Sept. 23, 1969 M. VASILANTONE 3,468,247

CONTINUOUS PRINTER WITH MEANS TO MAINTAIN A MOVING WEB LATERALLY TAUT

Filed Dec. 30, 1966 3 Sheets-Sheet 1

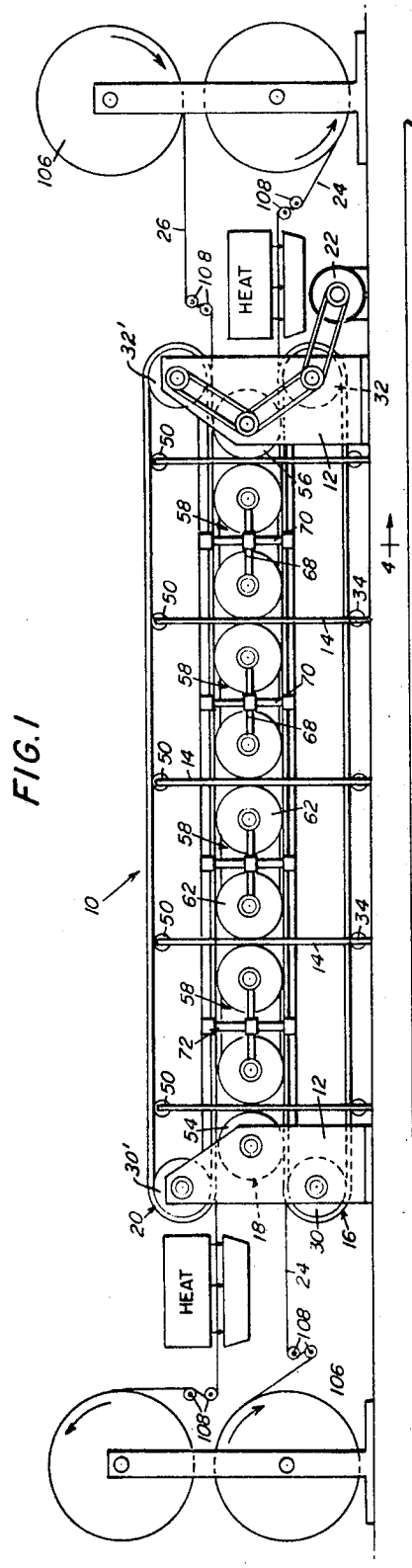


FIG. 1

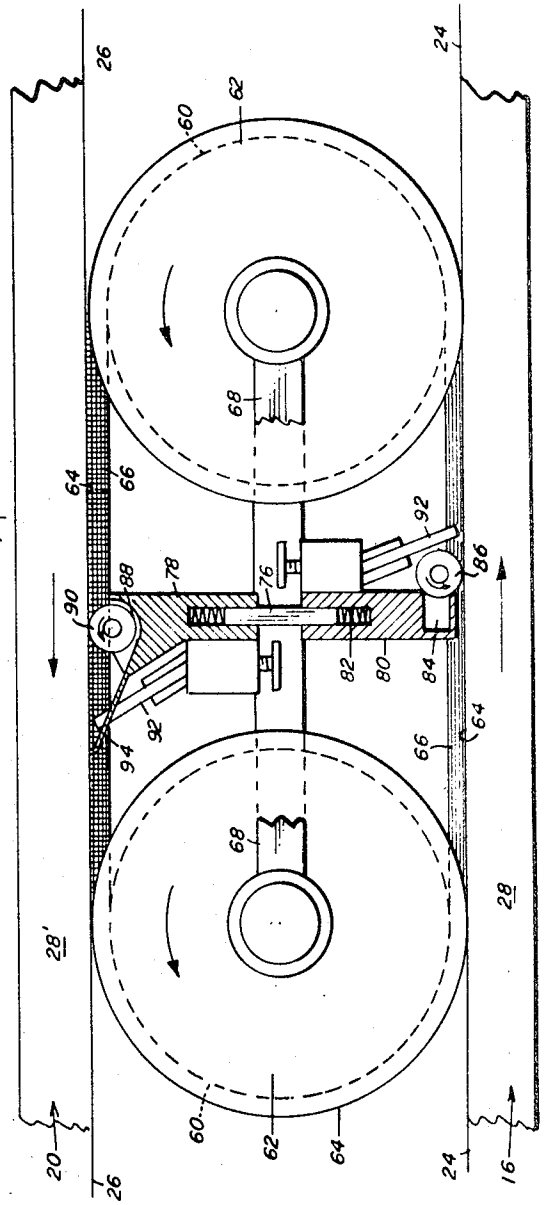


FIG. 3

INVENTOR
MICHAEL VASILANTONE
BY Robillard and Beyrne
ATTORNEYS

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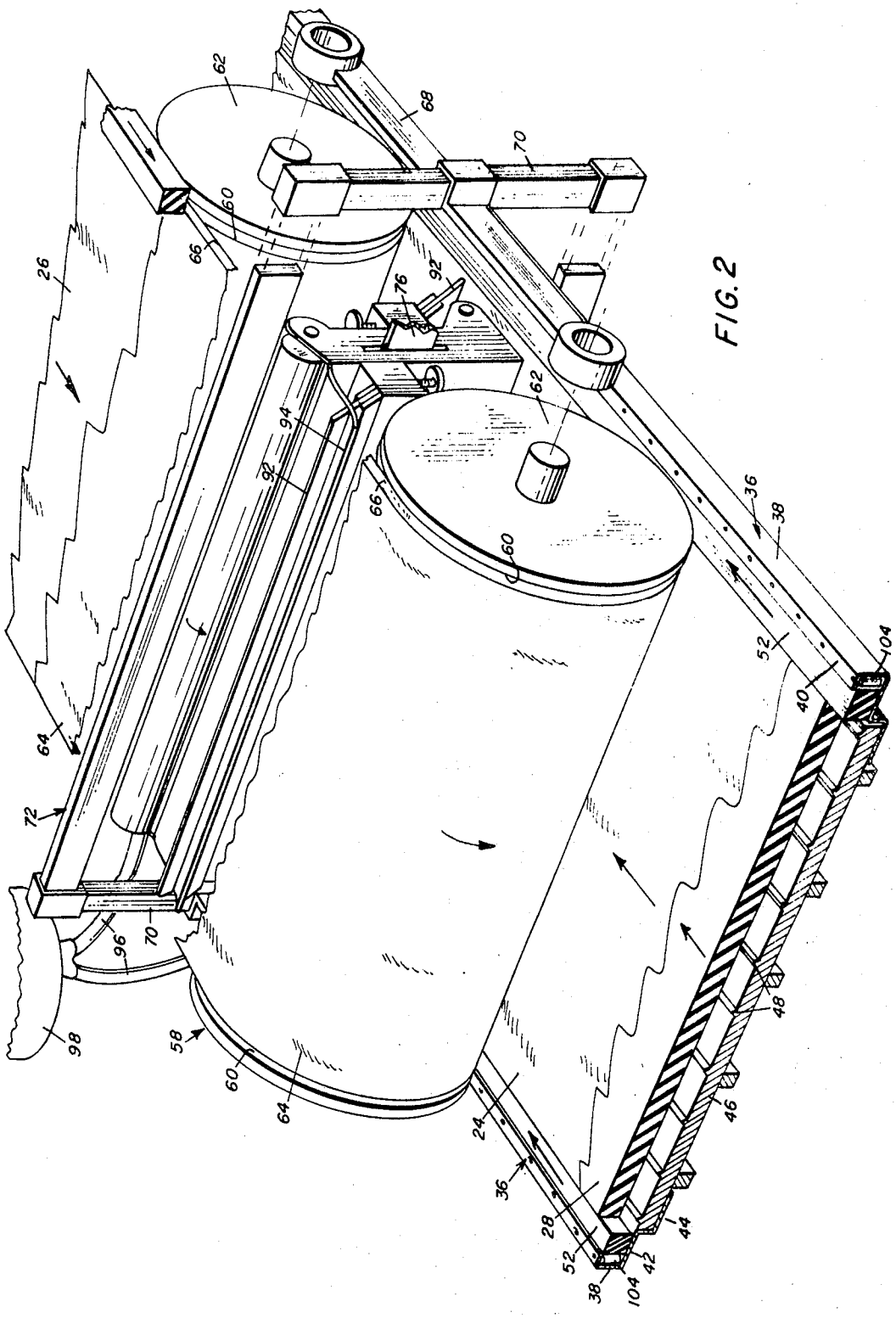


FIG. 2

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CONTINUOUS PRINTER WITH MEANS TO MAINTAIN A MOVING WEB LATERALLY TAUT

Filed Dec. 30, 1966 3 Sheets-Sheet 3

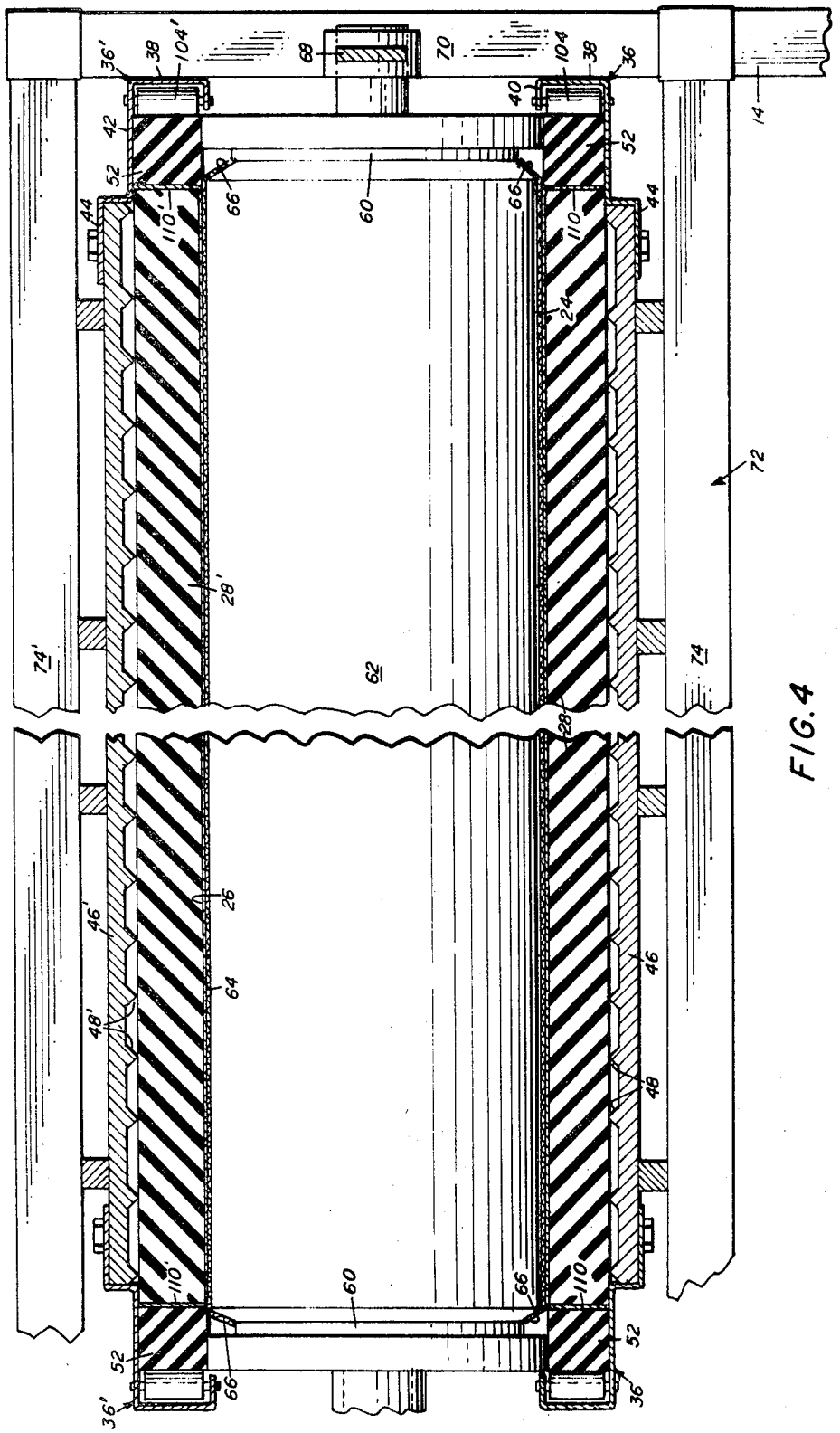


FIG. 4

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3,468,247

CONTINUOUS PRINTER WITH MEANS TO MAINTAIN A MOVING WEB LATERALLY TAUT

Michael Vasilantone, 401 John St.,
Roselle, N.J. 07203

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U.S. Cl. 101—115 7 Claims

ABSTRACT OF THE DISCLOSURE

A wire screen printing apparatus which includes means for maintaining two longitudinally oppositely moving webs of textile material laterally taut as insignia are continuously printed thereon. A pair of endless resilient locking strips circumscribe a plurality of drum printing assemblies located between two platen belts. As each textile is received on its respective platen belt, the locking strips engage the textile edges which overhang the said platen belts and wedge them against the edges of the platen belts to stretch them and render them laterally taut.

This invention relates to a textile printing machine which can imprint a moving web of material passing therethrough.

An objective of the invention is to provide an assembly which will stretch and maintain the moving textile material taut both longitudinally and laterally during a continuous printing operation.

Another important objective of the invention is to provide a printing apparatus having an endless belt which acts as a conveyor and a platen.

Another objective of the invention is to provide a printing apparatus having a single means for both rotating wire printing screens and stretching the textile material.

A further objective of the invention is to provide an apparatus having means which both tautens a moving fabric as it undergoes a multi-color printing process and releases it after the full printing process is completed.

A still further objective of the invention is to provide an apparatus having means for simultaneously and continuously stretching and printing two different webs of oppositely moving textile material.

These and other objects of the invention will become more apparent to those skilled in the art by reference to the following detailed description when viewed in light of the accompanying drawings wherein:

FIGURE 1 is a side elevational view of the printing apparatus;

FIGURE 2 is a perspective view, partly in section, of a drum printing unit of the printing apparatus;

FIGURE 3 is a side elevational view, partly in section, of the drum printing unit shown in FIGURE 2; and

FIGURE 4 is a cross-sectional view of a drum printing unit taken along the line 4—4 of FIGURE 3.

Referring now to the drawings, wherein like numerals indicate like parts, the numeral **10** generally indicates a printing apparatus supported at its ends by legs **12** and along its middle by vertical uprights **14**. The printing apparatus generally comprises three levels of endless belt-type assemblies with a platen belt assembly **16** at the lowest elevation, a lock strip printing assembly **18** at an intermediate elevation, and a second platen belt assembly **20** at the highest elevation. The assemblies **16**, **18** and **20** are driven by a motor **22**. The assemblies are located such that the clockwise driven platen web assemblies **16** and **20** cooperate with opposite runs of the counterclockwise driven lock strip printing assembly **18** to tauten and convey two separate webs of textile material **24** and **26** in opposite directions therebetween.

An endless platen **28** consisting of a web of hard but flexible material such as rubber or plastic is disposed about rollers **30** and **32**. The rollers **30** and **32** are rotatably secured in the legs **12** and are spaced far enough apart so that the run of the platen assembly **16** is longer than the run of the lock strip printing assembly **18**. Between the rollers **30** and **32**, the lower run of the platen **28** is supported by rollers **34** which are mounted on the uprights **14**. Inwardly facing channels or siderails **36** are rigidly secured to the uprights **14** opposite the upper run of the platen **28**.

As best seen in FIGURE 2, the siderails have a vertical web **38** provided with a flange or skirt **40** on its upper end and a flange **42** wider than the said skirt on its lower end. A flange extension **44** is offset downwardly and protrudes inwardly from the flange **42** and is rigidly secured to a table **46**. The table **46** is a flat sheet of metal having a series of longitudinal ribs **48** and provides support for the moving platen **28** with a minimum of friction.

The upper platen assembly **20** is identical to the lower platen assembly **16** except that it is positioned so that its lower run cooperates with the lock strip printing assembly **18**. In other words, it is a mirror image of the lower assembly. The assembly includes a web **28'** disposed around rollers **30'** and **32'**, a pair of siderails **36'**, and a table **46'**. The intermediate rollers **50**, rotatably mounted on the uprights **14**, support the upper run of the web **28'** on its underside.

The lock strip printing assembly **18** is comprised generally of a parallel pair of endless lock strips **52** of resilient, rubber-like material which pass over the opposite peripheral edge of end rollers **54** and **56** and a series of four drum printing units **58**.

Each drum printing unit is comprised of a pair of rotatable drums **62** over which passes a continuous wire screen **64** of stainless steel. Each screen **64** is suitably stencilled to provide the particular pattern desired. The edges **66** of the screen are rolled and extend into peripheral grooves **60** located on the opposite ends of the drums **62**. The rollers **62** of each printing unit are spaced apart and are rotatably supported by a bracket **68**. The bracket is rigidly secured to a vertical leg **70** of a rectangular frame **72**. The horizontal legs **74** are rigidly secured to the outer surfaces of the tables **46** and **46'**, respectively.

A holder arm **76** is interposed between the rollers **62** of each printing unit and the upper and lower runs of the silk screen **64** and extends horizontally between rigid connections at the midpoints of the vertical legs **70**. Upper and lower roller supports **78** and **80**, respectively, are slidably mounted on opposite longitudinal edges of the arm **76** and are resiliently biased outwardly by springs **82**.

An ink trough **84** is provided by a cutout portion adjacent the free end of the lower support **80** which extends for substantially the entire length thereof. The cutout portion opens to the right side as seen in FIGURE 3 to provide an ink supply to a lower ink roller **86**. An ink trough **88** is provided by a cutout portion in the free end of the upper support **78** directly beneath an upper ink roller **90**. Both of the roller supports **78**, **80** are provided with adjustable squeegees **92** for scraping excess ink from the wire screen **64** and recycling it back to the ink trough. To this end, a flat, inclined collar **94** extends upwardly and outwardly from the ink trough **88**. The collar serves to catch the excess ink and allow it to flow by gravity back to the trough. Although no collar is necessary on the bottom support **80**, the squeegee must be close enough to the ink roller **86** so that the viscosity of the ink and the rotation of the roller **86** will overcome the force of gravity to recycle the ink back to the trough. Each ink trough **84** and **88** has its own supply line **96** from a supply tank **98** (FIGURE 2).

Referring now to FIGURE 4, the locking strip can be seen to have a rectangular cross-section. The strip **52** frictionally engages the drums **62** for driving rotation thereof.

The upper and lower runs of the lock strip **52** are housed within the siderails **36** and **36'**. A series of vertical roller bearings **104** and **104'** rotatably supported by the upper and lower flanges of the siderails **36** and **36'**, respectively, bear against the lock strip to urge it against the edge of the respective platen belts **28** and **28'**.

It is important to note that the length of the upper and lower runs of the lock strip **52**; that is, the distance between the vertical diameters of the rollers **54** and **56**, is shorter than the length of the runs of upper and lower platen webs **28** and **28'** respectively. This is to allow the textile materials **24** and **26**, as they issue from their respective feed bolts **106** and pass through a pair of conventional tensioning rollers **108**, to be received and centered on the platen webs **28** and **28'**. The textiles **24** and **26** must be wider than the platen belts **28** and **28'** so that edge portions **110** and **110'** will overhang the platen belts on both sides.

The discussion of the operation of the continuous printer will initially describe the printing of the lower textile **24** as it passes from left to right through the apparatus and thereafter describe the printing of the upper textile **26** as it simultaneously passes from right to left.

As the lower textile **24** is received on the lower platen belt **28**, it is tensioned in a longitudinal direction by the tension rollers **108**. The edges **110** of the textile **24** are engaged by the locking strip **52** as the locking strip passes around the roller **54**. The edges **110** are pulled downwardly and wedged between the lock strips **52** and the edges of the platen belt **28** to effect a lateral tensioning of the textile **24**. Because of the tight fit of the lock strip between the edges of the platen belt and the roller bearings **104** and because the platen belt and lock strip are driven to move at the same lineal speed, the textile will be locked and tautened for a distance equal to the length of siderails **36**. As the tautened textile moves between the stationary table **46** and successive drum printing units **58**, the four ink rollers **86** simultaneously and continuously force different colored inks through the lower runs of the wire screens **64**. In this manner, the textile receives a continuous multicolored printing as long as it passes through the apparatus **10**.

In a similar mode, the upper textile **26** has its edge portions locked and tautened between the upper run of lock strips **52** and the lower run edges of the upper platen **28'** as the lock strip passes around the roller **56**. Again, the platen belt **28'** is driven at the same lineal speed as the upper run of the lock strip and as the textile **26** passes between the drum printing units **58** and the upper table **46'**, the four ink rollers **90** force ink through the upper runs of their respective wire screens **64**.

As one skilled in the art will readily understand, the requirement that there be no relative movement between the wire screen and the textile in the immediate printing area is necessary for effective wire screen printing. The lock strip **52** provides this means because of its frictional driving engagement with the drums **62**. Since the lineal speed of the screen runs is determined by the lineal speed of the lock strip and since the textiles **24** and **26** are locked therewith to likewise move at the same lineal speed, the necessary screen-textile stationary relation is effected.

In a similar vein, since the tables **46** and **46'** act as backstops, the response of the platen belts **28** and **28'** to the bias of the springs **82** through the ink rollers **86** and **90** is advantageously limited.

In summary then, the instant invention achieves by direct and rugged means the tautening of moving textile material in a lateral as well as a longitudinal direction and also the necessary stationary relationship between the moving textile material and the moving wire screen so that a continuous printing operation between the printing surface and an ideally flat work material is effected.

What is new and therefore desired to be protected by Letters Patent of the United States is:

1. An apparatus for continuously placing insignia on moving flexible material comprising a movable platen for receiving said material to be printed having a lateral width less than that of said material, drive means for moving said material over said platen with edge portions overlying vertical side surfaces of said platen, printing means rotatably mounted over said platen for continuously printing said material as it passes between said platen and said printing means, and resilient strip means mounted adjacent to and for movement with said platen for engaging and holding said edge portions against said vertical side surfaces of said platen.

2. The invention as described in claim **1** wherein said printing means comprises a plurality of pairs of spaced apart rotatable drums, an endless wire screen mounted to pass around said pair of drums, and ink distributing means located between said drums for forcing ink through said wire screen onto said material.

3. The invention as described in claim **2** wherein said strip means comprises a pair of endless resilient strips frictionally engaged in circumscribing relation about opposite ends of said drums.

4. The invention as described in claim **1** wherein said ink distributing means comprises a roller biased against said screen, ink supply means for supplying ink to said roller and a resilient squeegee biased against said screen for scraping the excess ink therefrom.

5. The invention as described in claim **1** wherein a second platen is disposed oppositely from said first platen with respect to said rollers.

6. An apparatus for continuously placing insignia on moving flexible material comprising a raised platen for receiving said material to be printed having a lateral width less than that of said material, said platen comprising a movable endless web of rubber-like material having a top run and a bottom run, drive means for moving said material over said platen with edge portions overlying sides of said top run of said platen, printing means rotatably mounted over said platen for continuously printing said material as it passes between said top run of said platen and said printing means, a table supporting that portion of the top run disposed opposite said printing means, resilient strip means mounted adjacent said top run of said platen for engaging and holding said edge portions against said top run of said platen and a bearing means secured to said table for forcing said strip means against said top run.

7. The invention as described in claim **6** wherein said bearing means comprises a pair of elongated channel members secured to said table disposed parallel to said top run along the edges thereof, said channel members opening inwardly and rotatably supporting bearing members therein.

References Cited

UNITED STATES PATENTS

1,670,337	5/1928	Brackett et al.	226—172 X
2,019,375	10/1935	Wheelwright	101—122 X
2,276,181	3/1942	Foster	101—122 X
2,359,825	10/1944	Campbell	101—115

ROBERT E. PALFREY, Primary Examiner

CLIFFORD D. CROWDER, Assistant Examiner

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