March 4, 1969 D. M. SIMMONS 3,430,561

LOCKING DEVICE FOR ROTARY PLATE CARRIER SHEET

Filed April 22, 1968 Sheet 1 of 2

FIG. 1

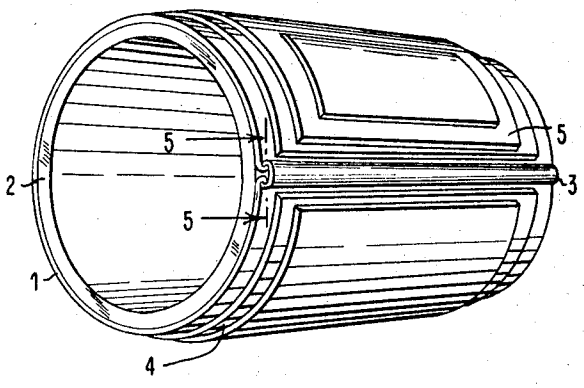


FIG. 3

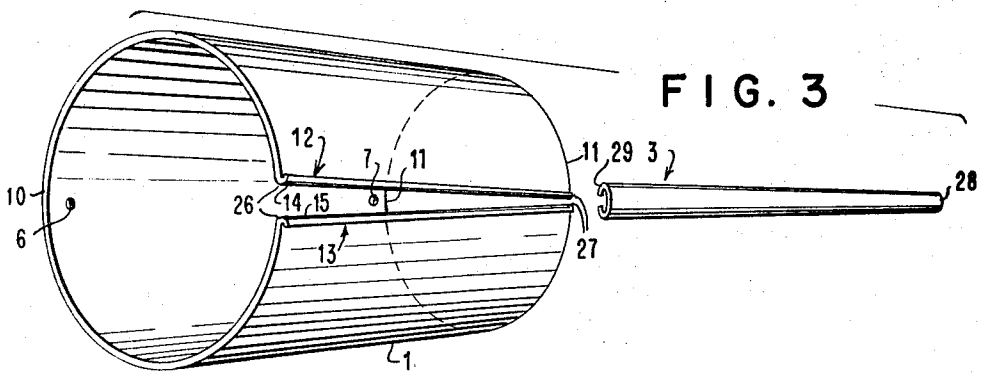
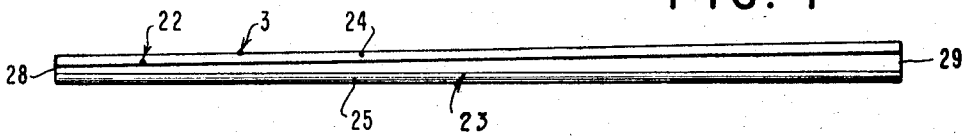


FIG. 4



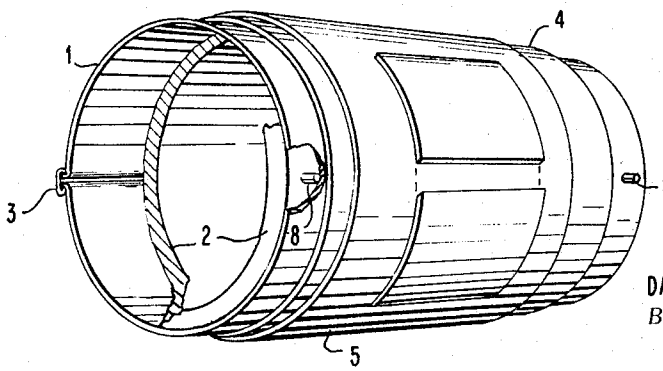


FIG. 2

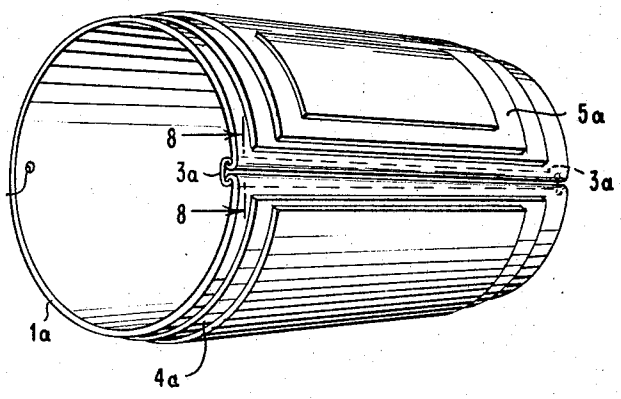
INVENTOR.
DAYTON MARK SIMMONS
BY Jay L. Cinamon
ATTORNEY

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LOCKING DEVICE FOR ROTARY PLATE CARRIER SHEET

Filed April 22, 1968 Sheet 2 of 2

FIG. 6



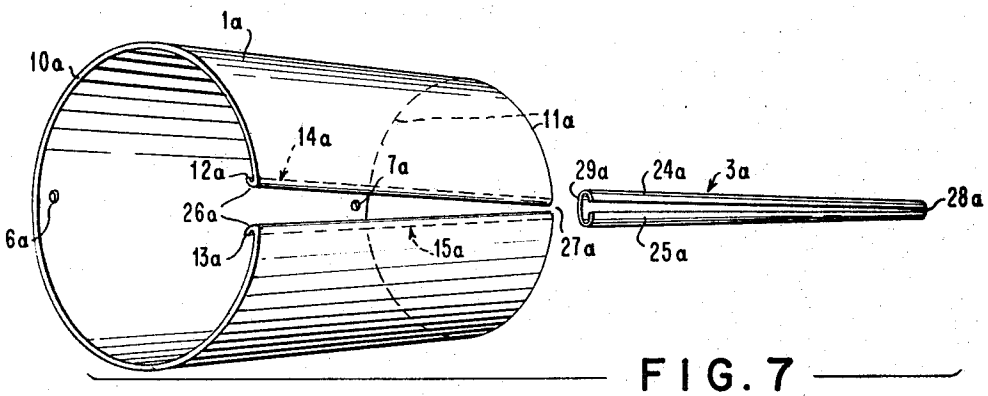


FIG. 7

FIG. 8

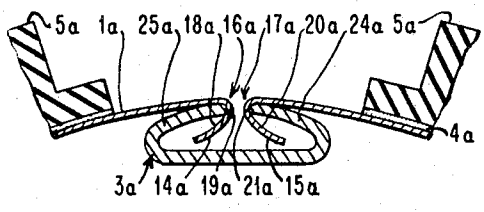
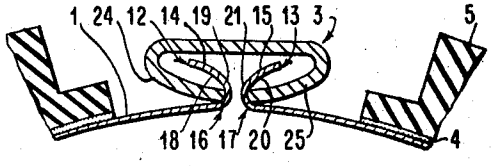


FIG. 5



INVENTOR.

DAYTON MARK SIMMONS

BY Jay L Cinamon

ATTORNEY

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3,430,561

LOCKING DEVICE FOR ROTARY PLATE CARRIER SHEET

Dayton Mark Simmons, Parchment, Mich., assignor to International Paper Company, New York, N.Y., a corporation of New York

Continuation-in-part of application Ser. No. 539,196, Mar. 31, 1966. This application Apr. 22, 1968, Ser. No. 722,892

U.S. Cl. 101—415.1 17 Claims

Int. Cl. B41f *1/28, 21/00;* B41l *21/00*

ABSTRACT OF THE DISCLOSURE

The present invention provides a combination of locking and registry means whereby a carrier sheet having a printing plate applied thereto is locked on a plate cylinder under uniform tension and with the printing plate aligned in accurate registry. A carrier sheet having registry holes, the carrier sheet having been tapered and crimped to provide lips defined by arcuate fold surfaces, is slipped over registry pins projecting from the surface of a printing cylinder, and the lips of a locking clip, said locking clip having been tapered and crimped to provide said lips, engage the arcuate folds and progressively slide thereover until the carrier sheet is completely engaged and locked under uniform tension.

This application is a continuation-in-part of my copending aplication Ser. No. 539,196, filed Mar. 31, 1966, now abandoned.

The present invention relates to locking means and registry means for use with rotary printing presses, and, more particularly, to means for locking a carrier sheet having a non-rigid printing plate applied thereto on a plate cylinder of a flexographic printing press and to means for mounting and maintaining said printing plate in accurate registry.

The packaging industry, and in particular that segment of the industry which manufactures plastic-coated paperboard cartons, employs the flexographic printing process to imprint the advertising indicia which appear on the surface of the cartons. It is important in flexographic printing, as in other types of printing, to attain a high quality of printing impression and to achieve and maintain accurate registry. This is especially true in the printing of plastic coated paperboard milk and juice cartons which are sold to the consuming public, where an attractively printed package is an important selling feature. The achievement of a high quality printing impression and accurate registry is, however, especially difficult in flexographic printing, which involves the use of nonrigid printing plates which are susceptible to distortion during press operation.

Flexographic printing involves the use of a rotary plate or printing cylinder on which a nonrigid printing plate is mounted. The printing plate is generally prepared from a material such as rubber or plastic and is mounted either directly on the plate cylinder or on a carrier sheet which is then mounted on the plate cylinder. When a carrier sheet is utilized, with the printing plate already affixed, the carrier sheet must be locked onto the plate cylinder. The means for locking the carrier sheet in place on the cylinder taught by the prior art generally comprise the use of either rings or bands mounted one at each end of the cylinder, or the use of a plurality of screws to secure the carrier sheet to the cylinder.

The prior art locking means suffer from the same fundamental defect; namely, the failure to maintain the carrier sheet and the associated nonrigid printing plate under a uniform tension, thus making it extremely

difficult, if not impossible, to achieve the necessary high degree of precision. If the carrier sheet and the rubber printing plate affixed thereto are not under a uniform tension, they will not closely conform to the curvature of the cylinder and will tend to be lifted from the surface of the rapidly rotating cylinder. This results in a printing impression of poor quality and imperfect and inaccurate registry. In addition, the devices of the prior art take excessively long periods of time to be removed and remounted, causing the press to be shut down for lengthy periods of time and resulting in inefficient operation and excessive cost.

It is an object of the present invention to provide novel means for locking in place on a cylinder of a press a carrier sheet having a printing plate mounted thereon. It is another object to provide locking means of the type described which are relatively inexpensive to produce. It is yet another object to provide such locking means and a carrier sheet adapter for use therewith which may readily be mounted and which, when mounted, maintains the carrier sheet and the printing plate affixed thereto in place with a high degree of precision when the press is operating at high speeds. It is a further object to provide, in combination, novel means for aligning a printing plate affixed to a carrier sheet to insure precise registry, and novel means for locking said carrier sheet having said printing plate affixed thereto in place on a plate cylinder with a high degree of precision.

In accordance with the above-identified objects of the present invention, a flat, generally rectangular carrier sheet, which is provided with at least two registry holes, is formed as a cylinder surface, with the opposing edges thereof, tapered and crimped to provide lips defined by arcuate fold surfaces. The carrier sheet which has a nonrigid printing plate affixed thereto is mounted on a rotary plate or printing cylinder, which is provided with a pair of upwardly extending registry pins. A tapered locking clip is provided with crimped edges adapted to engage the arcuate fold surfaces which define the lips of the carrier sheet. The lips of the locking clip are caused to slide progressively over the arcuate fold surfaces of the mounted carrier sheet, drawing the arcuate fold surfaces closer and closer together, but never into contact. When the locking clip is completely in place, it applies a strong uniform clamping force securing the carrier sheet to the cylinder. By virtue of the locking clip which applies a uniform tension to the carrier sheet and to the printing plate affixed thereto about the entire curvature of the cylinder, and the registry means which insures accurate alignment of the printing plate, the carrier sheet is maintained in precisely aligned position even after extended press operation. The locking means and registry means of the present invention provide for printing tolerances of from about 0.0005 inch to about 0.001 inch, which is a significant improvement over that achievable by the prior art means.

Further features, objects, and advantages of the present invention will be apparent from the following detailed description and the accompanying drawings, in which:

FIGURE 1 is a perspective view of a carrier sheet according to the invention having a printing plate affixed thereto and secured in place on a rotary plate cylinder by the locking means of the present invention.

FIGURE 2 is a perspective view of the assembly shown in FIGURE 1, the assembly being turned 180° from the view illustrated in FIGURE 1, showing the registry feature of the present invention with the carrier sheet partially broken away and the plate cylinder partially broken away.

FIGURE 3 is a perspective view of the carrier sheet with the locking means dismounted.

FIGURE 4 is a plan view of the bottom of the locking means.

FIGURE 5 is a fragmentary partial cross-sectional view taken at the line **5—5** of FIGURE 1 showing a portion of the carrier sheet, print and locking means, but not showing the plate cylinder.

FIGURE 6 is a perspective view of an alternative embodiment of a carrier sheet and locking clip according to the invention having a printing plate affixed thereto.

FIGURE 7 is a perspective view of the carrier sheet of FIGURE 6 with the locking means dismounted.

FIGURE 8 is a fragmentary cross-sectional view taken at the line **8—8** of FIGURE 6.

Referring to FIGS. 1 and 2, a completely mounted assembly is shown comprising a carrier member or sheet **1** maintained in position under uniform tension, about a rotary plate cylinder **2**, by means of a locking member or clip **3** according to the invention. As a matter of convenience in illustrating the invention, the plate cylinder **2** is shown without its end plates or discs and without the shaft about which it rotates. Adhesively affixed to the carrier sheet **1** is a flexible backing sheet **4** having a rubber printing plate **5** adhesively affixed thereto. The carrier sheet **1** is provided with a pair of circular registry holes **6** and **7**, having their circumferential edges abutting the circumferential surfaces of a pair of projecting circular registry pins **8** and **9** which extend upwardly from the surface of rotary plate cylinder **2**, according to the invention. The registry pins are disposed in a straight line parallel to the axis of cylinder **2**. The diameters of said registry holes and registry pins are substantially equal. The holes **6** and **7** and the pins **8** and **9** provide means for achieving and maintaining accurate registry in accordance with the present invention.

The structure of the carrier sheet **1** and locking clip **3** are illustrated in detail in FIGURE 3. The carrier sheet **1** is flat and substantially rectangular, prior to being tapered, curved and crimped as shown in FIG. 3. While the carrier sheet **1** is in its original flattened condition, it is provided, as by punching, with circular registry holes **6** and **7**. The holes are in a straight line perpendicular to edges **10** and **11** of the carrier sheet, and are disposed parallel to the axis of cylinder **2**. The holes which are approximately $\frac{5}{32}$ inch in diameter are equidistant from opposing edges **12** and **13** of the carrier sheet. The holes **6** and **7** are located near the edges **10** and **11** of the carrier sheet and fall outside the perimeter of the printing plate **5**, as shown in FIG. 2. Although the carrier sheet is depicted as having two registry holes, and the cylinder as having two registry pins, it is to be understood that the carrier sheet can be provided with registry holes in excess of two, for example three, four, or five holes. In fact, there is no limitation as to the number of holes or pins that can be provided, aside from the obvious limitation of diminishing carrier surface from which to punch the registry holes. The geometry of the holes and the pins is circular as a matter of practical convenience, but the holes and pins could have other geometrical shapes and function equally well in accordance with the present invention.

It is to be understood that while the invention has heretofore been described and will hereinafter be described with reference to a single printing plate, such as is employed in the printing of gallon size cartons, two or more printing plates can be mounted on the carrier in accordance with the present invention. When two printing plates are used their center lines, which correspond to the central vertical score lines of the gable topped cartons to be imprinted, are 180° apart. In addition, when two printing plates are employed, as is the case when half-gallon, quart, half-quart and pint cartons, etc., are being imprinted, the registry holes in the carrier sheet and, consequently, the registry pins, fall inside the perimeters of the printing plates, since the relief areas of the plates occupy a greater amount of surface area than when a single plate is used.

The surfaces of the cylinder registry pins do not abut the relief surfaces of the printing plates, but stand freely between the relief surfaces. The height of said registry pins **8** and **9**, irrespective of whether a single printing plate or a pair of printing plates are being used, from the tops of the pins to their point of entry into the surface of the plate cylinder **2**, into which they are screwed, is from about $\frac{1}{32}$ inch to about $\frac{3}{32}$ inch, which is below the level of the relief surface of the printing plate or plates, as the case may be.

In order to insure a complete understanding of the importance attached to the fabrication of the carrier sheet, a brief description of the fabrication of the carrier sheet, subsequent to the provision of the registry holes, the details of which have already been discussed, would be of benefit. The registry holes **6** and **7** of the still flat carrier sheet **1** are slipped over pins or stops in a sheet metal shear, such as a guillotine cutter, and opposing edge **12** is sheared at an acute angle, preferably less than 1 degree, and even more preferably about 13 minutes, to provide a tapered edge. The carrier sheet is then reversed on the pins and opposing edge **13** is sheared or cut at exactly the same angle as was edge **12**. The carrier sheet is then placed on a curving machine to provide the carrier sheet with a curved cylindrical surface of uniform diameter, as measured from each point on the curved surface of the carrier sheet. The tapered edges **12** and **13** are then crimped in a two-stage crimping operation, using first a crimping die and then a finishing die, to provide a pair of lips **14** and **15** of uniform width, defined by arcuate folds **16** and **17**, as shown in FIG. 5. Arcuate fold **16** has a concave surface **18** and a convex surface **19**, and arcuate fold **17** has a concave surface **20** and a convex surface **21**. The radius of curvature of the arcuate folds **16** and **17** are from about .020 inch to about .030 inch. It is preferred that the radius of the arcuate folds be .025 inch. The radius of curvature of the arcuate folds **16** and **17** imparted by the die is significant. For, if the radius of either of the arcuate folds were substantially less than .020 inch or substantially greater than .030 inch, the lips **14** and **15**, which are defined by arcuate folds **16** and **17**, would contact or bear against the underside or an interior portion of the engaged locking clip **3**. This would cause the carrier sheet **1** and the associated printing plate to become slack and to be lifted from the surface of the cylinder **2** during operation of the press. This would result in a poor printing impression of non-uniform quality.

Although the geometry of the folds **16** and **17** has been described as arcuate, other geometrical shapes could be employed. For example, the folds could consist of parallel, straight surfaces formed by two right angle bends.

Referring to FIGS 3 and 4, the edges of the locking clip **3** are also tapered at the same acute angle as were the edges of the carrier sheet **1**, and its edges **22** and **23** are also crimped to provide lips **24** and **25** adapted to engage the concave surfaces **18** and **20** of the arcuate folds defining the lips **14** and **15** of the carrier sheet.

As a consequence of the taper provided by shearing the edges of the carrier sheet an an angle, the edges of the carrier sheet are spaced further apart at one end **26**, than at the other end **27**, as is apparent from FIG. 3. The lips **24** and **25**, of locking clip **3**, as is evident from FIG. 4, diverge from a narrow end **28** to a wider end **29**. Thus, the taper of the crimped edges of the carrier sheet and that of the crimped edges of the locking clip are so arranged that the acute angle defined by the edges of the carrier sheet is substantially the same as, or equal to, the acute angle between the lips of the locking clip. Consequently, when the lips **24** and **25** of the locking clip engage with the concave surfaces **18** and **20** of the arcuate folds **16** and **17** defining the carrier lips **14** and **15**, a uniform tension is applied along the entire length of the concave surfaces of the arcuate folds of the carrier sheet engaged by the locking clip. The convex

surfaces **19** and **21** are always in spaced-apart relationship along their entire lengths, even when the locking clip is completely engaged with the carrier sheet. With the locking clip engaged, the convex surfaces **19** and **21** ahe spaced apart of their widest end approximately 5/32 inch. At their narrowest end the convex surfaces are spaced apart approximately 2/32 inch. Thus, the convex surfaces of the carrier member, when the locking clip completely engages the concave surfaces, diverge slightly from the narrow end to the wide end. Each of said convex surfaces, is, thus, substantially 180° from the centers of said registry holes when said locking member completely engages the concave surfaces of said carrier member.

In the preferred embodiment, as illustrated in FIG. 5 the lips **24** and **25** of the locking member **3** are longer than the lips **14** and **15** of the carrier sheet. As a result, the lips **24** and **25** of locking clip **3** engage only the concave surfaces **18** and **20** of the arcuate folds **16** and **17** which define lips **14** and **15**. Consequently, a portion of the force exerted by the locking clip is a downward force drawing the lips of the carrier sheet together toward the center of the cylinder. However, the lips **14** and **15** of the carrier sheet **1** never contact or bear against the lips **24** and **25** of the locking clip **3** or the underside or interior of locking clip **3**. Thus, the lips **14** and **15** of carrier sheet **1** are spaced from, and out of contact with, the lips **24** and **25** of the mounted and engaged locking clip **3**. During operation of the press, at speeds of approximately 325 r.p.m., if the lips of the carrier sheet were to contact the lips of the locking clip, the carrier sheet and the printing plate affixed thereto would lift from the surface of the cylinder, causing a disruption of the uniform tension and resulting in a printing impression of nonuniform quality.

The locking clip can be made of any of a number of suitable materials and of various thicknesses. A suitable material has been found to be stainless steel having a thickness of .020 inch. Stainless steel is desirable because of its extreme resistance to corrosion. The overall height of the locking clip must be sufficiently below the height of the upper surface of the printing plate in order to provide sufficient clearance between both the impression cylinder and the inking cylinders used in conjunction with the present carrier sheet. In preparing the carrier sheet, as has been previously discussed in detail, the curvature must of course be provided as nearly perfect as possible all the way to the locking crimp. The carrier sheet can also be made of any number of suitable materials, a preferred material being stainless steel. It can also be provided in various thicknesses, a suitable thickness being about .0159 inch.

The actual application of the printing plate to the carrier sheet, which we refer to as premounting, is carried out on a mounting cylinder as a matter of practical convenience. If the premounting were done on the plate cylinder of the flexographic press it would necessitate the shutting down of the press for excessive periods of time, resulting in a more time consuming and costly operation. The mounting cylinder, it should be noted, is similar to the plate cylinder, including the provision of registry pins, upon which the rotary plate carrier sheet will ultimately be mounted.

In applying the printing plate to the carrier sheet, backing sheet **4** is utilized, which is provided with adhesive on both surfaces, a protective sheet being applied to only one of the surfaces. The unprotected surface of the backing sheet **4** is first affixed to the carrier sheet **1** while the carrier sheet is on the mounting cylinder registry pins. Then the protective coating is stripped from the other surface and the printing plate **5** is directly affixed thereto. The printing plate **5**, which is adhesively affixed to the backing sheet **4**, which is, in turn, adhesively affixed to the carrier sheet **1**, is now in accurate registry and ready to be removed from the mounting cylinder and placed upon the plate cylinder.

In the instance when two printing plates rather than one are being premounted, an indexing device, consisting of a curved segment of plexiglass having an intended line enscribed thereon and which is hingedly connected to the mounting cylinder, insures that the centers of the printing plates, which correspond to the central vertical score lines of the gable-topped cartons which are being imprinted, are substantially 180 apart when mounted.

The carrier sheet, with the printing plate affixed thereto, is mounted upon the plate cylinder **2** by placing the registry holes **6** and **7** in the carrier sheet over the plate cylinder registry pins **8** and **9**, and slipping them down and over said pins. Then the wide end **29** of the locking clip is inserted over the narrow end **27** of the carrier sheet. The locking clip is then caused to slide in an axial direction, progressively engaging the concave surfaces of the arcuate folds of the carrier sheet and gradually drawing them together because of the taper provided in the crimped-over edges of both the carrier sheet and the locking clip. When the entire locking clip **3** engages the entire length of the concave surfaces **18** and **20** of the carrier sheet, sufficient clamping force is applied to the carrier sheet so that it engages the cylinder of the press. The force thus applied is uniform and is maintained throughout extended periods of press operation.

An alternative embodiment is illustrated in detail in FIGS. 6–8, the plate cylinder, however, not being shown, and comprises a carrier sheet **1*a*** having a cylindrical curvature similar to that of the carrier sheet **1** of the embodiment described above. The carrier sheet **1*a*** is provided with tapered edges **12*a*** and **13*a*** so that the edges at one end **26*a*** are spaced further apart than at the other end **27*a***. However, in this embodiment, the edges **12*a*** and **13*a*** are crimped radially inwardly instead of outwardly as in the previous embodiment. The inward crimping of the edges **12*a*** and **13*a*** provides lips **14*a*** and **15*a***. The locking clip **3*a*** is mounted by placing its wide end **29*a*** over the narrow end **27*a*** of the lips of the carrier sheet, and is slideably moved into place in a manner similar to that described with respect to the earlier embodiment. When in place, as shown in FIG. 8, the lips **24*a*** and **25*a*** of the locking clip **3*a*** engage only the concave surfaces **18*a*** and **20*a*** of arcuate folds **16*a*** and **17*a*** of the carrier sheet **1*a*** and clamp the carrier sheet in place with a uniformly applied force. Printing plate **5*a*** mounted on a backing sheet **4*a*** is applied to the carrier sheet **1*a*** in a manner similar to that described above.

When the embodiment is utilized in which the crimped lips are directed radially inwardly, the printing or plate cylinder must be provided with a recess, such as a groove or slot in order to receive the crimped-over lips of the carrier member **1*a*** and the locking clip **3*a***. The operation of this embodiment is in all other respects similar to that described with respect to the embodiment of FIGS. 1–5.

The carrier sheet and locking clip assembly of the present invention have many advantages over devices of the prior art utilized for the purpose of securing a carrier sheet to a rotary plate cylinder of a flexographic printing press. First, the structures are relatively inexpensive to fabricate. Second, the assembly is very easy to mount on a printing press cylinder. Third, the registry holes in the carrier sheet serve a dual function of critical significance. They serve as a pre-registry or alignment means in the fabrication of the carrier sheet so that, after crimping, the convex surfaces of the carrier member are substantially 180° from the centers of the registry holes. They also serve as a postregistry means in aligning the printing plate on the curved and crimped carrier sheet for mounting on the plate cylinder over the upstanding registry pins. The pins in addition to serving as registration guide means, also serve to lock the carrier sheet or shell against frictional forces and, also, against centrifugal forces. Additionally, the present arrangement provides a

close fitting and precisely positioned arrangement. Further, the locking member or clip, since it has the same degree of taper as the lips of the carrier sheet, provides a uniform tension along the entire length of the cylinder. The locking clip may be of various materials and in various thicknesses. Additionally, when mounted, both the locking clip and the registry pins remain disposed below the printing surface and, thus, do not interfere with any of the printing functions.

It is to be understood that the invention is not limited to the exact details of construction, operation, or exact materials or embodiments shown and described, as obvious modifications and equivalents will be apparent to one skilled in the art, and the invention is therefore to be limited only by the scope of the appended claims.

What is claimed is:

1. Apparatus for locking a carrier member having a printing plate affixed thereto to a plate cylinder of a rotary printing press, which comprises:

(a) a substantially rectangular sheet-form carrier member contoured to define a substantially cylindrical surface and adapted to be mounted on said plate cylinder;

(b) opposing edges of said carrier member being crimped to form a pair of lips extending radially from the cylindrical surface defined by said carrier member and away from each other;

(c) each of said carrier member lips being defined by an arcuate fold having a concave and a convex surface;

(d) a locking member comprising an elongate sheet-form strip having its opposing edges crimped to provide a pair of lips extending toward each other;

(e) the opposing edges of said carrier member lips being disposed at an acute angle with respect to each other, thereby being spaced apart from each other a greater distance at one end thereof than at the other;

(f) the lips of said locking member being disposed with respect to each other at an acute angle substantially equal to that between the edges of said carrier member, thereby also being spaced apart from each other a greater distance at one end thereof than at the other;

(g) the lips of said locking member being adapted to engage the concave surfaces of said carrier member;

(h) said locking member being mounted on said carrier member with the lips at the wide end of said locking member engaging the narrowly spaced-apart concave surfaces of said carrier member whereby said locking member lips are caused to advance with sliding motion toward complete engagement of the concave surfaces of said carrier member and to clamp said carrier member tightly about said plate cylinder;

(i) the convex surfaces of said arcuate folds being in spaced-apart relationship to one another throughout their entire lengths, whereby said carrier member is maintained under uniform tension about the curvature of the plate cylinder;

(j) said locking member contacting said carrier member solely at the concave surfaces of said arcuate folds.

2. The apparatus according to claim 1 and which includes registry means, said registry means comprising:

(a) a pair of upwardly extending registry pins being provided in the surface of said plate cylinder, said pins being disposed in a straight line parallel to the axis of said plate cylinder;

(b) said carrier member being provided with a pair of registry holes disposed in a straight line parallel to the axis of said plate cylinder, said holes being equidistant from opposing edges of said carrier member, said registry holes in said carrier member being adapted to be slipped on and over said upwardly extending registry pins, the diameters of said registry holes and of said registry pins being substantially equal, the circumferential edges of said registry holes being in abutting relationship with the circumferential surfaces of said registry pins at the point of entry of said pins into the surface of said plate cylinder, whereby said holes and said pins align said printing plate and maintain it in accurate registry when said carrier member is locked in place about said plate cylinder by said locking member.

3. The apparatus according to claim 1 wherein the arcuate folds defining the lips of said carrier member have a radius of from about .020 inch to about .030 inch whereby the lips of said carrier sheet are in spaced-apart relation from and out of contact with the lips of said engaged locking member to prevent movement of said carrier member during press operation.

4. The apparatus according to claim 1 wherein the opposing edges of said carrier member are crimped to form lips extending radially outwardly from the cylindrical surface defined by said carrier member.

5. The apparatus according to claim 1 wherein the opposing edges of said carrier member are crimped to form lips extending radially inwardly from the cylindrical surface defined by said carrier member.

6. The apparatus according to claim 2 wherein the convex surface of each of said arcuate folds is substantially 180° from the centers of said registry holes when said locking member completely engages the concave surfaces of said carrier member.

7. Apparatus for locking and registering a carrier member having a printing plate affixed thereto to a plate cylinder of a rotary printing press, which comprises:

(a) a substantially rectangular sheet-form carrier member contoured to define a substantially cylindrical surface and adapted to be mounted on said plate cylinder;

(b) opposing edges of said carrier member being crimped to form a pair of lips extending radially from the cylindrical surface defined by said carrier member and away from each other;

(c) each of said carrier member lips being defined by an arcuate fold having a concave and a convex surface;

(d) a locking member comprising an elongate sheet-form strip having its opposing edges crimped to provide a pair of lips extending toward each other;

(e) the surface of said plate cylinder being provided with a pair of upwardly extending registry pins disposed in a straight line parallel to the axis of said plate cylinder;

(f) said carrier member being provided with a pair of registry holes disposed in a straight line parallel to the axis of said plate cylinder, said holes being equidistant from opposing edges of said carrier member, said registry holes in said carrier member being adapted to be slipped on and over said upwardly extending registry pins, the diameters of said registry holes and of said registry pins being substantially equal, the circumferential edges of said holes being in abutting relationship with the circumferential surfaces of said registry pins at the point of entry of said pins into the surface of said plate cylinder, whereby said holes and said pins align said printing plate and maintain it in accurate registry when said carrier member is locked about said plate cylinder by said locking member;

(g) the opposing edges of said carrier member lips being disposed at an acute angle with respect to each other thereby being spaced apart from each other a greater distance at one end thereof than at the other;

(h) the lips of said locking member being disposed with respect to each other at an acute angle substantially equal to that between the edges of said

carrier member, thereby also being spaced apart from each other a greater distance at one end thereof than at the other;

(i) the lips of said locking member being adapted to engage the concave surfaces of said carrier member;

(j) said locking member being mounted on said carrier member with the lips at the wide end of said locking member engaging the narrowly spaced-apart concave surfaces of said carrier member, whereby said locking member lips are caused to advance with sliding motion toward complete engagement of the concave surfaces of said carrier member and to clamp said carrier member tightly about said plate cylinder;

(k) the convex surfaces of said arcuate folds being in spaced-apart relationship to one another throughout their entire lengths, whereby said carrier member is maintained under uniform tension about the curvature of the plate cylinder;

(l) said locking member contacting said carrier member solely at the concave surfaces of said arcuate folds.

8. The apparatus according to claim **7** wherein the arcuate folds defining the lips of said carrier member have a radius of from about .020 inch to about .030 inch, whereby the lips of said carrier member are in spaced-apart relation from and out of contact with the lips of said engaged locking member to prevent movement of said carrier member during press operation.

9. The apparatus according to claim **7** wherein the convex surface of each of said arcuate folds is substantially 180° from the centers of said registry holes when said locking member completely engages the concave surfaces of said carrier member.

10. The apparatus according to claim **7** wherein the opposing edges of said carrier member are crimped to form lips extending radially outwardly from the cylindrical surface defined by said carrier member.

11. The apparatus according to claim **7** wherein the opposing edges of said carrier member are crimped to form lips extending radially inwardly from the cylindrical surface defined by said carrier member.

12. Apparatus for locking and registering a carrier member having a pair of printing plates affixed thereto to a plate cylinder of a rotary printing press, which comprises:

(a) a substantially rectangular sheet-form carrier member contoured to define a substantially cylindrical surface and adapted to be mounted on said plate cylinder;

(b) opposing edges of said carrier member being crimped to form a pair of lips extending radially from the cylindrical surface defined by said carrier member and away from each other;

(c) each of said carrier member lips being defined by an arcuate fold having a concave and a convex surface;

(d) a locking member comprising an elongate sheet-form strip having its opposing edges crimped to provide a pair of lips extending toward each other;

(e) the surface of said plate cylinder being provided with a pair of upwardly extending registry pins disposed in a straight line parallel to the axis of said plate cylinder;

(f) said carrier member being provided with a pair of registry holes disposed in a straight line parallel to the axis of said plate cylinder, said registry holes being equidistant from opposing edges of said carrier member, said registry holes in said carrier member being adapted to be slipped on and over said upwardly extending registry pins, the diameters of said registry holes and of said registry pins being substantially equal, the circumferential edges of said holes being in abutting relationship with the circumferential surfaces of said registry pins at the point of entry of said pins into the surface of said plate cylinder whereby said holes and said pins align said pair of printing plates and maintain them in accurate registry when said carrier member is locked about said plate cylinder by said locking member;

(g) the opposing edges of said carrier member lips being disposed at an acute angle with respect to each other thereby being spaced apart from each other a greater distance at one end thereof than at the other;

(h) the lips of said locking member being disposed with respect to each other at an acute angle substantially equal to that between the edges of said carrier member, thereby also being spaced apart from each other a greater distance at one end thereof than at the other;

(i) the lips of said locking member being adapted to engage the concave surfaces of said carrier member;

(j) said locking member being mounted on said carrier member with the lips at the wide end of said locking member engaging the narrowly spaced-apart concave surfaces of said carrier member, whereby said locking member lips are caused to advance with sliding motion toward complete engagement of the concave surfaces of said carrier member and to clamp said carrier member tightly about said plate cylinder;

(k) the convex surfaces of said arcuate folds being in spaced-apart relationship to one another throughout their entire lengths whereby said carrier member is maintained under uniform tension about the curvature of the plate cylinder;

(l) said locking member contacting said carrier member solely at the concave surfaces of said arcuate folds.

13. The apparatus according to claim **12** wherein the centers of said printing plates are substantially 180° apart.

14. The apparatus according to claim **12** wherein the arcuate folds defining the lips of said carrier member have a radius of from about .020 inch to about .030 inch whereby the lips of said carrier member are in spaced-apart relation from and out of contact with the lips of said engaged locking member thus preventing movement of said carrier member during press operation.

15. The apparatus according to claim **12** wherein the convex surface of each of said arcuate folds is substantially 180° from the centers of said registry holes when said locking member completely engages the concave surfaces of said carrier member.

16. The apparatus according to claim **12** wherein the opposing edges of said carrier member are crimped to form lips extending radially outwardly from the cylindrical surface defined by said carrier member.

17. The apparatus according to claim **12** wherein the opposing edges of said carrier member are crimped to form lips extending radially inwardly from the cylindrical surface defined by said carrier member.

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WILLIAM B. PENN, *Primary Examiner.*

J. REID FISHER, *Assistant Examiner*