Oct. 27, 1931. H. C. SCHROEDER 1,829,189

INKING ROLLER

Filed March 12, 1928 3 Sheets-Sheet 1

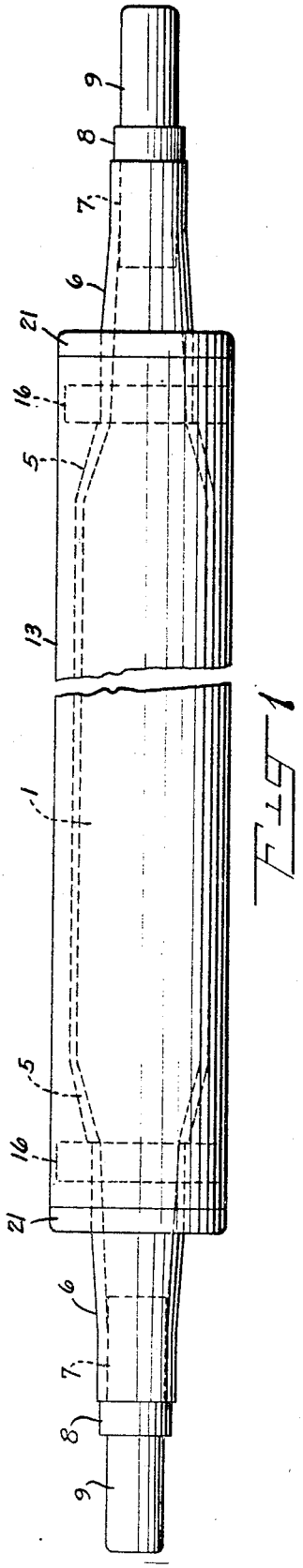


FIG 1

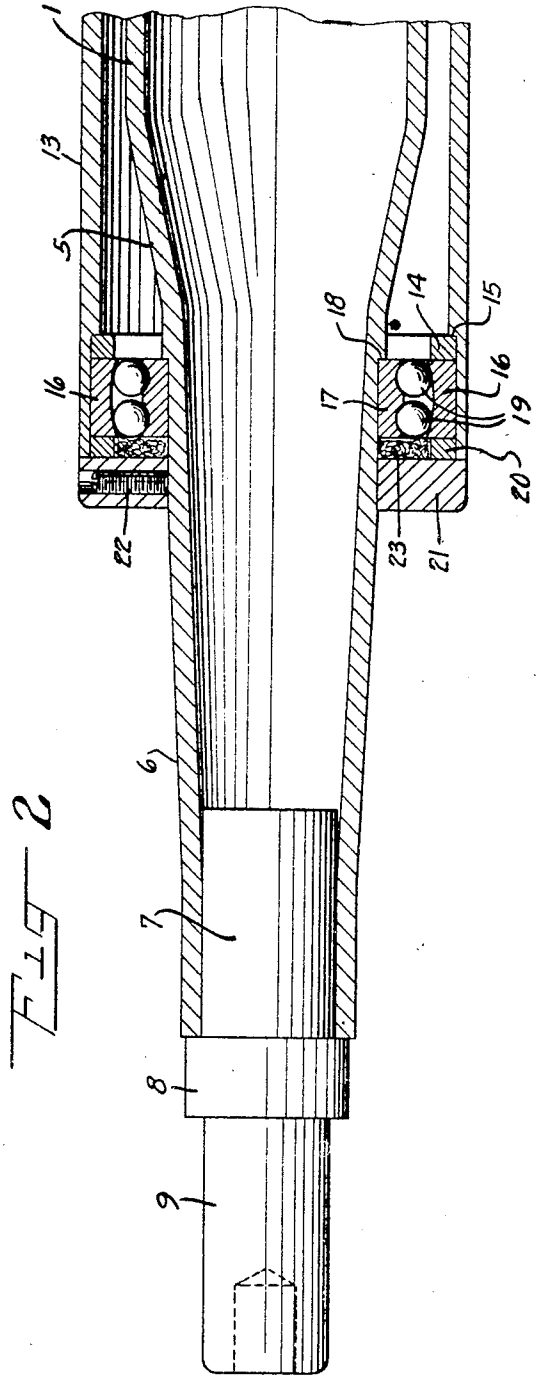


FIG 2

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INKING ROLLER

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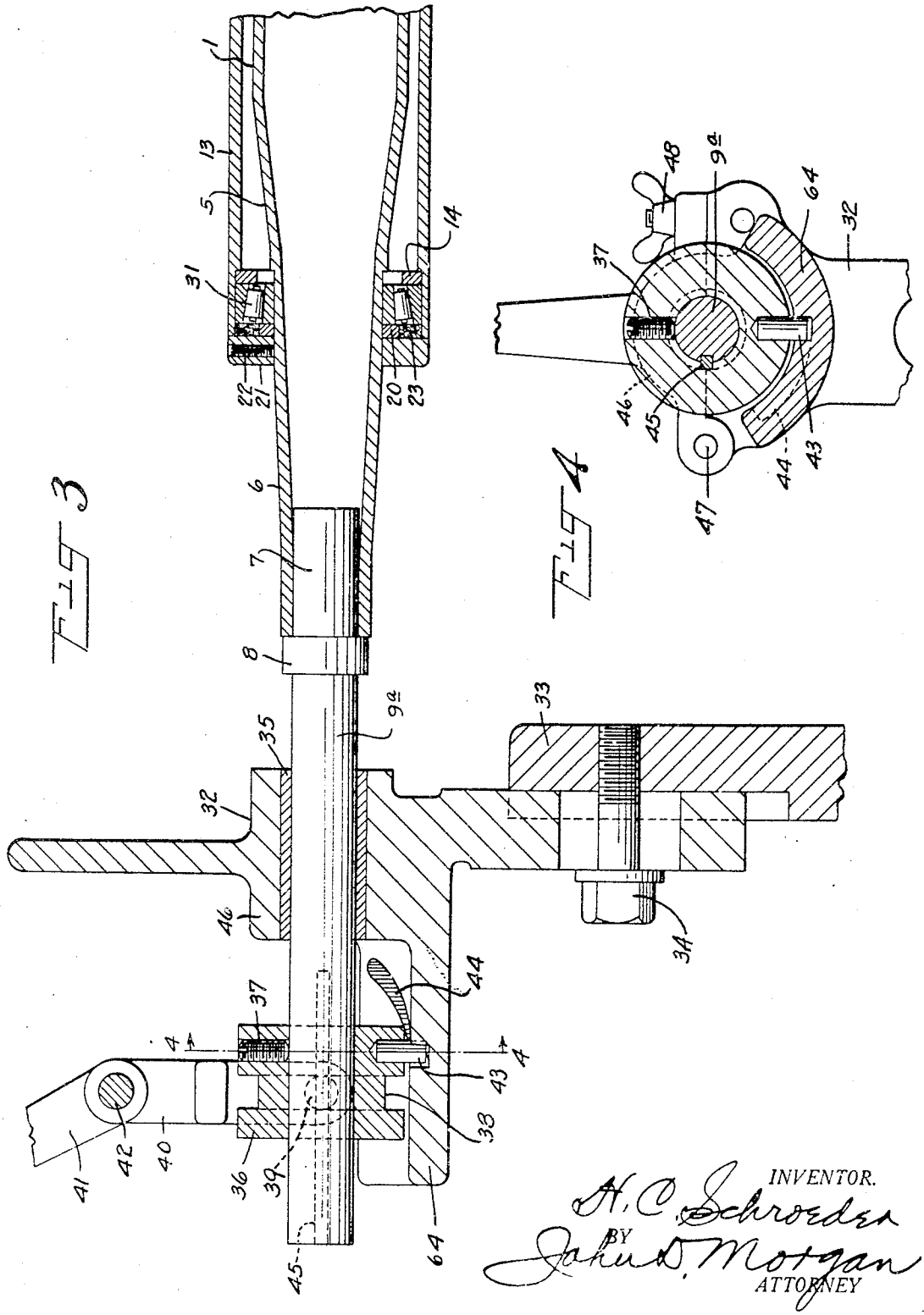



FIG 3

FIG 4

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INKING ROLLER

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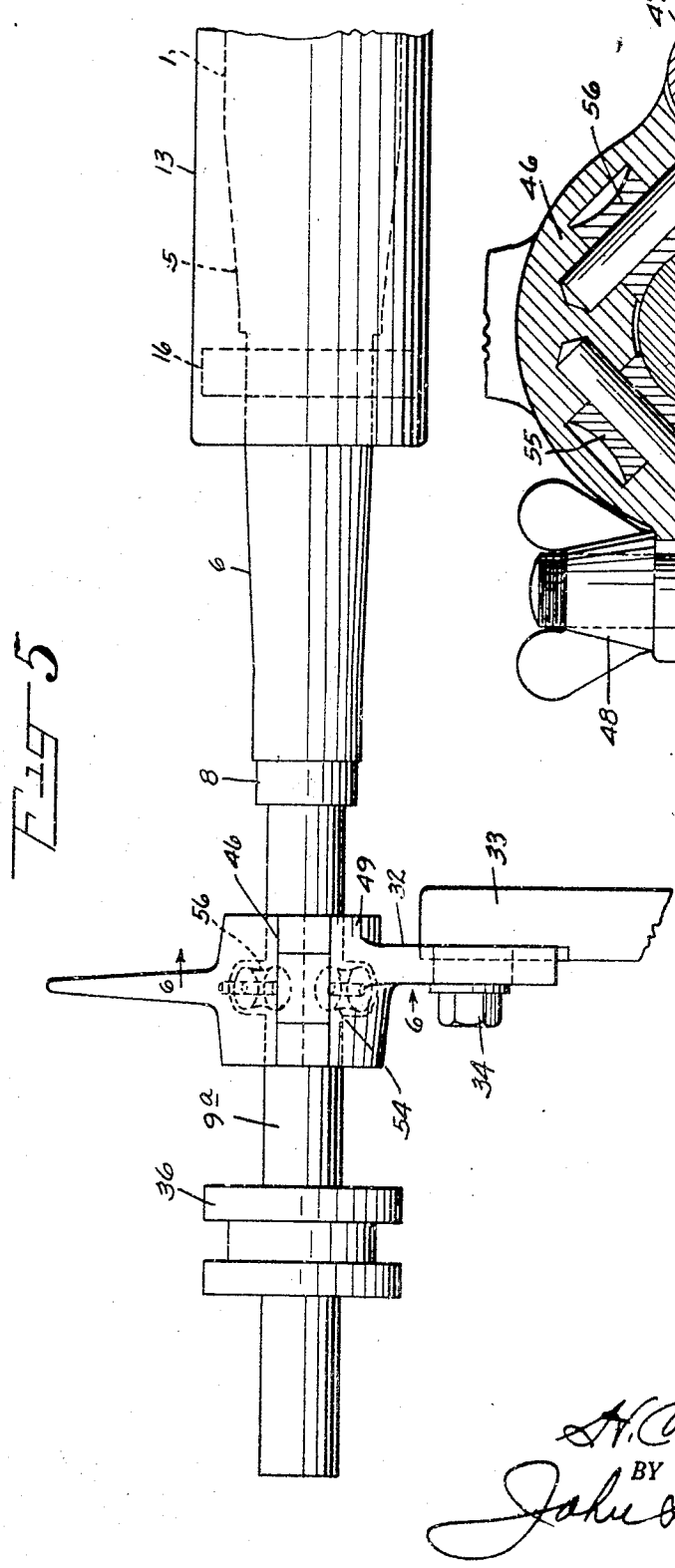



FIG 5

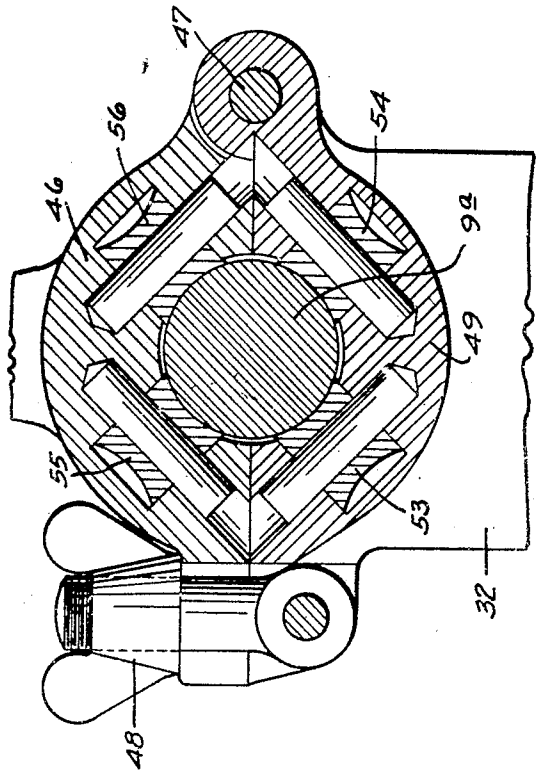



FIG 6

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Patented Oct. 27, 1931 1,829,189

# UNITED STATES PATENT OFFICE

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## INKING ROLLER

Application filed March 12, 1928. Serial No. 260,979.

The invention relates to new and useful improvements in the construction and mounting of inking rollers for printing presses, although in certain of its aspects the invention has wider uses where similar conditions and requirements exist.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, construction, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:—

Fig. 1 is an elevation of an inking roller embodying the invention;

Fig. 2 is a fragmentary, longitudinal section, on an enlarged scale, corresponding to the left-hand end of Fig. 1;

Fig. 3 is a fragmentary, sectional view showing the invention embodied in a vibrating ink roller;

Fig. 4 is a full transverse section on line 4—4 of Fig. 3;

Fig. 5 is a fragmentary elevation of a modified form of bearing mechanism; and

Fig. 6 is an enlarged transverse section on line 6—6 of Fig. 5.

The invention is directed principally to providing a construction for inking rollers of printing presses and the like wherein requisite or desirable relative lightness of structure, together with great rigidity and uniformity of structure are required, and exact and uniform surface contact over the entire exterior cylindrical surface of the roller are essential.

The operation of distributing and preparing the ink for application to the plates of rotary printing presses, and especially rotary presses wherein a very high class of printing is required together with the highest speed consistent with such quality is very difficult and exacting. Modern presses are of great width, and the inking rollers can be supported only at their ends, and the permissible or possible weight of the rollers is very definitely restricted. It is therefore essential to secure a structure having the requisite degree of lightness, and which at the same time is extremely rigid so that there is no flexure or variation in the length of the roller, and especially no tendency towards sagging, even in the central part thereof. That is, the ink distributing and applying action must be exactly uniform over the entire cylindrical inking surface of the roller.

In carrying out the main purposes of the invention also, it is desirable to provide a roller of hollow cylindrical form mounted by ball bearings upon a stationary tubular shaft, which shaft is provided of such form as to provide the greatest degree of rigidity possible with the amount of material employed, and also to provide room for the bearings upon the exterior thereof.

The invention as embodied, broadly comprises a hollow inner supporting member which is medianly of maximum diameter and is diminished outwardly toward either end, taperingly or otherwise. The median portion of this support is within the cylindrical rotatable roller member, and ball bearings are interposed between the rotatable roller and the inner portions of the decreased ends of the support. Thus in the median, unsupported structure the materials are disposed so as to provide the maximum rigidity and resistance to distortion. In the relatively small ends of the supporting member are mounted pintles, which provide strong and compact bearings for the entire structure.

The foregoing general description, and the following detailed description as well, are illustrative and exemplary of the invention, but are not restrictive thereof in so far as it is novel.

The accompanying drawings illustrate, by way of example, the present preferred embodiment of the invention, which realizes the advantages described. The central or

non-rotating supporting part of the roller, which may be conveniently termed the shaft, comprises a central cylindrical portion 1. This central portion is preferably of very large diameter so as to provide the greatest resistance possible against sagging, flexure or other distortion in the central portion of the relatively long reach of the roller, and with this in view this tubular portion 1 occupies most of the interior space within the enclosing rotatable tubular roller structure. Toward either end thereof, beginning within the outer, rotatable tubular member, the tubular shaft 1 is tapered gradually decreasingly outwardly, although not necessarily regularly, as shown at 5, and terminates at either end in portions 6 of least diameter.

To provide strong and compact supporting portions at the extreme ends of the roller structure, there are fitted into the interior of the respective ends 6 of this shaft or supporting structure two solid pintles or shaft ends 7, which form a tight fit therewithin. Each pintle 7 is provided with a projecting shouldered collar 8, which fits snugly against the outer end of the reduced end 6 of the tubular shaft 1. The pintles 7 have cylindrical exterior end portions 9, which may be shaped and otherwise adapted for any kind of support desired. The exterior of the rotatable roller member 13 is usually covered with a composition or material suitable for inking, or such other ues as the roller may have.

The rotatable roller body comprises a hollow cylinder 13, enclosing the enlarged central portion 1 of the supporting shaft or structure, and at either end thereof the roller is rotatably mounted on a ball bearing, which bearing is mounted on the reduced portion 5 of the tubular shaft. As exemplarily embodied, a retaining thrust ring 14 is snugly fitted against a shoulder 15 formed on the interior of the roller 13, and a ball or race ring 16 is fitted snugly within the roller 13 and against the thrust ring 14. An interior ball race ring 17 is fitted against an exterior shoulder 18 formed on the exterior of the tapered portion 5 of the inner tubular shaft, and suitable balls 19 are interposed between the two ball rings in a customary manner. An exterior retaining ring 20 is tightly fitted against the exterior side of the ball ring 16, and a flat, apertured annular cap plate 21 fits over the ball race, abuts closely on the end of the tubular roller 13, and closely encircles the portion 5 of the tubular shaft. This retaining plate is held in position in any manner desired, as for instance as by a clamping screw 22. A felt washer 23 may be employed as a lubricant retaining device within the cap plate.

In Figs. 3 and 4 the invention is shown applied to a vibrating inking roller. In this form the anti-friction bearings between the tubular supporting core and the rotatable shell are preferably roller thrust bearings 31, which may be of any known or other suitable form. One of the pintles 7 of the tubular support has its cylindrical bearing end $9^a$ of a relatively elongated form. This pintle $9^a$ has a bearing in a support 32, which support is variably positionable upon a frame member 33 by suitable means, such as a bolt and slot connection 34. The pintle $9^a$ is preferably provided with a bushing 35 within the supporting member 32.

For the purpose of effecting light and easy longitudinal reciprocation or vibration of the roller, means for longitudinally reciprocating or vibrating the inking roller, comprises a collar 36 fixed on the shaft $9^a$ by any suitable means, such as a clamping screw 37 threaded into the collar and engaging the shaft. The collar 36 is provided with an external annular cam groove 38. Into this groove projects a pin 39 fixed on an arm 40 of a vibrating lever 41, which lever is pivotally mounted at 42, on any suitable part of the machine frame. The lever 41 is rocked in a known manner through a slight arc of movement by any known or suitable mechanism. There is thereby imparted a slight longitudinal reciprocatory movement to the shaft $9^a$ and the tubular support 1, and this is imparted through thrust bearings 31 to the roller shell 13, the latter being thereby free to rotate on the support 1, but moving with it in the desired vibratory movement for effecting the ink distribution.

Means are also provided for effecting a slight to and fro rotary movement of the shaft $9^a$ conjointly with the longitudinal vibration already described. In the embodied form of said means, a pin 43 is fixed in the collar 36 and projects into a cam groove 44, formed in a curved extension plate 64, which is preferably integral with the supporting member 32. To insure the short rotary reciprocatory movement being imparted to the shaft $9^a$ and the support 1, there is preferably provided a key 45 between the shaft $9^a$ and the collar 36. The bearing is preferably a split bearing, and the upper part 46 may be hinged at one side at 47 and have a lock nut 48 at the other side. Thus the roller is readily removable and replaceable in its bearings.

In Figs. 5 and 6 a modified form of anti-friction bearing is provided, wherein the shaft of the roller is not partially rotated during its reciprocatory movement, but reciprocates without turning in an anti-friction bearing at either end of the shaft. As embodied, the lower half 49 of the split bearing is provided with two anti-friction rollers 53 and 54, journaled in the half-bearing 49, the rollers being curved to conform to the shaft as shown in Fig. 6 and with their axes perpendicular to shaft $9^a$. Two like anti-friction rollers 55 and 56 are similarly journaled in the

upper hinged half 46 of the bearing. The four rollers are in contact with the reciprocable shaft $9^a$, but otherwise the bearing is out of contact with the shaft. This constitutes an anti-wear bearing which carries the reciprocatory pressure of the shaft.

It will be clear, of course, that with this bearing, and more especially with the form shown in Figs. 3 and 4, a partial rotation, either reciprocatory or uni-directional, is imparted from time to time to the shaft $9^a$, thereby decreasing the resistance to the endwise reciprocatory movement, or vibration, of the roller. At the same time such a mounting serves also to distribute any possible wear. This is likewise true with respect to the other forms shown. With the mechanism shown in Figs. 3 and 4, if desired, an angular change of position may be readily effected by unscrewing and rescrewing the clamping screw 37.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. An inking roller or the like including in combination an inner stationary tubular supporting member having its median portion of maximum diameter and its ends decreasing outwardly, a tubular roller medianly enclosing said supporting member, ball bearings mounted on said decreased tubular parts of the supporting member and within the ends of the tubular roller, and solid pintles fitted within and projecting from the hollow ends of said supporting member.

2. An inking roller or the like including in combination an inner stationary tubular supporting member having its median portion of maximum diameter and its ends decreasing outwardly, a tubular roller medianly enclosing said supporting member, ball bearings mounted on said decreased tubular parts of the supporting member and within the ends of the tubular roller, and solid supporting members fixed to the diminished ends of said supporting member.

3. An inking roller or the like including in combination an inner stationary tubular supporting member having its median portion of maximum diameter and its ends gradually decreasing outwardly, a tubular roller medianly enclosing said supporting member, and ball bearings mounted on said decreased tubular parts of the supporting member and within the ends of the tubular roller.

4. An inking roller including a tubular supporting member having a relatively large diameter in a median portion and a lesser diameter near the ends, a tubular member enclosing the median portion and having anti-friction bearings on said portions of lesser diameter.

5. An inking roller including in combination an inner tubular supporting member, a tubular roller medianly enclosing said supporting member, and anti-friction thrust bearings therebetween, said supporting member having its median portion between said bearings enlarged and substantially filling the hollow portion of the roller.

6. An inking roller including in combination an inner integral tubular supporting member, a tubular roller medianly enclosing said supporting member, and anti-friction thrust bearings at either end of the tubular roller between the roller and tubular supporting member, said supporting member having its median portion between said bearings enlarged and substantially filling the hollow portion of the roller.

In testimony whereof, I have signed my name to this specification.

HANS C. SCHROEDER.