Jan. 26, 1965 E. W. WORTHINGTON ETAL 3,167,010

ADJUSTABLE PRESS ROLLER SOCKETS

Filed June 13, 1962 5 Sheets-Sheet 1

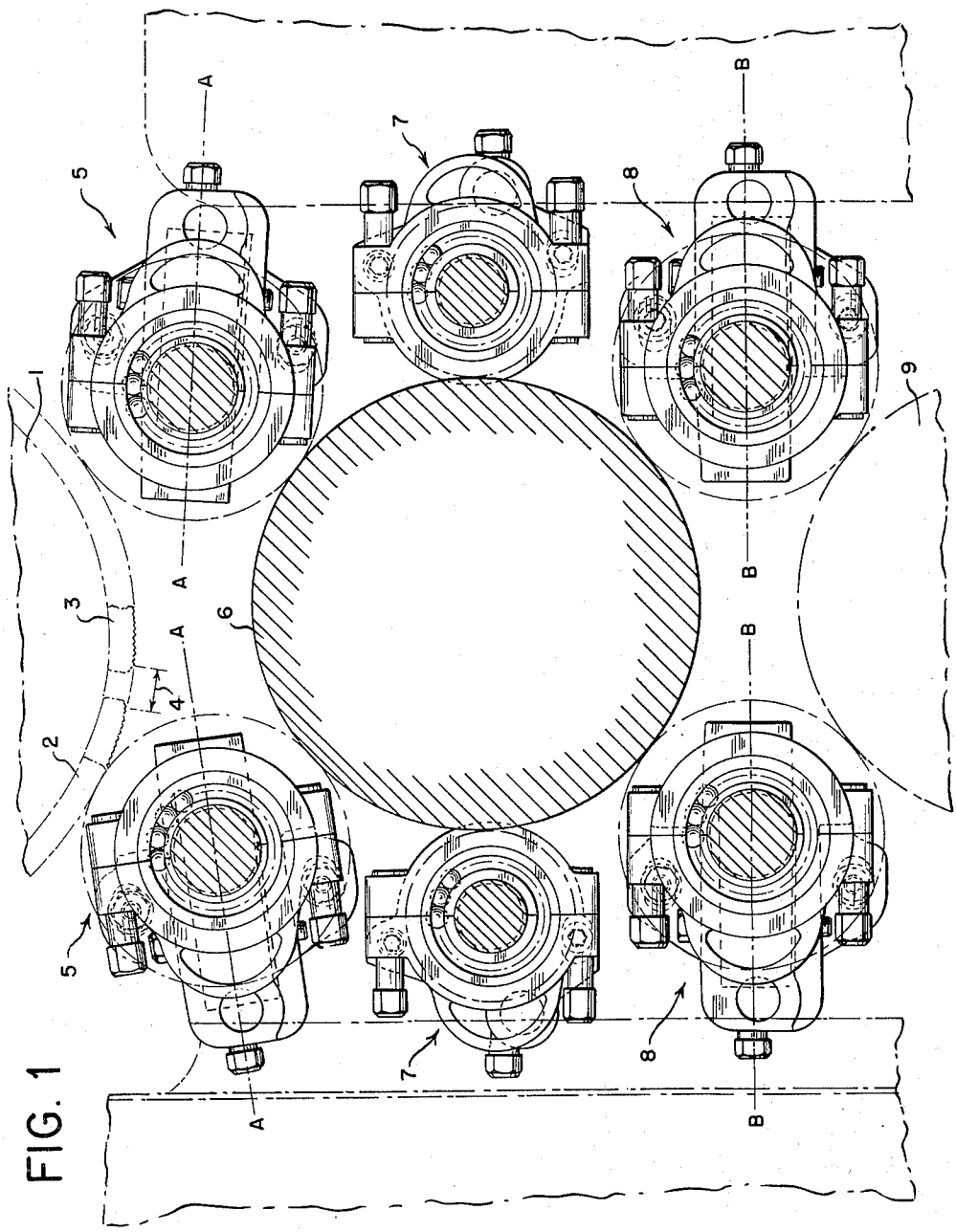

FIG. 1

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FIG. 2

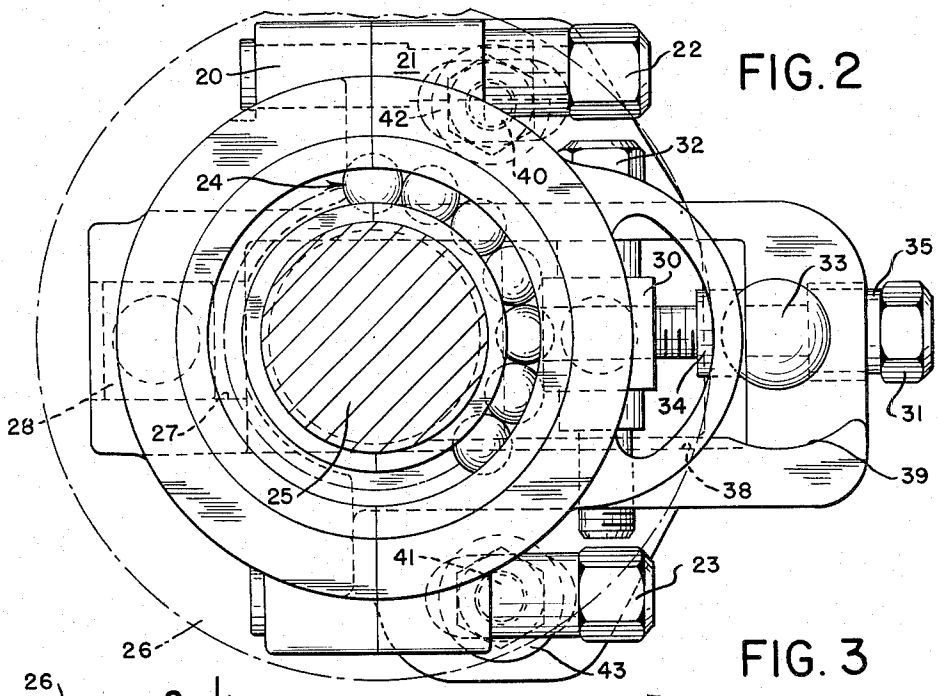

FIG. 3

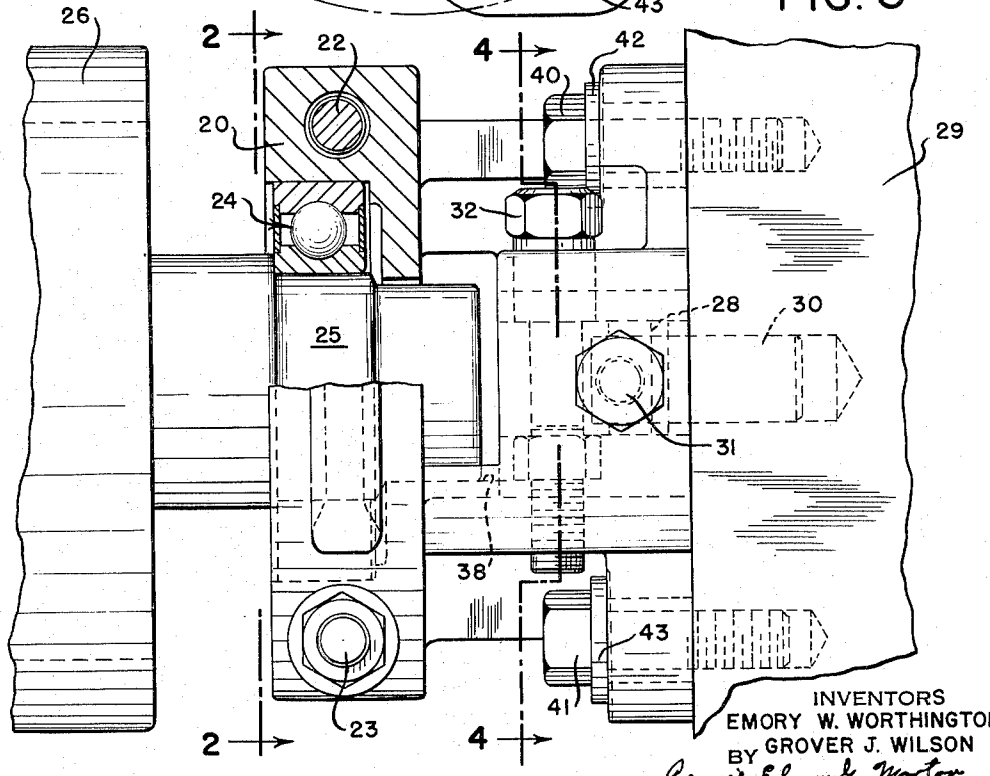

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FIG. 4

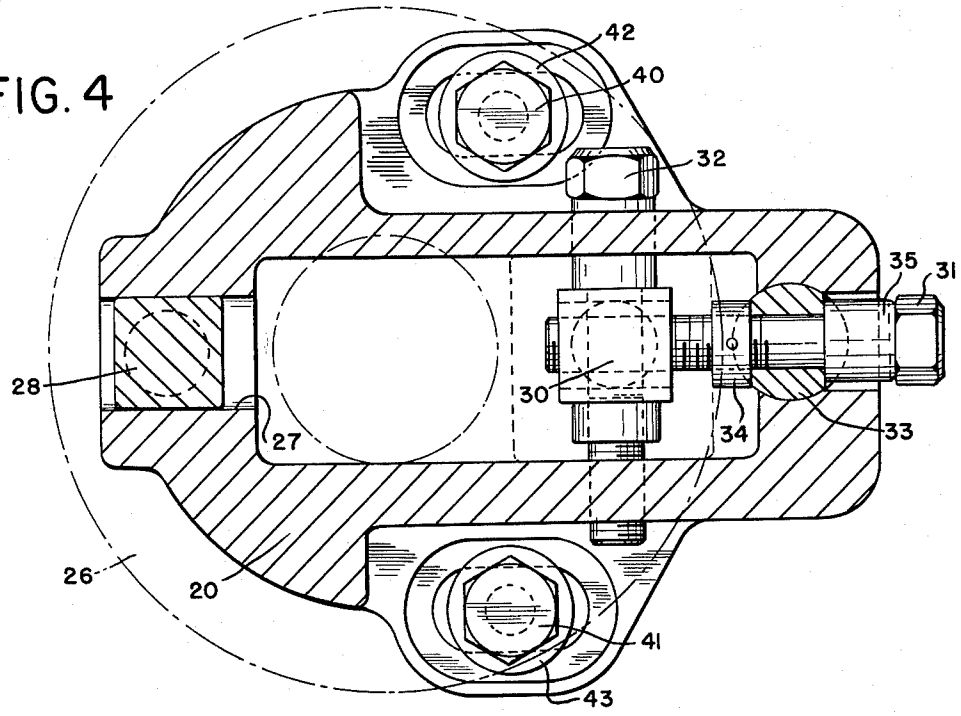
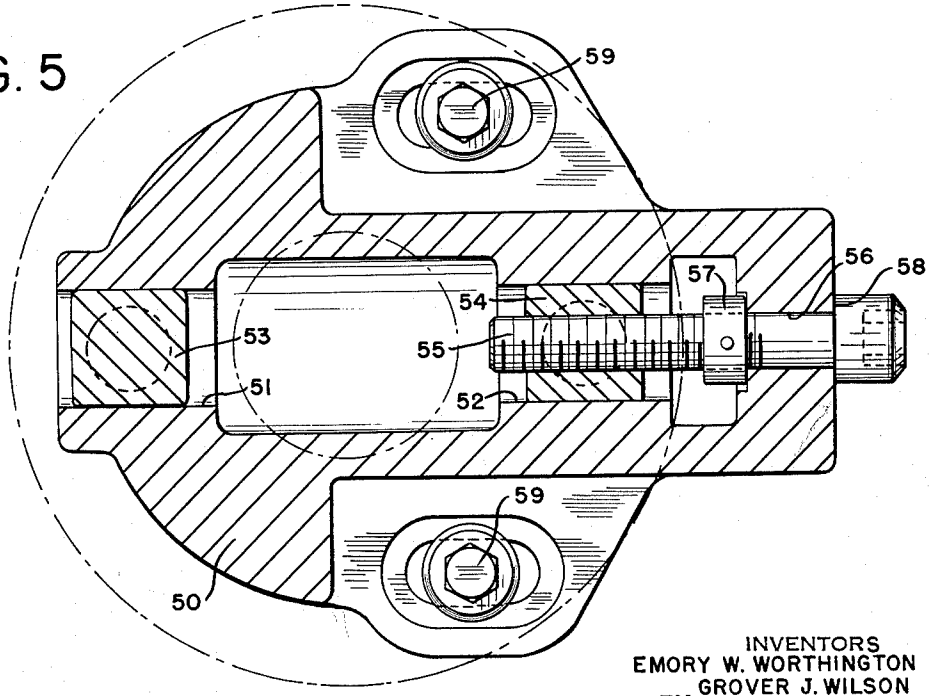


FIG. 5



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ADJUSTABLE PRESS ROLLER SOCKETS
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FIG. 6

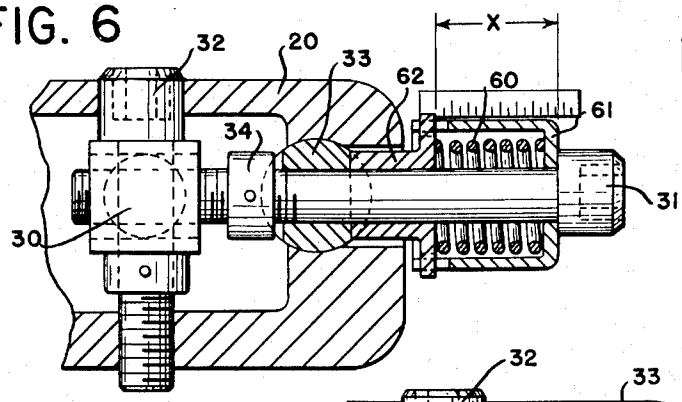

FIG. 11

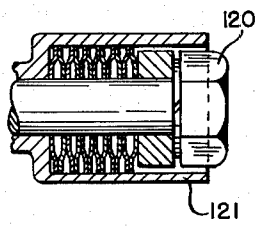

FIG. 7

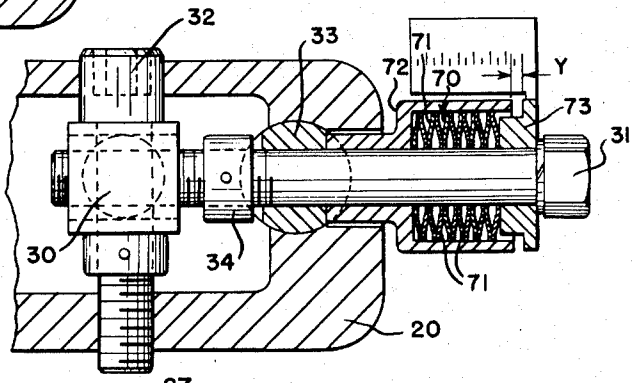

FIG. 8

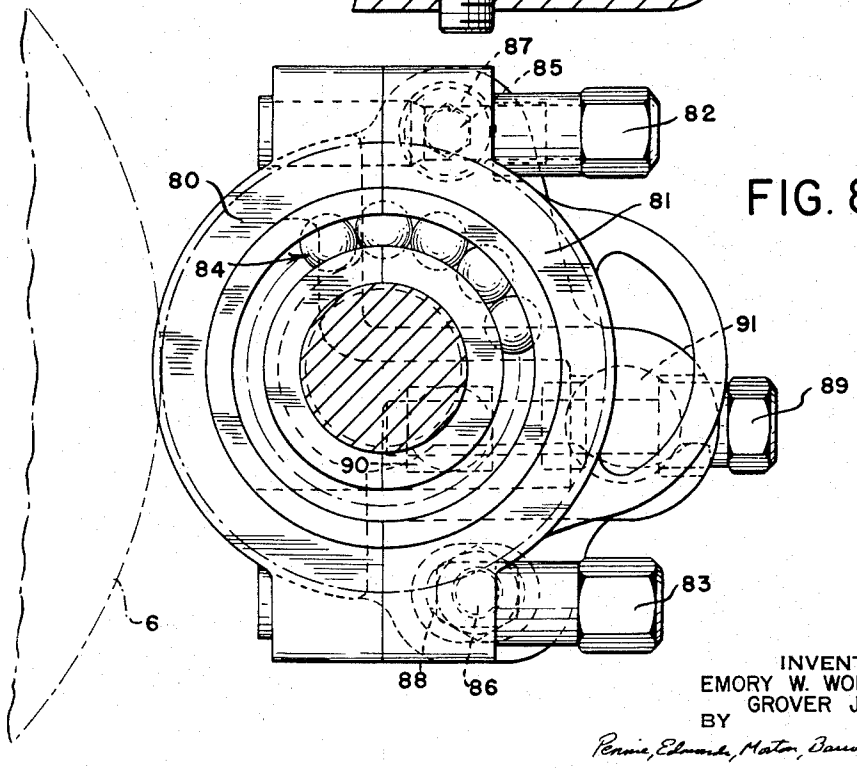

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FIG. 9

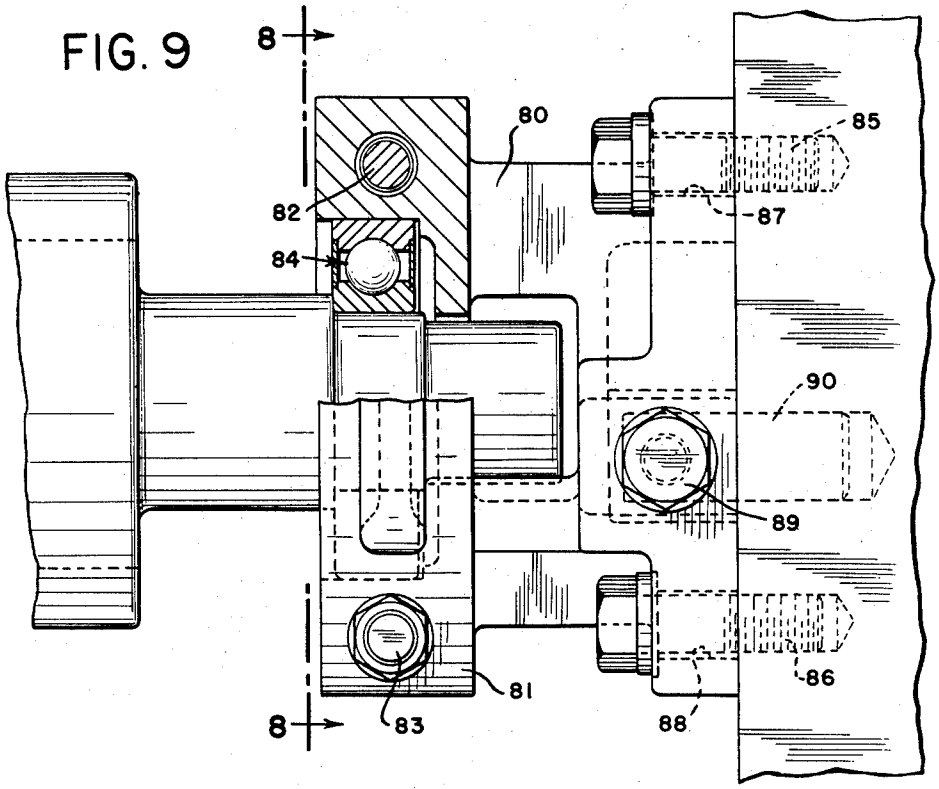
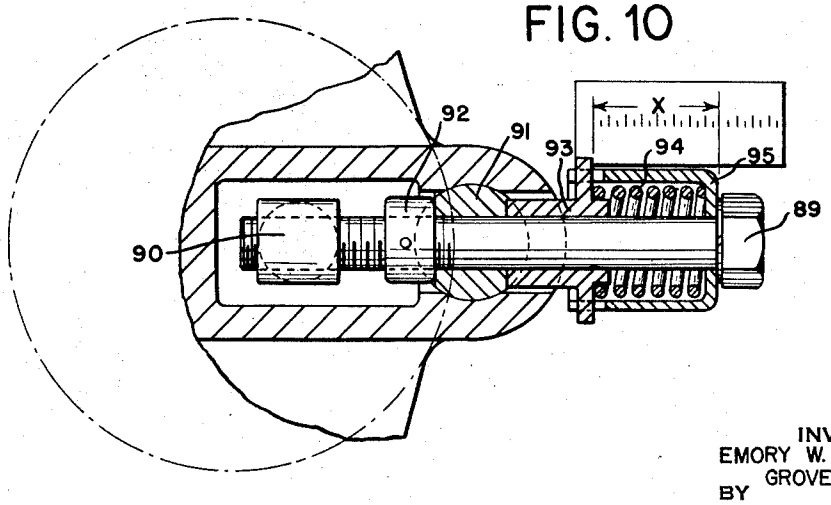


FIG. 10



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3,167,010

ADJUSTABLE PRESS ROLLER SOCKETS

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Filed June 13, 1962, Ser. No. 204,660
8 Claims. (Cl. 101—349)

This invention relates to adjustable press roller sockets and more particularly to roller sockets which may be moved with respect to the bed frame of a press. This application is a continuation-in-part of our application Serial No. 12,728, filed March 4, 1960, now abandoned, and entitled Adjustable Press Roller Sockets.

In conventional rotary type printing presses, ink is transferred to the plate cylinder on which the printing plates are mounted through a series of ink rollers and ink drums from a fountain roller which rotates in a bath of ink. The various ink rollers comprise form rollers which bear against the plate cylinder and an ink drum, distributor rollers which bear against an ink drum and which serve to distribute ink evenly over the drum, and transfer rollers which transfer ink from one ink drum to another ink drum or from a fountain roller to an ink drum. The amount of ink to be placed on the plate cylinder depends upon the pressure that the various ink rollers bear against the plate cylinders and ink drums. These ink rollers, which include the form, distributor and transfer rollers, are usually adjustable so that they may be moved towards or away from the plate cylinder and various ink drums which they may contact.

A difficulty which has existed in prior printing presses incorporating this type of ink regulation means has been one of maintaining precise adjustment during the press run and also of providing for easy, accurate adjustment of the various rollers. Previously the pressure between the various ink rollers and associated plate cylinder or ink drums was determined by means of slip sheets threaded between the rollers, plate cylinder and ink drums. The slip sheets comprised three layers of paper or other thin material wherein the middle layer was slipped between the two outer layers and the force necessary to slip the middle layer of paper was indicative of the force that the rollers contacted the plate cylinder and drums. The difficulty of this obviously complicated way of determining pressure was that it took two operators to slip the middle sheet between the outer sheets and then it still was not determinative of the exact force needed to slip the middle sheet as the two operators might have two different conceptions as to the amount of force necessary to slip the middle sheet.

Another method of determining pressure exerted by the ink rollers on the plate cylinder and ink drums was to thread in one sheet of paper, apply what was thought to be the correct roller pressure on the various rollers, then remove the roller pressure, remove the sheet and examine it for ink contact marks which would indicate that a particular pressure had been exerted by a particular roller. The problem raised by this method was that when the roller was reset without the paper, there would be no certainty that the roller would again bear against the ink drums or plate cylinder at the same pressure as when the paper was included.

After rollers have been in use for a while, they absorb ink and tend to swell which in turn will vary the pressure with which the rollers contact the plate cylinder or ink drums. This necessitates readjustment of the rollers to insure that the pressure between the rollers and drums or plate cylinder will be the same and consequently the above laborious steps in resetting the rolls to obtain proper roll pressure.

Further the form rollers which contact the plate cylinder in the prior art devices would tend to be thrown out of adjustment after a period of use. This is because as the rollers contacted the gap between the printing plates on the plate cylinder, they would be subjected to a pounding action which over a period of time would move the rollers with respect to the plate cylinder and thus vary their pressure.

It is an object of our invention to overcome the aforementioned difficulties adherent in the prior art devices by providing for an adjustable roller socket which may be securely clamped to the press frame by clamping means after the rollers have been set with the desired pressure against the various ink drums and plate cylinder. We further provide means whereby the rollers may be easily moved towards and away from the plate cylinder and various ink drums in order that the pressure may be easily regulated. Further we provide means which will automatically maintain the proper pressure of the various rollers against the various ink drums and plate cylinder when the clamping means are unclamped and which further will give a visual indication to the press operator of the force at which the various ink rollers bear against the associated ink drums or plate cylinder.

Broadly, we provide for a socket body which has therein a receptacle for receiving an end of the shaft of an ink roller. A lug is mounted on the press frame and a screw threaded to the lug. The screw in turn passes through a part of the socket body and operatively engages a portion thereof so that as the screw is rotated, it will cause the socket body to move with respect to the lug and press frame. Separate clamping means are provided whereby the socket body may be clamped securely to the press frame so that if there is a tendency for the screw to rotate because of vibration or other means, the socket body will not move with respect to the press frame. In addition spring means are provided between the screw and the socket body whereby the socket body will be urged away from the end of the screw at a predetermined force to position the roller into engagement with its associated ink drum or plate cylinder at a predetermined force when the clamping screws are unclamped.

In some embodiments of the invention, the socket body has therein a cutout or track which may engage another lug mounted on the press frame so that the body may move only in a predetermined direction when forced to do so by rotation of the screws or lug force of the spring when the clamping means are unclamped.

Referring to the drawings in which preferred embodiments of our invention are shown,

FIG. 1 is a sectional view illustrating contact of various ink rollers with a plate cylinder and ink drums of a press;

FIG. 2 is an enlarged side view of an adjustable socket shown in FIG. 1 and taken along lines 2—2 of FIG. 3 which may be adjusted in more than one direction;

FIG. 3 is a partial sectional front view of the adjustable socket shown in FIG. 2;

FIG. 4 is a sectional view of the socket shown in FIG. 3 taken along lines 4—4;

FIG. 5 is a sectional view of a slightly different socket than that appearing in FIG. 4 and adjustable in one direction;

FIG. 6 is an enlarged sectional view illustrating an automatic adjustment means;

FIG. 7 is a sectional view similar to FIG. 6 illustrating a different embodiment of an automatic adjustment means;

FIG. 8 is an enlarged side view of a portion of FIG. 1 illustrating an adjustable socket for a distributor roller;

FIG. 9 is a partial sectional front view of the adjustable socket illustrated in FIG. 8;

FIG. 10 is an enlarged sectional view illustrating the

automatic adjustment means of the socket of FIG. 8; and

FIG. 11 illustrates a slightly different adjustment means from that shown in FIG. 6 and FIG. 7 in that different measuring indices are used.

Referring to the drawings in which our invention is described in greater detail, 1 denotes in FIG. 1 a plate cylinder having thereon printing plates 2 and 3 separated by a gap 4. Plate cylinder 1 is engaged by form rollers denoted generally by 5 which in turn also engage an ink drum 6. Ink drum 6 is engaged by distributor rollers denoted generally by 7 and also by transfer rollers denoted generally by 8. Transfer rollers 8 in turn engage a second ink drum 9. In order that ink may be properly applied to the plate cylinder 1, it is necessary that the various ink rollers 5, 6 and 8 be adjustable towards and away from the drums and plate cylinder. Because, as shown in FIG. 1, the plate cylinder 1 is of greater diameter than the ink drum 6, the form rollers 5 would be adjustable along lines A—A so that pressure will vary equally against the plate cylinder and ink drum 6 as the rollers 5 are moved away or towards the roll gap.

Similarly distributor rollers 7 should move radially with respect to drum 6 in order that roll pressure may be varied along the length of the rollers 7. Because the ink drums shown in FIG. 1 are of the same diameter, transfer rollers 8 should be moved along line B—B which lies normal to the line connecting the centers of the ink drums. This will result in the same pressure being applied to drums 6 and 9 as the roller 8 is moved towards or away from the roll gap.

All of the rollers shown may be moved along other lines than the desired lines A—A and B—B in order to correct for any uneven pressure between the ends of the rollers or to overcome skew of the rollers.

Referring to FIGS. 2, 3, and 4, a two-way adjustment roller socket is illustrated which may be used as a roller socket for either of rollers 5, 7 or 8, but preferably the socket would be used with the form rollers 5 or transfer rollers 8. The roller socket comprises a socket body 20 which has mounted thereon a socket cap 21 held to the body by containing screws 22 and 23. The socket body 20 and socket cap 21 together form a receptacle for antifriction bearing 24 which in turn has mounted therein an end of shaft 25 of an ink roller 26. The body portion 20 in turn has a cutout 27 which forms a track into which a lug 28 may slide. Lug 28 in turn is rotatably mounted in the frame 29 of the press.

A second lug 30 is fixed into the frame 29 and has threaded into it a first screw 31. A second screw 32 extends at right angles to screw 31 and passes through the lug 30. The screw 32 has stops on either side of the lug and is threaded into the lower part of body 20. Screw 31 in turn passes through a rotatable insert 33 contained in the body portion 20 and has thereon a stop 34 which bears on one end of the insert 33. The screw 31 has a further bearing portion 35 which bears on the other end of insert 33.

It is apparent that as the screw 31 is rotated, it will cause the body portion 20 to move parallel to the track 27 and to slide along the lug 28. Screw 31 would be the adjusting screw rotated if the structure shown in FIG. 4 were the structure applied to the rollers 5 and 9 as shown in FIG. 1 and it were decided to move the rollers either along lines A—A and B—B. In the event that the rollers were slightly skewed or if for some reason it were decided to have an ink roller bear against either one of the ink drums or against an ink drum and plate cylinder with different forces, then screw 32 would be rotated to cause the body portion to pivot about the rotatable lug 28. In order to allow the slight pivotable movement about lug 28, insert 33 must be rotatable so that the body portion may so pivot.

The body portion further has a guide 38 so that when the cap 21 is removed, the roller may be moved out along the guide. A stop portion 39 on the guide serves as a stop to prevent the heavy roller from rolling off the guide when the cap is removed.

In order that the roller may be held firmly in position after it has been properly adjusted by means of screws 32 and 31, clamping screws 40 and 41 are provided which extend into the frame 29 of the press. Washers 42 and 43 serve as a bearing surface so that the screws 40 and 41 may securely force the body portion 20 into engagement with the frame 29 to prevent any slippage of the body portion and roller with respect to the frame. The clamping means disclosed is independent of the adjustment means so that in the event either of the screws 31 or 32 became loosened due to vibration, the socket body will not inadvertently move and thus throw the associated ink roller out of adjustment.

Reference is now made to FIG. 5 which discloses a positive one-way adjustable socket which has particular applicability to transfer rollers such as that shown in FIG. 1. The socket illustrated in FIG. 5 comprises a body portion 50 which has therein a cutout portion 51 which serves as a track or guide for lugs 53 and 54 which are fixedly mounted in the press frame. The lug 54 has threaded therein a screw 55 which passes through a bore 56 contained in the body. The screw 55 in turn bears on the body through stop 57 and bearing portion 58. In addition the body is provided with independent clamping screws 59 which are similar in all respects to the clamping screws illustrated in FIG. 4 and which are also independent of the adjustment screw 55.

Because lugs 53 and 54 are fixedly mounted in the press frame, body portion 50 may only move in one direction away from or towards the roll gap between adjacent ink drums depending upon the direction of rotation of the adjustment screw 55.

Referring to FIG. 6, an automatic adjustment means is illustrated whereby a socket may be automatically positioned when the clamping means are unclamped to impact a desired force on the ink roller with which it is associated. For convenience sake, parts which are identical to the structure illustrated in FIG. 4 are given like numerals. The automatic adjustment means comprises a compression spring 60 which is interposed between a spring cover 61 and a journal 62. The spring cover 61 in turn bears on the head portion of the screw 31 while the journal 62 bears upon the rotatable insert 33. Indices are provided for measuring the distance X as shown in FIG. 6 which corresponds to the over-all length of the spring 60 which in turn indicates the force with which the rollers engage the ink drum.

When the clamping means of the socket body are unclamped, spring 60 will urge journal 62, insert 33 and the body 20 away from the head of the screw 31 and so force a roller, the shaft of which is contained in the socket body, to bear against an ink drum, and/or a plate cylinder. The bearing force will be dependent upon the compression force on the spring. For example, if it is desired that the ink rollers bear against an ink drum at the amount of 5 lbs. per linear inch of rubber contact and the ink roller is 100 inches long, the total force urging the ink roller into contact with the ink drum must be 500 lbs. with the result that a force of 250 lbs. must be exerted on each socket body mounted on the two ends of the roller. In this case, a spring of 250 lbs. force would be utilized which force could be read on the indices giving the over-all length of the spring. In the event that a greater force were required in order to obtain a larger flat where the rubber ink roller contacts the drum, screw 31 would be rotated to compress the spring 60 until the larger figure were reached which again would be determined by reference to the over-all length of the spring.

Reference is now made to FIG. 7 in which a slightly different embodiment of the automatic adjustable means is illustrated and where, as in FIG. 4, similar parts have the same reference numerals. Instead of compression spring 60 as shown in FIG. 6, a Belleville spring 70 is

formed by a plurality of spring steel discs 71, the number of which can be selected to suit the condition of the roller size and the flat pressure required. The discs are surrounded by a journal 72 and bear against a stop 73 which in turn bears against the head of the screw 31. In this embodiment the strength or compressible force of the spring is determined by measuring by indices the distance Y which will reflect the compressible force of the spring.

Referring to FIG. 8, there is illustrated a roller socket which is particularly adaptable for use with a distributor roller such as that illustrated in FIG. 1. The socket comprises a socket body 80 and a socket cap 81 which is affixed to the body by means of screws 82 and 83. The socket body and cap form a receptacle into which fits an antifriction bearing 84 which in turn has therein one end of the center shaft of the distributor roller. The body portion is held to the press frame by means of clamping screws 85 and 86 which, after the roller has been properly positioned, are tightened to securely lock the socket body with respect to the press frame.

The screw 85 fits through a bore 87 contained in the body while the screw 86 passes through a groove 88 contained in the body. An adjustment screw 89 is threaded into a lug 90 which is fixed in the press frame. Screw 89 extends through a rotatable insert 91 contained in the socket body and bears on the insert 91 through an adjustable stop 92 and a journal 93. Compression spring 94 is positioned between journal 93 and a spring cover 95, all similar to that shown in FIG. 6, and bears on the head of screw 89.

As the screw 89 is rotated and when the clamping screws 85 and 86 are loosened, the socket body will be caused to pivot about screw 85. In order that the body may pivot about the screw 85, the groove 88 is included so that screw 86 may slide therein. The compression force of the spring is measured by indices over the distance X as set out in FIG. 6. It is seen that the embodiment shown in FIGS. 8–10 differs from that shown in FIGS. 2 and 3 in that the adjustment will only be in one direction rather than in two directions as shown in the prior embodiment. It is sufficient, however, that the adjustment only be in one direction when the socket is applied to a distributor roller since the roller only contacts one drum.

Reference is made to FIG. 11 which shows a different measuring means whereby the force with which the rolls bearing against each other may be readily measured by the sense of touch rather than the sense of sight. Often, it is desirable that measurements be made by touch rather than by reference to visual indicators. This is particularly true if the parts to be measured are located in inaccessible spots or in areas that are poorly lighted. By utilizing the construction as shown in FIG. 11, the bolt head 120 of the preloaded unit may be made so that it is normally flush with the spring cover 121 when the rolls bear against each other with the desired force. In the event that the rolls bear against each other with less than the desired force, the bolt head will protrude from the end of the spring cover as shown in FIG. 11 and in the event the spring is compressed too much, the spring cover will protrude with respect to the bolt 120. A person's sense of touch is extremely precise and it is possible to difference protrusion of a few thousandths of an inch by touch.

It is apparent that by using a roller socket constructed according to our invention, ink rollers may be adjusted with respect to one or more ink drums with a minimum of effort and a maximum of accuracy. It is further apparent that by utilizing our novel structure, the force with which the ink rollers actually bear upon the ink drums or plate cylinder, and the resultant flat of the rubber of the ink rollers may be easily determined by reference to the over-all length of the springs exerting the force urging the roller into contact with the drum. It is further apparent that our novel structure will provide a positive clamping means whereby the adjustable roller sockets may be locked to prevent a shift or change of position due to rotation of the adjustment screw caused by vibration of the running press.

We claim:

1. An adjustable press roller socket for an ink roller of a printing press having a frame, said socket comprising a socket body having mounting means therein for receiving an end of the shaft of said ink roller, a cutout in said body with one side of said cutout forming a track, a plurality of rectangularly-shaped lugs mounted on said frame with at least one of said lugs slidably engaging said track, clamping means positioned on opposite sides of said mounting means for locking said body to said frame to prevent movement of said body with respect to said frame, and adjustment means separate from said clamping means for moving said body with respect to said frame; said adjustment means including a screw positioned between said clamping means threadingly engaging one of said lugs and passing into a bore in said body with a portion of said screw operatively engaging said body so that as said screw is rotated, the body will be caused to move with respect to said frame.

2. An adjustable press roller socket according to claim 1 having in addition a single spring means interposed between said screw and said body to urge said body to move with respect to said frame in a direction parallel to said track; said spring means extending radially of said roller to the roller operating position.

3. An adjustable press roller socket according to claim 2 having in addition distance indicating means associated with said spring means whereby the length of said spring means may be determined to indicate the force with which said roller bears against another coacting roller in said press.

4. An adjustable press roller socket for an ink roller of a printing press having a frame comprising, a socket body for receiving an end of the shaft of said roller, a first lug rotatably mounted on said frame, a track in said body slidably engaging said lug, a second lug fixedly mounted on said frame, a first screw threadingly engaging said second lug, a rotatable insert contained in said body, said rotatable insert having a bore through which said first screw passes with a portion of said screw operatively engaging said insert, a second screw passing through said second lug, extending at right angles to said first screw and threadingly engaging a portion of said body, and clamping means separate and independent of said screws and lugs for clamping said body to said frame; said body being caused to rotate about the axis of rotation of said first lug when said second screw is rotated, said track being caused to slide along said first lug when said first screw means is rotated, and said clamping means when in the clamped position preventing movement of said body with respect to said frame independent of rotation by said first and second screws.

5. An adjustable press roller socket according to claim 4 having in addition spring means interposed between said first screw and said rotatable insert whereby said body is urged to move with respect to said frame in a direction parallel to said track.

6. An adjustable press roller socket according to claim 5 having in addition distance indicating means associated with said spring means whereby the length of said spring means may be measured to indicate the force with which said roller bears against another coacting roller in said press.

7. An adjustable press roller socket for a distributor roller of a printing press having a frame, comprising a socket body, said socket body being adapted to receive an end of the shaft of said distributor roller, a lug fixed to the frame of said press, a screw threadingly engaging said lug, a rotatable insert contained in said body with said insert having a bore therein through which said screw

passes with a portion of said screw operatively engaging said insert, a first clamping screw threaded into said frame and passing through a first opening contained in said body, and a second clamping screw threaded into said frame and passing through a second opening contained in said body; said adjustment screw when rotated causing said body to rotate about one of said clamping screws when the other of said clamping screws is unclamped.

8. An adjustable press roller socket for an ink roller of a printing press having a frame, comprising a socket body adapted to receive an end of the shaft of said roller, a lug mounted on said frame, at least one adjustment means including a screw threadingly engaging said lug and passing through said body with a portion of said screw operatively engaging said body, clamping means separate from any adjustment means for locking said body to said frame, said clamping means when in the clamped position preventing movement of said body with respect to said frame independent of rotation of said screw, a single pre-loaded pressure means for urging said socket body along a selected plane to the roller operating position when said clamping means is unclamped, and distance indicating means associated with said pre-loaded pressure means for indicating displacement of said pre-loaded pressure means to indicate the force with which said roller bears against another coacting roller in said press.

References Cited in the file of this patent

UNITED STATES PATENTS

1,381,948	Vandercook	June 21, 1921
1,658,588	Bechman	Feb. 7, 1928
1,974,987	Ginsberg	Sept. 25, 1934
2,048,366	Ball	July 21, 1936
2,540,525	Howarth et al.	Feb. 6, 1951
2,699,116	Harless	Jan. 11, 1955
2,860,579	Granger	Nov. 18, 1958
2,861,516	Harless	Nov. 25, 1958

FOREIGN PATENTS

1,196,587	France	Nov. 25, 1959