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Abendroth et al.

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[54] **INK FOUNTAIN IN AN INKING MECHANISM FOR PRINTING MACHINES**

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[52] **U.S. Cl.** **101/365**

[51] **Int. Cl.** **B41f 31/04**

[58] **Field of Search** 101/365, 350, 363

[56] **References Cited**

UNITED STATES PATENTS

3,013,489	12/1961	Moser et al.	101/350
1,574,474	2/1926	Faltus	101/365
2,140,950	12/1938	Blackley	101/365
984,913	2/1911	Hayes	101/365
2,583,640	1/1952	Faeber	101/365

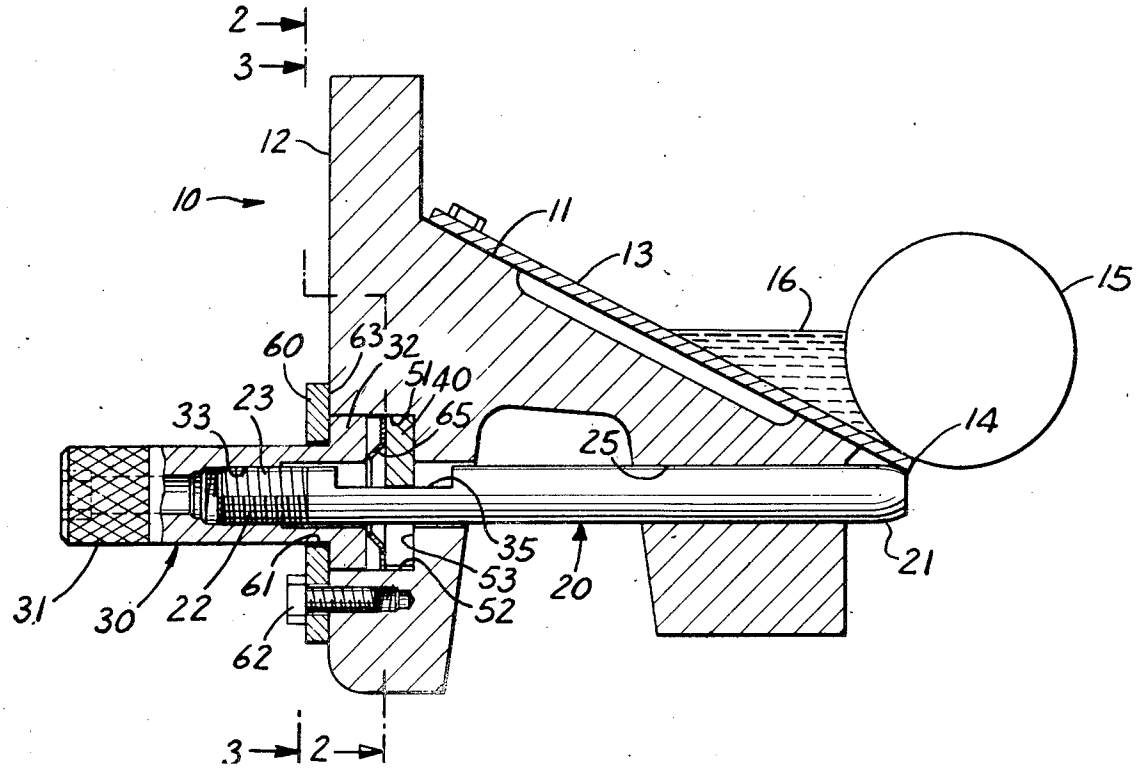
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[57] **ABSTRACT**

An ink fountain having a fountain roller and cooperating blade, the fountain including a plurality of blade adjusting pins which are mounted in the frame for endwise movement. The presented outer ends of the pins are threaded for engagement by respective adjusting nuts. The adjusting nuts are captively rotatable in the frame and a key is interposed between the frame and each of the pins for holding the pin against rotation as the nut is turned to move the pin inwardly and outwardly. The captivity is provided by an annular flange or shoulder at the inner end of each nut, the flange being received in a groove enclosed by a retainer plate, the retainer plate being removable to permit retraction of the pin, nut and key as a unit for cleaning purposes.

9 Claims, 3 Drawing Figures



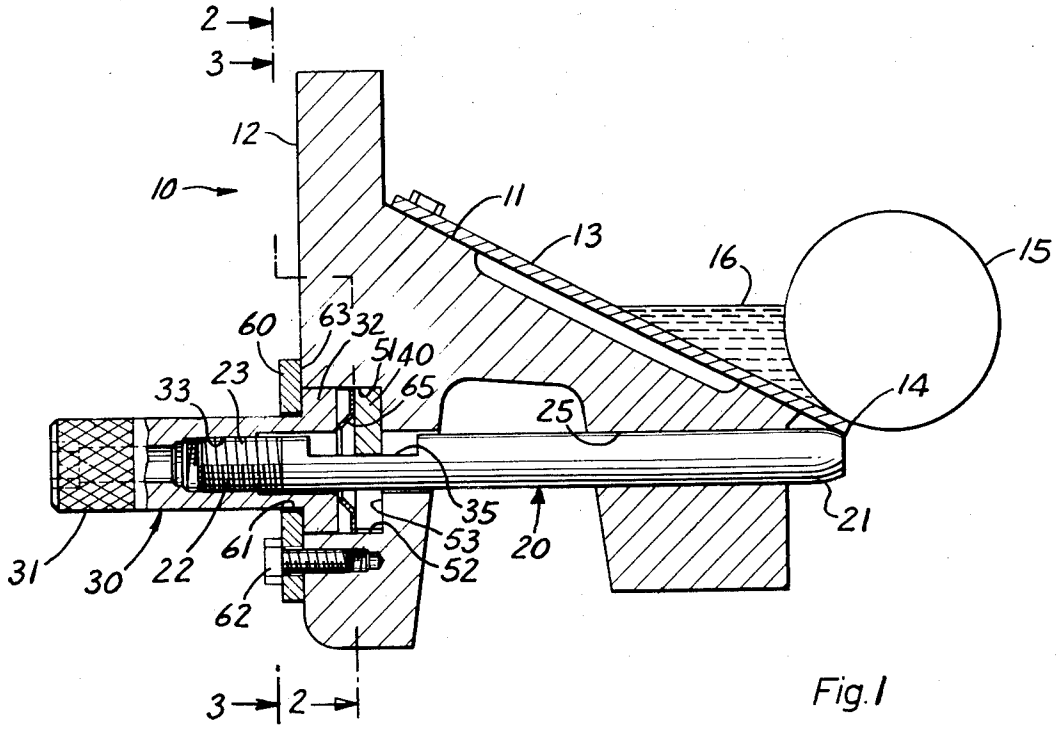


Fig. 1

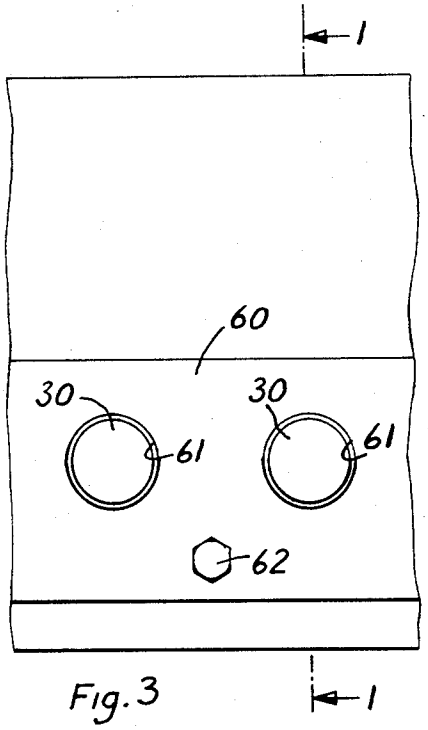


Fig. 3

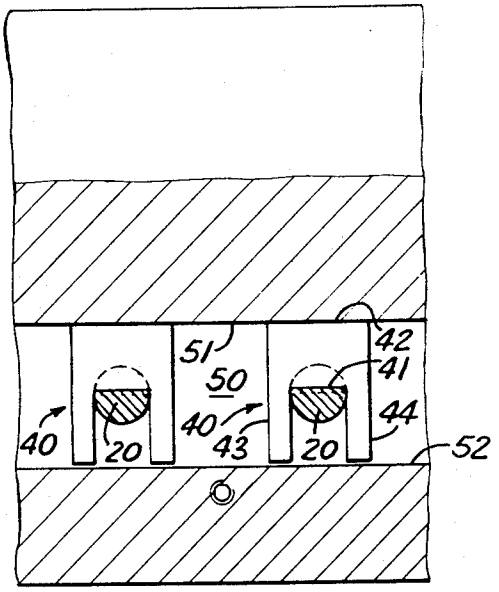


Fig. 2

INK FOUNTAIN IN AN INKING MECHANISM FOR PRINTING MACHINES

It is conventional to provide a plurality of spaced adjusting pins for adjusting the edge of the fountain blade with respect to the surface of a fountain roller. Conventionally, such pins have been threaded for screwing into and out of the frame of the fountain. However, such screwed connection makes the disassembly of the pins from the fountain for cleaning purposes a time consuming and troublesome task, and removal of the pins for cleaning destroys the adjustment. Moreover, the adjustment is of such high precision that where the tip of the pin is even slightly eccentric, as may occur for example where the pin is bent, proper adjustment is difficult to achieve. Structures have been provided in which the pins are mounted for pure reciprocating movement but such structures have for the most part been inherently complex and expensive.

Accordingly, it is an object of the present invention to provide an ink fountain having blade adjusting means which is highly precise and consistent but which may be made using no more than the normal machining tolerances. It is a related object to provide an adjusting mechanism for a fountain blade which permits precise endwise adjustment of the pin, without pin rotation, which is extremely simple and inexpensive and in which all of the parts required for adjustment and keying are accommodated in a simple axially facing groove extending longitudinally of the frame of the fountain, with the parts being held in place in the groove by a removable retainer plate.

It is another object of the present invention to provide an adjusting pin assembly for a fountain blade which brings about an adjustment relative to a reference surface on the retainer plate and in which the retainer plate may be disengaged for removal of the assembly without disturbing the adjustment between the nut and the pin and which permits such adjustment to be automatically reestablished when the pin and retainer plate are reassembled on the frame in working position.

It is a more specific object to provide a pin assembly for an ink fountain in which the pin is keyed to the frame for pure axial movement and in which the pin is threaded at its presented outer end for engagement of a tubular nut, the tubular nut having a flange for holding the nut captive, with a spring for pressing the flange against the reference surface.

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

FIG. 1 is a vertical section taken through the frame of an ink fountain along the line 1—1 in FIG. 3.

FIG. 2 is a vertical section taken at right angles to that shown in FIG. 1 and looking along the section line 2—2 in FIG. 1.

FIG. 3 is a fragmentary view looking along the line 3—3 in FIG. 1.

While the invention has been described in connection with a preferred embodiment, it will be understood that we do not intend to be limited to the particular embodiment shown but intend, on the contrary, to cover the various alternative and equivalent constructions which may be included within the spirit and scope of the appended claims.

Turning to the drawing there is shown an ink fountain having a horizontally extending relatively massive frame **10** having an inclined surface **11** and a vertical presented, or outer, surface **12.** Mounted upon the inclined surface **11** is a horizontally extensive blade **13** having an edge **14** which cooperates with the surface of a fountain roller **15.** A body of ink **16** is contained between the blade and the fountain roller, and the blade is sprung slightly away from the surface of the fountain roller to produce a longitudinal gap which determines the thickness of a film of ink transmitted by the fountain roller and which is passed to a series of conventional inking rollers (not shown).

In accordance with the present invention the gap between the blade and the roller is established and maintained in adjustment by means of a series of spaced pins, the pins being keyed against rotation and provided at their outer ends with respective adjusting nuts, the nuts having shoulders or flanges which engage a retainer plate to provide a reference bearing surface and with the plate being removable to permit the pins and the nuts thereon to be removable from the frame as a unit.

Thus referring to the drawing there is shown a typical pin **20** which occupies a shallow angle with respect to the fountain blade **13** and which has a tip **21** at its inner end engaging the edge of the blade and a presented, or outer, end **22** formed with a thread **23.** The pin occupies a bore **25.** For engaging the thread **23** a nut **30** is provided which is of hollow tubular shape having a knob **31** at its outer end, a flange **32** at its inner end and an internal thread **33** which snugly engages the thread **23** on the pin. The threads are preferably of fine pitch closely fitted.

For the purpose of preventing rotation of the pin **20** it is keyed with respect to the frame by a flat **35** machined on one side of the pin and engageable by a key **40** having opposed surfaces **41, 42.** As shown in FIG. **2,** the key **40** is preferably of inverted U-shape with the surface **41** being formed as an "inside" surface extending between side portions **43, 44** which straddle the pin.

In accordance with the invention the flange **32** of the nut, and the key **40** as well, are dimensioned to fit within a horizontal groove **50** which extends continuously the length of the frame and which has walls **51, 52** and a flat root surface **53.** For enclosing the groove a retainer plate **60** is provided having a plurality of circular openings **61** through which the tubular portions of the nuts registeringly extend, the retainer plate being held in place by a series of machine screws **62.** The inner surface **63** of the plate serves as a reference surface for the flange **32** on each of the nuts. For the purpose of pressing the nut, and more particularly its flange, against this reference surface, a spring washer **65** is interposed between the nut **30** and key **40.**

In operation the knob portion **31** of each of the nuts is rotated either in one direction or the other to establish the desired running clearance, or gap, between the edge of the blade and the fountain roller.

As a practical matter, it is difficult to confine the ink **16** and the ink tends to contaminate the inner ends of the pins **20** so that periodically the pins must be removed from the frame of the fountain for cleaning. To remove the pins in the present construction, all that is necessary is to unscrew the machine screws **62** which hold the retainer plate **60** in place. Each pin assembly, consisting of a pin, nut, key and spring washer may be

then easily and quickly withdrawn. After clean-up the pin assemblies may be reinserted into the position shown in the drawing, the retainer plate 60 may be replaced and the retaining screws 62 screwed tight. This reestablishes the nuts in the reference axial position and simultaneously prestresses the springs. Thus, provided that the threads 23, 33 have not been intentionally rotated with respect to one another, the original position of the blade with respect to the roller is established all along the edge of the blade. The time required for disassembly, cleaning and reassembly is a small fraction of that required in more conventional fountain structures.

It is one of the features of the present construction that a high degree of precision and reproducibility are achieved without employing more than average machining tolerances and with only simple machining steps. Manufacture of the pins with flats machined thereon and with cooperating nuts of tubular shape having a flange at one end presents no machining problem. The keys 40 are simply formed and need not be precise. All that is necessary on the frame of the fountain is to provide a single longitudinal groove which intersects bores dimensioned for reception of respective pins. The assemblies are all held in precise reference position by the retainer plate and with any tolerance in the depth of the groove being taken up by expansion of the spring washers associated with each of the assemblies.

While it is preferred to form the thread 23 on the outside surface of the pin and to form a cooperating thread 33 on the inside surface of the nut, it will be apparent that this is not essential to the invention and that, if desired, the pin may be formed with an internal thread at its outer end engaged by a cooperating screw which extends axially within the tubular adjusting member 30. Thus the member 30 may be generically referred to as a "threaded adjusting element." Alternatively, the term "nut" may be considered as generic to denote either an internal or an external thread.

While it is preferred to form an actual "flat" 35 on the pin 20 in the region of the groove 50 for cooperation with a key having a corresponding flat surface 41, it will be understood that the term "flat" is intended to denote any non-circularity for keyed engagement to prevent rotation of the pin.

The term "tubular" as applied to the threaded element 30 is simply intended to denote that such member is of hollow construction permitting telescoped engagement with respect to the outer end of the pin.

The retainer plate 16 may be of any length to accommodate a convenient number of the adjusting nuts. The flanges 32 of the adjusting nuts may be fitted to the width of the groove to provide cantilevered support of the outer end of the pin or, if desired, the flanges may have a diamter which is less than the width of the groove.

As used herein, the term "frame" may be considered to include the retainer plate in which case the "retaining means" may be considered the screws which secure the retainer plate.

We claim as our invention:

1. In an ink fountain the combination comprising a frame, a fountain roller journaled in the frame and having a cooperating fountain blade presenting its edge to the roller surface, a plurality of spaced adjusting pins having their tips engaging the edge portion of the blade at a shallow angle to adjust the running clearance between the blade and the roller thereby to determine the thickness of ink film, each pin being mounted in the frame for axial movement and presenting an outer end remote from the tip, each pin having a thread at its outer end, a threaded adjusting element having a thread closely fitted to the thread on the pin, retainer means in the frame for holding the threaded adjusting element captive against endwise movement while permitting rotation of the threaded element thereby to produce relative endwise movement of the pin, the pin having an axially extending flat formed thereon and a key interposed between the frame and the flat for engaging the flat to prevent rotation of the pin as it is acted upon by the adjusting element, the retainer means being releasable to permit removal of the pin and the threaded element as a unit for cleaning purposes.

2. The combination as claimed in claim 1 in which the retainer means includes a plate horizontally elongated and having a plurality of openings for registering with the tubular nuts.

3. In an ink fountain, the combination comprising a frame, a fountain roller journaled in the frame and having cooperating fountain blade presenting its edge to the roller surface, a plurality of spaced adjusting pins having tips engaging the edge portion of the blade at a shallow angle to adjust the running clearance between the blade and the roller, each pin being mounted in the frame for axial movement and presenting an outer end remote from the tip, the outer end of each pin being threaded, each pin having a tubular nut which is internally threaded for snug engagement with the thread on the pin and having a radially extending flange, bearing means in the frame for engaging the flange to prevent endwise movement of the nut while permitting the nut to be adjustably rotated thereby to adjustably move the pin in opposite directions, the pin having an axially extending flat formed thereon and a key interposed between the frame and the flat for engaging the flat to prevent rotation of the pin as it is acted upon by the nut, and means for disassembling the bearing means to permit removal of the pin and nut assembled thereon as a unit for cleaning purposes.

4. The combination as claimed in claim 3 in which the key is of U configuration straddling the pin and having an interior surface which engages the flat on the pin, separate keys being provided for each of the pins.

5. In an ink fountain the combination comprising a frame, a fountain roller journaled in the frame and having a cooperating fountain blade presenting its edge to the roller surface, a plurality of spaced adjusting pins having tips engaging the edge portion of the blade at a shallow angle to adjust the running clearance between the blade and the roller, the frame having a series of parallel bores for snugly receiving the pins for endwise movement, the frame having a longitudinal axially facing groove communicating with all of the bores, the groove having opposed parallel side walls, each pin having a flat positioned thereon in the region of the groove, each pin having a key registered in the groove for engaging the flat to prevent rotation of the pin while permitting endwise movement thereof, each pin being threaded at its outer end, a tubular nut having a thread which snugly engages the thread on the associated pin, the nut having a radially extending flange on its inner end dimensioned for accommodation between the

walls of the groove, a retainer means on the frame for holding the flange of the nut captive while providing clearance for adjusting the nuts, a spring in the groove for pressing each nut outwardly against the retainer means, the retainer means being removably secured to permit retraction of the nut, pin, spring and key from the groove as a unit for cleaning purposes.

6. The combination as claimed in claim **5** in which the key has a first surface which engages the flat and a second surface which snugly engages the wall of the groove which is opposed to the flat.

7. The combination as claimed in claim **5** in which each key is formed to straddle the associated pin and in which the spring is in the form of a spring washer interposed between the key and the inner end of the nut for pressing the nut outwardly of the frame and against the retainer means.

8. In an ink fountain the combination comprising a frame, a fountain roller journaled in the frame and having a cooperating fountain blade presenting its edge to the roller surface, a plurality of spaced adjusting pins having inner ends engaging the edge portion of the blade at a shallow angle to adjust the running clearance between the blade and the roller and having respective outer ends, the frame having a series of bores for snugly receiving the pins for endwise movement, the frame having a longitudinal axially facing groove communicating with all of the bores, the groove having opposed parallel side walls, each pin having a flat positioned thereon in the region of the groove, each pin having a key registered in the groove the key being of U-shape having an internal surface for engaging the flat to prevent rotation of the pin while permitting endwise movement thereof, each pin being threaded at its inner end and having a tubular nut with a thread which snugly engages the thread on the pin, the nut having an annular flange on its inner end dimensioned for accommodation between the walls of the groove, a flat retainer plate on the frame overlying the groove having springs for accommodating the nuts while holding the flanges of the nuts axially captive, spring washers seated in the groove for pressing the respective nuts outwardly against the retainer plate, the retainer plate being removably secured by screws to permit retraction of the assembled nut, pin, spring washer and key from the groove as a unit for cleaning purposes and for prestressing the springs when the retainer plate is reapplied.

9. In an ink fountain the combination comprising, a frame, a fountain roller journaled in the frame and having a cooperating fountain blade presenting its edge to the roller surface, a plurality of spaced adjusting pins having their tips engaging the edge portion of the blade at a shallow angle to adjust the running clearance between the blade and the roller thereby to determine thickness of ink film, each pin being mounted in the frame for axial movement and presenting an outer end remote from the tip, the pin having a thread at its outer end, a threaded adjusting element having a thread closely fitted to the thread on the pin, means defining an axially facing groove in the frame for accommodating the threaded adjusting element, retaining means for holding the threaded adjusting element in the groove captive against endwise movement while permitting relative rotation thereby to produce endwise movement of the pin, the pin having means for keying to the frame to prevent rotation of the pin as it is acted upon by the adjusting element, the retaining means being releasable to permit removal of the pin and the threaded element as a unit for cleaning purposes.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,779,165 Dated December 18, 1973

Inventor(s) Paul Abendroth and Kurt Reiser

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover page:

After data item "[21]", insert the following item as follows:

--[30] Foreign Application Priority Data

November 9, 1971 Germany . . . . 2155539 --.

Signed and Sealed this

Eighth Day of January 1980

[SEAL]

Attest:

SIDNEY A. DIAMOND

Attesting Officer *Commissioner of Patents and Trademarks*