June 2, 1942. J. SCHMUTZ 2,285,060

FLEXIBLE PRINTING PLATE

Filed March 16, 1940

Fig. 1

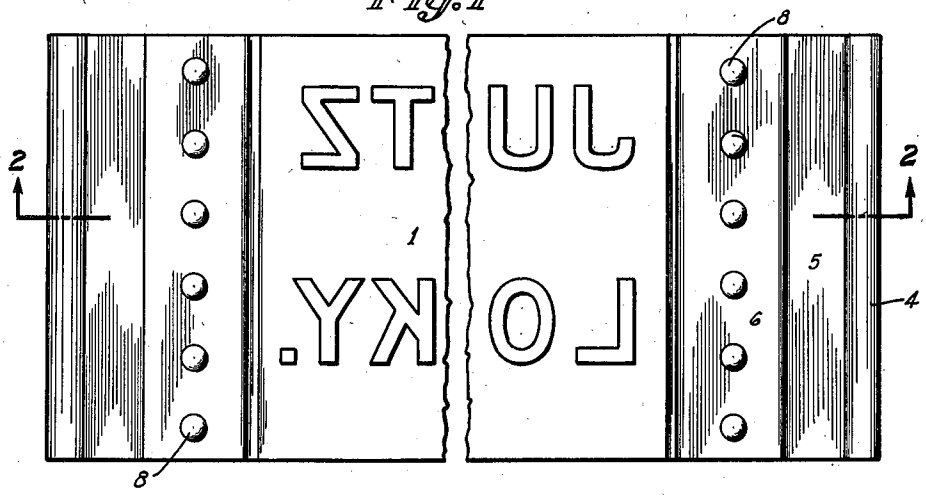


Fig. 2

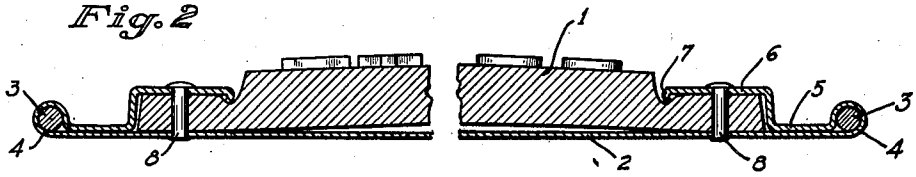


Fig. 4

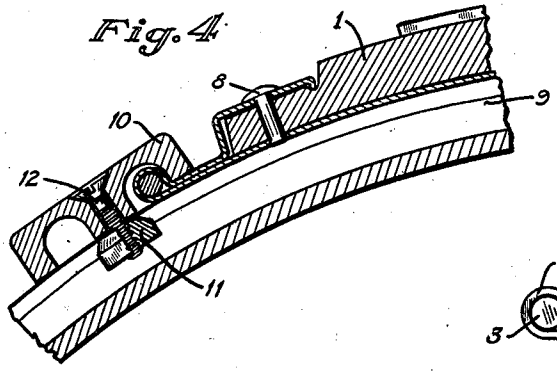
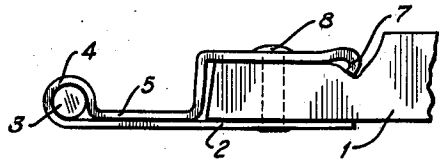


Fig. 3



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FLEXIBLE PRINTING PLATE

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9 Claims. (Cl. 101—401.3)

This invention relates to improvements in flexible printing plates for rotary printing cylinders.

Heretofore, a flexible printing plate, composed of a canvas-backed engraving gum on which the type is permanently engraved, has been wrapped partially around a rotary printing cylinder and firmly secured thereto by manually lacing its ends together. The chief advantage of this plate is its low cost of manufacture. Its chief disadvantage lies in the difficulty of accurately lining it up, or positioning it, on the cylinder in exact register. Ordinarily, it is necessary to approximate the correct position of the plate on the cylinder, secure it firmly and determine the error in register, then loosen, adjust and tighten the plate and redetermine the error in register and thereafter repeat these operations until exact register is secured. Such operations are not only slow and laborious but complicated by the fact that uneven lacing tension often distorts the plate sufficiently to pull one portion thereof out of register although allowing other portions to be in exact register. Furthermore, when once properly positioned and operated, the plate tends to stretch and work out of exact register necessitating additional adjustments from time to time.

The flexible printing plate, shown in my Patent #2,189,682 granted February 6, 1940, is composed of a flexible metal backing on which a type-bearing rubber member is vulcanized. The securing edges of the metal backing are rolled or beaded to facilitate retaining engagement with a clamping mechanism which, for each securing edge, comprises: a securing bar extending along the securing edge and over both the bead and the adjacent portion of the drum; dovetail nuts slidably mounted in dovetail grooves formed in the cylinder; and clamping screws connecting the securing bar to the dovetail nuts and serving to draw the plate toward the nuts and as tightly against the cylinder as may be desired. This arrangement entirely overcomes the registration difficulties above mentioned since the plate may be lightly clamped to the cylinder in a position approximating exact register, thereafter moved into exact register by tapping the clamping mechanism and then clamped immovably in exact register by tightening the clamping mechanism. Furthermore, the metal backing takes up whatever strain is placed on the plate while its flexure insures an even tension on the type-bearing member. Its chief disadvantages are its relatively high manufacturing cost and a tendency of the securing bead to flatten out.

The principal object of the present invention is to provide an improved flexible printing plate having the advantages of the aforesaid prior plates while eliminating their disadvantages. More particularly, the objective is to provide an inexpensive plate which can be easily and quickly mounted on the cylinder in exact register.

When a printing plate produces an uneven impression, it is customary to raise the lower portions thereof by introducing "make-ready" (i. e. thin sheets of paper) between the plate and the printing cylinder, the make-ready ordinarily being cemented or otherwise attached to the cylinder or plate. The make-ready thus applied is not permanent. If applied to the cylinder, it must be removed when the plate is removed and reapplied when the reuse of the removed plate is desired, thus involving enforced idleness of the printing equipment. On the other hand, if it is applied to the plate, it is exposed to the wear and tear of handling when the plate is removed from the cylinder. This usually makes it necessary to re-apply new make-ready when the reuse of the removed plate is desired.

Another object is to provide a plate in which make-ready may be easily, quickly and permanently incorporated away from the printing mechanism and, therefore, without requiring the enforced idleness of such mechanism during the make-ready application.

A further object is to provide a novel form of backing for printing plates of this general character.

The invention is illustrated in the accompanying drawing wherein:

Figure 1 is a plane view of a plate constructed in accordance with my invention;

Figure 2 is a section taken through line 2—2 of Figure 1;

Figure 3 is a fragmentary enlarged view of one edge of the plate; and

Figure 4 is a fragmentary section showing the plate as it appears on a printing cylinder.

The flexible rectangular printing plate embodiment of the invention, illustrated in the drawing, comprises: a flat flexible type-bearing member 1; a flat flexible backing 2 arranged underneath, and in face-to-face relation with, the type-bearing member, with a make-ready space therebetween; and means, along two opposed end margins of the make-ready space, securing the type-bearing member to the backing, the make-ready space being accessible along its side margins through the openings formed by the type-bearing member and the backing.

While any suitable material may be used for

the type-bearing member 1, a canvas-backed engraving gum is preferred, at the present time, because it is an inexpensive stock item readily obtainable on the market in standard sizes. The type-bearing member 1 is prepared in the customary way by engraving its gum face so as to leave the type stand out in relief.

The flat flexible backing 2 preferably is composed of sheet metal of a suitable gauge. In accordance with my invention, each of its securing ends is fashioned not only to accommodate the means by which it may be mechanically secured or clamped to the cylinder, but preferably to provide a binding recess within which the corresponding end margins of the type-bearing member may be received. Accordingly, each securing end is rolled over a rod 3 to form a securing bead 4 and then extended laterally over the backing to form, adjacent the backing, a depressed strip 5 of sufficient width to accommodate the mechanical securing means, and to form, in outwardly spaced relation from the backing, a raised binding strip 6 which cooperates with the backing proper to define a binding recess. The free edge of the raised binding strip 6 is inwardly turned to form a retaining flange 7.

The type-bearing material is arranged over the backing 2. In further accordance with my invention, that portion of the space between the adjacent face areas of these members, which correspond to the type-bearing area of the type-bearing member, is rendered available as a make-ready space, by leaving it unsecured. Accordingly, the type-bearing member and backing are secured only along the end margins of the make-ready space thus provided, such margins corresponding, in the embodiment illustrated, to the end margins of the type-bearing member.

While the end margins of the type-bearing member may be secured to the backing in any suitable way, they preferably are made to extend into the binding recess and are bound therein by suitable fastening means such as the rivets 8 which pass through the binding strip 6 of the type-bearing member 1 and the backing 2. The rivets 8 not only pull the binding strip inwardly to press the type-bearing material firmly against the backing but, in doing so, cause the retaining flange 7 to bite into the type-bearing material and thus insure a firm and even grip.

The securement of the end margins of the type-bearing member to the backing is preferably effected when both parts are flat so that there is little or no tension on the type-bearing member. With this arrangement, when the printing plate is mounted on the cylinder, the outward flexure of the backing against the type-bearing member will place the latter under a degree of tension sufficient to prevent it from moving relatively to the backing during the printing operation.

The plate may be mounted on the cylinder 9 in any suitable way. Since the clamping arrangement shown in Figure 4 is of the character disclosed in my aforesaid Patent #2,189,682, it should suffice to say that it comprises: a securing bar 10 positioned to extend along and over the securing bead 4 and bearing upon the depressed strip 5 on one side of the bead and that portion of the cylinder 9 adjacent the other side of the bead; dovetail nuts 11 slidably mounted in suitable dovetail grooves of the cylinder; and clamping screws 12 connecting the securing bar 10 to the dovetail nuts 11 and serving to draw the plate toward the nuts into engagement with the cylinder. The plate may be mounted simply by placing it on, and clamping it to, the cylinder in a position approximating exact register. Thereafter, by tapping the securing bar with a hammer, the plate may be inched into exact register and then clamped so tightly as to render it immovable. It is desirable that the securing bars 10 engage and exert a pull on the beads of the plate in opposite directions in order to prevent any possibility of the plate moving relatively to the clamping mechanism.

It will be readily appreciated that the present plate may be inexpensively manufactured and easily and quickly mounted in exact register and that, when once mounted, it will be immovably fixed on the cylinder and, therefore, require no further attention. Should low spots develop in the plate, make-ready may be readily inserted from the side margins of, and applied in, the make-ready space. The make-ready may be readily applied to a removed plate; hence the application does not require the printing mechanism to be "shut down." Since the make-ready is concealed, and protected by, the backing and the type-bearing member, it will be more or less permanent; hence the application of new make-ready to correct the same condition will ordinarily be unnecessary.

Heretofore, when a plate became worn sufficiently to round off the corners of the type, causing the type impressions to lose their sharpness and become ragged along the edges, it has been necessary either to scrap the plates or to regrind the type face of the plates and then adjust the printing mechanism to the reduced thickness of the plate. Usually, the plates were scrapped because of the difficulties in effecting a readjustment of the printing mechanism. However, the protected make-ready space of my improved plates makes it possible to insert a make-ready sheet of sufficient thickness to compensate for the wear and then grind the face of the type sufficiently to restore its sharpness. In this way, a worn plate can be restored to the condition of a new plate without necessitating any adjustment of the printing mechanism. Ordinarily, from three to five regrinding operations of this character will be possible, thus correspondingly extending the useful life of the plate.

The foregoing plate, as described, is admirably suited for use where exact register is necessary as in multi-color work. Where exact register is not required, as is often the case in one-color jobs, the protected make-ready space may be eliminated and a less expensive plate produced simply by eliminating all of the backing except that necessary to provide the marginal securing edge members. For example, the marginal securing edge member shown in Figure 3, as a fragmentary view of the backing shown in the other figures, is alone sufficient for use as a securing edge member where the make-ready space is to be eliminated. It will be understood, of course, that another marginal edge member will be provided along the opposed edge of the plate.

Having described my invention, I claim:

1. A unitary printing plate comprising: a flexible unitary backing member presenting a face portion and opposed end portions; a flexible type-bearing member presenting corresponding face and end portions; and means mechanically connecting the corresponding end portions of these members rigidly together, their corresponding face portions cooperating to define a make-ready space between members; said backing

member being operative, when flexed outwardly against the type-bearing member, to tension the latter.

2. A unitary printing plate comprising: a flexible unitary backing member; a flexible type-bearing member extending over the backing member with a make-ready space therebetween; and means, along two opposed end margins of the make-ready space, mechanically securing the type-bearing member rigidly to the backing member, said members being unsecured along the side margins of the make-ready space to permit access thereto.

3. The plate defined in claim 2 wherein: said backing is operative, when flexed outwardly against the type-bearing member, to tension the latter and, when flexed away from the type-bearing member, to render the make-ready space openly accessible along its side margins.

4. A unitary printing plate comprising: a flat flexible unitary backing; a flat flexible type-bearing member extending over the backing with a make-ready space therebetween; and means, along two opposed end margins of the make-ready space, mechanically securing the type-bearing member rigidly to the backing, said space being accessible along its side margins; said type-bearing member being substantially untensioned when flat and said backing being operative, when flexed outwardly against the type-bearing member, to tension the latter.

5. A unitary printing plate comprising: a backing member presenting a face portion and an end portion, the end portion being turned and laterally extended over the face portion to provide a raised bead along the end portion, a depressed clamping strip along the bead, and a raised binding strip along the clamping strip, the binding strip cooperating with the face portion to form a binding recess; a type-bearing member, having face and marginal end portions, arranged with its marginal end portion extending into said binding recess; and means mechanically securing the marginal end portion of said type-bearing member rigidly to the binding strip and backing.

6. A printing plate backing comprising: a flat flexible backing member presenting a face portion and an end portion, the end portion being rolled to form a bead and laterally extended over the face portion to form a depressed strip along the bead and a raised binding strip inwardly spaced from the bead.

7. The backing defined in claim 6 wherein: the free edge of the binding strip is provided with an inwardly directed retaining flange.

8. A printing plate comprising: a flat flexible backing member presenting a face portion and an end portion, the end portion being turned over the face portion to provide a raised binding strip which cooperates with the face portion to form a binding recess; a type-bearing member, having face and marginal-end portions, extending over said backing member with its marginal-end portion extending into said binding recess; and means for securing the marginal-end portion of said type-bearing member to the binding strip and backing, the corresponding adjacent face portions of said members cooperating to form a make-ready space.

9. A printing plate comprising: a flat flexible backing member presenting a face portion and opposed end portions, each end portion being rolled to form a bead and laterally extended over the face portion to form a depressed strip along the bead and a raised binding strip inwardly spaced from the bead; a flexible type-bearing member having a face portion extending over the face of the backing and opposed end portions extending into opposed recesses of the backing; and means for fixedly securing each end portion of the type-bearing member to the adjacent binding strip and backing, the corresponding face portions of the members cooperating to form a make-ready space.

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