Nov. 17, 1953

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MEANS FOR VARYING THE CIRCUMFERENCE OF PRINTING CYLINDERS

2,659,306

Filed March 8, 1951

2 Sheets-Sheet 1

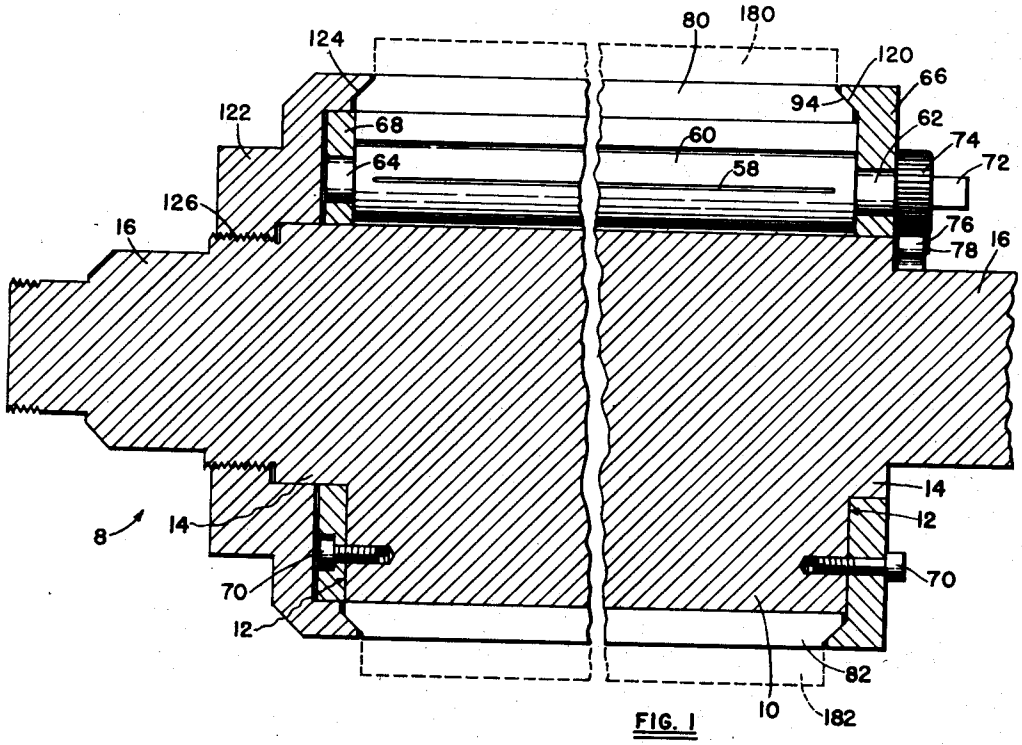

FIG. 1

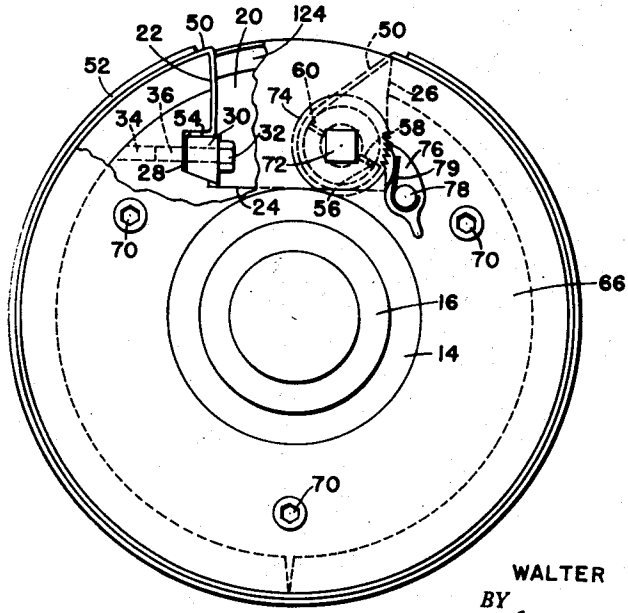

FIG. 2

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2 Sheets-Sheet 2

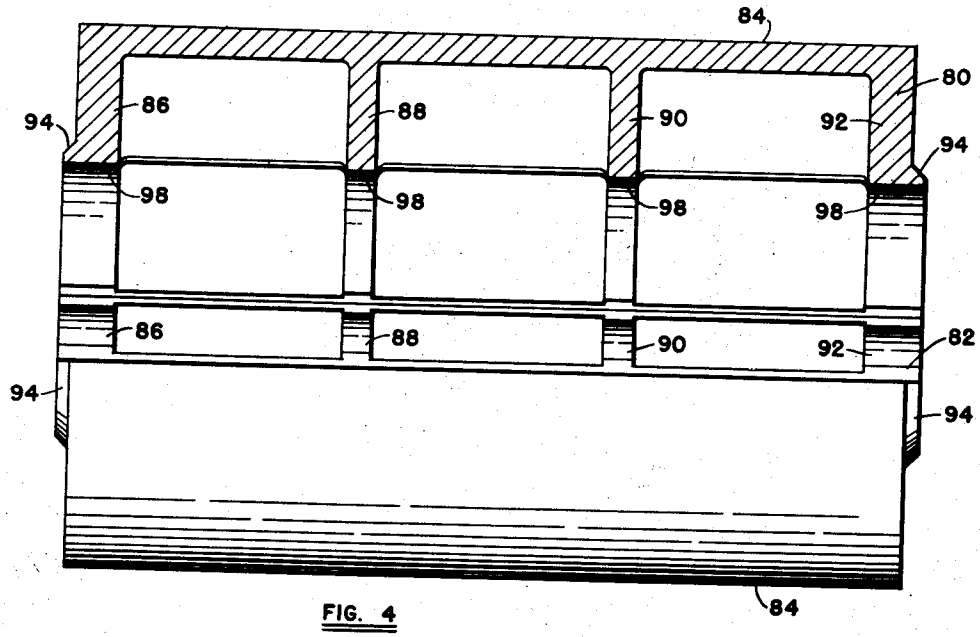

FIG. 4

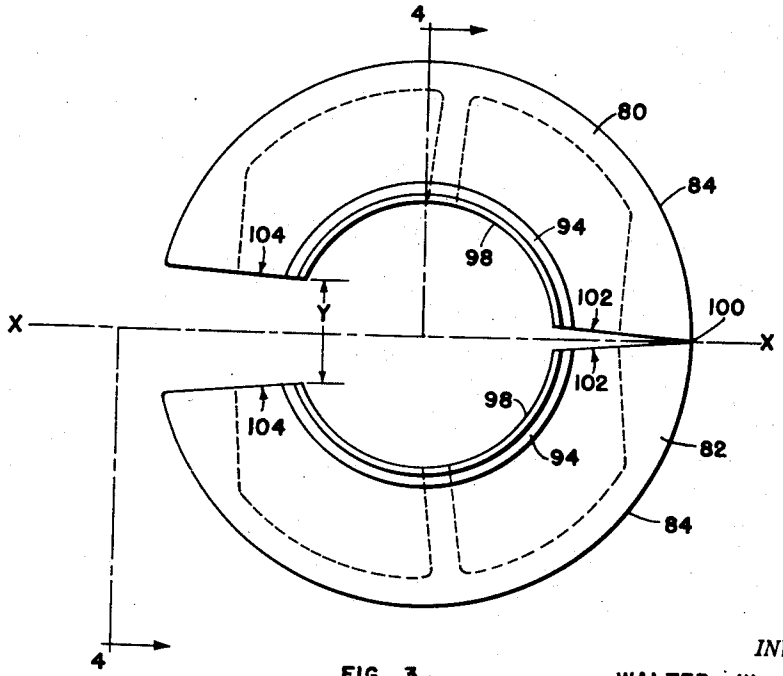

FIG. 3

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MEANS FOR VARYING THE CIRCUMFERENCE OF PRINTING CYLINDERS

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5 Claims. (Cl. 101—415.1)

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This invention relates to rotary printing cylinders and more particularly to a printing cylinder of adjustable circumference.

An object of the invention is to provide an adjustable-circumference printing cylinder.

Another object of the invention is to provide a composite printing cylinder which comprises a carrier roll or cylinder to which a pair of complementary half-cylinder shells may be securely though releasably fastened for enabling an operator to simply and easily increase the effective circumference of the carrier cylinder, thereby greatly enhancing the utility of the device.

Still another object of the invention is to provide a printing cylinder with means for enabling the operator to vary the effective circumference thereof to suit the particular printing job being run, by means of a plurality of complementary pairs of interchangeable half-cylinder shells to which suitable printing plates may be affixed.

A further object of the invention is to provide a base or carrier cylinder to which various sized pairs of complementary half-cylinder shells may be securely though releasably attached by means of clamping means secured to and carried by the carrier cylinder.

Still a further object of the invention is to provide an adjustable-circumference printing cylinder which includes means for enabling the effective circumference of the cylinder to be increased or decreased to meet the requirements of the particular printing job being run and which includes other means for securely though releasably attaching carrier sheets, to which the printing plates are secured, to the outer circumference of the composite cylinder.

Another object of the invention is to teach a highly efficient, inexpensive method of varying the effective circumference of printing cylinders.

Another object of the invention is to provide a carrier roll or cylinder with simple, yet highly effective means for detachably anchoring various sized pairs of half-cylinder shells thereto.

These and other objects are attained by the means described herein and as disclosed in the accompanying drawings, in which

Fig. 1 is a vertical section through a composite printing cylinder embodying the teachings of the present invention taken along axis X—X of Fig. 3.

Fig. 2 is an elevational view of the right end of the cylinder of Fig. 1 with a portion thereof broken away for disclosing certain structural details.

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Fig. 3 is an end view of a pair of complementary half-cylinder shells comprising a detail of the present invention.

Fig. 4 is a view taken on line 4—4 of Fig. 3.

Considerable difficulty has been experienced in the printing industry when it became desirable or necessary to increase or decrease the effective circumference of the printing cylinder of a rotary press to accommodate the requirements of different printing jobs. Heretofore different sized printing cylinders have been utilized wherein each cylinder had an effective circumference of fixed length. To vary the effective circumference of a printing cylinder necessitated its removal and replacement with another cylinder.

One of the prime objects of the present invention is to provide a printing cylinder the effective circumference of which may be varied, without necessitating its removal from the press.

With particular reference now to Fig. 1, the numeral 10 denotes the central cylindrical portion of a carrier roll or cylinder 8 the outer circumference of which is preferably less than the minimum printing cylinder circumference desired.

In the preferred embodiment of the invention the opposite ends of central cylindrical portion 10 are undercut as at 12 for providing concentric collars 14. Axial shafts 16 of lesser diameter than the central portion and collars project from opposite ends thereof as illustrated, it being understood that these portions of the roll are adapted to be received within suitable bearings for rotatably mounting the cylinder relative to the frame of a printing press, or the like.

An elongated slot 20 is provided throughout the entire length of central cylindrical portion 10. said slot including a front wall 22, bottom wall 24 and a rear wall 26. The lower portion of front wall 22 is preferably undercut as at 28 for receiving an elongated clamping bar 30. Suitable means. such as, by way of example, bolts 32 may be utilized for detachably securing bar 30 in undercut portion 28, it being observed that suitable tapped holes 34 may be provided for receiving shanks 36 of the bolts.

The numeral 50 denotes generally an elongated, flexible, carrier-sheet adapted to be wrapped around and secured to the effective circumference of the cylinder. A printing plate 52 is secured to and carried by sheet 50. One end of the carrier sheet may be turned under as at 54 for engaging the upper edge of undercut portion 28, to which it is securely though releasably

anchored by means of the wedging action of clamping bar 30. The other end 56 of the carrier sheet may be received within elongated slot 58 of an elongated roller 60 for enabling the sheet to be wound upon the outer periphery of the roll.

With particular reference now to Fig. 1, it will be noted that the opposite ends of roller 60 are rotatably journaled as at 62 and 64 to end plates 66 and 68, respectively, which are secured to and carried by the ends 12 of central cylindrical portion 10 by means of bolts 70. One end of roll 60 may terminate in an outwardly projecting squared or key portion 72 engageable by a suitable wrench for enabling an operator to rotate roll 60 about its axis. A ratchet member 74 is keyed to shaft 72, and a pawl 76 is pivotally secured to and carried by end plate 66 as at 78.

In the preferred embodiment of the invention suitable means such as spring 79 may be provided for normally maintaining the pawl in operative relationship with the ratchet for thereby precluding accidental or unintentional unwinding of roll 60.

From the foregoing, it will be noted that by applying a turning force in a counter-clockwise direction to roller 60, the carrier sheet will be tensioned on the effective circumference of the printing cylinder.

In passing it will be noted that printing plate 52 may, if desired, comprise a rubber plate secured to carrier-sheet 50 by means of a suitable adhesive.

In those instances wherein it is desirable to vary the effective circumference of the printing cylinder a pair of complementary half-cylinder shells 80 and 82 may be clamped to the central cylindrical portion of the carrier cylinder. As best illustrated in Figs. 3 and 4, each half-cylinder shell includes an outer peripheral printing-plate supporting surface 84 including inwardly projecting radial members 86, 88, 90 and 92, each terminating in arcuate surfaces 98, adapted to abuttingly engage portions of the outer periphery of the central portion of carrier cylinder 10 for thereby locating the complementary half-cylinder shell portions 84 in spaced parallelism with the outer surface of the carrier cylinder.

In the preferred embodiment of the invention the endmost radial members 86 and 92 of shell portions 80 and 82 are provided with outwardly projecting inwardly inclined annular shoulders or surfaces 94 which comprise locking collars engagable by complementary portions of clamping means secured to and carried by the carrier cylinder.

In the preferred embodiment of the invention the half-cylinder shells are made as light in weight as is practicable without sacrificing the rigidity required for adequately supporting a flexible printing plate. Uniformly satisfactory results have been obtained when the shells have been fabricated from cast aluminum with two laterally spaced radial members 88 and 90 provided intermediate ends 86 and 92. Arcuate portions 98 of each shell segment are dimensioned to closely and accurately follow the contour of the outer face of the central cylindrical portion of the carrier cylinder.

As best illustrated in Fig. 3 the annular collars 94 are concentric with respect to the axis of rotation of the cylinder. The complementary half-cylinder shells meet in line contact as at 100, it being noted that the adjacent faces 102 of

radial portions 86, 88, 90 and 92 are not diametrically disposed but are slightly inclined away from diametric axis X—X such as, by way of example, by a 5° taper, for insuring a smooth, continuous, even surface along contact edge 100.

The opposite adjacent faces 104 may likewise be inclined the same amount with reference to diametric axis X—X, however it will be noted that the lateral spacing between the closest portions of edges 104, as indicated by the dimension Y, is at least equal to the lateral spacing between front wall 22 and rear wall 26 of elongated slot 20 provided in the central cylindrical portion 10 of carrier cylinder, for thereby facilitating access to the interior of the slot for such purposes as, by way of example, securing and tensioning carrier sheet 50, as hereinabove more fully set forth.

The annular locking collars 94 of each of the various sized pairs of complementary half-cylinder shells are of the same size whereby to be interchangeable with the clamping means hereinafter more fully described. In this manner I am able to secure complementary half-cylinder shells the effective circumference of which ranges from a minimum to a maximum by utilizing a single universal clamping means.

As disclosed in Fig. 1, end plate 66 is provided with a continuous, annular socket 120 having a taper complementary to the taper of locking collars 94 of the half-cylinder shells. As earlier noted, end plate 66 is fixedly secured to end face 12 of the central cylindrical portion 10 of the carrier cylinder whereby to rotate therewith.

An axially shiftable locking plate 122 having an annular socket 124 complementary to the taper of the annular locking collar of the half-cylinder shells may be threadably mounted to the axial shaft of the carrier cylinder as at 126 for movement into or from locking engagement with the locking collar of a pair of complementary shells mounted on the carrier cylinder.

In Fig. 1 the numerals 80 and 82 denote generally a pair of complementary half-cylinder shells having the smallest effective circumference, whereas the numerals 180 and 182 indicate the next larger size pair of complementary half-cylinder shells, the effective circumference of which is greater than the effective circumference of shells 80 and 82 in proportion to the radius of the spacing of outer face 84 from the axis of rotation.

From the foregoing it will be noted that I have thus provided simple yet highly effective means for enabling anyone of a plurality of various sized pairs of complementary half-cylinder shells to be securely though releasably fastened to a carrier roll or cylinder utilizing common clamping means secured to and carried by said carrier cylinder.

What is claimed is:

1. An adjustable circumference printing cylinder comprising a carrier cylinder including a central cylindrical portion from the opposite ends of which axial shafts of lesser diameter project, an elongated slot in and extending transversely across said central portion, end plates securely though releasably secured to opposite ends of the central cylindrical portion of the carrier cylinder and across the ends of said slot, an elongated roll in said slot spanning and with its opposite ends journaled to said end plates, an elongate clamp bar receivable within said slot, said clamp bar and roll adapted to engage opposite ends of a carrier sheet circumscribing the cylinder, one of said end plates including an annular peripheral

socket overhanging one end of said central portion, the other end plate including a peripheral edge substantially flush with the outer surface of said central portion, and a clamp late secured to and axially shiftable along that axial shaft remote from that end plate which includes the annular peripheral socket, said clamp plate including an annular recess dimensioned to bodily receive the other of the end plates, and an annular peripheral socket beyond said recess movable into overhanging relationship with the other end of said central portion.

2. An adjustable circumference printing cylinder comprising a carrier cylinder including a central cylindrical portion from the opposite ends of which axial shafts of lesser diameter project, an elongated slot in and extending transversely across said central portion, end plates detachably secured to opposite ends of the central cylindrical portion of the carrier cylinder and across the ends of said slot, an elongated roll in said slot spanning and with its opposite ends journaled to said end plates, an elongate clamp bar receivable within said slot, a pair of complementary half-cylinder shells each including an arcuate outer surface and inwardly projecting radial members adapted to engage the outer surface of the carrier cylinder for disposing their respective outer surfaces in spaced parallelism with the outer periphery of the cylinder, opposite ends of each of said shells terminating in duplicate annular shoulders, a flexible printing-plate carrier-sheet dimensioned to circumscribe the circumference of said pair of shells with its opposite ends engaging said clamp bar and roll, means for rotating said roll for tensioning the carrier-sheet onto and around said half-cylinder shells, one of said end plates including an annular peripheral socket disposed beyond the outer surface of the carrier cylinder and overhanging one end of said central portion and engageable with the annular shoulders at one end of said pair of shells, a clamp plate secured to an axially shiftable along that axial shaft remote from the last mentioned end plate, said clamp plate including an annular recess dimensioned to bodily receive the other of the said end plates and an annular peripheral socket movable into overhanging relationship with the other end of said cylinder and in engagement with the annular shoulders at the other end of said shells for securely though releasably securing the pair of shells to the cylinder.

3. An adjustable circumference printing cylinder comprising a carrier cylinder including a continuous central cylindrical portion from the opposite ends of which axial shafts of lesser diameter project, an elongated slot in and extending transversely across said central portion, bearing means across the ends of said slot, an elongated roll in said slot spanning and with its opposite ends journaled to said bearing means, an elongate clamp bar receivable within said slot, a pair of complementary cylinder shells each including an arcuate outer surface, forward and rear edges and ends having annular shoulders extending axially therefrom, said shells also including inwardly projecting radial members each terminating in an arcuate inner surface adapted to engage the outer surface of the carrier cylinder for disposing their respective outer surfaces in spaced parallelism with the outer periphery of the cylinder and for disposing the forward edges of the shells in abutting relationship with their rear edges in spaced relationship and substantially along opposite sides of said slot, a flexible printing-plate carrier-sheet dimensioned to circumscribe the arcuate outer surface of said shells with its opposite ends engaging said clamp bar and roll, means for rotating said roll for tensioning the carrier-sheet onto and around said cylinder shells, and clamping means engageable with the ends of said shells for securely though releasably securing the shells to the cylinder.

4. An adjustable circumference printing cylinder comprising a carrier roll including a central cylindrical portion from the opposite ends of which axial shafts of lesser diameter project, a pair of complementary partial cylinder shells including radial members adapted to abuttingly engage portions of the outer surface of the carrier roll, and means at opposite ends of said central cylindrical portion detachably secured to and carried by said carrier roll, each of said means including a continuous annular peripheral socket adapted to overhang an end of the said central portion and engage one end of said shells for detachably securing said shells to and in driven relationship with the carrier roll.

5. An adjustable circumference printing cylinder as defined in and by claim 4, wherein the central cylindrical portion is provided with a transverse slot, a flexible printing-plate carrier-sheet dimensioned to circumscribe the circumference of said shells, and means disposed within and on opposite sides of said slot for engaging opposite ends of said carrier sheet and for tensioning said sheet around and onto said shells.

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