June 3, 1958 D. S. DOUGAN 2,837,024

INK FOUNTAIN BLADE

Filed April 7, 1955 2 Sheets-Sheet 1

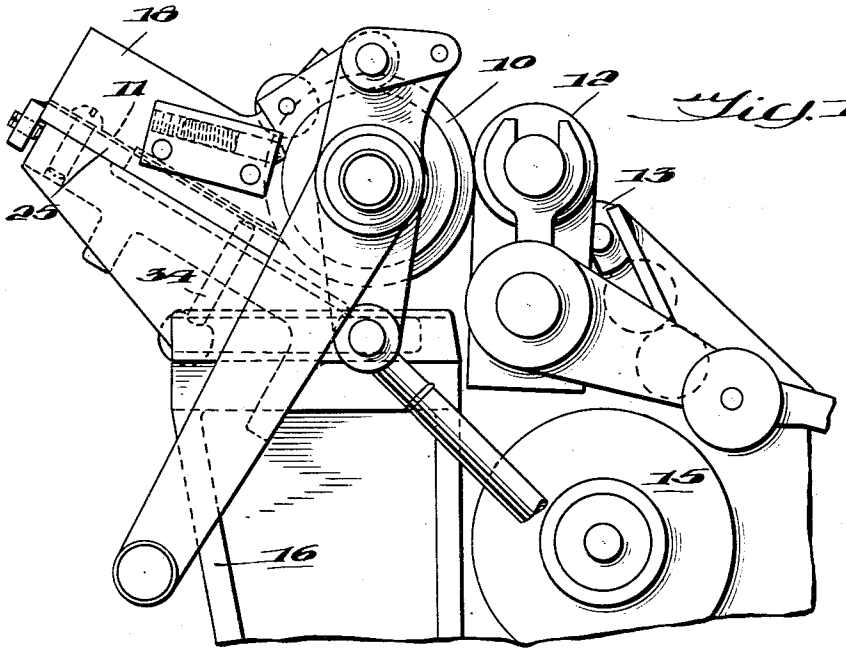
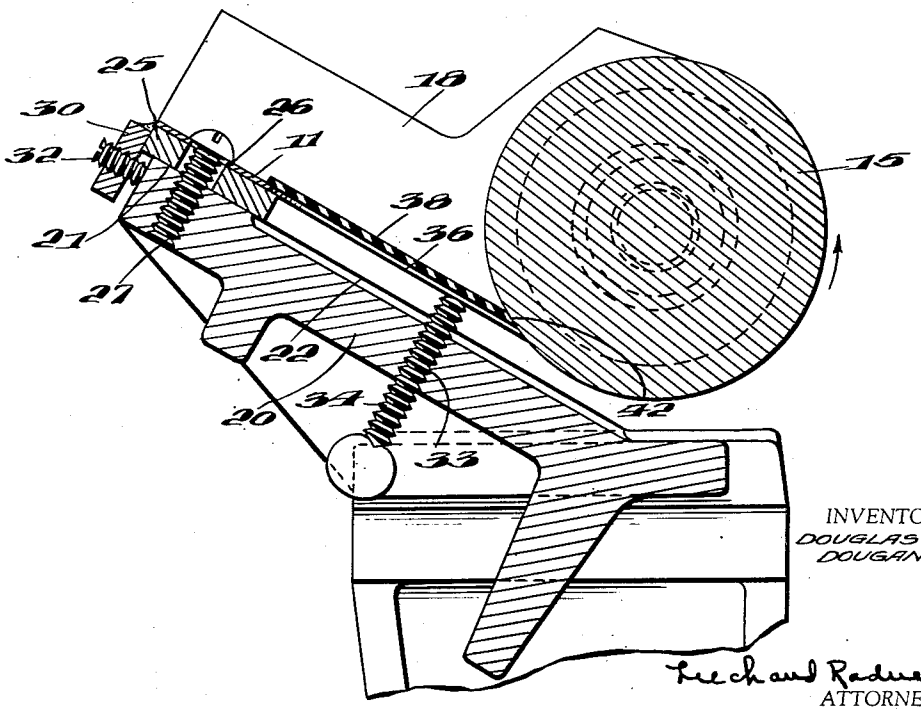


Fig. 1.

Fig. 2.



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June 3, 1958 D. S. DOUGAN 2,837,024

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Filed April 7, 1955 2 Sheets-Sheet 2

Fig. 3.

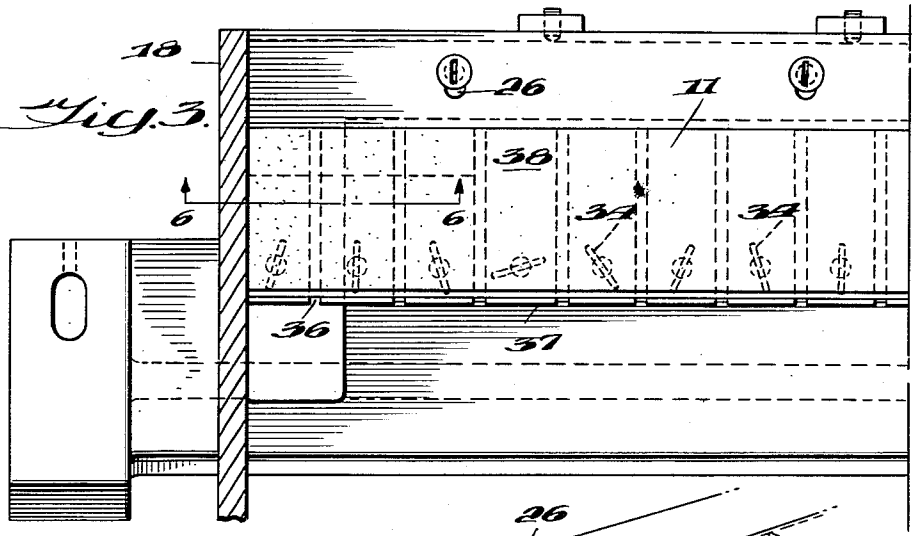


Fig. 4.

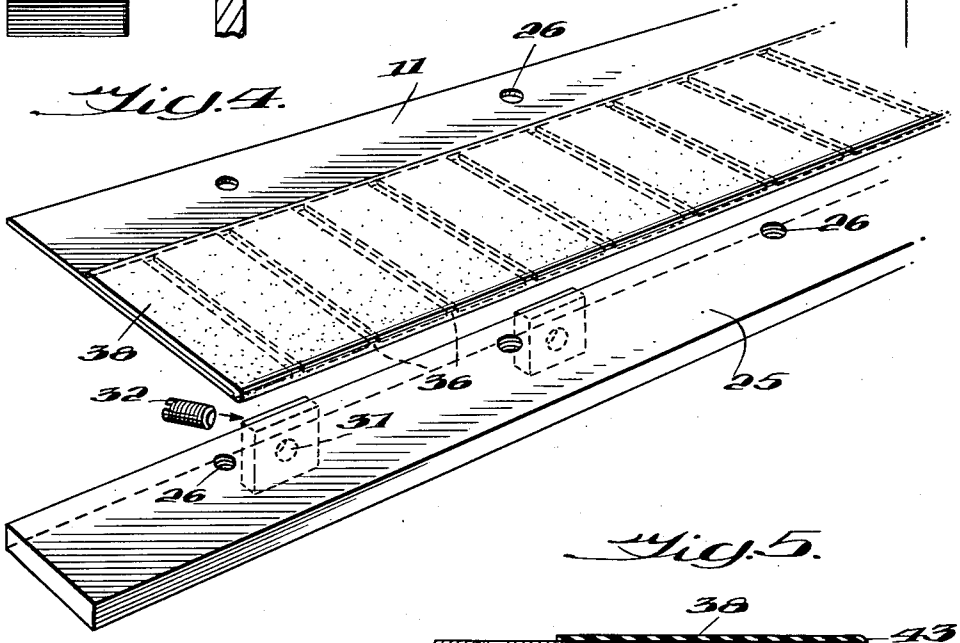
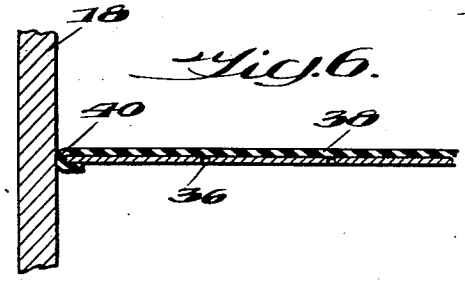


Fig. 5.



Fig. 6.



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INK FOUNTAIN BLADE

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9 Claims. (Cl. 101—365)

This invention relates to improvements in ink fountain blades and more particularly to such blades having facility for independent, individual adjustment of small lengths of the effective metering edge thereof.

In many types of printing presses, and particularly in connection with web-fed, off-set or intaglio printing machinery, the ink which is of relatively heavy consistency is contained in a fountain from which it is supplied to the appropriate inking rolls in metered quantities. In many cases the bottom of this fountain consists of a thin, flexible, steel blade or doctor, the lower edge of which can be adjusted relative to a large distributing or fountain roll that carries the ink from the reservoir to the succeeding train of rolls for delivery to the press plate. Thus the ink going to the plate is metered between the edge of the blade and the roll.

In many cases the requirements for ink delivery throughout the width of the press or of the plate from which the printing is effected are not at all uniform, that is, some areas in which the printing is denser require greater quantities of ink than others, and heretofore efforts have been made to control the quantity by localized deflecting of the metering edge of the blade by forcing portions of the blade toward the roll by means of some of a plurality of set screws distributed along its length and just behind its edge. However, the edge of the blade cooperating with the roll is continuous across the width of the press and it is found that when one set screw is adjusted to reduce the amount of ink needed in its area there is often a requirement to readjust several other set screws, some remote from the first, because the effect of making the initial adjustment is felt more or less throughout the length of the blade.

It is therefore an important object of the present invention to provide an arrangement of blade which overcomes the above difficulty and permits adjustment of selected areas within the blade length independent of any requirement for adjustment of other areas.

To solve this problem it is proposed to use a blade transversely slit from the metering edge for a considerable distance, dividing the edge and the portions adjacent it into parallel strips or tongues of any desired width, each one adapted to be controlled in its position relative to the ink feeding roll by means of an individual set screw.

Such a blade forming the bottom of an ink reservoir, however, would not be ink tight and there would be seepage or actual flow of ink through the slits separating the individual blade tongues, primarily because of the difficulty of making these slits sufficiently narrow and their edges closely adjacent enough to prevent such seepage.

It is therefore a further object of the present invention to provide a resilient cover for the slitted portion of the blade constructed to provide no interference for the individual tongue adjustment but affording a liquid-tight area through the length and width of the blade.

It is a still further object of the invention to provide a resilient, continuous, smooth surface on the top portion of the slitted doctor blade which facilitates the cleanup

when ink is to be removed or changed, and which facilitates the agitation of the ink within the reservoir.

As a further object of the invention it is the intent to provide sealing means contiguous with the resilient surface extending around from the ends of the blade to cooperate with the reservoir end plates and provide effective sealing there.

Other and further objects and features of the invention will be more apparent to those skilled in the art upon consideration of the accompanying drawings and following specification wherein are disclosed two exemplary embodiments of the invention, with the understanding that changes and modifications may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

Fig. 1 is a side elevation of that portion of a representative printing press incorporating the ink fountain and accessory parts, the blade of the present invention being shown in dotted lines;

Fig. 2 is a vertical section, normal to the axis of the fountain roll, through an ink fountain incorporating the improved blade of the present invention;

Fig. 3 is a top plan view of one end of the blade of the present invention mounted on the fountain body for support and adjustment and illustrating the fountain end wall in section and with the fountain roll removed;

Fig. 4 is a fragmentary exploded perspective view of the blade and its spacer plate before the integration by welding;

Fig. 5 is a transverse section through a modified form of blade structure; and

Fig. 6 is a fragmentary longitudinal section through the blade and fountain end wall showing the seal effected by the resilient covering where it extends around the blade end.

Referring now to the drawings, the invention is illustrated in its general form in Fig. 1, showing a side elevation of the ink fountain portion of the press, which is only exemplary, since numerous forms of fountains incorporating the basic elements of combined metering and fountain roll, end walls and resilient reservoir bottom or blade **11** are found in various types of presses. The ink of heavy consistency is held in the elongated V-shaped space between the inclined blade **11** and the contiguous surface of the metering roll **10**, which rotates in a counterclockwise direction in this view. The ink is metered between the adjustably positioned edge of the blade and the surface of the roller and supplied from the fountain roller to pick-up roll **12** and from it through a succession of distributing rolls **13** to the plate which is to be inked, such plate for instance may be wrapped about the plate roll **15**.

Portions of the side frame **16** of the press are illustrated in this figure as providing support and bearings for the various parts as will be understood. A reference to Fig. 2 shows more clearly the essential features of the reservoir proper, of which the blade of the present invention is the principal portion.

In Fig. 2 the roll **10** is illustrated as being mounted for rotation between end plates **18** and above the fountain body **20**, which comprises a casting longer than the roll **10**, suitably reinforced by ribs on its bottom, as illustrated, and pitched at an incline of approximately 30° to the horizontal toward the roll. The rear portion of its upper face **21** is machined to a plane surface throughout the length of the body and for a portion only of its width, being elevated above the remaining portion **22** which leads toward and beneath the roll **10**.

The resilient blade **11** which forms the bottom of the reservoir and cooperates with the roll to meter the ink supply is mounted above the surface **21** by means of the spacer bar **25** preferably secured beneath the rear por-

tions of the blade by welding. A plurality of openings **26** through the blade and its spacer bar loosely receive screws **27** threaded into appropriate openings in the fountain body as seen in the drawing to clamp the blade in operative position and permit a certain degree of fore and aft adjustment to facilitate the cooperation of the metering edge of the blade with the roll surface.

Fig. 4 shows in detail the construction of the spacer **25** and its openings **26**. This view and Fig. 2 illustrate the adjusting plates **30** welded to the rear edge of the spacer **25** and threaded as at **31** to receive the adjusting screws **32** which engage the rear edge of the fountain body as seen in Fig. 2 to limit the forward movement of the blade and to permit its accurate adjustment prior to tightening of the screws **27**.

The blade **24** is continuous for the full length of the fountain and extends from the rear edge of the spacer plate to substantial contact with the surface of the metering roll.

In order to adjust the edge of the blade so as to have varying spacings from the roll surface at different places to regulate the thickness of the ink film supplied to various portions across the width of the printing plate, a large number of holes **33** are tapped through the fountain body normal to the surface of the blade and just a slight distance back from its functional edge. These holes each accommodates a thumb screw **34** which can be engaged against the under face of the blade, which in the absence of these screws is uniformly spaced from a surface of the roll by the adjusting screws **32** an amount at least equivalent to the spacing desired to supply the maximum quantity of ink needed at any portion of the plate. Areas which need less ink are so served by adjusting the edge of the blade closer to the surface of the fountain roll by means of the various and appropriate thumb screws. When this adjusting is done with a blade whose edge is continuous there is interaction between various portions of the blade edge and careful adjustment of many thumb screws is often necessary, particularly if two closely spaced areas require a heavy coating of ink and an intermediate area a thin one.

The present invention overcomes these difficulties by slitting the blade normal to its length and for a distance extending back at least as far as the forward edge of the spacer plate **25**. These slits, exaggerated in width, are illustrated at **36** in all but Fig. 1. The space between adjacent slits **36** is chosen to provide an adequate number of tongues which are the portions **37** formed between adjacent slits and to provide their width such as to give incremental adjustment of the ink flow as found necessary in the type of press under consideration. Each tongue is naturally provided with its own adjusting thumb screw, as clearly seen in Fig. 3, and its edge position can be wholly independent of any other portions of the edge of the blade. It is, however, necessary to cut these slits with tools of finite width leaving spaces through which ink might seep were it not kept out by means constituting a further feature of the invention, the application of a continuous length or sheet of thin resilient material **38** extending at least from the metering edge of the blade back to a position slightly closer to the rear edge of the blade than the bottoms of the slots between the tongues. This resilient material may be of synthetic rubber or of other suitable resilient plastics which are so constituted as to resist petroleum base solvents and varnishes such as are used in ink manufacture and in the cleanup of the press. At the same time it must be free from abrasives to prevent damage to the surface of the metering roll. For satisfactory operation it may be equivalent to the rubber used on the ink rollers and printing blankets of offset presses. The rubber is vulcanized to the steel in a manner well known to those working in that art.

The rubber is applied only to the upper surface of the blade and preferably does not extend into the slots. Its primary purpose, of course, is to prevent leakage of ink between the slots, but secondarily it gives the base of the fountain a smooth surface for cleaning and for the agitation of the ink in the fountain, and gives additional spring with elastic resistance to the blade sections so as to give a positive action to the ink control adjustment when using the thumb screws **34** and under certain circumstances, as will be pointed out later, serves as the wiping surface of the blade when full pressure is applied by means of the thumb screws, thus preventing the scoring of the steel fountain roll when it is doctored by the rubber rather than the steel edge of the blade.

Moreover, the rubber is turned over the ends of the blade as illustrated at **40** in Fig. 6, thus providing for a close and sealing fit between the end of the blade, which is carefully sized as to length, and the end plates **18** of the fountain to prevent any leakage at these points.

In the form of the blade illustrated in Figs. 2 and 3, the rubber and the steel of the blade tongues is ground away as shown at **42** to the radius of the roll **15** so that the actual doctoring is done by the steel edge of the blade except in the areas between the tongues. However, in order to achieve a degree of protection to the surface of the roll against scoring the edge of the resilient sheet **38** may be turned over the tongue edges of the blade as seen at **43** in Fig. 5 so that all of the doctoring is done by the resilient material rather than the steel of the blade.

The results of using this type of tongued blade have proven its superior qualities.

I claim:

1. A combined bottom plate and ink metering blade for an ink fountain adapted to cooperate with the fountain roll and be adjusted by thumb screws across its length to non-uniformly regulate the ink feed across the roll width comprising a resilient metal blade having a longitudinal metering edge for gauging the ink delivery onto the roll and a remote edge portion for mounting the blade, said blade having a plurality of narrow slits extending from near the mounting edge through the gauging edge to provide a plurality of tongues allotted one to each set screw, and a single sheet of flexible material secured throughout its full area to the upper or roll confronting faces of all of said tongues to seal the slits between them against ink leakage.

2. The device as defined in claim 1 in which the said flexible sheet is cut away at the tongue ends substantially to the curvature of the roll whereby the metal of the blade does the metering.

3. The device defined in claim 1 in which the said flexible sheet extends over said metering edge and the material of the sheet protects the roll surface from the metal of the blade.

4. A blade of the type described comprising, in combination, an elongated substantially flat sheet of spring metal having a straight longitudinal gauging edge and a remote mounting edge, said sheet having a plurality of slits therein extending from near the mounting edge through the gauging edge to provide a plurality of flexible tongues and a fluid-tight sheet of flexible material secured throughout its area to one face of said blade to cover the full surface of all of the tongues.

5. The blade as defined in claim 4 in which said flexible sheet extends around the said gauging edge onto the opposite face.

6. The blade as defined in claim 4 in which said metal sheet has straight end edges and the said flexible sheet is turned over the end edges.

7. An ink fountain for printing presses comprising a rotatable fountain roll, a fountain body inclined upwardly from a position spaced beneath said roll, a fountain bottom and ink metering blade having its remote edge secured to the remote edge of the body and its opposite or gauging edge adjacent said roll and spaced above said body, said blade including a plurality of closely adjacent tongues whose free ends compose said gauging edge,

thumb screws extending through said body and each engaging beneath a tongue near its free end, an ink resistant single flexible sheet of plastic material covering the upper face of said blade for at least the whole tongue area thereof to seal the spaces between tongues against ink leakage, means for securing the adjacent faces of said blade and sheet together throughout the whole area of the latter.

8. The ink fountain of claim 7 in which rigid end members cooperate with the blade and roll to contain the ink, said blade fitting closely between said end members and

said plastic sheet being turned around the ends of the blade to form seals with the end plates.

9. The ink fountain of claim 7 in which said flexible sheet is vulcanized to the metal blade throughout the whole area of the sheet.

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