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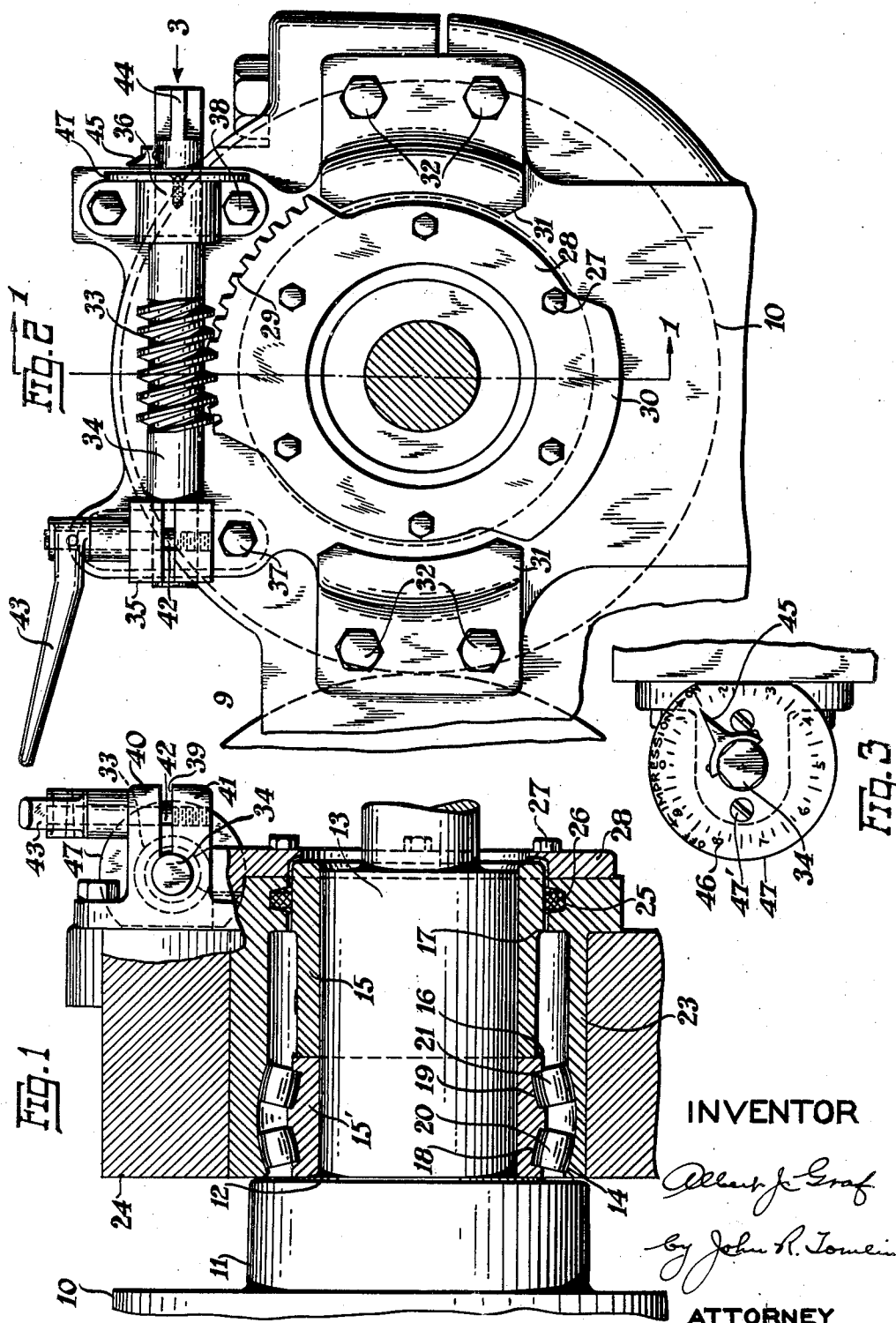
A. J. GRAF

1,972,840

CYLINDER BEARING FOR PRINTING MACHINES

Filed April 22, 1932

2 Sheets-Sheet 1



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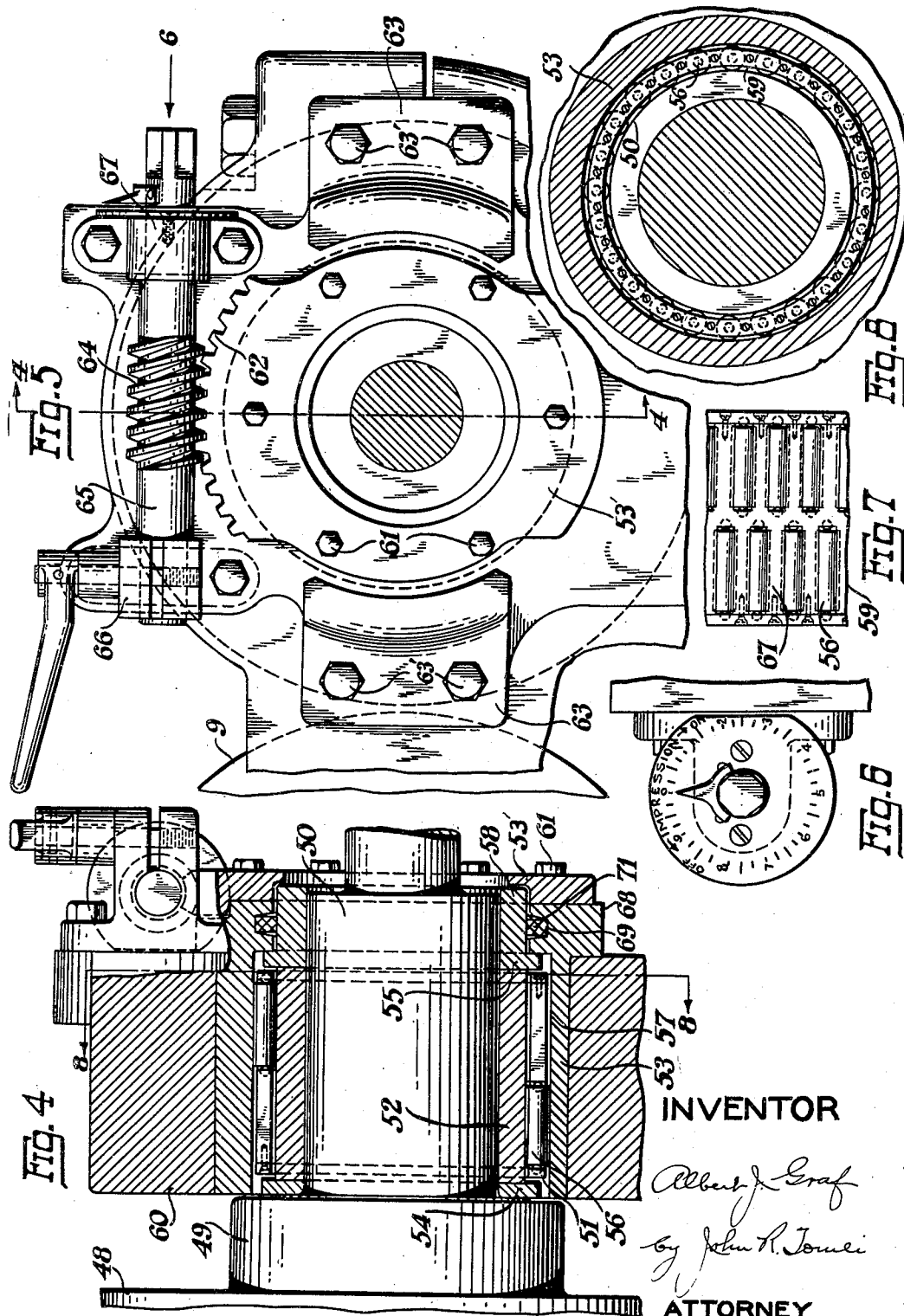
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UNITED STATES PATENT OFFICE

1,972,840

CYLINDER BEARING FOR PRINTING MACHINES

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Application April 22, 1932, Serial No. 606,820

5 Claims. (Cl. 101-247)

This invention in general relates to novel means for adjusting the cylinders or rollers of printing machines, and has for its principal object the provision of a more efficient method and means

for adjusting, equalizing or varying the pressure with which impressions are made and for compensating for wear and differences of thickness in the blankets or other coverings employed with cylinders or rollers used with printing machines.

A more particular object is to provide a novel bearing which is adapted to be used with and to adjust a cylinder or roller to provide a greater or less pressure for making impressions and also to vary the distance between coating cylinders or rollers for suitable adjustment, regulation of pressure, compensation of wear and the like.

It is also an object of the invention to provide a cylinder bearing of generally improved construction whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

It has been found essential in practice to provide adjustably supported bearings for conveniently and expeditiously positioning the cylinders or rollers of printing machines so that they may be moved or be arranged towards or from each other and whenever bodily or translational movement is necessary, together with suitable indicating means for denoting the actual amount of adjustment afforded or necessary.

The present invention contemplates the provision of a simplified and more efficient anti-friction bearing adapted for bodily moving or adjusting printing cylinders and rollers with respect to coating means, and for indicating the degree or magnitude of the adjustment made and the relative position of one end of the cylinder to the other end and to the impression member.

For the purpose of illustrating the invention there is shown in the accompanying drawings two forms thereof which are at present preferred, since the same have been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

Preferred embodiments of the invention are

illustrated in the accompanying drawings, wherein:

Figure 1 is a fragmentary longitudinal sectional view, partly in elevation, taken on the line and viewed in the direction of the arrow 1 of Figure 2, showing an embodiment of the invention as applied to the form cylinder of a rotary printing machine;

Figure 2 is a fragmentary end elevational view, partly in section, of the device shown in Figure 1;

Figure 3 is a fragmentary elevational detail view of the device, as viewed in the direction of the arrow 3 of Figure 2, showing the indicating means employed with the present invention;

Figure 4 is a view similar to Figure 1 taken on the line and viewed in the direction of the arrow 4 of Figure 5, of a modified form of the invention;

Figure 5 is a view similar to Figure 2 of the device shown in Figure 4;

Figure 6 is a fragmentary elevational detail view as seen in the direction of the arrow 6 of Figure 5 of the indicating means employed with the modified form of the invention;

Figure 7 is a fragmentary elevational view of a bearing member used with the modified form of the invention; and

Figure 8 is a transverse sectional view taken on line 8-8 of Figure 4, looking in the direction of the arrows.

With more particular reference to the drawings wherein similar characters of reference indicate corresponding parts in the preferred forms of the invention; 9 designates an impression cylinder and 10 a plate or form cylinder or roller, having a shaft 11 shouldered as at 12 to provide a journal 13 which is supported on an anti-friction bearing 14. The bearing 14 is composed of an inner ring or race member 15 which is shouldered as at 16, 17 and a second adjacent inner ring 15' recessed or provided with diagonally positioned grooves or races as at 18, 19 for a purpose which will hereinafter appear. The diagonally positioned races 18, 19 accommodate roller bearings 20, 21 which are engaged against a concave, or arcuate portion 22 formed on the inner surface of an eccentric outer ring or race member 23 which forms an important feature of the present invention and which coacts with a portion of the frame 24 of the printing machine (not shown) and the journal 13 of the cylinder or roller to move or shift the latter bodily in order to compensate for any wear, to secure a greater or less effective pressure between a coating cylinder or roller and in general to provide means for bodily or translationally adjusting the cylinders or rollers of printing machines. While only one end of the form cylinder is illustrated, it is to be understood that the other end is substantially similar to the one shown and that a duplicate adjusting device is connected thereto

for the same purpose and functions so that both ends of the form cylinder may be adjusted as desired.

As will hereinafter appear, the entire anti-friction bearing of the present invention which supports the rotating member or journal 13 of the shaft 11 has its bearing surfaces concentric with the axes of the rotating member, the carrying elements, i. e., the balls or rollers being engaged directly with the said bearing surfaces, the inner supporting surface of the frame 24 being eccentric the axis of the cylinder 10.

The eccentric outer ring or race member 23 of the anti-friction bearing may be considered as having a cam surface or as having a bore eccentrically positioned relatively to its circumference for a purpose appearing hereinafter, and is provided with a groove 25 to accommodate a suitable packing or lubricant-retaining washer 26. Secured to the eccentric ring 23, in any suitable manner as by the screw 27, is a disc or plate 28 having a gear segment 29 and a projection or cam 30 secured to or formed integrally therewith. The eccentric ring or race member 23 is retained in position by a pair of keeper plates 31 fastened in any suitable manner to the frame 24, as by screws 32 and also serving as stops when engaged by the projection 30, to limit the rotation of the plate 28, and consequently the outer race 23. The gear segment 29 of the disc 28 is engaged by a worm 33 formed on a bar or shaft 34 rotatably mounted in bearing brackets 35, 36 secured to the frame 24 by screws 37 and 38 respectively. The bearing bracket 35 is split or slotted as at 39 to form a somewhat U-shaped bearing having legs 40, 41 which may be drawn together or spread apart and thus adjusted by a screw 42 having an operating handle or wrench 43 fastened or pinned thereto, the adjusting screw 42 being threadedly engaged in holes formed in the legs, 40, 41 of the said bearing 35. When the legs 40, 41 of the bearing bracket 35 are drawn together, the shaft 34 is locked or bound therein, thereby fastening the said shaft 34 in position after the desired adjustment or position of the cylinder 10 is obtained.

The worm shaft 34 has one end squared as at 44 which is adapted to be received in a suitable socket wrench or key (not shown) for turning the said shaft 34 to move the plate 28 and consequently the ring 23 in order to adjust the cylinder 10. Fastened to the shaft 34 is an indicating needle or index arm 45 which is adapted to pass over a calibrated scale 46 formed on a disc or plate 47 secured to the bearing bracket 36 in any suitable manner, as by the screws 47'. By inspection of Figure 3 it will be seen that when shaft 34 is turned to move the cylinder 10 towards or away from the impression cylinder 9 the magnitude or degree of movement may be readily determined by a glance at the scale 46 which is graduated to preferably indicate "on" and "off" and intermediate positions of the form cylinder 10. Since the worm 33 and coacting gear segment 29 must be turned considerably to produce an appreciable displacement of the cylinder 10, the movement of the indicating needle or arm 45, it will be observed, gives a highly amplified indication of the actual movement of the eccentric outer bearing ring and, consequently, of the cylinder 10.

The function and general manner of operation of the device has been in large measure indicated from the foregoing description, but will appear more fully from the following brief description:

Assuming the cylinder 10 is in operative position for performing its functions and that it is desired to move same to inoperative position or a position adapted for the better handling of the immediate products being handled, the socket wrench will be engaged with the squared end 44 of the worm shaft 34 in order to turn same and, consequently, the gear segment, thereby turning the eccentric outer ring 23 and shifting the position of the cylinder 10. Since the bore of the outer ring 23 is eccentrically positioned relatively to the circumference thereof which is positioned within the frame 24 as mentioned above, the cylinder 10 will be moved or shifted away from the impression cylinder, as the said eccentric ring 23 turns. When the desired position or adjustment is arrived at the slotted bearing 35 may be locked by turning the screw 42 in order to lock the worm shaft 34 and consequently the cylinder in position. Both ends of the cylinder 10, it is to be understood, as mentioned above, are provided with eccentric bearings of the kind above described.

In Figures 4 to 8 inclusive, a modified form of the invention is shown. In a number of respects the details are practically identical. In the present instance, 48 designates the cylinder or roller, 49 the shaft and 50 the journal which is supported on a bearing 51. The bearing 51, which in some respects is similar to bearing 14, is composed of an inner ring or race member 52, mounted directly on the journal 50, and of an outer eccentric ring or race member 53. The inner ring or race 52 of the bearing 51 has arranged adjacent thereto a pair of plates 54, 55 which serve to retain the roller bearing assembly 56, hereinafter described, in the annular space or chamber 57 lying between the inner and outer rings or race members of the present bearing. The plate 55 is formed as a flange on a sleeve or bushing 58 rotatable on the journal 50 of the shaft 49 and may be secured to the inner race 52 or rotate independently thereof. As best shown in Figures 4 and 7, the rollers 56 are revolvably arranged in a cylindrical cage 59 which is received in the space 57 between the inner and outer race members 52 and 53.

The outer ring or race member 53 is essentially an eccentric serving the same purpose as the eccentric outer bearing 23 described above in the other form of the invention.

The present eccentric outer ring or race member 53, which is arranged within a portion of the frame 60 of the present modified form of the invention, is secured to a disc or plate 53' by screws 61 and has a gear segment 62 formed thereon. Keeper plates 63 to retain the bearing assembly operatively in position on the journal 50 and also serving as stops for the plate 59 are secured to the frame 60 in any suitable manner as by the screws 63'. The gear segment 62 is engaged by a worm 64 formed on a shaft 65 which may be turned in the same manner as described above, in connection with the form shown in Figures 1, 2 and 3. Bearing brackets 66, 67 for the worm shaft 65 have practically the same functions as the corresponding members in the first form and are constructed similarly.

All the other component parts of the modified form of the invention are likewise similar with the exception of the inner and outer rings or race members 52 and 53, which have been partly described above. The outer ring 53 also has a flanged collar 68 secured to or formed integrally therewith, the said collar having a groove as at

69 to accommodate a lubricant-retaining washer or packing material 71.

When the worm shaft 65 is turned the disc or plate 59 and the eccentric outer ring 53 secured thereto will turn thus bodily shifting the shaft 49 and its cylinder or roller 48.

The indicating means for denoting the degree of compensation or pressure employed, or the magnitude of movement of the form cylinder 48 is identical in the present instance with that shown in Figures 1, 2 and 3, this being indicated by a corresponding similarity in the reference numerals employed.

The general function and manner of operation of the two forms of the device has been in large measure indicated from the foregoing details, it being understood that when adjustments are desired, a socket wrench will be applied to the squared end of the respective worm shafts 34 and 65 shown in the two forms of the invention and the said shafts turned until the eccentric outer rings of their respective bearings 14 and 53 have moved their adjacent shaft and the cylinder attached thereto to the degree desired for compensating for wear or for applying the desired pressure. The adjustment afforded by the means described and shown, it will be noted, is a fine one, and as indicated on the calibrated scale, may be accurately determined to the degree desired.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiments to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. The combination with a printing machine including a frame having bearing apertures formed therein and coacting printing cylinders operably supported in the frame and having bearing shafts, of anti-friction bearings rotatably supporting one of the printing cylinders, each anti-friction bearing including an outer ring operably received within a bearing aperture and having inner and outer peripheries arranged eccentric to each other, an inner ring having concentric inner and outer peripheries, the inner periphery engaging a bearing shaft, anti-friction members operably positioned between the inner and outer rings, and means for rotating the outer ring as an operative component of the printing machine to thereby move the printing cylinder transversely to adjust it relative to its coacting printing cylinder.

2. The combination with a printing machine including a frame having bearing apertures formed therein and coacting printing cylinders operably supported in the frame and having bearing shafts, of anti-friction bearings rotatably supporting one of the printing cylinders, each anti-friction bearing including an inner ring having inner and outer peripheries concentrically arranged relative to the bearing shaft of the printing cylinder, the inner periphery engaging the bearing shaft, an outer ring having an inner periphery concentrically arranged relative to the said shaft and an outer periphery eccentric thereto, the outer periphery engaging the wall of a frame bearing aperture, anti-friction members

operably positioned between the inner and outer rings, and means for rotating the outer ring as an operative component of the printing machine to thereby move the printing cylinder transversely to adjust it relative to its coacting printing cylinder.

3. The combination with a printing machine including a frame having bearing apertures formed therein and coacting printing cylinders operably supported in the frame and having bearing shafts, of anti-friction bearings rotatably supporting one of the printing cylinders, each anti-friction bearing including an inner ring having inner and outer peripheries concentrically arranged relative to the bearing shaft of the printing cylinder, the inner periphery engaging the bearing shaft, an outer ring having an inner periphery concentrically arranged relative to the said shaft and an outer periphery eccentric thereto, the outer periphery engaging the wall of a frame bearing aperture, anti-friction members operably positioned between the inner and outer rings, means for rotating the outer ring as an operative component of the printing machine to thereby move the printing cylinder transversely to adjust it relative to its coacting printing cylinder, and means for visually indicating the extent of transverse movement of the printing cylinder.

4. The combination with a printing machine including a frame having bearing apertures formed therein and coacting printing cylinders operably supported in the frame and having bearing shafts, of anti-friction bearings rotatably supporting one of the printing cylinders, each anti-friction bearing including an inner ring having inner and outer peripheries concentrically arranged relative to the bearing shaft of the printing cylinder, the inner periphery engaging the bearing shaft, an outer ring having an inner periphery concentrically arranged relative to the bearing shaft and an outer periphery eccentric thereto, the outer periphery engaging the wall of a frame bearing aperture, anti-friction members operably positioned between the inner and outer rings, means for rotating the outer ring as an operative component of the printing machine to thereby move the printing cylinder transversely to adjust it relative to its coacting printing cylinder, and means for locking the outer ring relative to the printing machine frame.

5. The combination with a printing machine including a frame having bearing apertures formed therein and coacting printing cylinders operably supported in the frame and having bearing shafts, of anti-friction bearings rotatably supporting one of the printing cylinders, each anti-friction bearing including an outer ring operably received within a bearing aperture and having inner and outer peripheries arranged eccentric to each other, an inner ring having concentric inner and outer peripheries, the inner periphery engaging a bearing shaft, anti-friction members operably positioned between the inner and outer rings, means for rotating the outer ring as an operative component of the printing machine to thereby move the printing cylinder transversely to adjust it relative to its coacting printing cylinder, means for visually indicating the degree of adjustment of the printing cylinder, and means for locking the outer ring relative to the printing machine frame.

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