Dec. 13, 1949 W. W. DAVIDSON 2,491,090

PRINTING PLATE

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Fig-1

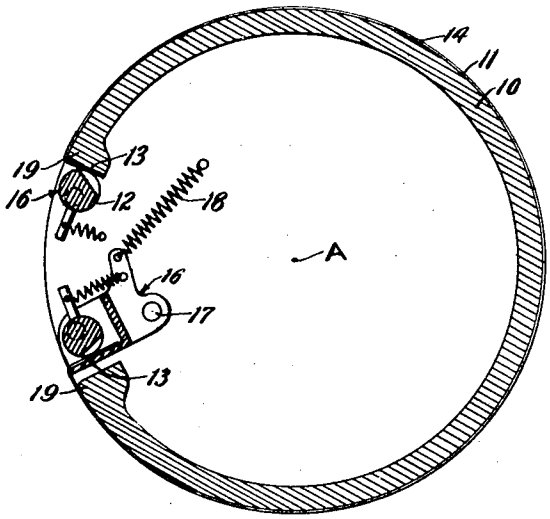


Fig-2

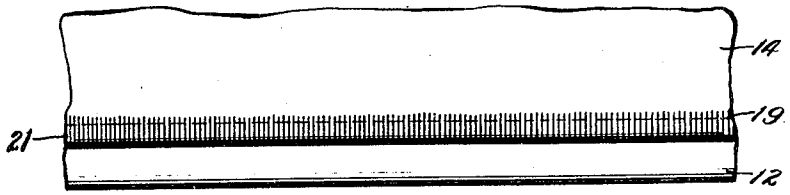
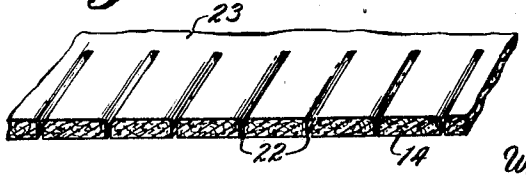


Fig-3

Fig-4

Fig-5



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2,491,090

PRINTING PLATE

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13 Claims. (Cl. 101—415.1)

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My invention pertains to planographic printing plates and relates more specifically to a thin flexible type of planographic plate adapted to prevent buckling of the plate under the influence of lithographic dampening solutions.

One of the primary objects of my invention is to provide a planographic printing plate of the type described formed in such manner as to prevent wrinkling or buckling of the plate on the press under the action of lithographic fluids.

This and other objects of my invention will become apparent from the following description and from the drawing in which

Figure 1 is a sectional view of my plate attached to the drum of a rotary lithographic press of the offset type;

Figure 2 is a partial end view of my plate as applied to the drum;

Figure 3 is an end section of one form of my invention;

Figure 4 is an end section of another form of my invention; and

Figure 5 is and end section of still another modification of my plate.

There are two general types of thin flexible planographic plates ordinarily employed commercially. One class consists essentially of a thin sheet of metal foil such as aluminum ordinarily backed with some type of reinforcing medium such as paper. The second class consists of a thin flexible web of organic material such as paper treated to render the material more suitable for use as a printing plate and to provide a lithographic surface. The materials employed in forming plates of this class are usually cellulosic in nature. In many cases, the structure of the cellulose is wholly destroyed as is the case with plates formed of synthetic plastics and in others, the structure may be altered only partially as illustrated by various parchmentized types of planographic plates. In coated or impregnated types of plates, the fibrous structure of the paper web usually remains substantially undisturbed and since this type of plate is usually the least expensive, it is widely used.

It is essential that a planographic plate be capable of retaining on all non-image areas of its surface a film of moisture and for this reason many types of plates in this class have high water absorption. Although plates of this nature are often treated to render the fibers waterproof without making them water repellent, substantially all of the plates of this class exhibit some expansion or stretching when dampened by lithographic fluids. This phenomena is most pronounced in paper plates and the least noticeable when plastic sheet is employed as a web.

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This invention is concerned primarily with paper base planographic plates but is equally applicable to other similar plates wherein the expansion upon dampening constitutes a potential source of difficulty.

Referring to the drawings, a printing drum 10 is rotatably mounted about an axis A and includes a printing surface or periphery 11. A portion of the printing surface 11 is cut away, as is common in such drums, to provide recessed areas in which plate clamping means 16 may be positioned. The clamping means may take many forms and are not material to this invention but may suitably comprise a roller or bar 12 mounted parallel to the axis of the drum 10 for eccentric rotation and positioned coact with an abutment 13 formed on ends 19 of the drum 10 in such manner that rotation of the bar 12 will bring its surface into contact with that of the abutment 13 thereby clamping a plate 14 firmly to the roller. The leading clamping means 16 is fixed, but the following clamping means may be pivotally mounted as at 17 and urged inwardly by a spring 18 in order to apply a continuous tension to the plate 14.

Since the inking and dampening rollers pass over the surface of the plate 14 every revolution, it is obvious that the printing surface of the drum 10 must be smooth and that no portion of the clamping means 16 extend outwardly beyond the surface. It is customary to dispose the grain of printing plates expansible by dampening in a direction which will minimize the expansion normal to the axis A of the drum 10. Any expansion occurring in this direction is therefore small and is compensated by the spring tensioning means 18. This type of structure, however, permits considerable expansion of the plate 14 in the direction parallel to the axis which, if unrestrained, would not be objectionable since it does not tend to throw the press out of registry. The clamping means 16, however, and particularly the bar 12, will usually extend substantially the entire length of the drum 10 and therefore serves to normally restrict the expansion of the plate 14 parallel to the axis of the drum 10. Furthermore, the dampening rollers do not contact the portion of the plate disposed between the clamp 16 and the end 19 of the drum. Expansion of the plate 14 parallel to the axis A therefore results in a series of folds or buckles unusually forming on the printing surface 11 near the ends 19 and which project upwardly a distance sufficient to

force them into firm contact with the inking rollers. Because of the resulting abrasive action and increased pressure, ink is deposited on these buckles or folds and is in turn deposited by the press on the work.

I have found that this difficulty can be substantially eliminated by forming on an end of the plate 14 a series of substantially linear mutilated areas extending from a point adjacent the end of the plate towards the center of the plate a distance sufficient to position the inner ends of the mutilated areas on or near the printing surface 11 adjauent the ends 19. These mutilated areas, which greatly reduce the resistance of the section of the plate on which they are disposed to expansion, are preferably formed on the plate after the coating or impregnating steps, if any, have been completed and in their most effective form resemble substantially straight parallel lines normal to the axis of the drum A and normal to the direction of expansion. Since the maximum difficulty is encountered at the leading edge of the plate, the mutilated areas are most advantageously formed at this point but are preferably formed to both ends of the plate 14.

The width and spacing of the mutilated areas is not critical, but I have found that substantially linear areas, that is areas which greatly exceed the width, are highly effective when spaced about one-sixteenth of an inch apart. The mutilated areas may be formed by placing the edge of the plate on a yielding surface such as rubber and embossing or indenting the mutilated areas on the sufrace of the plate with a blunt instrument to form areas of parallel linear indentations 21. Wheels or discs of the type used for precreasing paper, operating against a rubber pressure roll, are satisfactory for this purpose. The indenting or scoring action causes a distortion of the web material immediately below the instrument and is preferably sufficient to cause ridges 24 to appear on the opposite surface of the plate immediately below the indentations 21. If the plate employs a fibrous web, the indentations should be sufficiently deep to produce a visible set or distortion of the fibers.

The instrument used for forming the indentations 21 should be blunt in order to avoid complete rupture or tearing of the web and to insure that small portions of the fiber or web material do not project upwardly beyond the general surface of the plate. It is, of course, obvious that the ridges 24 and, to a certain extent, the plate areas lying between the indentations 21 will project slightly beyond the plane of the plate but the amount of projection is not great enough to cause pickup of ink.

The indentations 21 may be arranged relative to each other in a number of ways; for example, as illustrated in Figure 3, the indentations 21 may be formed only on the surface of the plate or, as illustrated in Figure 4, alternately on the face and back of the plate 14.

Another method of forming mutilated areas is to form a series of slits 22 substantially similar in length and disposition to the indentations 21. In this modification, however, the slits 22 should not extend to the edge of the plate because of the difficulty in handling which would obviously be encountered.

I prefer to terminate the slits a short distance inwardly from the edge of the plate leaving as unslit section 23 interposed between the end of the slits 22 and the end of the plate 14. However, the unslit strip 23 should not be of such depth that

the slits 22 will be uncovered by the clamping means 16 since the most efficient operation of my plate requires that the mutilated areas extend substantially to the clamping means 16. If desired, the indentations 21 could be similarly formed, leaving an unmutilated strip adjacent the end of the plate 14 but since this serves no useful purpose where indentations are employed, I ordinarily prefer to continue the indentations 21 to the end of the plate.

Although I do not wish to bind myself to any theory of operation, it is believed that mutilation of the type described produces lines of weakness or variable strength which may serve to distribute the buckling areas evenly across the plate in such manner that no single buckle is sufficiently great to cause the plate to pick up ink. Furthermore, the plate after indenting has a pleated appearance indicating that there may have been a flow of material coupled with a compensating contraction which reduces the resistance of the section bearing the indentations to expansion.

Planographic plates treated in accordance with the teachings of my invention can be placed directly on the printing drum without prior treatment without danger of buckling near the drum ends. This not only reduces the degree of skill required by the operator but increases the utility of the plate for, in many instances, the highest degree of skill cannot prevent buckling of ordinary plates. Furthermore, the manufacturer of paper plates is enabled to employ certain less expensive materials in the manufacture of the plate which have heretofore been considered unusable because of excessive expansion.

In compliance with Section 4888 of the Revised Statutes, I have herein described only certain preferred modifications of my invention but it is to be understood that I do not wish to be limited to the specific details herein described except in so far as described in the appended claims.

I claim:

1. A flexible printing plate comprising a thin flexible web of material expansible by dampening and adapted for attachment to a rotatable drum, the plate being characterized by a series of substantially uniform linear and parallel mutilated areas adjacent one end of the plate.

2. A flexible printing plate comprising a thin flexible web of material expansible by dampening and adapted for attachment to a rotatable drum, the plate being characterized by a series of substantially uniform linear mutilated areas adjacent one end of the plate, said areas being generally normal to the axis of the drum.

3. A flexible planographic plate comprising a thin flexible web of material expansible by dampening and adapted for attachment to a rotatable printing drum, the plate being characterized by a series of substantially linear uniform mutilated areas adjacent one end of the plate, said areas being generally normal to the axis of the drum and of sufficient length to extend onto the surface of the drum.

4. A generally rectangular flexible planographic plate comprising a web of flexible fibrous material expansible by dampening and adapted for attachment to a printing press, the plate being characterized by a plurality of substantially uniform linear mutilated areas approximately parallel to the long dimension of the plate and disposed adjacent one end of the plate.

5. A generally rectangular planographic plate comprising a web of paper expansible by dampening and adapted for attachment to a printing

press, the plate being characterized by a plurality of substantially uniform linear mutilated areas approximately parallel to the long dimension of the plate and disposed adjacent one end of the plate.

6. A flexible printing plate comprising a thin flexible web of material expansible by dampening and adapted for attachment to a rotatable printing drum, the plate being characterized by a series of substantially linear surface indentations generally normal to the axis of the drum and extending inwardly from an end of the plate a distance sufficient to reach the printing surface when attached to the printing drum.

7. A flexible printing plate comprising a thin flexible web of material expansible by dampening and adapted for attachment to a rotatable printing drum, the plate being characterized by a series of substantially linear surface indentations formed alternately on the face and back of the plate and generally normal to the axis of the drum, said indentations extending inwardly from an end of the plate a distance sufficient to reach the printing surface of the plate when attached to the printing drum.

8. A flexible printing plate comprising a thin flexible web of material expansible by dampening and adapted for attachment to a rotatable printing drum, the plate being characterized by a series of slits generally normal to the axis of the drum and of sufficient length to extend from approximately the edge of the printing surface to a point short of the end of the plate when attached to the printing drum.

9. A flexible planographic printing plate comprising a paper web adapted for attachment to the drum of a rotary press, a lithographic coating on one surface of the plate, and a series of substantially linear surface indentations generally normal to the axis of the drum extending inwardly from an end of the plate a distance sufficient to reach the supporting plane of the drum.

10. A flexible planographic printing plate comprising a paper web adapted for attachment to the drum of a rotary press, a lithographic coating on one surface of the plate, and a series of substantially linear surface indentations formed alternately on the surface and back of the plate

generally normal to the axis of the drum extending inwardly from an end of the plate a distance sufficient to reach the supporting plane of the drum.

11. A planographic printing plate comprising a fibrous web expansible by dampening, a lithographic surface on the web, said web being adapted for attachment to the drum of a rotary press, and a series of substantially parallel linear mutilated areas adjacent one end of the plate, said areas being generally normal to the axis of rotation of the press and characterized by distortion of the fiber structure beneath each of said areas.

12. A planographic printing plate comprising a fibrous web expansible by dampening, a lithographic surface on the web, said web being adapted for attachment to the drum of a rotary press, and a series of substantially parallel linear mutilated areas adjacent one end of the plate, said areas being generally normal to the axis of rotation of the press and characterized by distortion of the fiber structure beneath each of said areas, said distortion being of such character as to substantially prevent protrusion of adjacent areas above the plane of the plate surface.

13. A planographic printing plate comprising a web of organic material expansible by dampening, a lithographic surface on the web, said web being adapted for attachment to the drum of a rotary press, and a series of substantially parallel linear mutilated areas adjacent one end of the plate, said areas being generally normal to the axis of rotation of the press and characterized by distortion of the structure of the web beneath each of said areas.

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