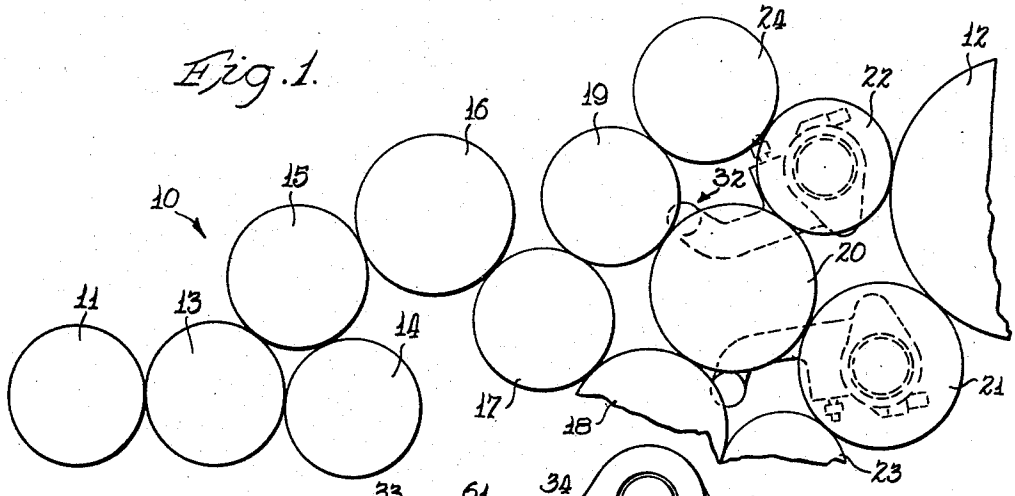
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INK ROLLER SOCKET

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Fig. 1.



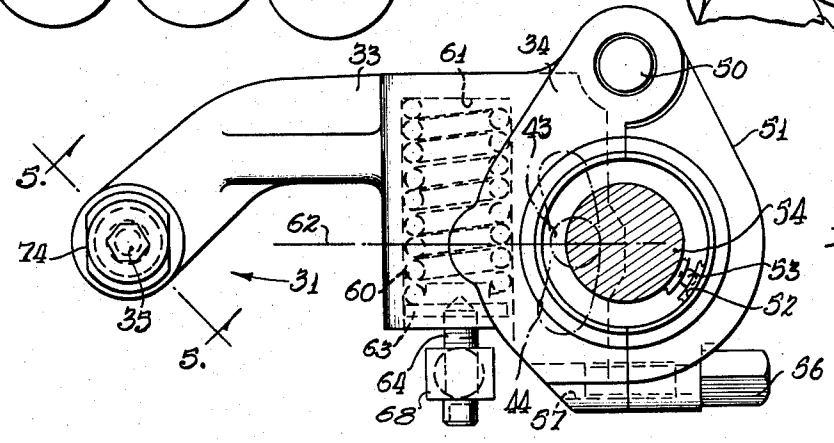


Fig. 2.

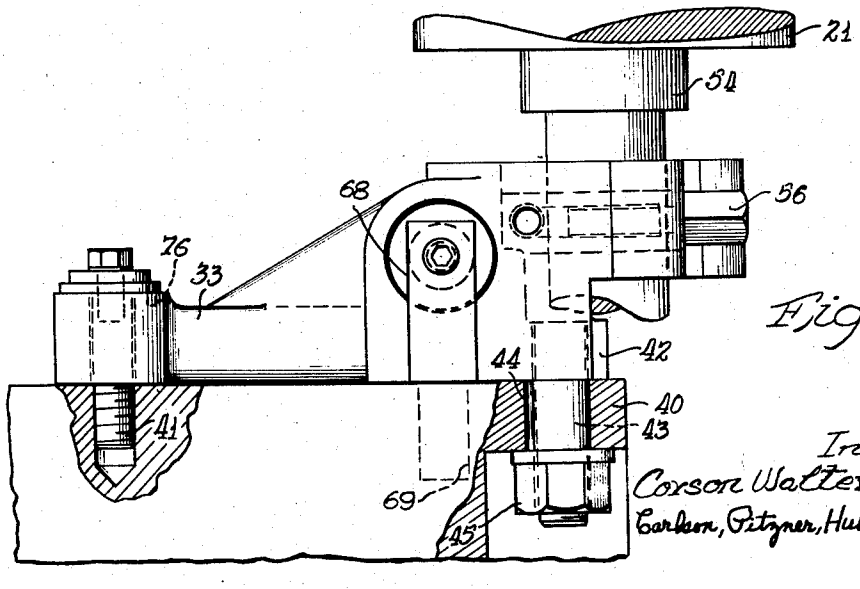


Fig. 3.

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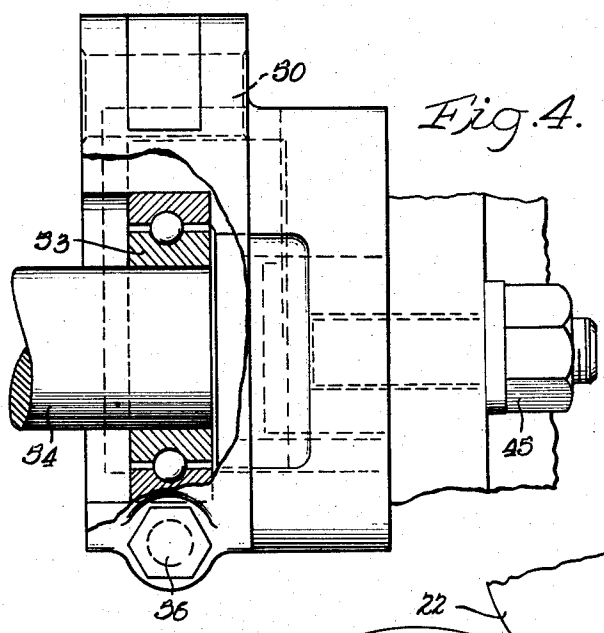


Fig. 4.

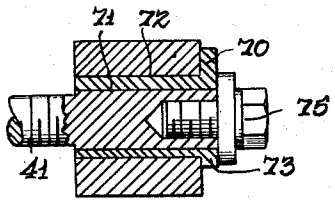


Fig. 5.

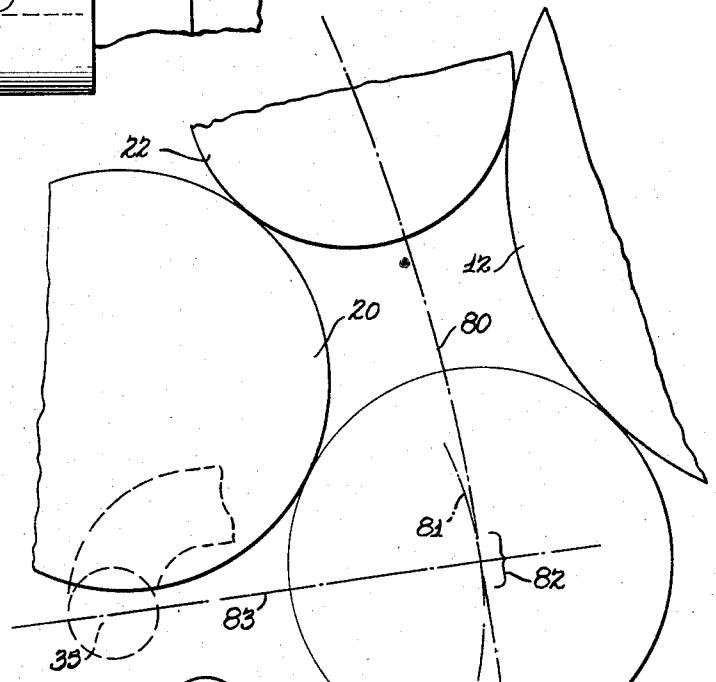


Fig. 6.

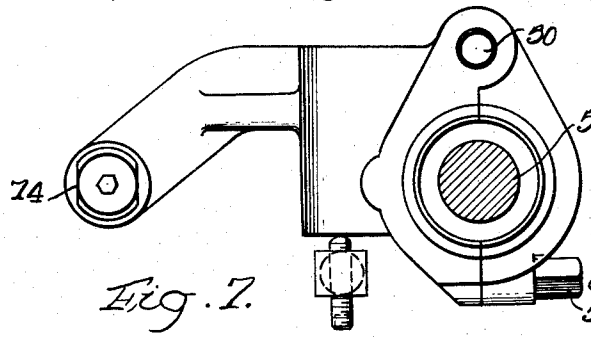


Fig. 7.

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2,915,009

INK ROLLER SOCKET

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Application February 18, 1955, Serial No. 489,090

3 Claims. (Cl. 101—349)

The present invention relates to printing presses and more particularly to means for mounting rubber rollers therein.

It is an object of the present invention to provide an improved ink roller socket which is more easily adjusted than conventional sockets and in which a single adjustment at each end of the roller is sufficient to cause the roller to bear with proportioned force against two separate cylinders. It is a related object to provide an ink roller socket which may be adjusted to bear with equal force against two cylinders and which once adjusted, maintains a balanced condition in spite of changes brought about by heat, ink absorption, or substitution of rollers.

It is another object to provide an improved ink roller socket, which is simple in construction, but which enables precise and independent adjustment of pressure and pressure balance at each end of the roller without requiring that unusually close tolerances be maintained in the construction of or mounting of the sockets.

It is a further object to provide a novel ink roller socket which positively guides the roller along a predetermined path of adjustment which is equidistant from two spaced cylinders and which may be either resiliently supported or positively clamped in position at the discretion of the press operator. It is a related object to provide an ink roller socket which is particularly suitable for mounting form rollers and which operates stably and without bounce or vibration, transferring an even film of ink to the printing plates regardless of the number of plates on the cylinder.

Finally, it is an object to provide an ink roller socket which is inexpensive to construct, which is easily mounted on new or existing printing presses, which permits rollers to be readily changed, and which requires no maintenance or readjustment even after long periods of use.

Other objects and advantages of the invention will become apparent on reading the attached detailed description and upon reference to the drawings in which:

Figure 1 shows an arrangement of inking rollers in printing press employing roller sockets for the form rollers constructed in accordance with the present invention.

Figure 2 is an elevation of one of the roller sockets shown in Fig. 1 on a larger scale.

Figure 3 is a bottom view of the roller socket of Fig. 2 and showing a section of the press frame.

Fig. 4 is a right hand end view of the roller socket of Fig. 2.

Fig. 5 is a section along the line 5—5 in Fig. 2.

Fig. 6 is a diagram showing the path of adjustment of a roller mounted in the socket shown in Figs. 2–4.

Fig. 7 shows a modified construction providing positive rather than resilient support for the roller.

While the invention has been described in connection with certain preferred embodiments, it will be understood that I do not intend to limit the invention to such embodiments, but intend to cover all modifications and

alternative constructions which are included within the spirit and scope of the appended claims.

Turning to Fig. 1, an ink roller arrangement indicated generally at **10** is fed by ink from a fountain roller **11** and applies a thin and even film of ink to the plates mounted on a plate cylinder **12**.

Included in the path of ink flow are a feed roller **13** and transfer rollers **14—16**, which supply a film of ink to a first ink drum **17**. Ink is taken from the ink drum **17** by additional transfer rollers **18, 19**, a portion of this ink film being conveyed to a second ink drum **20**. From the ink drum **20** the ink film is transferred to the plate cylinder by form rollers **21, 22**. Ink is additionally supplied to the form rollers by auxiliary cylinders **23, 24** respectively, which receive their ink supply directly from the rollers **18, 19** previously referred to. Following conventional practice the transfer rollers and form rollers are covered with rubber or the like and appropriate vibrating mechanisms (not shown) are provided for vibrating the ink drums **17, 20** as well as the auxiliary cylinders **23, 24**.

In carrying out the present invention the form rollers **21, 22** are mounted in sockets **31, 32**, respectively, which are hinged so that the rollers move bodily in arcuate paths of adjustment. As shown in Figs. 2–4, the socket **31** has an arm **33** and a generally semi-circular bearing receptacle **34**, the arm being pivoted for rotation about a pivot **35** having an axis parallel to the roller axis. The socket is mounted flatly adjacent the inside surface of the printing press frame, a section of which is indicated at **40** in Fig. 3. Pivoting takes place on a stud **41** which is screwed into the frame. For the purpose of anchoring the forward portion of the socket to the frame while permitting the socket to rock about the pivot, the mounting surface **42** of the socket is engaged by a threaded stud **43**. Such stud extends through an arcuate opening or slot **44** formed in the frame and has a nut **45** at its outer end.

Turning attention to the bearing receptacle **34**, a hinge **50** is provided at one edge thereof for mounting a cap **51**. Such cap is of generally semi-circular shape as shown, complementing the shape of the receptacle **34**. The receptacle and cap taken together provide a circular recess **52** for receiving an anti-friction bearing **53** supporting the shaft **54** of the ink roller. For the purpose of clamping the bearing in place, the cap **51** is provided with a clamping screw **56** which engages a registering threaded hole **57** in the bearing receptacle. To release the roller **21** it is sufficient to unscrew the screw **56**, permitting the cap **51** to be swung around to an out-of-the-way position about the hinge **50**.

In accordance with the present invention, means are provided for applying resilient pressure against the socket arm **33** so that the form roller **21** bears resiliently against the ink drum **20** and the plate cylinder **12**. In the present instance the resilient force is provided by a coil spring **60** which is nested in a bore **61** integrally formed in the socket arm **33**. Preferably such bore is arranged at right angles to a line **62** which interconnects the pivot **35** and the roller axis. Engaging the end of the spring **60** and telescoped a short distance inside the bore **61** is a disk-shaped pilot **63**. In order to adjust the pressure exerted by the spring **60**, a stationarily mounted adjusting screw **64** is provided. Such screw is mounted in a post **68** in the form of an eyebolt anchored in a hole **69** formed in the press frame.

Further in accordance with the present invention, the pivot **35** is arranged so that the roller axis follows an arcuate path approximately equidistant from the surface of the cylinders **12** and **20** in the range of adjusting movement. To obtain this condition with a high degree of precision, means are provided for adjusting the location

of the effective pivot point 35. For this purpose I prefer to use an eccentric bushing 70 (Fig. 5) having an off center bore 71 for engaging the stud 41 and having an outer surface 72 which fits snugly into a bore provided in the socket arm. The bushing has a collar 73 which is flatted as indicated at 74 (Fig. 2) so that the bushing may be bodily rotated by a wrench. The bushing and stud are held captive by a screw 75 threaded into the end of the stud 41. Adjusting the orientation of the bushing 70 causes the socket arm to be adjusted longitudinally over a limited range dependent upon the degree of eccentricity.

While the structure of the socket 31 has been described in some detail above, it will be understood that the socket at the other end of the roller 21 (not shown) is simply a mirror image. It will further be understood that the sockets mounting the form roller 22 correspond to those employed for mounting the form roller 21.

As a result of using the above construction, it is not necessary to use unusual care to control the position and alinement of the mounting studs 41 at each side of the press, and any minor departures from the desired position may be precisely compensated. It is well within the capabilities of a pressman to adjust the two bushings 70, using equal spring pressure at each end, so that the roller 21 creates equal flats along the cylinders 12, 20 over the entire length of the roller. After the adjustment is made the bushings 70 may be pinned in place in their respective arms 33 by pins 76.

The advantages of the present socket construction may be more fully appreciated by reference to the diagram in Fig. 6. In this diagram the numeral 80 represents the desired path of adjustment and is the locus of points lying equidistant from the surfaces of the cylinders 12 and 20. It is hyperbolic in form since the two cylinders have unlike diameters. Because of the present socket construction, the axis of the form roller 21 moves along an arcuate path 81. With the sockets mounted and adjusted as described, the arc of movement 81 of the roller 21 coincides with the path of adjustment 80 over a range 82 which may be called the "useful range of adjustment." It is found that in a practical case such useful range is on the order of ¾ inch and is sufficient to include the locus of all rollers having the same nominal diameter but different actual diameter due to manufacturing variations or the like. The range is sufficient, moreover, to include all positions of adjustment of such rollers, from heavy pressure to light.

Thus, once the roller sockets at each end of the roll have been adjusted by rotating the eccentrics to produce equal flats, the condition set forth in Fig. 6 is achieved and readjustment is not usually required over the life of the press. When a form roller is substituted by one having the same, or nearly the same, nominal diameter but different actual diameter, the spring compresses or expands slightly, automatically compensating for the difference in diameter, the spring rate being sufficiently low so that there is only negligible differences in actual pressure. The structure thus avoids the necessity for making a series of complicated and inter-related adjustments as necessary when using sockets of more conventional design.

In employing the above teachings, the diameters of the ink drum 20 and the plate cylinder 12, as well as the distance between them, are established. The present invention is not limited to any particular diameter of form roller and convenient values may be chosen to provide desired film forming characteristics, one of the form rollers being of somewhat greater diameter than the other as shown. A reasonable center-to-center distance of the socket arm is next chosen, the ideal distance being that which will produce approximately equal curvature for the curves 80, 81 (Fig. 6), at least over a wide range centered about the useful range 82. In the event that this requires a socket arm of undue length, a shorter, more convenient length may be used, without sacrificing the main advantages of the present arrangement, for example, a length producing a radius of curvature of approximately 7 or 8 inches.

Having established the length of the arm, the nominal position of the pivot 35 is next determined by constructing line 83 (Fig. 6) which is perpendicular to the desired path of adjustment 80 at the point representing the nominal radius of the roller 21, the pivot being marked thereon at the desired radius.

It is one of the features of the present device that two modes of operation are possible: the socket may be left floating as described or it may be solidly clamped to the press frame by the stud 43 and nut 45 (Fig. 3) while still providing for self-adjustment. Thus in order to compensate for changes in roller diameter caused by heat or ink absorption, the nut 45 is simply released momentarily which permits the roller to move away slightly into a new equilibrium position, after which the nut 45 may be retightened. Because of the above pivot mounting the ratio of the pressures remains the same, with the actual values of pressure being determined by the setting of the adjusting screw 64.

Since the prescribed adjustment of the pivot 35 assures a condition of pressure balance, it is possible to adjust the spring pressure even though the inking arrangement is retracted from the plate cylinder, for example, during the changing of plates in the case of a magazine press. The operator simply adjusts the spring pressure by turning the adjusting screw 64 at each socket until the required width of flat is produced on roller 20. The nut 45 is then screwed tight. When the rollers are again brought into engagement with the plate cylinder 12 prior to starting up the press, the desired width of flat will be automatically produced on the plate cylinder.

Although it is usually desirable to establish pressure balance between the form roller and the cylinders which it engages as described, it is one of the features of the present invention that unlike pressures may be established simply by rotating the eccentrics at the pivots 35 at each end of the form roller so that the sockets are offset by the same amount with respect to the central locus 80 in Fig. 6. This can be accomplished by an operator simply by adjusting for a desired ratio between the widths of the flats, and the ratio will not be substantially changed when other rollers having the same nominal diameter are substituted or upon making a change in spring pressure.

Since the upper socket 32 is assisted by gravity, it will generally be desirable to use a somewhat smaller spring in this socket than is used in the socket 31. Moreover, if desired, positive positioning of the roller sockets may be accomplished by omitting the spring 60 and by causing the adjusting screw 64 to bear directly against the socket arm as shown in Fig. 7. This, however, makes it necessary to readjust the screws at each end of the roller when a replacement roller is substituted, contrasted with the automatic take-up which takes place in the preferred embodiment mentioned above.

The present socket is particularly suitable for the mounting of rubber ink rollers, especially form rollers. Nevertheless, it will be apparent to one skilled in the art that the sockets may be used with advantage in the mounting of rigid ink cylinders. Thus in the following claims the terms "rollers" and "cylinders" are not necessarily limited to rubber covered and rigid elements respectively, and both are defined simply as rotating cylindrical elements.

I claim as my invention:

1. In a printing press, the combination comprising a frame, first and second cylinders spaced from one another, an ink roller engaging both of said cylinders simultaneously for transferring a film of ink from one to the other, a roller socket at each end of said roller, arms supporting said roller sockets pivotally mounted upon a common axis disposed parallel to the roller axis, said

pivot axis being so positioned relative to the axis of said cylinders that the roller is constrained to an arcuate path of movement which corresponds to a desired arcuate path of adjustment between the two cylinders, means anchored on said frame and resiliently bearing against said socket arms for urging the sockets and the roller mounted thereon into engagement with said cylinders, means including separate eccentrics at the pivot axes of the respective arms providing a small amount of endwise adjustment of said arms to equalize the pressure applied by said roller against the respective cylinders, and means for locking said eccentrics in adjusted position.

2. In a printing press, the combination comprising a frame, first and second cylinders supported on said frame in laterally spaced relation with their axes substantially parallel, one of said cylinders being of larger diameter than the other cylinder so as to define a hyperbolic locus of points equidistant from the surfaces of said cylinders, an ink roller adapted to engage both cylinders simultaneously for transferring a film of ink from one cylinder to the other, said supporting means including a pair of arms pivoted on said frame and having sockets adjacent their free ends journalling opposite ends of said roller, the pivots for said arms being located at the concave side of the hyperbolic locus, said arms each having a substantial radius with the arm pivot axis lying at right angles to said hyperbolic locus at the roller position so that the path of movement of the roller substantially coincides with said locus through a range corresponding to the useful range of adjustment required to accommodate variations in roller diameters.

3. In a printing press, the combination comprising a

frame, first and second cylinders of unlike radii laterally spaced from one another and defining a hyperbolic locus of points equidistant from the surfaces of said cylinders, an ink roller engaging both of said cylinders simultaneously for transferring a film of ink from one to another, a roller socket at each end of said roller, arms supporting said roller sockets pivotally mounted upon a common pivot axis disposed parallel to the roller axis, means anchored on said frame and resiliently bearing against said socket arms for urging the roller mounted thereon into equalized engagement with said cylinders, adjusting means on each of said arms for changing the effective length thereof through a small range, and means for locking said adjusting means to maintain said adjustment during operation of the press, said arms each having a substantial radius and having a pivot axis lying at right angles to said hyperbolic locus of points at the roller position so that the ink roller is constrained to an arcuate path of movement which coincides with said hyperbolic locus of points.

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