

Feb. 6, 1940.

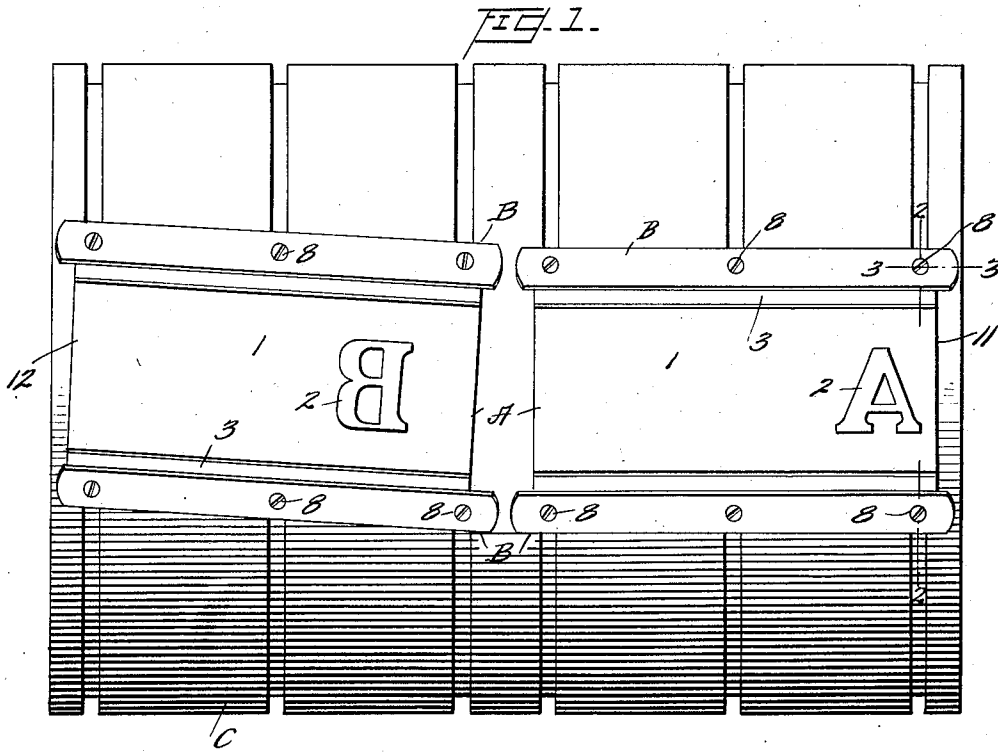
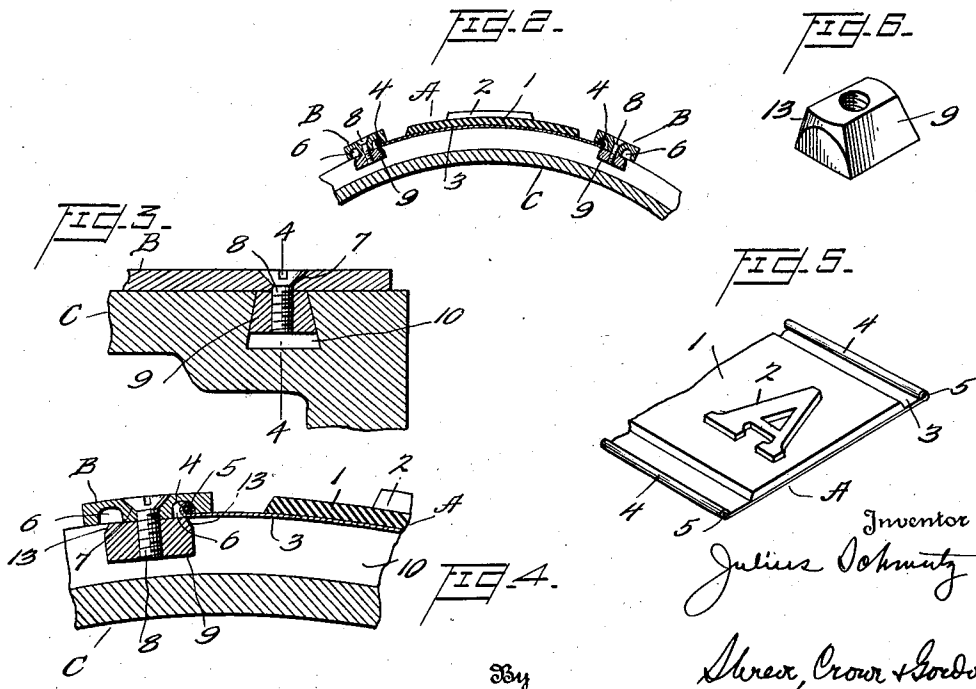
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2,189,682

PRINTING PLATE AND ATTACHING MEANS

Filed Aug. 31, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 7.

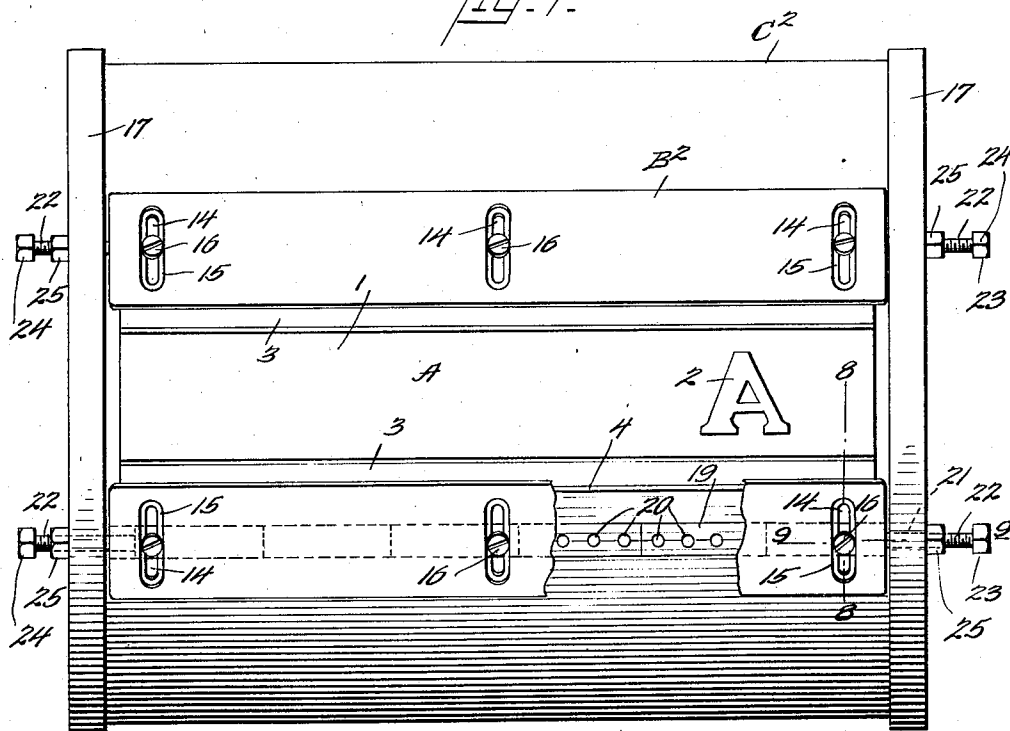


FIG. 8.

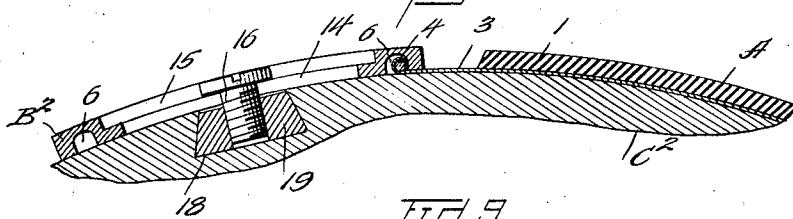
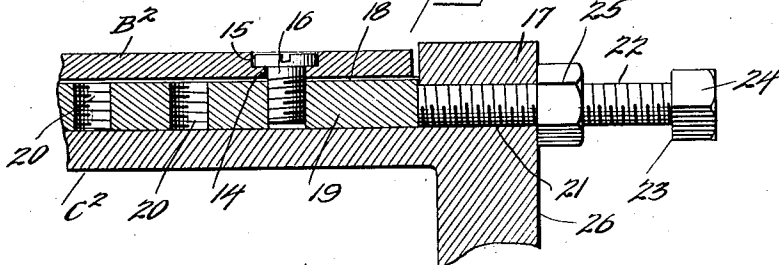


FIG. 9.



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UNITED STATES PATENT OFFICE

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PRINTING PLATE AND ATTACHING
MEANS

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12 Claims. (Cl. 101—415.1)

Generically this invention relates to printing plates, but it is more particularly directed to such a plate wherein a vulcanized or hand engraved printing plate is mounted on a flexible metal back and including means for attaching the plate to the printing cylinder.

One of the principal objects of this invention is the provision of a practical and economical plate of this character and adjustable means for securely, snugly and accurately attaching the plate to the printing cylinder.

An important object of this invention is the provision of a flexible plate backing structure and attaching means therefor so constructed as to be adjustable without removing the plate from the cylinder and wherein the flexible metallic backing structure may be standardized to accommodate a rubber printing plate element or printing characters of the particular size desired, thereby effecting a saving in the printing element forming material.

A further object of this invention is the provision of a flexible metallic back for a rubber or other resilient printing plate having its attaching edges for co-operation with a clamping strip for securing the printing plate to the printing cylinder and so constructed that the clamping strip will clampingly engage the plate throughout its length to fasten the plates securely and snugly, preventing its coming off during the printing operation or buckling away from the cylinder and permitting adjustment of the plate horizontally and circumferentially of the cylinder as desired.

Another important object of this invention is the provision of a flexible metal back rubber printing plate and cooperating attaching means of this character engageable by a clamping means so constructed as to adjust the angle of the printing plate with respect to the cylinder or other printing plate to effect a fine registration of colors, even though the plates may be slightly out of register with each other, and without removing the plate from the cylinder and which is an important advantage, since heretofore in many cases the clamping arrangement on the outside edges of the plates not being true with the printing characters has rendered it difficult to effect the necessary color registration.

With these and other objects in view, which will become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts, herein after more fully described and claimed, and il-

lustrated in the accompanying drawings, in which like characters of reference indicate like parts throughout the several figures, of which:

Fig. 1 is an elevation of a cylinder with two printing plates mounted thereon.

Fig. 2 is a section taken on the line 2—2 of Fig. 1.

Fig. 3 is a section taken on the line 3—3 of Fig. 2.

Fig. 4 is a section taken on the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary perspective view of a portion of a printing plate.

Fig. 6 is a perspective view of an attaching nut.

Fig. 7 is an elevation of a different form of cylinder and plate attaching means.

Fig. 8 is an enlarged section on the line 8—8 of Fig. 7.

Fig. 9 is an enlarged section on the line 9—9 of Fig. 7.

The manner of constructing printing plates and the manner of effecting their attachment and adjustment with respect to the printing cylinders and plates with which color registration is necessary, with which I am familiar, has proven deficient in many respects. In the first place, it has proven difficult to securely attach the plates to the cylinder and it also has been impossible to satisfactorily adjust the plate or plates longitudinally and circumferentially with respect to the cylinder without requiring much time and effort, to say nothing of the difficulty in effecting color registration, occasioned either by the edges of the plate not being true with respect to the printing characters or when a plate becomes slightly out of position and also to produce different sized rubber or other flexible plates without considerable loss and wastage of various amounts of material in connection with different sized plates, and it was to overcome such deficiencies and to provide a printing plate having a flexible metal backing susceptible of standardization and wherein different sized plates may be adapted for mounting thereon necessitating only the material requisite for a desired size, thereby eliminating wastage of material, said metal backing being so formed along its attaching edges as to cooperate with complementary engaging means carried by the attaching strip, said strip adapted when tightened to draw the plate or plates connected to said strip snug about the cylinder throughout the surface area of the plate, the construction of said attaching means being such that a plate

may be angularly adjusted with respect to a plate with which it is adapted to effect registration without removing the plate from the cylinder, said attaching means being adapted to secure more than one plate to the cylinder and permitting a plate or plates carried thereby to be adjusted or removed and other plates substituted without the necessity of removing the remaining plates carried thereby, that I designed the printing plate and attaching means forming the subject matter of this invention.

In the illustrated embodiment characterizing this invention there is shown a printing plate A, a printing plate attaching element or strip B, and printing cylinder C. The printing plate A is formed with a vulcanized rubber plate portion 1 or with molded printing characters 2 vulcanized or otherwise suitably mounted on a thin flexible metallic backing member 3 formed at its opposite attaching edges with an upstanding bead 4 formed in any suitable manner, or if desired may be formed by bending said edges around a rod or core 5 or upon themselves as will be clear without further description.

The anchor attaching strip or bar B is formed on one surface adjacent its opposite edges with longitudinal slots 6, which slots if desired may be semi-circular in cross section so as to grippingly engage the respective edges 4 of plate A, as will directly more fully appear. In the present instance the strips B are formed with three equispaced openings 7 beveled to receive the correspondingly formed head of screws 8, said screws adapted to threadedly engage the complemental formed dovetail nuts 9 designed to fit in the dovetail grooves 10 formed in parallel spaced relation in the circumferential surface of cylinder C so that when the flexible plate A is mounted on cylinder C with a slot 6 of a strip B engaging over the bead 4 at opposite sides of the plate, a tightening of screws 8 will draw the plate into tight surface contact over cylinder C, as will be apparent.

It will be noted that one of the strips B may be employed for attaching the edges of two adjacent plates, thereby eliminating the necessity for a multiplicity of attaching elements and at the same time owing to the fact that the plate is permanently held at every point throughout its contacting area that it will be firmly held in place and maintained against displacement even under rigid and continuous operating requirements.

It will also be observed that plates may not only be mounted at opposite sides of the strips and in end to end relation between the strips, but as shown in Fig. 1 the strips and plates may be mounted in end to end relation such as designated 11 and 12 in Fig. 1. It is obvious that a plurality of these plates may be mounted circumferential of the cylinder as desired, and that by simply loosening screws 8 the plate may be adjusted longitudinally of the cylinder and when necessary circumferential of the cylinder as well without removing any adjacent plate held by the clamping strip B, or the plate may be removed and two smaller plates substituted and secured in operative position by tightening screws 8, as will be apparent.

If it is not desired to disturb the centering of the plate with respect to its position on the cylinder and yet position the plate at a considerable angle, as shown at 12, it is only necessary to loosen the end screws 8 and use the center screws as pivots to angularly position the bars B as desired

by shifting the end nuts 9 in grooves 10 and then tightening said screws to secure the plate 12 at the desired angle and in printing position. By this means it will be observed a fine registration of colors can be secured even though the plates may be slightly out of register with each other and without removal of the plates to effect their readjustment, and in order to effect a maximum adjustment of the nuts 9 in grooves 10 said nuts are formed at their opposite ends with rounded or curved faces 13. Where fine registration of colors is desired such adjustment adds greatly to the quality of the printing and effects much saving in time, thereby limiting the time consumed in stoppage of the press, by being able to adjust the plates where a number of colors are being printed and to also permit mounting of plates adapted to block in certain printed matter, where flowers or other artistic pictures are being printed, as will be apparent.

Having described a printing plate and attaching means for printing cylinders designed to not only secure the plate but to effect longitudinal and circumferential adjustment thereof with respect to the cylinder where the dovetail grooves extend circumferentially of the cylinder, means for attaching the plate and effecting its similar adjustment with respect to the cylinder where the dovetail grooves extend longitudinally thereof and wherein the attaching means and groove structure is slightly modified, but without departing from the scope or spirit of the invention, will now be described.

In Figs. 7, 8, and 9 there is shown a printing plate A formed with a vulcanized rubber plate portion 1 having printing characters 2 and vulcanized or suitably mounted on a flexible metallic backing 3 formed at its edges with upstanding beads 4, such structure being similar to that of plate A hereinbefore described.

The anchor or attaching strip B² is formed on one surface adjacent its opposite edges with longitudinal slots 6 similar to slot 6 heretofore described for engaging the respective edges 4 of plate A, as will be apparent. The strips B² are adapted to extend substantially the length of the cylinder C and are wider than the strips B in order to accommodate the transverse slots 14 which are positioned similar to openings 7 of strips B and are countersunk as at 15 to receive the complementally formed head of screws 16.

In connection with this form the printing cylinder C is similar to the cylinder above described except it may be formed with circumferential or annular end flanges 17 extending slightly above the plate supporting surface and is formed in said surface with the circumferentially spaced longitudinally extending grooves 18. These grooves are similar to groove 10 except that they extend longitudinally instead of annularly of the cylinder.

A plurality of dovetail blocks 19 corresponding to dovetail nuts 9 are slidably mounted in end to end relation throughout the length of the grooves, or certain of them, and are formed with a plurality of spaced threaded openings 20 adapted to selectively receive the threaded portions of screws 16 extending through clamping bars B² to clamp the printing plates A to the cylinder, as will hereinafter more fully appear.

The opposite ends of said cylinder C are formed with an annular row of threaded openings 21 in alignment with the respective grooves 18 and adapted to receive the threaded shanks 22 of bolts 23 formed with octagonal heads 24.

Aligned bolts 23 in opposite ends of said cylinder C are adapted to engage the respective exposed ends of blocks 19 for effecting longitudinal adjustment of the blocks with respect to said grooves 18, and plates A with respect to cylinder C, said blocks being locked in such adjusted position by octagonal nuts 25 threadedly adjustable on shanks 21 of bolts 23 and engageable with the ends 26 of cylinder C, as will directly more fully appear.

While the operation of my improved plate and attaching means is thought to be clear from the above description, it might be well to further state that with respect to the form illustrated in Figs. 1 to 5, assuming the strips B are connected to the cylinder, to operatively mount the printing plate 11 or plates 11 and 12 it is only necessary to place the plate in the proper position on cylinder C, bring groove 6 into interlocking engagement with bead 4 and tighten screws 8, and it will be apparent that as the screws 8 are tightened the plate will be drawn down in taut or snug binding engagement with the supporting surface of the cylinder by strips B and the plate will be held throughout the length of its clamping edges, rendering creeping, buckling or slippage of the plate practically impossible during the printing operation, thereby assuring accurate printing and fine registration of colors in connection with such latter type of printing.

Where a strip B is employed to secure two printing plates, by slightly loosening screws 8 a respective plate may be adjusted or removed and another plate substituted without necessitating removal of the other plate, thereby rendering it easy to replace or accurately adjust a plate or plates and by virtue of which not only is a saving in labor and stoppage of the press effected, but more accurate printing obtained. In multi-color printing where the characters of one plate may be slightly out of register, one of said plates may be easily adjusted without having to remove the plate and remount it and without changing the centering of the plate, by slightly loosening the end screws 8 of the opposing clamping bars B and pivoting said bars about the intermediate or center screws 8 to shift the plate 12, for instance, at an angle to effect the proper registration and tighten screws 8 to lock the plate in such adjusted position, as shown in Fig. 1. This has heretofore been extremely difficult if not impossible of attainment, since if the attaching means were loosened the plate would spring from its position and necessitate complete remounting of the plate as in the first instance.

The operation of the form illustrated in Figs. 7, 8 and 9 is generally similar to that above described except as to such modifications necessary in view of slight structural changes in cylinder C. In this form the operation of mounting plates A and their clamping engagement with strips B2 are similar to that above described, except circumferential adjustment of the plate A in this form is effected by loosening the screws 16 and moving the strips B2 circumferentially of the cylinder, such movement being permitted by the transverse slots 14, and longitudinal adjustment of the plates with respect to said cylinder is effected by the relative adjustment of bolts 23, since it will be apparent that loosening said bolts at one end of the cylinder and tightening them at the other will effect adjustment of the strips B and plate A as will be apparent. This adjustment of the printing plate and its retention

in such adjusted position is likewise effected without necessitating removal and replacement of the plate.

It will therefore be apparent that to loosen, adjust and secure the plate in such adjusted position will be expeditiously effected without the necessity of removing and remounting the plate to effect such adjustment, as has heretofore been necessary.

It will thus be observed that I have designed a flexible metallic printing plate backing element susceptible of standardization and on which is adapted to be mounted a rubber printing plate element of varying sizes, thereby effecting a saving in the printing element forming material, and formed with attaching means on its respective edges, and attaching means carried by the cylinder and engageable therewith throughout the length of the said backing element for maintaining the plate in proper printing position on the cylinder, said attaching means being operable to permit longitudinal, circumferential, and angular adjustment of the plate with respect to said cylinder without removal of the plate from the cylinder and, where a number of plates are employed, permitting adjustment of one plate with respect to another and the removal of one plate held by the attaching means without removal of the other, said plate and attaching means structure being simple in construction, versatile in its adaptive use, manufacturable at a minimum cost and efficient for the purposes intended.

Although in practice I have found that the form of my invention illustrated in the accompanying drawings and referred to in the above description as the preferred embodiment is the most efficient and practical, yet realizing the conditions concurrent with the adoption of my invention will necessarily vary, I desire to emphasize that various minor changes in details of construction, proportion and arrangement of parts, may be resorted to within the scope of the appended claims without departing from or sacrificing any of the principles of this invention.

I claim:

1. The combination with a flexible printing plate formed with fastening elements along two of its opposite edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, means in connection with the clamping members to engage over the fastening elements of the plate, said means being coextensive with the length of the plate, and coacting means between the clamping members and the surface of the cylinder to permit circumferential adjustment of the clamping members and the plate over said cylinder surface and their angular adjustment relative to the path of movement for the said circumferential adjustment, said coacting means including a series of spaced concentric grooves circumscribing the cylinder.

2. The combination with a flexible backing for a flexible printing plate formed with fastening elements along two of its opposite edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, channel means in connection with the longitudinal edges of the clamping members, the means along one edge adapted to engage the fastening elements of the backing member, said means along the free edges of said clamping members adapted to engage respectively the fastening element of

an adjacent flexible backing and coacting means between the clamping members and the surface of the cylinder to permit circumferential adjustment of the clamping members and backing member over said cylinder surface and their angular adjustment relative to the path of movement for the said circumferential adjustment.

3. The combination with a flexible printing plate formed with fastening elements along two of its edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, fastening element engaging means in connection with the longitudinal edges of the respective clamping members, said means along one edge of said clamping members adapted to engage the fastening elements of said plate, the means along the other edge adapted to engage respectively the fastening elements of an adjacent plate, coacting means between the clamping members and the surface of the cylinder to permit circumferential adjustment of the clamping members and plate over said cylinder surface and their angular adjustment relative to the path of movement for the said circumferential adjustment.

4. The combination with a flexible backing for a flexible printing plate formed with fastening elements along two of its edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, means in connection with the longitudinal edges of the respective clamping members, the means along one edge adapted to engage the fastening elements of the backing member, coacting means between the clamping means and the surface of the cylinder to permit circumferential adjustment of the clamping members and the backing member over said cylinder surface and their angular adjustment relative to the path of movement for the said circumferential adjustment, said means including a series of spaced concentric grooves circumscribing the cylinder, and locking elements carried by the clamping members and operating in the grooves, the means along the free edges of said clamping members adapted to engage respectively the fastening element of an adjacent flexible backing.

5. The combination with a flexible backing for a flexible printing plate formed with fastening elements along two of its edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, means in connection with the clamping members to engage the fastening elements of the backing member, and coacting means between the clamping members and the cylinder to permit circumferential, longitudinal and angular adjustment of the backing member over said cylinder surface, said coacting means including a trio of spaced grooves extending circumferentially of the cylinder.

6. The combination with a flexible printing plate formed with fastening elements along two of its edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, means in connection with the longitudinal edges of the clamping members, the means along one edge adapted to engage the fastening elements of the plate, the means along the other edge of said clamping members adapted to engage respectively the fastening element of an adjacent plate, coacting means between the clamping members and the surface of the cylinder to permit circumferential adjustment of the clamping members and the plate over said cylinder surface, and coacting means in connection

with the cylinder and ends of said clamping members to effect longitudinal adjustment of said clamping members and said plate over said cylinder surface.

7. The combination with a flexible printing plate formed with fastening elements along two of its edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, means in connection with the longitudinal edges of the respective clamping members, the means along one edge adapted to engage the fastening elements of the plate, the means along the other edge of said clamping members adapted to engage respectively the fastening element of an adjacent flexible plate, coacting means between the clamping members and the surface of the cylinder to permit circumferential adjustment of the clamping members and the plate over said cylinder surface, and coacting means in connection with the ends of the cylinder and ends of said clamping members to effect longitudinal adjustment of said clamping members and said plate over said cylinder surface, each of said clamping means adapted to engage the fastening element of an additional plate.

8. The combination with a flexible backing for a flexible printing plate formed with fastening elements along two of its edges, of a printing cylinder, a pair of clamping members disposed upon the surface of the cylinder, means in connection with the longitudinal edges of the clamping members, the means along one edge adapted to engage the fastening elements of the backing member, the means along the other edge of said clamping members adapted to engage respectively the fastening element of an adjacent flexible backing, a plurality of adjustable coacting means between the clamping members and the surface of the cylinder, certain of said adjustable means constituting pivots, said coacting means adapted to permit circumferential adjustment of the clamping members and backing member over said cylinder surface and the angular adjustment of said clamping members and backing member over said cylinder surface relative to the path of movement for the said circumferential adjustment.

9. The combination with a plurality of flexible printing plates, each of said plates being formed with fastening means along two of its opposed edges, of a printing cylinder, a series of clamping members disposed upon the surface of the cylinder, means in connection with the opposed side edges of the respective clamping members, the means along one edge adapted to engage the fastening means of one plate and the means along the other edge adapted to engage the fastening means of another plate, coacting means between the clamping members and the surface of the cylinder to permit circumferential, longitudinal, and angular adjustment of the plates relative to said cylinder surface.

10. The combination with a printing cylinder, of a series of flexible backing elements for flexible printing plates mounted circumferentially of the cylinder, the respective backing elements formed with fastening means along two of their opposite edges, a series of clamping elements having means adapted to engage the fastening means of adjacent backing elements to interconnect said backing elements as a unit, certain of said clamping elements adapted to engage the free edges of and constitute anchor means for the end backing elements, and coacting means

between the clamping elements and the surface of said cylinder adapted to permit circumferential and longitudinal adjustment of the unit with respect to said cylinder and longitudinal adjustment of the individual backing elements with respect to said cylinder.

11. The combination with a printing cylinder, of a plurality of flexible printing plates positioned circumferentially of said cylinder, the respective plates being formed with fastening means along two of their opposed edges, a series of clamping members, each of said clamping members adapted to engage the fastening means along one edge of adjacent plates, coating means between the clamping members and the surface of the cylinder to permit circumferential, longitudinal and angular adjustment of said plates relative to said cylinder surface.

12. The combination with a printing cylinder,

of a series of flexible backing members for flexible printing plates mounted circumferentially of the cylinder, the respective backing members formed with fastening means on two of their opposite edges, a plurality of clamping elements having means engaging the fastening means along one edge of adjacent backing members to interconnect said members as a unit and adapted to permit relative adjustment of said members with respect to each other and said clamping elements, the clamping elements engaging the fastening means along the free edges of the end backing members constituting anchoring means, and coating means between the clamping elements and the surface of said cylinder adapted to permit circumferential, longitudinal, and angular adjustment of the backing unit with respect to said cylinder.

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