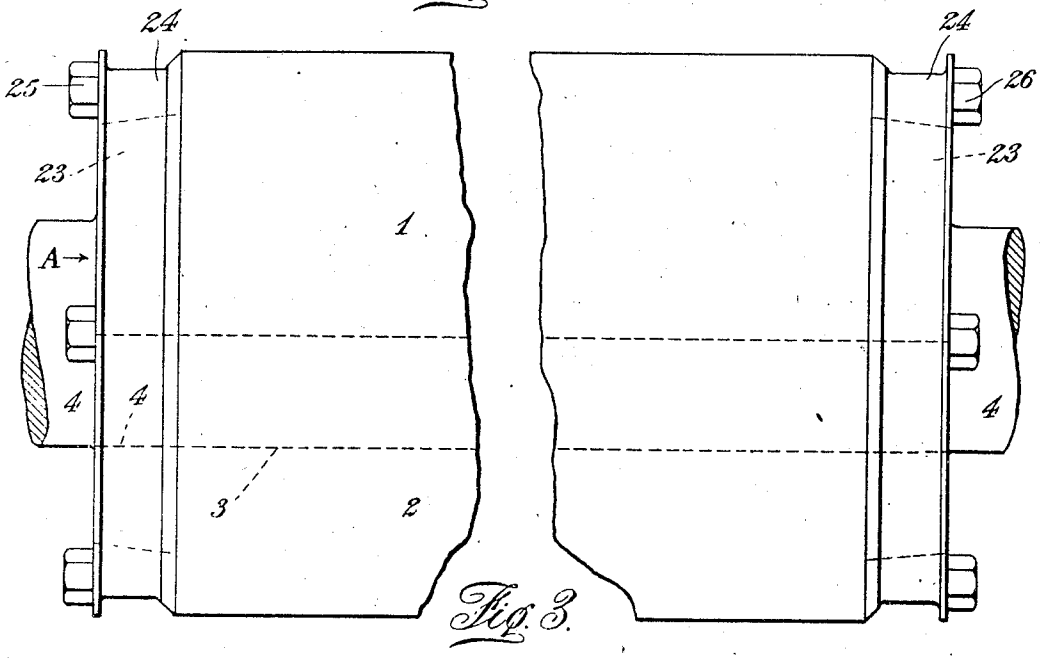
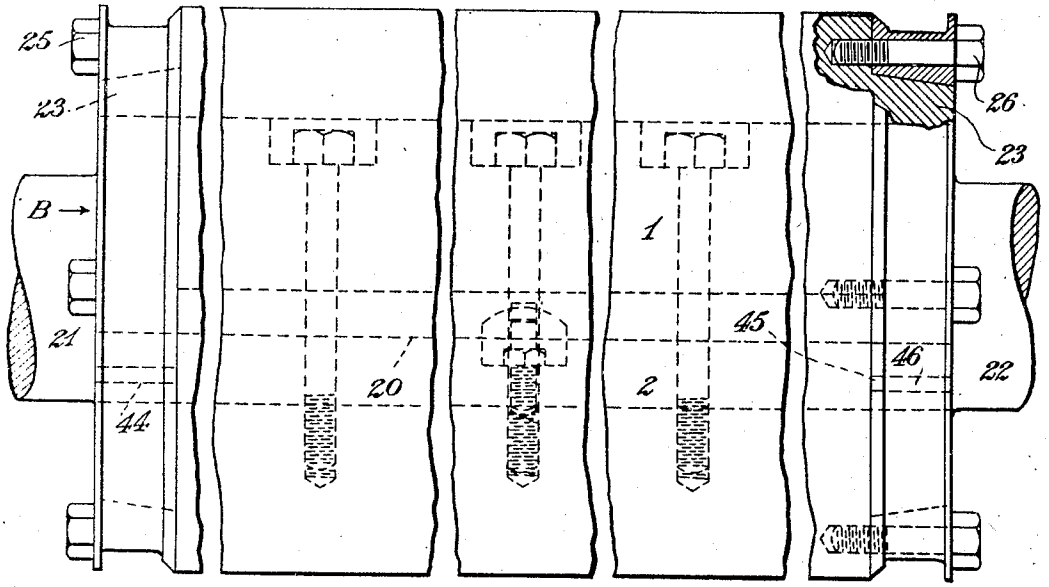


Fig. 3.



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Fig. 2.

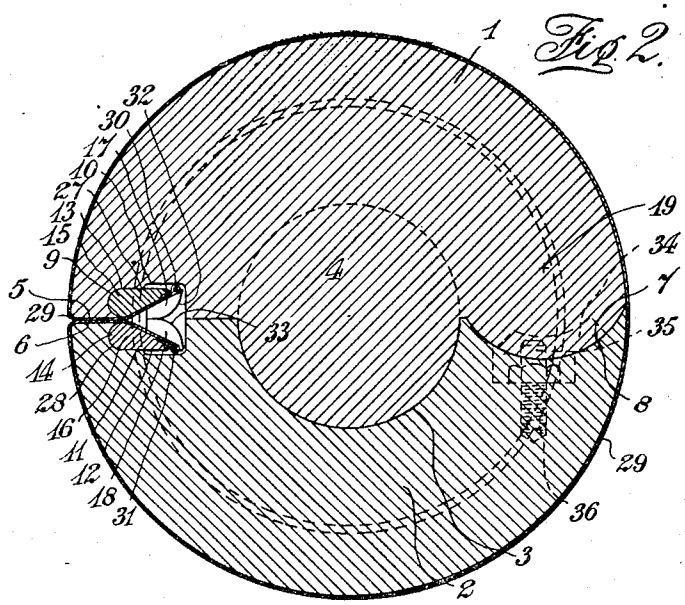


Fig. 4.

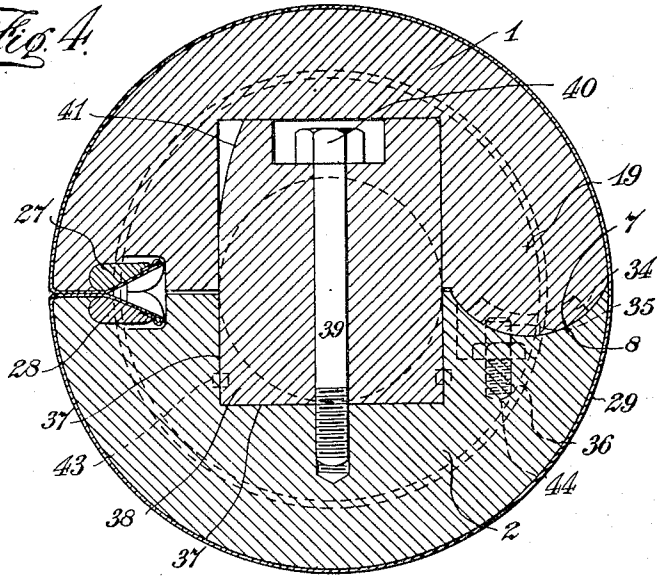


Fig. 5.

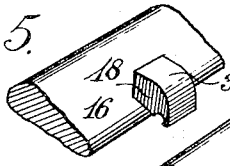
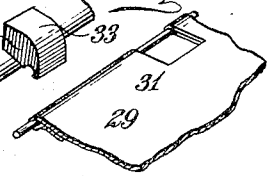


Fig. 6.



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UNITED STATES PATENT OFFICE

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PRINTING AND OTHER CYLINDER AND MEANS FOR SECURING SHEETS THERETO

Application filed December 3, 1929, Serial No. 411,351, and in Great Britain December 11, 1928.

This invention relates to printing and other cylinders which are adapted to carry metallic sheets. Such cylinders with the sheets secured thereon are useful for many purposes. The invention however relates more particularly to printing cylinders and has for its object to provide an improved construction of printing cylinder and means for securing a metallic sheet such as a design plate or sheet thereon. The separating faces of the cylinder parts may be of many forms some of which are hereinafter described by way of example.

According to the present invention a cylinder specially for printing purposes is formed in at least two parts the plane of section extending longitudinally of the cylinder the separating surfaces on one side of the sectional plane being adapted to act as pivotal surfaces on which the cylinder parts can be angularly displaced to effect the attachment of a design sheet to the cylinder. The separating faces of the cylinder parts are so shaped or formed as to provide a pivotal surface about which either cylinder part or both cylinder parts may be rocked or turned so that the ends of a single metallic sheet can be engaged between the other two opposed faces of the two parts and the parts subsequently rocked or angularly moved to apply tension to the engaged sheet when assembling the cylinder parts.

The separating or jointing face of one cylinder part may be provided with a centrally disposed arcuate recess extending longitudinally of the respective part and adapted to receive a correspondingly shaped projecting portion on the jointing face of the other cylinder part thus dividing the plane of section into four jointing faces, two of the said jointing faces opposite each other being straight flat surfaces each having a recess adapted to retain means for securing the ends of the sheet to the cylinder and also for tensioning the sheet when assembling the two cylinder parts. The other two jointing faces of the two-part cylinder form two parallel abutting portions which when assembling the cylinder parts act as a pivot on which the two cylinder parts can be turned so as to tension the sheet when assembling the two cylinder parts together. This latter operation may be effected by placing one cylinder part in position on a printing machine or other suitable apparatus and superimposing the other cylinder part thereon and thereafter rotating the cylinder parts against a counter-cylinder or roller such rotation acting to close the two cylinder parts together and in such closure action the two cylinder parts turn on the aforesaid pivotal surface and thus produce a tension on the metallic sheet the ends of which are engaged between two opposed faces of the cylinder parts. Each cylinder part may be cored, cast or otherwise formed to provide a suitable surface for a shaft which may be square, rectangular, circular or of any other desired cross-section.

If desired the shaft or shafts which carry the cylinder as a whole may form an integral part or parts of either cylinder part or such shaft or shafts may be rigidly attached to either cylinder part or both cylinder parts.

The means for carrying the sheet ends are of a pivotal nature and comprise two bars extending longitudinally of the cylinder. Each bar is of a wedge shape in cross section and has its larger width disposed outwardly of the cylinder part and each edge of each bar is rounded so that each bar is capable of a rocking movement in co-operation with a correspondingly rounded outer face in each recess. Each bar is formed with hooks on its inner edge such hooks being integral with or rigidly attached to the respective bar, and the outer or under face of each hook is undercut to embrace a reinforcing rod carried by the end of the metallic sheet. Both ends of the latter are provided with perforations so as to permit of the hooks on the bars passing through the said perforations and engaging the reinforcing rods passing through lugs on the ends of the sheet. Each end of the sheet is of a similar form and the rod on each end of the sheet may be rigidly secured thereto by any suitable means. Each bar is preferably flat on its outer face whereas the inner face is preferably of an arcuate form. The outer edges of the bars extend longitudinally of the two bars and can thus rock on the cor-

respondingly shaped outer faces of the recesses one of which is provided on two opposed jointing faces. The two parts of the cylinder when assembled may be held in position by collars or discs each having an internal conical bore which co-operates with a correspondingly shaped portion on the ends of the cylinder parts. The two discs or collars may be provided with outward extensions which form shafts adapted to be supported in suitable journals in the frame of the machine.

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 more particularly for printing cylinders in accordance with the present invention:—

Figure 1 is a longitudinal elevation of a printing cylinder according to the present invention,

Figure 2 is a cross section thereof looking in the direction of the arrow A, Figure 1,

Figure 3 is a longitudinal elevation of a modified form of printing cylinder also in accordance with the present invention,

Figure 4 is a cross section of Figure 3 looking in the direction of the arrow B, Figure 3,

Figures 5 and 6 are perspective detail views of part of a rockable bar and the gapped sheet end.

Referring to Figures 1 and 2 of the drawings the printing cylinder is shown as being formed in two parts 1, 2. The jointing face of the part 2 is provided with a centrally disposed arcuate recess 3 extending through the entire length of the part 2 of the cylinder and is adapted to receive a correspondingly shaped projection portion 4 on the jointing face of the cylinder part 1 thus dividing the plane of section into four jointing faces 5 and 6, 7 and 8. The projecting portion 4 extends longitudinally the whole length of the cylinder part 1 and sufficiently far beyond the end faces thereof to form the cylinder shaft. Two faces 5 and 6 of the cylinder jointing faces are disposed opposite each other and are formed with straight flat surfaces. The flat surface 5 is provided with a recess 9 which extends inwardly of the cylinder part 1 and is widened out at its inner end as at 10. The cylinder part 2 is formed with a recess 11 extending inwardly of the cylinder part 2 and is widened out as shown at its inner end as at 12. The recesses 9, 11 are each of arcuate form at their outer ends as shown at 13, 14 so as to form pivotal surfaces for the outer correspondingly shaped surfaces of rockable bars 15, 16 each of which carries a hook shaped member 17, 18 which are adapted to engage the ends of a rod carried by a metallic design sheet. The other two faces 7 and 8 of the cylinder parts 1 and 2 are formed one as an arcuate projecting portion 7 which engages a correspondingly shaped recess 8 in the cylinder part 2 so that the arcuate projecting portion 7 and the recess 8 form a pivotal surface having a common axis 19 about which the two parts of the cylinder can be rocked or turned when assembling the cylinder parts with the ends of the aforesaid metallic sheet in position between the two cylinder parts. Angular displacement of the two cylinder parts relatively to each other rocks the bars 15, 16 and applies tension to the sheet in assembling the two cylinder parts. The cylinder as a whole is supported in position by a shaft formed by the projecting portion 4 which may be made in one with either part of the cylinder parts 1 or 2 but is preferably made in one with the cylinder part 1. The two parts 1, 2 of the cylinder are formed with outwardly tapering projections 23 and the two cylinder parts are retained in the assembled position preferably by grooved rings 24, having conical bores corresponding to the tapered projections 23. The rings 24 are secured to the cylinder parts 1, 2 by set screws 25, 26 or other suitable means.

The rockable bars 15, 16 are provided each with a flat face 27, 28 their other faces being bevelled inwardly and the hooks 17, 18 are formed integral with the said bars and spaced at suitable distances apart along the length of each bar. 29 is a sheet metal design plate which extends right around the cylinder. The ends of the aforesaid sheet metal plate carrying rods 30, 31 are gapped as shown in Figure 6 to allow engagement of the sheet ends by the hooks which are suitably curved on their adjacent surfaces at 32, 33 so that they may abut and apply tension to the sheet when the latter is being assembled with the cylinder parts and with the ends of the sheet between the two directly opposed faces 5, 6 of the cylinder parts 1, 2. In the construction shown in Figures 1, 2, 3 and 4 the part 7 is provided with a recess 34 disposed centrally of the length of the projecting part 7 and adapted to receive the upper end 35 of a steadying pin 36 screwed into the part 2. The steadying pin 36 acts to prevent longitudinal displacement of the two cylinder parts 1, 2 and also facilitates positioning of the part 1 on the part 2 or vice versa.

As illustrated in Fig. 2, the shaft 4 is shown as forming an integral part of the cylinder part 1. Obviously, however, the shaft 4 may be formed as an integral part of the cylinder segment 2. The latter arrangement facilitates positioning of the cylinder parts and permits of the part 1 being turned on the part 2, whereas if the shaft 4 is integral with the part 1, then the part 2 would have to be turned on the part 1, which is somewhat inconvenient and a cumbersome method of assembling the two parts.

In the modified constructional form shown

in Figures 3 and 4 the same or like parts are indicated by the same reference numerals as the corresponding parts in Figures 1 and 2. In this construction the arcuate portion 4 shown in Figure 2 is omitted and the cylinder part 2 is formed with a rectangular recess 37 to receive a shaft 38 which carries both cylinder parts 1 and 2. The recess 37 extends the entire length of the part 2 and to the end faces thereof. The shaft 38 is secured to the cylinder part 2 by set screws 39 suitably spaced apart along the length of the shaft the upper face of which is recessed as at 40 to receive the head of the set screw 39. The shaft is cut away at 41 to a radius the centre of which lies in the axis 19 from which the co-operating pivotal surfaces of the parts 7 and 8 are struck. The arcuate face 41 of the shaft extends the whole length thereof and allows for the relative pivotal movement of the cylinder parts 1 and 2 when assembling these in position. In the construction shown in Figures 3 and 4 the shaft 38 is keyed to the cylinder part 2 by four small keys 43, 44, 45 and 46 two of which are disposed at each opposite end and on opposite sides of the shaft 38 as shown in Figure 4.

In operation the metallic sheet may be initially bent to its approximate form and the two ends of the sheet are thereafter connected to the respective hook bars, which may then be slipped into their respective recesses with the sheet extending around and embracing the surfaces of the cylinder parts. The two cylinder parts are then closed together by a counter roller or other suitable means in which action the sheet is tensioned by the pivotal movement of one part on the other or by the movement of both parts. It should be clearly understood however that the sheet 29 may be engaged with the rockable bars and these positioned in their respective recesses in any suitable and convenient manner.

What I claim is:—

1. A printing cylinder formed in at least two parts, one part being provided with a centrally disposed arcuate portion and an arcuate portion disposed to one side thereof, the latter arcuate portion being adapted to cooperate with a correspondingly shaped recess in the other cylinder part so that relative angular displacement of the parts can be effected so as to engage and apply tension to a metallic design sheet the ends of which are retained in position between the two other opposed separating faces of the cylinder parts and wherein the centrally disposed arcuate portion on one cylinder part is adapted to act as a shaft and to fit into a correspondingly shaped recess in the other cylinder part.

2. A printing cylinder according to claim 2, wherein each cylinder part is provided with a rectangular recess extending the entire length of each cylinder part the two recesses when the cylinder parts are assembled being adapted to engage a shaft having one corner cut away so as to permit of the angular displacement of the required cylinder part or both cylinder parts.

3. A printing cylinder split longitudinally to form at least two cylinder segments, the meeting faces of the segments on one side of the cylinder axis being formed in complementary curved planes for relative pivotal play of the sections, non-pivotal surfaces disposed on the other side of the cylinder axis, a design plate having its ends extending inwardly of and between the non-pivotal faces of the cylinder segments, means to engage the said design plate, and means to retain the cylinder segments in position when assembled.

4. A printing cylinder split longitudinally to form at least two cylinder segments, a pivotal joint on one side of the cylinder axis, a non-pivotal joint on the other side of the cylinder axis, means disposed between the non-pivotal faces of the cylinder segments and adapted to be rocked by butting contact, a design plate superimposed on the cylinder segments as a whole and overlapping the non-pivotal faces of the cylinder segment and engageable by the said rockable means so that on assembly of the cylinder segments tension is applied to the design plate.

5. A printing cylinder split longitudinally to form at least two cylinder segments, a pivotal joint on one side of the cylinder axis, a non-pivotal joint on the other side of the cylinder axis, rockable means disposed in recesses in the non-pivotal faces of the cylinder segments and adapted by abutting contact to apply tension to a design plate superimposed on the cylinder segments as a whole and overlapping the non-pivotal faces of the cylinder segment and engageable with the ends of the design plate so that on assembly of the cylinder segments tension is applied to the design plate.

6. A printing cylinder split longitudinally to form at least two segments, a pivotal joint on one side of said segments, a non-pivotal joint at the other side of said segments, tensioning means disposed between the faces of the latter joint, a design plate overlying the cylinder segments and loosely engageable with the tensioning means which are adapted by rocking movement to apply tension to the design plate on assembly of the cylinder segments, and means to retain the latter in assembled position.

7. A printing cylinder split longitudinally to form at least two cylinder segments, a pivotal joint on one side of said segments, a non-pivotal joint on the other side of the said segment, a circular portion disposed on one of said segments and adapted to act as a shaft and to engage a recess in the other of said segments, rockable means disposed be-

tween the non-pivotal faces of the cylinder segments, a design plate loosely engageable with said rockable means and adapted by assembly of the cylinder segments to tension the design plate, and means to retain the parts in assembled position.

8. A printing cylinder split longitudinally to form at least two cylinder segments, the meeting faces of the segments on one side of the cylinder axis being formed in complementary curved planes for relative pivotal play of the sections, means disposed between the pivotal faces of the said segments to prevent longitudinal relative displacement of the segments when assembled, a non-pivotal joint on the other side of said segments and having recessed superposed faces, tensioning means in the said recesses adapted by hooked engagement with the ends of a design sheet to apply tension to the latter, and means to retain the parts in assembled position.

9. A printing cylinder split longitudinally to form two superimposable cylinder segments, a pivotal joint on one side thereof, a non-pivotal joint on the other side of said cylinder segments, a centrally arranged circular portion on one segment engageable in a recess on the other segment and adapted to act as a shaft for both segments, rockable tensioning means disposed in the non-pivotal faces of the cylinder segments, a design plate engageable therewith and tensionable by rocking movement imparted to the rockable tensioning means when assembling the cylinder segments.

10. In a printing cylinder split longitudinally to form at least two cylinder segments, rockable tensioning means interposed between the cylinder segments, a design plate loosely engageable therewith and adapted to be tensioned by rocking movement imparted to the tensioning means during assembly of the cylinder segments.

11. In a printing cylinder split longitudinally to form at least two cylinder segments, tensioning means comprising bars interposed between the cylinder segments, hooks on said bars, design plate engageable therewith and tensionable by rocking movement imparted to the said hooks during assembly of the cylinder segment.

12. A printing cylinder split longitudinally to form at least two parts and comprising a centrally disposed arcuate portion, an arcuate portion disposed to one side thereof and adapted to cooperate with a correspondingly shaped recess in the other cylinder part so as to permit of the angular displacement of the cylinder parts in order to apply tension to a metallic design sheet having its ends extending inwardly of and between the two other opposed separating faces of the cylinder parts.

13. A printing cylinder split longitudinally to form at least two parts and comprising means interposed between two opposed faces of the segments on one side of the cylinder axis, the opposed faces on the opposite side of said axis being formed in complementary curved planes between the axis and surface of the cylinder to provide for pivotal relative play of the segments, the said means being engageably loosely with the ends of at least one design plate adapted to overlie the peripheral surfaces of the two segments so that on assembly of the two cylinder segments tension is applied to the design plate to cause the latter to lie snugly on the peripheral surface of the cylinder segments as a whole.

14. A printing cylinder split longitudinally to form at least two parts and comprising four separating faces in the plane of section, two faces thereof forming pivotal faces, tensioning means supported on the other two faces and attachably and detachably engageable with the ends of a metallic design plate so that during assembly of the two cylinder parts rocking movement is imparted to the said tensioning means so as to apply tension to the design plate.

15. A printing cylinder split longitudinally to form at least two parts and comprising tensioning means interposed between two separating faces in the plane of section, the meeting surfaces of the segments on one side of the axis being formed in complementary curved planes to provide for pivotal play of the segments relatively, and a design plate adapted to be associated by hooked engagement with the tensioning means so as to apply tension to the said design plate when assembling the cylinder parts.

16. A printing cylinder split longitudinally to form at least two parts and comprising two separating faces on one side of the cylinder axis and in the plane of section, two pivotal separating faces on the opposite side of the cylinder axis, and tensioning means engageable with a design sheet and interposed between the non-pivotal separating faces of the cylinder parts and adapted by abutting contact to apply tension to the design sheet when assembling the cylinder parts.

17. A printing cylinder split longitudinally to form at least two parts and comprising two non-pivotal separating faces on one side of the cylinder axis and in the plane of section, two pivotal separating faces on the opposite side of the cylinder axis, bars disposed in recesses in the non-pivotal faces, hooks on the said bars and engageable with the ends of a design sheet, the latter being tensioned by abutting contact of the said hooks when assembling the cylinder segments.

18. A printing cylinder split longitudinally to form at least two parts and comprising two non-pivotal separating faces on one side of the cylinder axis and in the plane of section, two pivotal separating faces on the

opposite side of the cylinder axis, bars disposed in recesses in the non-pivotal faces and having rounded outer edges to coact with rounded outer edges in the recesses, and undercut hooks on the said bars engageable with wires extending across gaps in the ends of a design sheet and rigidly secured thereto and engageable with the ends of the design sheet, the latter being tensioned by abutting contact of the said hooks when assembling the cylinder segments.

19. In combination with the segments of a longitudinally split printing cylinder, a bar disposed between the said segments, hooks on the said bar adapted to engage the end of a design sheet, and means to rock the said bar so as to apply tension to the design sheet when assembling the cylinder segments.

20. In combination with the segments of a longitudinally split printing cylinder, a pair of bars oppositely disposed between the cylinder segments, and hooks on the said bars loosely engageable with a design sheet and rockable during assembly of the cylinder segments to apply tension to the said design sheet.

21. A printing cylinder split longitudinally to form at least two parts, bars disposed between the cylinder segments and adapted to be associated with the respective ends of a metallic design plate by hooked engagement therewith so that on assembly of the cylinder segments the said bars are so angularly actuated as to apply tension to the metallic design plate.

22. A printing cylinder split longitudinally to form at least two segments, rockable bars disposed in recesses in adjacent faces of the two cylinder segments, the said recesses having outer curved surfaces to permit of angular movement of the said bars in the said recesses, by means of which movement the ends of metallic design plates are secured in position under tension on the cylinder segments.

23. A printing cylinder split longitudinally to form at least two segments, rockable bars disposed in recesses in adjacent faces of the two cylinder segments, hooks on the said bars, the said recesses having outer curved surfaces to permit of the angular movement of the said bars in the said recesses, metallic design plates engageable by the said hooks so as to secure the design plates in position under tension on the cylinder segments.

In testimony whereof I have hereunto signed my name.

GEORGE THOMAS BALDWIN.