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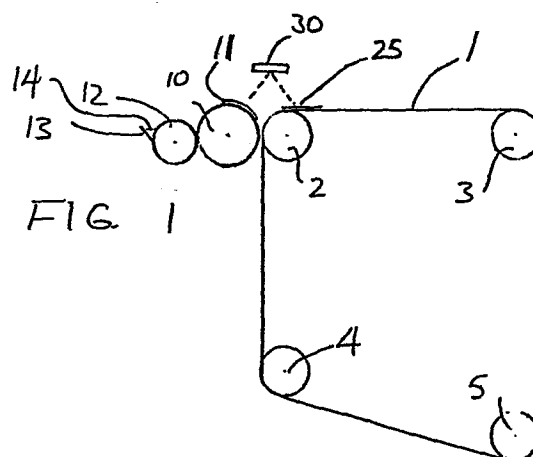
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54 **Flexographic printing apparatus.**

57 Flexographic printing apparatus comprises a substantially rigid roller 10 for supporting a plate 11 mounted adjacent another rigid roller 2, which together with additional rollers 3, 4 and 5, supports an endless belt 1. The belt 1 provides a support for a substrate to be printed. The drive of rollers 2 and 10 is synchronised and a mirror system 30 is provided to enable plate and print image to be aligned. The use of a flexible belt for the support of the substrate permits the normal independence between substrate length and support roller diameter to be removed. It also enables the use of smaller gears for the driving connection between synchronised rollers.



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FLEXOGRAPHIC PRINTING APPARATUS

The present invention relates to flexographic printing apparatus.

5 Prior to setting up flexographic printing
plates in a production flexographic printing press
the plates are tested in smaller scale machines
known as proofers and mounter-proofers. Despite
their smaller scale, these proofers/mounter-proofers
10 can be substantial and costly machines. To afford
a reasonable test run length for the substrate on
which the printing ink is to be deposited the working
roll which is to support the substrate has to have
a certain minimum diameter, typically up to two
15 metres. Since accuracy is all important, a further
requirement is that the working roll must be accurately dimensioned. This combination of size and
accuracy leads to the expense mentioned above.

According to the present invention there is
20 provided a flexographic printing apparatus for mounting
and proofing flexographic printing plates comprising

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means for supporting one or more flexographic printing plates means for supplying ink to the flexographic plate or plates and means for supporting a substrate to be printed in which the means for
5 supporting the substrate comprises a flexible member support on two or more substantially rigid supports.

In a preferred form of the invention, the flexible member is an endless belt advantageously following a path defined by a number of supporting rotatable
10 rollers. These rollers can be rearranged, and in particular displaced relative to each other, to alter the length of the belt and therefore the length of substrate which can be supported. The means for mounting the plates may also comprise a rotatable substanti-
15 ally rigid roller. This is disposed adjacent one of the rollers supporting the belt so that at the important line of contact between the plate and substrate both are supported by substantially rigid supports. These rollers have intermeshing gears at adjacent axial
20 ends or a friction drive or an electronic/electrical drive so that their rotation is synchronised. The spacing between these rollers and also their relative rotational positions may be altered as required. The

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means for supplying ink to the plate or plates comprises a roller and associated doctor blade the ink being stored in the trough formed between them.

5 In order that the invention may be more clearly understood, one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 shows a diagrammatic side
10 elevational view of apparatus for mounting and proof-
ing flexographic printing plates according to the
invention, and

Figure 2 is a diagrammatic plan view of part
of the arrangement of Figure 1.

15 Referring to the drawings, an endless flexible
belt 1 is supported on four spaced steel rotatable
rollers 2 to 5. The belt 1 may be made of any
suitable stable material such as paper, metal or
synthetic plastics material (for example polyester,
20 mylar or melinex). Rollers 3, 4 and 5 can be adjust-
ed in position to accept a different size of belt

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and therefore provide a different substrate support length.

Disposed adjacent roller 2 is a further steel rotatable roller 10 on which the flexographic printing plate(s) to be tested can be mounted. One such plate is shown by way of example at 11. Mounting is usually by means of adhesive, preferably using double sided adhesive tape.

Adjacent roller 10 is a further steel rotatable roller 12 and associated with this roller 12 is a steel doctor blade 13. The roller 12 and doctor blade together define a trough 14 to accommodate printing ink. Rollers 2, 10 and 12 are geared together by means of gears 20, 21 and 22 connected to their adjacent axial ends. These rollers therefore are synchronised. They may be adjusted relative to one another to a certain degree to accommodate different plate thicknesses, for example, in the case of rollers 2 and 10 or different rate of ink take up in the case of rollers 10 and 12, whilst still maintaining the intermesh of the gears. The drive to the rollers may be to any roller but will normally be to one of the rollers 2, 10 or 12. This drive,

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which is not shown, is generally an electric motor drive.

When printing in more than one colour, it is necessary to be able to accurately place the flexographic printing plate 11 on the roller 10 in register with the print image 25 already on the substrate so that the next colour may be printed over the last with precision. To this end a mirror system shown diagrammatically at 30 is provided.

10 The mirror projects an image of the plate on roller 10 onto the print image on the substrate to enable the two images to be accurately aligned. The position of the mirror is such that when the rollers 2 and 10 are subsequently rotated, the plate will contact the substrate precisely in register with the existing print image. Other optical systems may be used for registering as desired.

In use of the above apparatus, the substrate, usually plastics film or paper, is wound around and fixed to the flexible belt 1. The flexographic printing plate(s) 11 to be tested are fixed to the roller 10 and ink of the desired colour is supplied to the trough 14. The relative positions of the rollers 2, 10 and 12

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are adjusted to their desired relative positions.
The doctor blade 13 may also be adjusted to achieve
desired ink take up on roller 12. The rollers are
then driven so that the length of substrate passes
5 the plate on the roller 10 several images of the
plate being printed on the substrate as a result.
After examining these images, the process may be
repeated, perhaps after modifying the plate or
carrying out adjustments to the apparatus or
10 modifying the consistency of the ink as necessary.
Further runs may be done in different colours to
build up multicoloured images on the substrate,
the above registering system being used where neces-
sary. If different substrate lengths are to be used
15 different length of belt may be accommodated by
adjusting the position of rollers 3, 4 or 5.

It will be appreciated that the above embodi-
ment has been described by way of example only and
that many variations are possible without depart-
20 ing from the scope of the invention. It will also
be appreciated that by effectively replacing a single

large roll by a flexible belt supported on several smaller rollers greater flexibility is achieved.

In particular the use of smaller rollers in this way removes the normal interdependence between substrate

5 length and roller diameter and permits the use of correspondingly small gears to provide precise registering of the roller supporting the substrate at the printing location and the roller supporting the flexographic printing plate.

CLAIMS:

1. A flexographic printing apparatus for mounting and proofing flexographic printing plates comprising means for supporting one or more flexographic
5 printing plates, means for supplying ink to the flexographic plate or plates and means for supporting a substrate to be printed in which the means for supporting the substrate comprises a flexible member supported on two or more substantially rigid supports.
- 10 2. A flexographic printing apparatus as claimed in claim 1, in which the flexible member is an endless belt.
3. A flexographic printing apparatus as claimed in claim 2, in which the endless belt follows a path
15 defined by a number of supporting rotatable rollers.
4. A flexographic printing apparatus as claimed in claim 3, in which one or more of the rotatable rollers are adjustable, so that the length of the endless belt may be adjusted.
- 20 5. A flexographic printing apparatus as claimed in any preceding claim, in which the means for mounting the plates comprises a rigid member which is disposed adjacent one of the substantially rigid supports of the flexible member so as to provide substantially rigid support for
25 both plate and substrate at their line of contact.

6. A flexographic printing apparatus as claimed in claim 5, in which the rigid member comprises a rotatable substantially rigid roller.

7. A flexographic printing apparatus as claimed in claim 6, in which the substantially rigid roller and the adjacent substantially rigid support for the flexible member, which is also a roller, have intermeshing gears at adjacent axial ends so that their rotation is synchronised.

10 8. A flexographic printing apparatus as claimed in claim 6, in which the substantially rigid roller and the adjacent substantially rigid support for the flexible member, which is also a roller, are drivably connected by a friction drive so that their rotation is synchronised.

15 9. A flexographic printing apparatus as claimed in claim 6, in which the substantially rigid roller and the adjacent substantially rigid support for the flexible member, which is also a roller, are drivably connected by an electronic/electrical drive so that their rotation is
20 synchronised.

10. A flexographic printing apparatus as claimed in claim 7, 8 or 9, in which adjacent substantially rigid rollers are relatively adjustable.

11. A flexographic printing apparatus as claimed
25 in any preceding claim in which the means for supplying ink to the flexographic plate or plates comprises a roller

and associated doctor blade, which together define a
trough for the storage of ink.

12. A flexographic printing apparatus as claimed
in any preceding claim in which a mirror is provided to
5 enable a plate to be aligned with an image or a substrate.

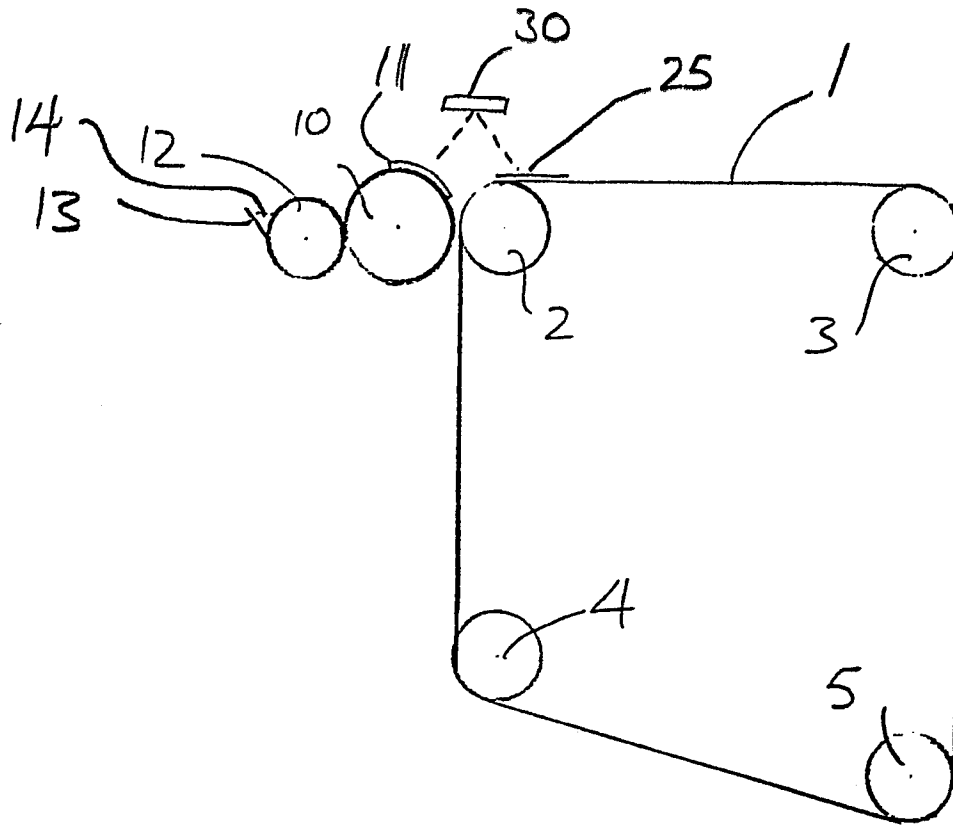


FIG. 1

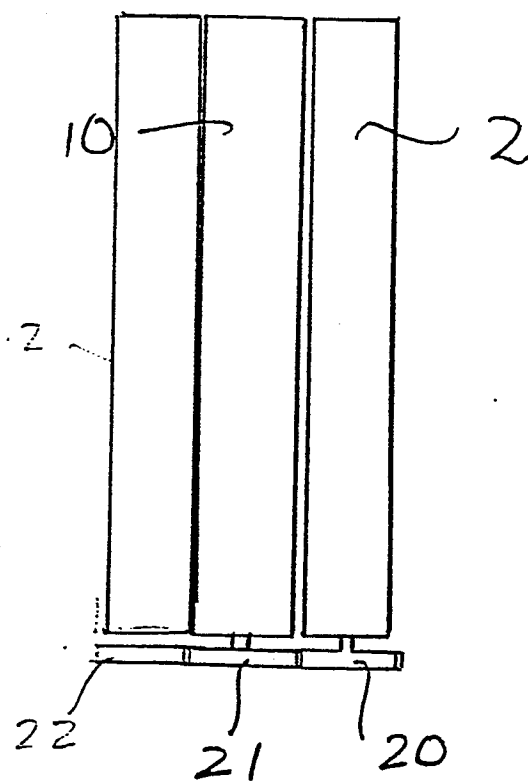


FIG. 2.