United States Patent

Easoz

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[54] **COMPOSITE FOUNTAIN BLADE CONSTRUCTION FOR REMOTE INK CONTROL SYSTEM**

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

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

[58] **Field of Search** ..... 101/365, 350, 363, 148, 207, 101/208, 157, 169; 15/236 A; 118/261

[56] **References Cited**

UNITED STATES PATENTS

980,454	1/1911	Thomson	101/365
2,062,154	11/1936	Welk	101/365
2,161,943	6/1939	Baue	101/365
2,837,024	6/1958	Dougan	101/365

Primary Examiner—J. Reed Fisher

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[57] **ABSTRACT**

An ink fountain blade assembly which includes a rigid backing member and a plurality of identical blade sections secured to the surface of the backing closely edge to edge and extending cantilever fashion to present a common substantially continuous film-forming edge for presentation to the surface of an associated fountain roller, one lateral edge of each of the blade sections being relieved along its cantilevered portion by an amount which is sufficient to permit freedom of adjusting movement toward and away from the roller but which is less than that which will leak a body of ink supported on the blade sections. Each blade section is chamfered in a rear corner position to provide distinctive visual indication, for assembly purposes of the edge which has been relieved.

7 Claims, 4 Drawing Figures

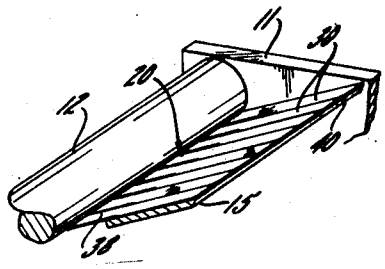


Fig. 1.

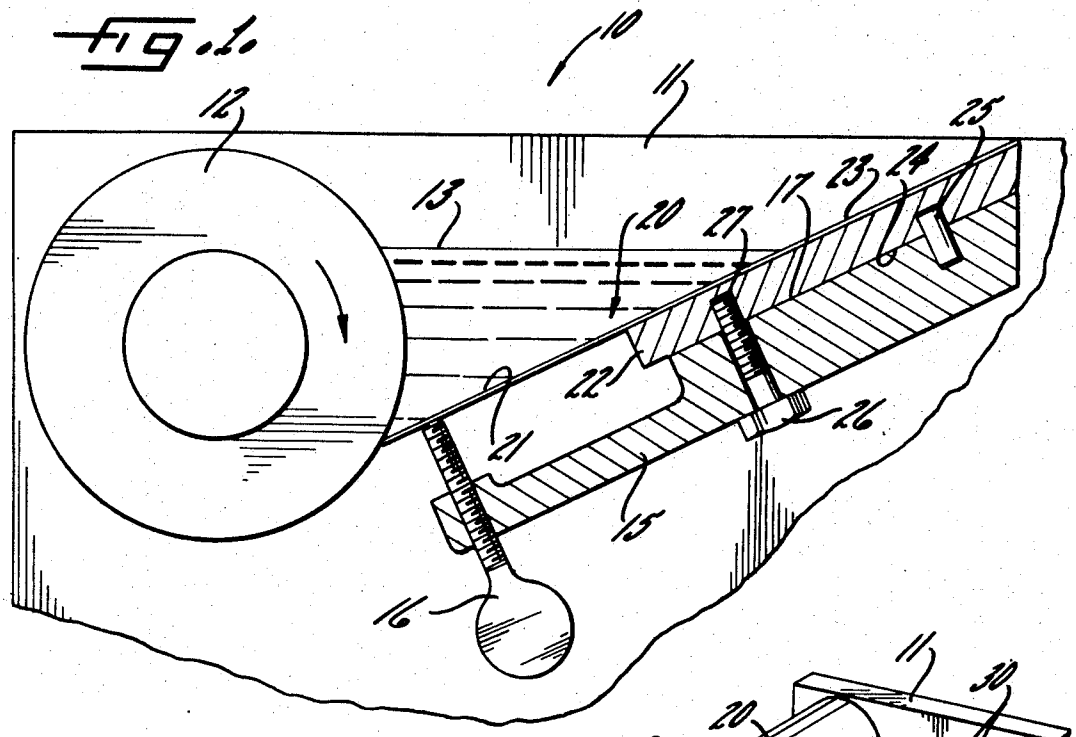


Fig. 2.

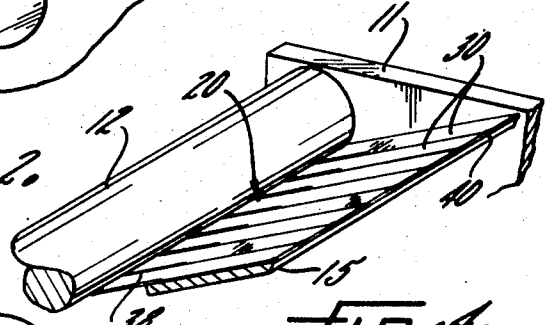


Fig. 3.

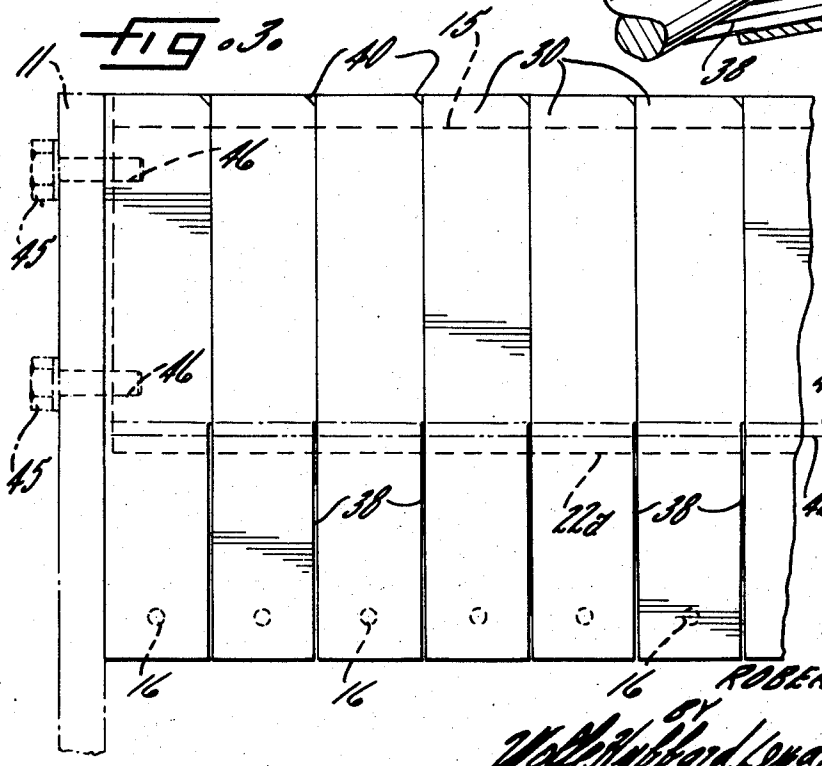
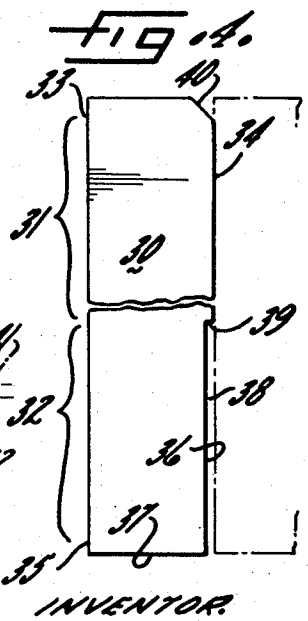


Fig. 4.



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COMPOSITE FOUNTAIN BLADE CONSTRUCTION FOR REMOTE INK CONTROL SYSTEM

While the forming of a film of ink from an ink body for printing purposes may be accomplished in a number of different ways, by far the most popular procedure is to employ a fountain blade having an edge which can be controllably adjusted relative to a cooperating fountain roller to form a predetermined thickness of ink on the roller, the ink being lifted from the surface of the roller and conveyed to a plate on the plate cylinder in the form of a thin continuous film by a series of transfer rollers and form rollers. While the necessity for providing a film of constant thickness is often emphasized, good quality printing requires that different amounts of ink be fed to the plate on the plate cylinder depending upon the need which exists at each point along the plate cylinder. Different amounts of ink are usually required in local areas across the width of the plate cylinder as determined by variations in the image area to be printed. Since a fountain blade in a practical thickness is relatively stiff, providing a series of adjusting screws along the film-forming edge does not permit an adequate differential adjustment of ink feed in adjacent locations. To overcome this, efforts have been made in the past to provide a blade assembly consisting of a number of independently adjustable sections each of which is subject to adjustment by its own adjusting screw. Faltus U.S. Pat. No. 1,574,474 is an example of the use of a segmented blade, but in this case the sections are moved backwardly and forwardly in the plane of the blade assembly. Baue U.s. Pat No. 2,161,943 shows blade sections secured to a rigid backing, and having provision for adjusting movement perpendicular to the plane of the blade assembly, but with the blades in contact edge to edge. Experience has shown that such blades are not capable of true independent adjustment and that the blade sections bind upon one another. Adjustment of one blade not only affects the adjustment of the adjacent blades, but the binding effect is indeterminant so that a "bound" blade may release itself for no apparent reason during a printing run resulting in a sudden and unwanted change in the amount of ink being fed.

Dougan U.S. pat No. 2,837,024 discloses a blade assembly having sections which are relatively widely spaced and in which the blade has an overall flexible covering to prevent leakage between the sections. Such a composite blade has not proved to be the answer to the problem since, for the sake of durability, it is necessary to employ rubber or relatively stiff composition and in a thickness sufficiently great so that adjustment tends to be transmitted from one section to the next to defeat independence of adjustment.

It is, accordingly, an object of the invention to provide a blade assembly for an ink fountain which overcomes the problems which have been encountered in the prior art. That is, it is an object to provide a blade assembly which consists of a number of adjacent sections each of which is controlled entirely independently of the others by a suitable adjusting screw, which avoids the binding of one blade section upon the next as the adjustment is being made and in which, nevertheless, the blade sections are sufficiently closely spaced over their cantilevered portions as to contain a body of ink without leakage. It is a related object to provide a blade assembly which consists of a series of completely independently adjustable sections having clearance slots between them but in which leakproof integrity is retained regardless of the degree of adjustment of any single blade section.

It is an object of the invention in another of its aspects to provide a blade assembly in which little or no care need be exercised incident to the assembly of the individual blade sections upon a backing and in which mounting of the blade sections insures an accurately predetermined amount of lateral clearance between the blade sections. Thus it is an object to provide a composite blade assembly and assembling procedure in which clearance between the cantilevered portions of the blades may be obtained inexpensively and yet held to within extremely close and exacting limits.

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

FIG. 1 is a sectional view of a blade assembly constructed in accordance with the present invention cooperating with a fountain roller.

FIG. 2 is a fragmentary perspective showing one end of the fountain of FIG. 1 but without the supporting bracket.

FIG. 3 is a plan view showing one end of the blade assembly and the adjacent fountain end wall.

FIG. 4 shows the profile of a single blade section.

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

Turning now to the drawin there is shown at **10** an ink fountain for a printing press having a pair of end plates **11** (only one of which is shown) and having a fountain roller **12** in contact with a body of ink **13**. The fountain roller will be understood to be conventional, that is, it will be understood to have a hard peripheral surface which is sealed at its ends with respect to the end plates, with provision for driving intermittently or at a slow rate of speed.

Extending between the end plates **11** is a supporting bracket **15** which is arranged downwardly at an angle and which has, threaded into its front edge, a series of adjusting screws, or keys, **16**. Mounted upon the upper surface **17** of the bracket is a blade assembly **20** consisting of blade structure **21** secured to a rigid backing member **22**. The latter has an upper surface **23** and a lower surface **24** which seats upon the bracket. The backing member is secured to the bracket by a series of registering pins **25** and a series of screws **26**, the screws being threaded into respective tapped holes **27** in the backing plate.

In accordance with the present invention the blade **21** is of composite construction being formed of a plurality of identical blade sections of rectangular shape having shank portions arranged closely edge to edge along the backing member and having cantilevered portions presenting tips alined with one another to produce a substantially continuous film-forming edge, one lateral edge of each cantilevered portion being relieved to a constant depth so that the section may un-

dergo free independent movement for adjustment of ink film. The lateral edges of each blade section are machined precisely perpendicular to the plane of the assembly and the depth of the relief is limited to a value which will insure independent movement but will prevent leakage between adjacent blade sections in all conditions of relative adjustment. Moreover, the shank portion of each blade section is permanently marked to identify the relieved side thereby to facilitate assembly and to enable subsequent verification that no more than a single relief exists between any two adjacent blade edges. Thus, turning to the exemplary embodiment shown in the drawing, the composite blade, indicated at **21**, is shown to consist of a plurality of relatively narrow blade sections **30**.

Since adjacent blade sections are identical it will suffice to focus attention on a typical section as illustrated in FIG. **4**. Here it will be seen that the blade **30** has a shank portion **31** having parallel lateral edges **33**, **34** and a cantilevered portion **32** having parallel lateral edges **35**, **36** as well as a film-forming edge, or tip, **37**. The lateral edge **36** has a lateral relief **38** which extends roughly half the length of the blade section and which has a limited but precisely defined width which is preferably 0.0005 inch. The edges **33**, **35** are smoothly continuous while the relieved edge is formed of slightly offset portions **34**, **36** defining between them a step, or root, **39**.

Because of the shallowness of the step **39** the edge having the relief is hard to identify by visual observation and, accordingly, to assist identification, the relieved edge carries a telltale, non-symmetrical marking, preferably in the form of a chamfer as indicated at **40**. This facilitates assembly since, if the chamfers on all of the blade sections are faced the same way, there will be no possibility that the relieved portions of adjacent blades will be coincident. In other words, by facing the blades so that the chamfers are symmetrically oriented there will be assurance that the slots between all of the cantilevered portions of adjacent blades will be precisely the same. Proper orientation can be verified at any time.

In accordance with one of the more detailed aspects of the present invention the depth of the relief is such that when the blades are assembled on the backing plate **22** with the lateral edges **33**, **34** of each of the blade sections clamped in intimate engagement from one blade section to the next, the blades will be oriented perfectly parallel to provide clearance between the cantilevered portions which are of accurately predetermined constant width, the clearance being at least approximately 0.0003 inch so that the sections may undergo free and independent movement but less than about 0.0007 inch, thus providing a slot having a width dimension which is sufficiently small as to prevent leakage of conventional commercial offset lithographic ink of normal viscosity between adjacent blade sections. It has been found that the viscosity of the standard commercial offset lithographic printing inks in common usage in sufficiently high so that there is little or no tendency for the ink to leak or weep between the blade sections. By carefully machining all of the lateral edges, including that which forms the relief, absolutely perpendicularly to the plane of the blades, leakage is avoided regardless of the condition of adjustment of the adjusting screws. Indeed, adhering to the preferred range of relief, no difficulty has been experienced with ink drawn by capillary action between the adjacent cantilevered sections of the blade. A section responds promptly to minute changes in adjustment, both inwardly as an adjusting screw is screwed in and outwardly, with followup, when the adjusting screw is turned in the retract direction.

In carrying out the present invention the shank portions **31** of the blade sections **30** are secured to the backing member **22**, not by riveting or machine screws which might have a tendency to develop localized strain in the body of the blade, but by a chemical bonding agent or adhesive which is preferably of the thermosetting type. Thus in manufacturing the present blade assembly **20** the bonding agent is applied between the blade sections and the top surface **23** of the backing member. With the blades clamped tightly edge to edge, bonding pressure is applied and maintained over a heat cycle. A wide range of commercial adhesives of the thermosetting type are available and capable of face-bonding the metal surfaces to produce a reliable and permanent joint. While selection of a particular bonding agent does not form a part of the present invention it is preferred to employ the material which is identified, simply by way of example, as Scotch Welding Tape No. LH–344050. Application of the bonding agent in tape form has the advantage that the bonded area may be accurately and conveniently localized. In accordance with one of the detailed aspects of the present invention the backing plate is so dimensioned as to extend, in the direction of the fountain roller, beyond the "line" of relief indicated at **41** (FIG. **3**) which connects the roots of the slots. Further in accordance with the invention the bonded area is not extended all the way out to the edge **22***a* of the backing plate but only to a margin **42** which lies between the line of relief **41** and the front edge of the plate. As a result the relieved portions of each blade section are partially bonded and not entirely cantilevered.

Further in accordance with the invention, the backing plate **22** is foreshortened in the longitudinal dimension so that the presented outer edges of the blade sections at the respective ends of the blade assembly project beyond the backing member. Accordingly, at assembly, the blade assembly can be clamped and bonded precisely to the specified overall lateral dimension such that when the blade assembly is mounted to the bracket **15** the outer edges of the blade sections at the respective ends of the assembly will have the required close sliding fit with the parallel inwardly facing surfaces on the respective fountain end plates **11**.

In some applications, clamping screws **45** can be provided which penetrate the end plates and which engage registering longitudinally extending tapped holes **46** in the backing member such that the end plates may be drawn into intimate engagement with the presented edges of the blade assembly.

It will be apparent that the present construction amply meets the objects set forth above. Accurate machining of the individual blade sections **30**, which are identical to one another, presents no problem and their manufacture may be largely automated. Application of the bonding agent and the assembling of the

blade sections on the backing member with the chamfers **40** all faced the same way produces extremely narrow slots of constant width without exercise of special care or attention. Note that at assembly the shank portions **31** of the blade sections may be clamped as tightly as desired edge to edge without risk of narrowing the slots, i.e., without risk of contact or binding between the cantilevered end portions. Subsequent bonding is a simple matter of using a prescribed heat and curing cycle in accordance with recommendations accompanying the commercial bonding agent.

The supporting bracket **15** which bridges the end walls of the fountain and upon which the backing member is supported, is tipped forwardly so that the blade sections in their normally relaxed state are spaced from the surface of the fountain roller. Turning the adjusting screws **16** associated with the individual tips of the blade sections causes the latter to be shifted upwardly to establish a predetermined small clearance with respect to the fountain roller, a clearance which may be readily varied depending upon the ink feed requirements at local areas along the entire length of the fountain roller. Because of the finite relief which exists over the entire cantilevered portion of each of the blades, adjustment is truly independent and adjusting one section has no effect whatsoever upon adjustment of an adjacent section.

What is claimed is:

1. A blade assembly for a fountain in a printing press which comprises a rigid backing member providing a flat mounting surface, a plurality of blade sections of identical rectangular shape having shank portions arranged closely edge to edge along the mounting surface and having cantilevered portions which extend beyond the mounting surface presenting tips generally alined with one another to produce a continuous film-forming edge, one lateral edge of each cantilevered portion being relieved to a constant depth of at least 0.0003 inch to form slots between the sections so that the sections may undergo free independent movement for adjustment of the ink film, the relief having a maximum depth of 0.0007 inch and the lateral edges of each blade section being precisely parallel to one another so as to prevent leakage between adjacent blade sections in all conditions of relative adjustment of the sections, the shank portion of each blade section being non-symmetrically marked for each visual identification of the relieved edge thereby to facilitate assembly on the backing member with consistent orientation to insure that no more than a single relief exists between any two adjacent blade edges.

2. The combination as claimed in claim **1** in which the depth of the relief on each of the blades is substantially 0.0005 inch.

3. The combination as claimed in claim **1** in which the marking is permanent and in the form of a chamfer on identical ones of the corners of the shank portion of each blade section.

4. The combination as claimed in claim **1** in which the mounting surface on the backing member is extended beyond a line connecting the roots of the slots for partial support of the cantilevered portions.

5. The combination as claimed in claim **1** in which the blade sections are face-bonded to the mounting surface and in which the bonding agent extends beyond a line connecting the roots of the slots.

6. An ink fountain for a printing press comprising, in combination, a frame including side plates presenting opposed parallel surfaces, a fountain roller having a surface extending from one side plate to the other, a rigid backing member providing a flat mounting surface spaced from the roller and angled downwardly with respect to it, a plurality of blade sections of identical rectangular shape having shank portions secured closely edge to edge along the mounting surface and having cantilevered portions which extend beyond the mounting surface in the direction of the roller presenting tips generally alined with another to produce a continuous film-forming edge, means including adjustment screws for positioning said cantilevered blade sections, one lateral edge of each cantilevered portion being relieved to a constant depth so that when the blade sections are similarly oriented slots of equal width are defined between them, the lateral edges of each blade section being precisely parallel to one another and the depth of the relief on each of the sections permitting free independent movement of the blade sections upon adjustment of the screws and precluding leakage of ink between adjacent blade sections in all conditions of relative adjustment of the sections, the blade assembly being dimensioned for snug fit between the end plates for containment of a body of ink above the blade assembly.

7. The combination as claimed in claim **6** in which the backing member is longitudinally foreshortened so that the presented lateral edges of the blade sections at the respective ends of the blade assembly project beyond the backing member and into close ink sealing engagement with the end plates, and threaded clamping means at each of the end plates for drawing the end plates into intimate engagement with the presented edges.

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