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SHEET 1 OF 2

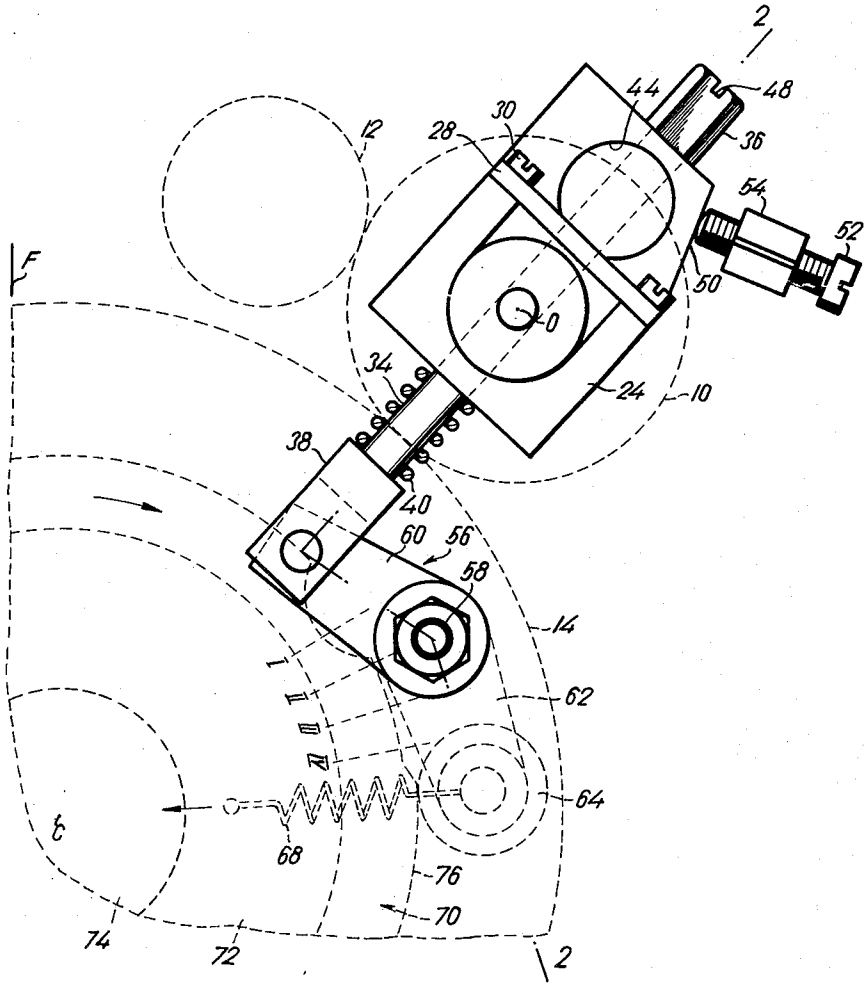


Fig. 1.

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[54] APPARATUS FOR MOUNTING ROLLERS IN OFFSET PRESSES

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[58] **Field of Search** 74/53; 101/352

[56] **References Cited**

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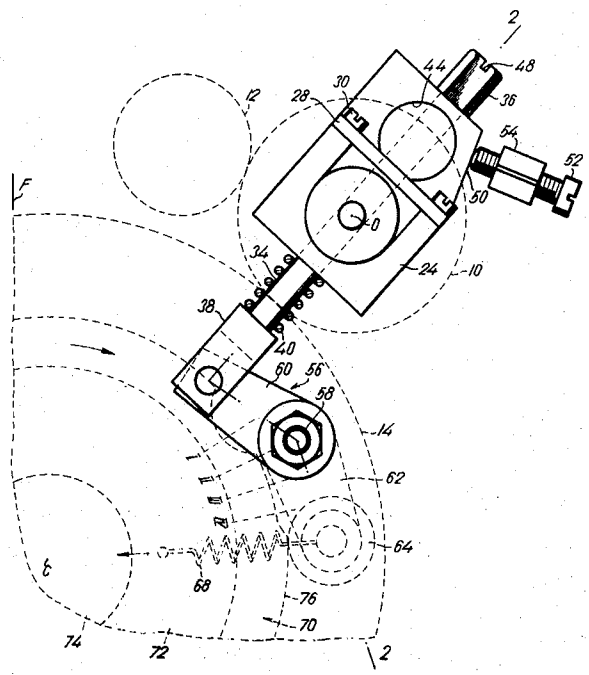
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[57] **ABSTRACT**

Apparatus for mounting an ink roller so that it may be shifted into engagement or disengagement with a form cylinder roller in an offset press. The apparatus comprises a holder for journalling the ink roller on a supporting frame, the holder being mounted so as to be reciprocally movable on said frame along a path radial to the axis of the form cylinder and an ink distributing roller to which it engages. The holder and frame are provided with engaging bearing means. A rod slideably extends through the holder parallel to the radial path of movement and has stop means limiting the relative upward and downward movement of the rod through said holder. Means are provided for reciprocating the rod in response to the selected operation of the machine whereby said holder can be listed and swung to cause the ink roller to engage and disengage selectively with the form cylinder and the ink distributor.

5 Claims, 2 Drawing Figures



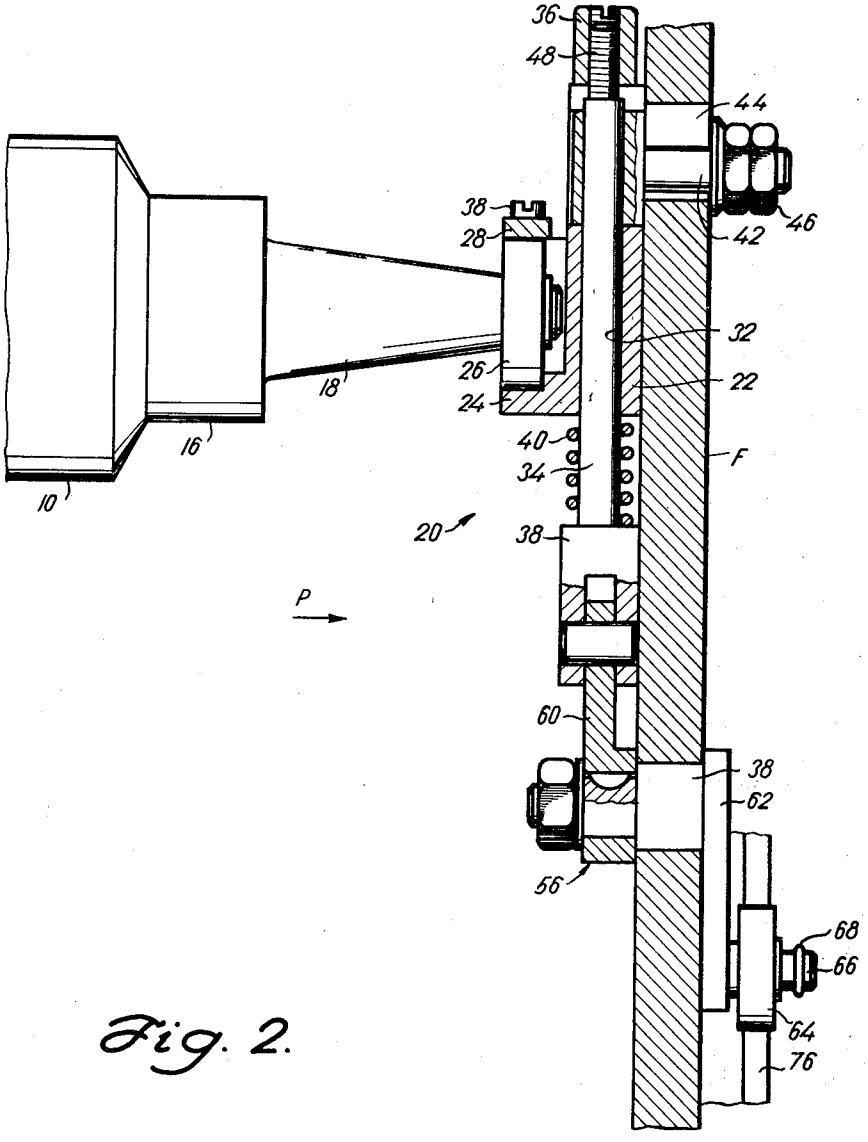


Fig. 2.

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APPARATUS FOR MOUNTING ROLLERS IN OFFSET PRESSES

BACKGROUND OF THE INVENTION

The present invention relates to apparatus for mounting paired rollers and, in particular, to apparatus for mounting the transfer roller of and inking unit of an offset printing machine.

Offset printing machines provide a good example of the use of paired rollers for the transfer of liquids such as ink from a reservoir to the point of use. In such machines a combination of ink-transfer rollers, distributing rollers, and form or printing cylinders are employed. Apparatus is provided whereby the ink transfer roller is shiftable into and out of engagement with either or both of the distributing rollers and the printing cylinder to provide constant pressure between the rollers and the cylinder to effect the proper transfer of the ink. Generally, the transfer roller engages the distributing roller simultaneously with the form cylinder. When the operation of the press is interrupted for short periods, the transfer roller must be disengaged from the form cylinder in order to prevent an excess of ink from being applied to the printing plate. When operation is interrupted for longer periods, the transfer roller must be also disengaged from the distributing roller as well so as to prevent deformation of the roller caused by the static pressure between the rollers. The apparatus must further be provided with a mechanism for maintaining the constant pressure unchanged after repeated engagements and disengagements of the roller.

It is the object of the present invention to provide an improved apparatus for mounting paired rollers for movement or shifting relative to each other.

It is an object of the present invention to provide in particular, an offset printing machine or the like with an improved means for mounting a transfer roller for more effective "tripping" action with respect to the form cylinder and distributing roller.

It is another object of the present invention to provide shifting and tripping apparatus for paired rollers in which the rollers are moved relative to each other substantially along a radial path so as to obtain a more effective and instantaneous disengagement.

It is another object of the present invention to provide apparatus for movably mounting the transfer roller or the like of an offset printing press for selective tripping action with respect to a form cylinder in which the pressure between the roller and the cylinder can be maintained unchanged even after successive engagements and disengagements.

It is another object of the present invention to provide apparatus of the type described which is simple in construction, more economical to build, easier to use, and to maintain over a long period of time than similar apparatus known in the prior art.

SUMMARY OF THE PRESENT INVENTION

According to the present invention, apparatus is provided for mounting paired rollers in an offset press or the like, wherein form cylinder is mounted for rotation about its axis. The apparatus comprises a holder in which the ink roller is journalled for rotation about an axis parallel to the axis of the form cylinder. The holder has an inclined outer surface engaging a bearing member secured to the frame. The holder is reciprocally movable on the machine frame along a path radial to the axis of rotation. A rod is provided which extends slideably through the holder parallel to the radial path of movement and has stop means for limiting the relative upward or downward movement through the holder. The rod is provided with means by which it is reciprocally movable in response to the selected operation of the machine whereby it causes the holder to selectively move the ink roller journalled thereon into and out of engagement with the form cylinder and the inking distributor roll.

In the preferred form, the means for reciprocating the rod comprises a cam having an arcuate cam face movable in response to the selected operation of the machine. Engaging the cam is a resiliently mounted cam follower which is linked to the reciprocal rod so that rotation of the cam will effect reciprocation of the rod. The cam is provided with a contoured profile adapted to cause the rod to move between fixed positions defining the engagement or disengagement of the rollers.

Preferably, the ink roller has associated therewith ink distributing rollers, offset from the radial pair and located so as to be engageable by the movable ink roller independently and by the moveable ink roller in conjunction with the fixed roller. The included surface on the holder forms a cam which is provided in this situation with a contoured profile which affects this selective operation in proper sequence. In this embodiment, the apparatus is further provided with means for forcing the moveable ink roller transverse to the path of movement so as to contact the third roller under pressure.

The full details and a complete disclosure of the present invention follow herein, referencebeing simultaneously made to the accompanying drawings in which the preferred embodiments are shown.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a side elevational view partly in section from the interior of the printing machine taken in the direction of P of FIG. 2, and

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1.

Only so much of the conventional offset printing machine is shown as is necessary for a full understanding of the present invention. The offset printing press is, in general, the conventional type such as that illustrated and described in "Photo-Offset Fundamentals" by John E. Gogoli (McKnight and McKnight Publishing Co., Bloomington, Ill., 1960, pages 158 et seq.,) and commercially available as the "A.T.F. Chief Twenty Press". The actual printing implements, and the complete set of roller mechanisms have been omitted since they are not directly necessary for an understanding of the present invention and will be obvious to all those skilled in the present art.

The present drawings further illustrate only one end of the assembly of an inking unit. It is understood that each of the rollers, and form or printing cylinder, are symmetrically constructed and have similar axle ends and mountings at each of its ends. In according with the present invention, the mounting at both ends are preferably the same in order to maintain the symmetry

of design and function and to equalize stress forces. They may, however, be different if desired. Accordingly, it has been found necessary to only show the apparatus at one end of the printing press and thereby avoid unnecessary repetition and prolix.

Still further, the concept of the present invention may be applied to the mounting to other paired engaging rollers and the fact that the drawings and description disclose the mounting of an ink transfer roller, a distributing roller, and a form cylinder should not be taken as limiting in any way.

DESCRIPTION

Turning now to the drawings, the device as seen comprises an ink transfer roller **10** adapted to cooperate in contact with both ink distributing roller **12** and a form cylinder **14**. The form cylinder **14** is journalled in suitable bearings to rotate about its longitudinal axis and to be fixed in position with respect to the frame or other supporting member F of the offset printing machine. The distributing roller **12** may likewise be mounted for fixed rotation about its axis parallel to the axis of the form cylinder. The form cylinder and distributing roller are conventional in the art and are provided with suitable drive means for their rotation. The distributing roller may be mounted for oscillation along its axes. As noted earlier, only one end of these elements are shown in the drawings.

As seen in FIG. **2** the transfer roller **10** is also of conventional design, having a neck-down portion **16** and an axle **18** which of course extends from each end. The axle **18** is retained within a supporting bearing assembly, generally depicted by the numeral **20** which is adapted to permit rotation of the transfer roller about its axes and to carry and shift the roller into and out of engagement with both the distributing roller independently and the distributing roller and form cylinder simultaneously.

The bearing assembly **20** comprises an L shaped holder bracket **22** having formed in its horizontal or short leg a U-shaped pillow block **24** in which a ball or roller bearing assembly **26** is secured. The axle **18** extends through the center of the bearing **26** and is rotatable therein in known manner. A cover plate **28** fastened by screws **30** holds the bearing **26** in the pillow block **24**. The long leg of the L shaped bracket **22** is provided with a vertical bore **32** through which an elongated rod **34** slideably extends. The upper end of the rod **34** is surrounded by a collar **36** which is secured to the rod so that it abuts against the upper edge of the holder **22**. The lower end of the rod **34** is provided with a bifurcated pivot head **38** having a rectangular or squared upper shoulder edge. Surrounding the rod **34** between the fork **28** and the lower edge of the holder is a compression spring **40** of relatively strong rate which is adapted to normally urge the holder bracket **22** upwardly into a firm seat against the collar **36**.

The bearing assembly is secured to the frame member F or another supporting member of the machine by a shaft **42** which is secured to and extends transversely from the upper end of the L shaped holder **22** through an enlarged vertical slot **44** formed in the frame. As shaft **42** is capped by a nut and washer assembly **46** which fits over the slot **44** and which permits the shaft **42** to reciprocate within the slot while maintaining the holder **22** adjacent the frame surface.

The rod **34** is arranged to extend along a path between the center C of the form cylinder and the center O of the transfer roller and will reciprocate in this path. The reciprocation of the rod **34** will cause the holder **22** to carry the transfer roller **10** into and out of engagement with the form cylinder also along this radial path. The degree of pressure between transfer roller **10** and the form cylinder **14** in their engaging position is of course dependent upon the extreme position of the holder **22** with respect to the rod **34**. Extending through the collar **36** of the holder **22** is a set screw **48** which abuts against the extreme end of the rod **34**. The set screw is adjustable to vary the relative position of the rod within the holder and thus vary the degree of pressure exerted between the transfer roller on the form cylinder.

As seen in FIG. **1** the holder **22** is provided with an inclined or slanted fact **50** on the side opposite the distributing roller **12**. This incline provides the holder with a wedge shaped cam surface having a high face at its lower end and a low face at its upper end. Abutting against the face is a second adjustable set screw **52** within a bearing **54** mounted within the frame F. The set screw abuts against the incline face **50** and provides a fixed camming surface for the inclined face; thus, as the holder **20** is moved downwardly by the action of the rod **34**, the wedge shaped cam causes the transfer roller to shift transversely to the path of movement of the rod so as to cause it to engage with the distributing roller **12**. As the holder **22** moves further downwardly the pressure causing the transverse shift is somewhat relieved so that the transfer roller **10** will contact the distributing roller with a predetermined pressure and simultaneously contact the form cylinder **14**. The adjusting means for both the vertical movement and the swing movement of the roller can be fixed and maintained in the fixed adjusted position so that notwithstanding any number of engagements and disengagements the exact pressure of the roller **10** on the distributing roller **12** and the form cylinder **14** can be maintained and will remain unchanged.

As noted, the reciprocation of the rod **34** causes the holder **22** to reciprocate with respect to the frame F carrying with it the transfer roller **10** which successively engages the distributing roller **12** independently or the distributing roller **12** and the form cylinder **14** simultaneously. The upward movement of the rod **34** reverses this operation again in a step-wise fashion so that engagement between the transfer roller and the form cylinder can be broken before the disengagement of the transfer roller and the distributing roller. A feature of the present invention is the provision of means for reciprocating the rod **34** and thus actuating the movement of the holder and transfer roller. It will be understood that the mechanism may, if desired, be placed on either or both of the bearing assemblies of the transfer roller. It is generally necessary, however, at only one end, and may be automatically or manually operated in response to the operation of the press to effect the selective reciprocation.

The mechanism for reciprocating the rod **34** comprises a two-armed offset crank lever **56** pivotted at this center about a pin **58** which is itself journalled in the frame F. The crank lever **56** has an inner arm **60** extending upwardly toward and journalled in the forked head end **38** of the rod **34** and an outer arm **62** extend-

ing offset therefrom on the opposite side of the frame member F. Journalled on the outer arm **62** is a cam follower **64** which is rotatable about a retaining pin **66**. Secured to the retaining pin **66** is a tension spring **68** which is secured at its free end to the frame F of the machine. The crank lever **56** is formed so that its arms extend in a manner whereby the arcuate movement of the cam follower **64** will reciprocate the rod **34**. The spring **68** is adapted to have a spring rate in excess of the rate of the compression spring **40** so that the crank lever is normally biased inwardly. The cam follower **64** is adapted to abut against an arcuate cam member (or circular cam) **70** which is fixed to rotate about a bushing **72** secured to an extension of the axle **74** of the form cylinder. The bushing **72** or can **70** is provided with conventional mechanisms as a motor, lever, pull rods, or other devices whereby it may be rotated either automatically or manually about the center of the shaft axle **74** at the proper time and in the proper position during interruption or shut-down of the printing press. Such means are not shown in detail in the present description or drawings as they are conventional in nature and are also believed to be well known to those skilled in this art.

The arcuate cam has a cam face **76** which is profiled in five distinct stages I – V. As seen, state I comprises a notch or indented surface of smaller diameter relative to the cam. Stage II comprises an inclined portion rising from the lowest radius to a plateau extending into stage III. Stage IV is another inclined portion extending from the plateau of Stage III onto a surface comprising stage V which has the longest or highest radius.

Stage V is of such a radius that it causes the crank **56** to move the rod **34** radially inward toward the center C of the cylinder **14** so that the transfer roller **10** presses against both the form cylinder **14** and the distributor roller **12**. Stage III is of such radius that the transfer roller is only pressed inwardly against the distributing roller and is not engaged with the form cylinder. Stage I, on the other hand, is of such shallow radius that the rod **34** is caused to extend its greatest distance upwardly so that the transfer roller is neither pressed against the form cylinder nor against the distributing roller.

In operation, when the printing press is in its initial position or in its fully stand-still or inoperative position the cam **74** is placed so that the follower **64** rests at stage I and in the shallow indented portion of stage I. In this position, the crank lever **56** is caused to push the rod **34** to its extreme upward position, disengaging the transfer roller from both the distributing roller and the form cylinder. As the printing press is placed in operation, the arm **74** is rotated counterclockwise (as seen in FIG. 2) so that the cam follower **64** rides successively up through stages II, III, IV, and finally through stage V, thus causing the rod **34** to carry the holder **22** into sequential engagement first with the distributing roller independently and then with the distributing roller and the form cylinder simultaneously. The shifting or tripping off of the transfer roller from the form cylinder is effected by the reverse operation of the cam **74**. Should only a temporary interruption of the printing press take place, the cam is only shifted from stage V to stage III where the cam follower causes the upward movement of the rod **34** to a position where the transfer roller is disengaged from the form cylinder but continues to be engaged with the distributing roller. In this manner, the distributing roller and the transfer foller can be continued to be rotated so that the ink is evenly distributed and excess ink is disposed of without application to the form cylinder. Should a more permanent halt in the printing operation be desired, the cam is then rotated to stage I where the action of the crank lever **56** causes the rod **34** to be fully elevated thereby moving the transfer roller from engagement with the distributing roller itself.

The upward movement of the rod **34** causes the inclined surface **50** of the holder to continue its engagement against the set screw **52**, thus maintaining the constant pressure of the transfer roller **10** against the distributing roller **12** even though the transfer roller **10** moves vertically away from the form cylinder. It will be noted that the movement of the transfer roller **10** is substantially along a path coincident with the radius of the form cylinder. This arrangement insures that the rollers engage and disengage in substantial point contact or in a line tangent to the circumference of both the form cylinder and the transfer roller. This is of particular importance during the disengagement of the roller since a sharp, clean, and efficient break is effected reducing the possibility of depositing of any excess ink on the form cylinder and preventing any unnecessary rubbing or scraping against the form cylinder.

The device thus described provides numerous advantages, amongst which the fact that the ink transfer roller is as noted lifted perpendicularly from the surface of the form cylinder. A further advantage lies in the fact of selective tripping so that the transfer roller can be disengaged from the form cylinder without being disengaged from the distributing cylinder. Still a further advantage lies in the fact that during the movement of the transfer cylinder, the pressure between it and the distributing roller is maintained constant due to the operation of the set screw **52** and the circular configuration of the transfer and distributing rollers. It will also be observed that the present device provides a simple mechanism of very few parts both economical to produce and to maintain. Since there is virtually no wear in any of the parts of the bearing assembly, the device should have an extremely long life.

A number of modifications have been suggested, and a number of changes will be apparent to those skilled in the art. The present description and drawing are intended to illustrate the invention and not to limit it in any manner.

What is claimed:

1. Apparatus for mounting an inking roller with respect to a form cylinder mounted for rotation about its central axis and an ink distributing roller mounted parallel therewith comprising a supporting frame, a holder mounted for reciprocal movement on said frame along a path radial to the path of said form cylinder, said roller being journalled in said holder for rotation about its axis parallel to the axis to said cylindrical member, a surface inclined to the radial direction formed on the exterior of said holder, means mounted on said supporting frame and bearing against the inclined surface, an elongated guide rod slideably extending through said holder parallel to the radial path

of said holder, stop means limiting the relative reciprocable movement of said guide rod through said holder, and means for reciprocating said guide rod in response to a selected operation whereby said holder is caused to selectively carry said roller into and out of engagement with said form cylinder and said ink distributing cylinder.

2. The apparatus according to claim 1 wherein said means for reciprocating said rod comprises a cam moveable in response to the selected operation of said machine, a cam follower, resilient means urging said cam follower into contact with said cam, link means interposed between said cam follower and said rod for connecting said follower to said rod.

3. The apparatus according to claim 2 wherein said cam is provided with a contoured profile adapted to cause said guide rod to move said inking roller between a first position out of contact with said ink distributing roller and said form cylinder, an intermediate position whereby only said inking and ink distributor rollers are in contact and a second position where said inking roller is in contact with both said ink distributor roller and said form cylinder.

4. The apparatus according to claim 1 wherein said stop means comprises a collar secured to the end of said guide rod above said holder and a compression spring located below said holder normally urging said holder into resilient abutment with said collar, an adjustable screw extending through said collar and bearing against the end of said holder, a pin secured to the holder and extending transversely through a vertical slot in said frame and adjustable means for capping said pin through said slot thereby permitting reciprocal movement of said pin in said slot.

5. The apparatus according to claim 1, wherein said means bearing against said inclined surface comprises an adjustable screw member.

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