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Herrington et al.

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[54] SHEET-SUPPORTING ASSEMBLY FOR AN INVERTER ROLL

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[52] **U.S. Cl.** **271/79,** 29/116, 101/420, 271/51, 308/236

[51] **Int. Cl.** **B65h 29/04,** B65h 29/20

[58] **Field of Search**.....271/82, 71, 51, 80, 79; 193/37; 29/116, 121; 287/52.04; 308/236, DIG. 7, DIG. 11; 101/416, 418, 419, 420

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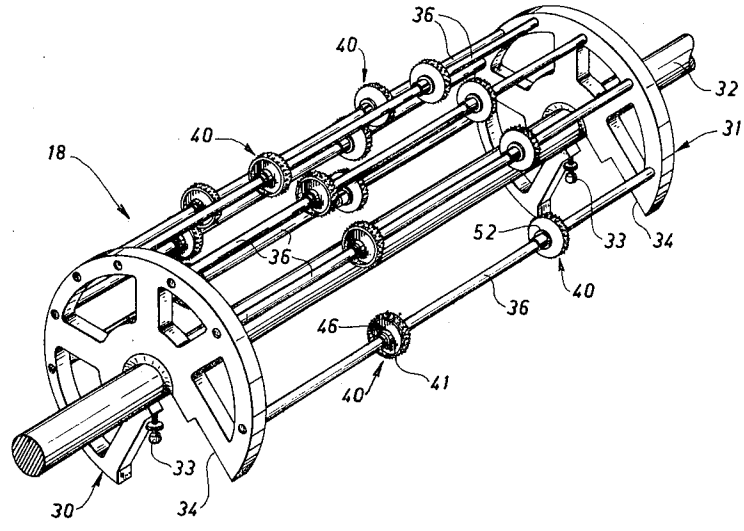
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[57] **ABSTRACT**

An inverter roll for an offset printing press includes a pair of axially spaced-apart spider wheels. A plurality of peripheral rods extend between the rims of the spider wheels and sheet-supporting wheels projecting beyond the cylindrical plane of the rims of the spider wheels are rotatably mounted on such rods to support the paper sheets as they pass around the inverter roll. The positions of such wheels along the rods are readily adjustable to ensure that such wheels always contact the printed surfaces of the sheets at nonprinted positions thereon.

8 Claims, 5 Drawing Figures



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SHEET 1 OF 2

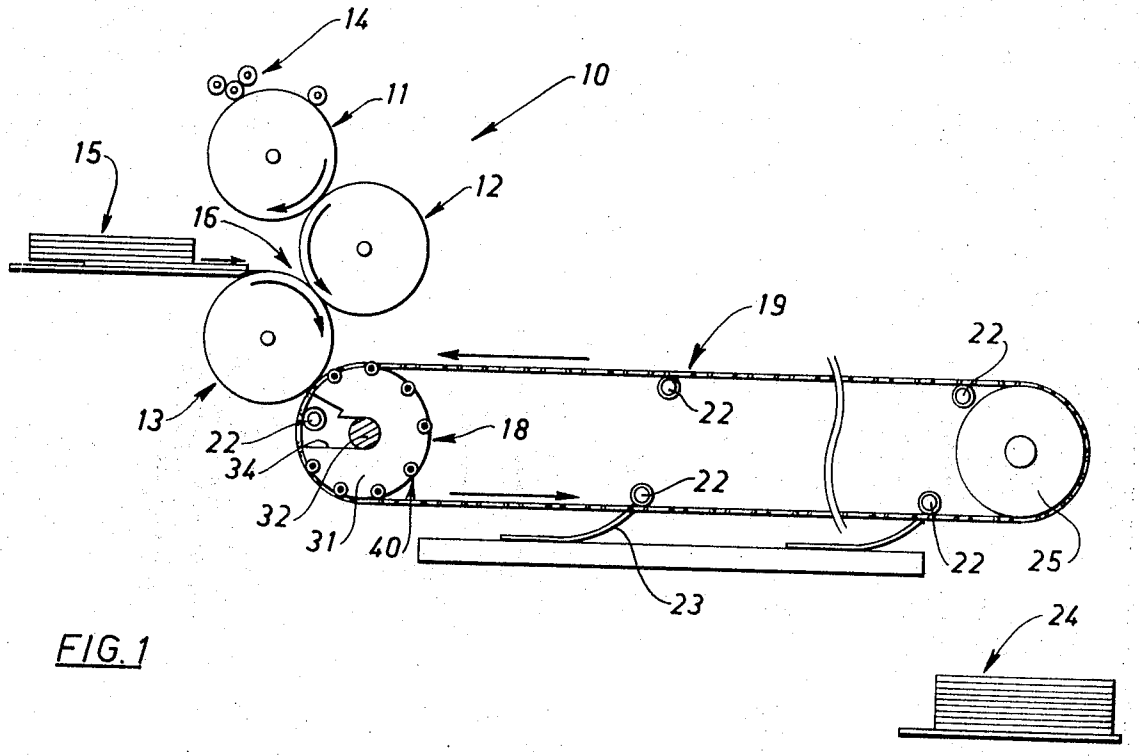


FIG. 1

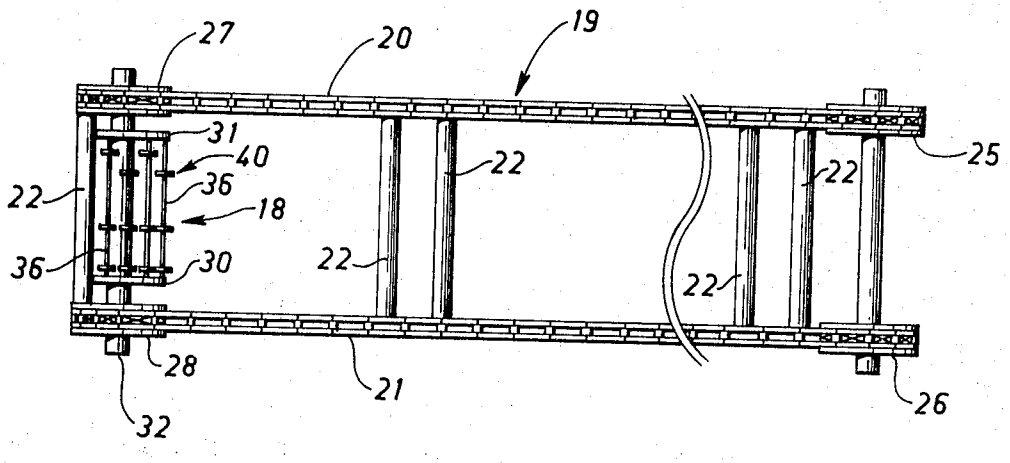


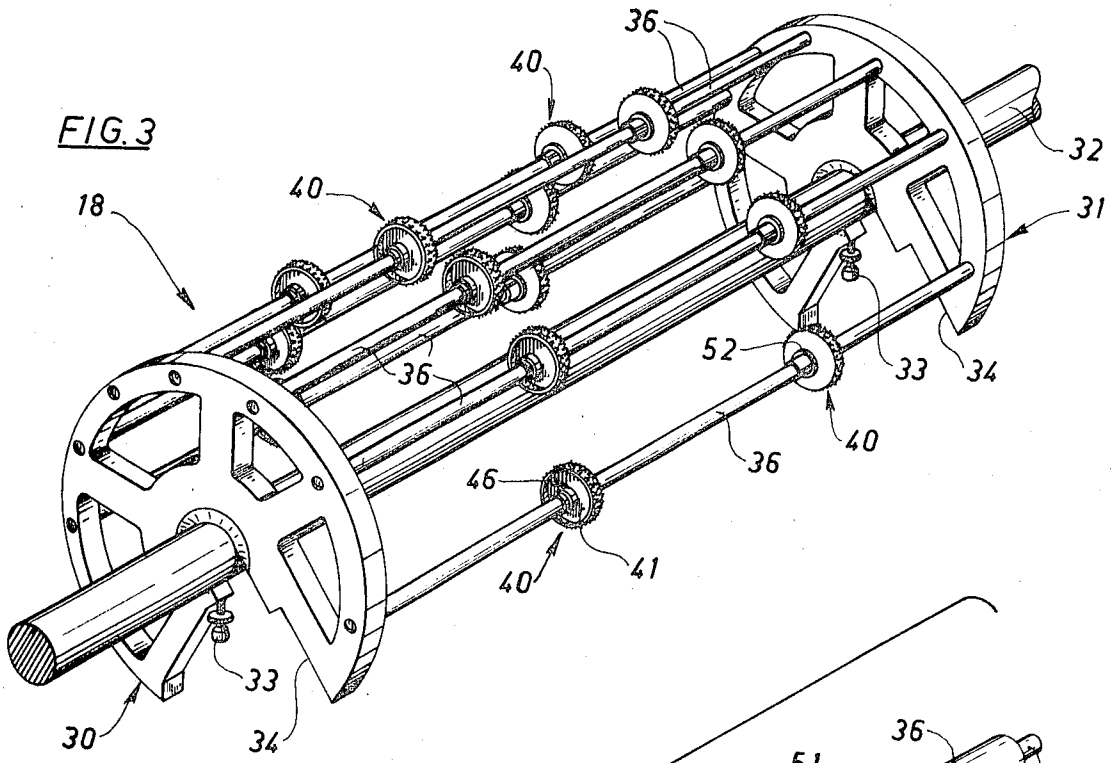
FIG. 2

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FIG. 3



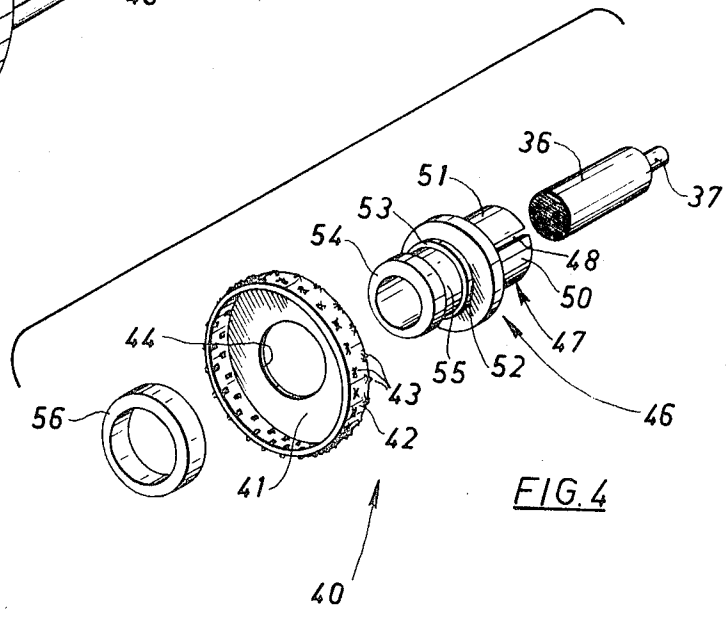


FIG. 4

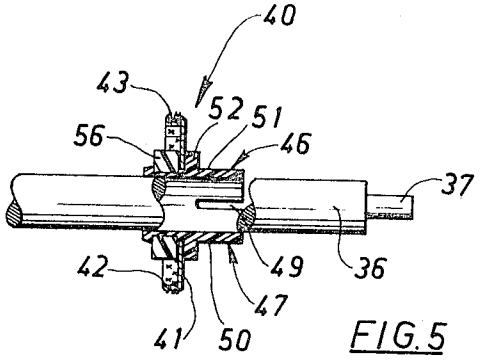


FIG. 5

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SHEET-SUPPORTING ASSEMBLY FOR AN INVERTER ROLL

BACKGROUND OF THE INVENTION

The present invention relates to sheet-supporting assemblies for printing machines which assemblies are particularly intended for use in inverter rolls of rotary offset printing machines.

More particularly, the invention relates to sheet-supporting assemblies for printing machines and which assemblies are characterized by the ease with which the positions of sheet-engaging wheels or rollers of such assemblies can be adjusted to ensure that such wheels or rollers engage nonprinted areas of the printed surfaces of paper sheets passing about transfer or inverter rolls of the press. In this way, the risk of smearing of the printed image on such a sheet is substantially reduced.

Although inverter roll assemblies and transfer roll assemblies have previously been proposed for the same purpose, many of the assemblies heretofore known have had relatively complex structures and have been not only expensive to manufacture but have also been difficult to install on existing transfer and inverter roll structures.

It is a principal object of this invention to provide a sheet-supporting assembly for an inverter roll or transfer roll of a printing press and which sheet-supporting assembly is particularly characterized by the simplicity of its structure and by function of the assembly whereby freshly inked surfaces are supported only on freely rotating wheels or rollers which can be readily laterally adjusted so that they selectively engage substantially nonprinted areas of printed sheets passing about the roll.

Other objects of the invention will become apparent as the description herein proceeds.

SUMMARY OF THE INVENTION

In its broadest scope, the present invention provides a sheet-supporting assembly for a roll of a printing press which assembly comprises a pair of axially spaced-apart mounting members adapted to be supported by a roll shaft, a plurality of generally peripheral rods extending between said mounting members so as to be generally parallel to the roll shaft, and wheels rotatably mounted on said rods in adjustable positions therealong for supporting a paper sheet passing about said roll.

In accordance with one particularly useful feature of this invention, each wheel provided on the sheet-supporting assembly thereof comprises an annular generally planar disc rotatably mounted between first and second external and axially spaced-apart annular flanges provided on a sleeve frictionally engaging a respective one of said rods for slidable adjustment therealong. A particularly useful construction for retaining such discs on such a sleeve will be described in greater detail hereinafter.

Other features and advantages of the invention will become apparent as the description herein proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described merely by way of illustration with reference to the accompanying drawings in which:

FIG. 1 is a fragmentary schematic side elevation of an offset printing press showing the use therein of an inverter roll incorporating a sheet-supporting assembly in accordance with the present invention;

FIG. 2 is a somewhat schematic partial plan view of the printing press of FIG. 1 showing the relative dispositions of the inverter roll and a chain-driven gripper belt constituting a discharge means of the printing press;

FIG. 3 is an enlarged perspective view of the inverter roll of the printing press of the preceding Figures;

Flg. 4 is an enlarged and exploded perspective view of one of the sheet-engaging wheel assemblies of the inverter roll of the printing press shown in the preceding Figures and also showing the manner in which such a wheel is adjustably

disposed on one of the peripheral rods of the inverter roll, such rod being shown fragmentarily; and

FIG. 5 is a vertical sectional view through the wheel assembly of FIG. 4 showing the wheel and its bearing sleeve in their assembled positions and showing that sleeve disposed about one of the peripheral rods of the inverter roll.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The offset printing press indicated generally at **10** in FIG. 1 of the accompanying drawings is conventional in that it includes a plate roll generally indicated at **11**, a blanket roll generally indicated at **12** and an impression roll generally indicated at **13**. An inking roller assembly generally indicated at **14** is provided in a conventional manner for inking the offset plate mounted on the plate roll **11**. In operation, the various rolls **11**, **12** and **13** rotate in the directions indicated by the arrows and a paper sheet fed from a feed station generally indicated at **15** passes through the nip **16** between the blanket roll **12** and the impression roll **13** to receive a printed image from the blanket roll **12**. The printed sheet is transferred from the impression roll **13** to an inverter roll generally indicated at **18** and from which it is, in turn, removed by a chain-driven gripper belt generally indicated at **19**.

The gripper belt **19** is conventional and includes a pair of spaced-apart chains **20** and **21** between which a number of transversally disposed gripper bars **22** are mounted for gripping the leading edges of successive sheets of paper carried on the inverter roll **18** in turn to transfer such sheets as shown schematically at **23** in FIG. **1** to a discharge stack generally indicated at **24**. The chains **20** and **21** are entrained around drive sprockets **25** and **26** respectively as well as around sprockets **27** and **28** respectively, the latter sprockets **27** and **28** being keyed to a main shaft **32** of the inverter roll **18** as will readily be understood by reference to FIG. **2** of the accompanying drawings.

Since the gripper belt **19** forms no part of the present invention and since it can be constructed in any appropriate manner, it will not be described in greater detail herein.

As already indicated, the present invention resides in the provision of a particular type of sheet-supporting assembly on the inverter roll **18** of the press **10** shown in the accompanying drawings. It will readily be understood by reference to FIG. **1** that, during the passage of a printed sheet around the inverter roll **18**, the printed surface of such a sheet will be in contact with the peripheral surface of that roll.

As already explained herein, it is a principal object of this invention to provide a roll such as an inverter roll in which the positions at which such a printed sheet is touched by the inverter roll can be controlled and adjusted so as substantially to reduce the risk of smearing of the printed image present on the sheet.

The general structure of the inverter roll **18** will now be described with particular reference to FIG. **3** of the accompanying drawings from which it will be seen that the roll **18** includes a pair of axially spaced-apart spider discs or wheels **30** and **31**, each of which is retained in position on the shaft **32** by a locking bolt **33**. Each of the spider discs **30** and **31** is formed with a cutaway sector **34**, as is conventional, for receiving the gripper bars **22** on operation of the press **10** as will also readily be understood by those conversant with the art.

A plurality of rods **36** extend between the spider discs **30** and **31** at mutually angularly spaced-apart positions therearound and, in accordance with one particularly useful feature of this invention, each such rod **36** is formed at each of its ends with a terminal stud **37** (FIG. **4**) which is slidably inserted into a corresponding opening in the rim of a respective one of the spider discs **30** and **31** being automatically retained in such opening when the spider discs **30** and **31** are clamped on the shaft **32**.

Slidably mounted on the rods **36** for positional adjustment therealong, there are provided a plurality of wheels which are generally and individually indicated at **40**. These wheels **40**

have a diameter sufficiently large such that the wheels project behind the cylindrical plane defined by the peripheries of spider wheels **30**, **31** and thereby support the printed paper sheet as it passes about the inverter roll **18** free of contact with wheels **30**, **31** and, support the printed paper sheet as it passes about the inverter roll **18** and, by adjusting the longitudinal positions of the wheels **40** on the rods **36** prior to operation of the press **10**, such wheels can be arranged so that they touch the printed sheet at unprinted positions thereon so substantially reducing the risk of smearing of the printed image.

One especially useful structure for each such wheel **40** and for the adjustable mounting of such wheels on the rods **36** will now be described in greater detail with particular reference to FIGS. **4** and **5** of the accompanying drawings.

Referring, therefore, particularly to FIGS. **4** and **5**, it will be noted that the wheel **40** illustrated therein comprises an annular generally planar disc **41** integrally formed around its outer edge with a peripheral flange **42** extending in the axial direction. The flange **42** is usefully formed with an irregular external surface to ensure effective transfer of each paper sheet from the impression roller **13**. In the disc **41** shown in FIGS. **4** and **5**, the flange **42** is shown as being stamped to provide outwardly projecting burrs **43**. It is, however, equally within the scope of this invention to apply a coating of a frictional material to the outer surface of the flange **42** for the same purpose. The disc **41** also includes an axial opening **44** (FIG. **4**) which, when the wheel **40** is assembled, is disposed coaxially about a sleeve member generally indicated at **46**.

Referring now in greater detail to the structure of the sleeve member **46**, it will be seen from FIGS. **4** and **5** that member **46** comprises a cylindrical sleeve **47** which fits slidably on a respective one of the rods **36** for frictional gripping engagement therewith. To facilitate such gripping engagement, the sleeve **47** is usefully formed with two diametrically opposed longitudinal slots **48** and **49** along a portion of its length so as to provide two tongues **50** and **51** which are resiliently urged into gripping engagement with the respective rod **36**. With this particular construction, the wheel **40** can be slid along the rod **36** whenever it is desired to adjust its axial position thereon but, once so adjusted into a required position, the tongues **50** and **51** serve firmly to retain the wheel **40** in that required position.

Integrally formed with the sleeve **47**, there is provided a first annular flange **52** which has a diameter greater than the diameter of the opening **44** in the disc **41**. Axially adjacent the flange **52**, the sleeve **47** is integrally formed with an annular lip or shoulder **53** (FIG. **4**) having substantially the same diameter as the opening **44**. The lip **53** serves to support the disc **41** when that disc is disposed in axial abutment with the flange **52**.

At the opposite end to the tongues **50** and **51**, the sleeve **47** is integrally formed with a second annular lip **54** which has substantially the same diameter as the lip **53** and is axially spaced apart from that lip to provide a peripheral recess **55** in which a resilient elastomeric collar **56** is received for holding the disc **41** in position coaxially around the lip **53**.

It will now be understood that the wheel **40** can be assembled simply by inserting the sleeve **47** into the opening **44** in the disc **41** until the latter is disposed around the lip **53**. The collar **56** can then be stretched over the lip **54** for insertion into the recess **55**.

The disc **41** and the flange **42** integrally formed therewith are usefully formed of metal, for example, by a stamping operation although the use of other materials such as a plastics material for that member is also possible. The sleeve **46** with the integrally formed flange **52** and the integrally formed lips **53** and **54** is usefully manufactured from a plastics material but the use of other materials is not precluded. As already indicated, the collar **56** is usefully formed of an elastomeric material.

In the use of the inverter roll **18** in a printing press such as the press **10**, the rods **36** are first fitted into the spider discs **30** and **31** in the manner already described and these discs **30** and **31** are then clamped to the shaft **32** by means of the locking bolts **33**. The various wheels **40** are then slid along the rods **36** into such positions that, during operation of the press **10**, each printed paper sheet is contacted by the flanges **42** of the disc **41** of the wheels **40** in nonprinted areas of such sheets.

Although the invention has been described with reference to an inverter roll in which the rods **36** carrying the wheels **40** are mounted directly on the spider discs **30** and **31**, it will be understood that it is equally within the scope of this invention to provide separate mounting members for supporting the rods **36** and which mounting discs can in turn be secured in any appropriate manner to existing spider discs of an inverter roll. Furthermore, it is within the scope of this invention to utilize the sheet-supporting assemblies thereof in the transfer rolls of multicolor printing presses.

We claim:

1. A sheet-supporting assembly for a roll of a printing press which assembly comprises a pair of axially spaced-apart mounting members adapted to be supported by a roll shaft, a plurality of generally peripheral rods extending between said mounting members so as to be generally parallel to the roll shaft, and a plurality of wheels rotatably mounted on said rods in adjustable positions therealong for supporting a paper sheet passing around said roll, each of said wheels comprising a generally planar annular disc rotatably mounted between first and second external and axially spaced-apart annular flanges provided on a sleeve frictionally engaging a respective one of said rods for slidable adjustment therealong, and the periphery of each of said wheels projecting beyond the plane of the mounting members.

2. A sheet-supporting assembly as claimed in claim **1** for use on an inverter roll of a printing press and in which each said mounting member comprises a spider wheel.

3. A sheet-supporting assembly as claimed in claim **1** in which each said annular generally planar disc is integrally formed with a paper sheet-engaging annular flange extending in the axial direction from the peripheral edge of said planar disc.

4. A sheet-supporting assembly as claimed in claim **3** in which said sheet-engaging annular flange of each said annular generally planar disc is formed with a roughened external peripheral surface for engagement with a paper sheet passing about the inverter roll.

5. A sheet-supporting assembly as claimed in claim **1** in which said annular generally planar disc of each said wheel is retained in position on a respective one of said sleeves by said first external annular flange which is integrally formed with said sleeve and by a resilient collar constituting said second external annular flange and which is axially retained in position on said sleeve by a first external annular lip integrally formed with said sleeve, said first annular lip being dimensioned so as to permit passage thereover of both said annular generally planar disc of said wheel and said collar when said collar is radially expanded but also normally to retain said collar in position around said sleeve.

6. A sheet-supporting assembly as claimed in claim **5** in which said sleeve is integrally formed with a second annular lip axially spaced apart from said first annular lip thereof to receive said collar therebetween and to receive said annular generally planar disc of a respective one of said wheels coaxially thereabout.

7. A sheet-supporting assembly as claimed in claim **6** in which each said sleeve is longitudinally slotted to facilitate its frictional gripping engagement with a respective one of said rods.

8. A sheet-supporting assembly as claimed in claim **7** in which each said sleeve, said first external annular flange thereof and said first and second annular lips thereof are integrally formed of a plastics material and in which said collar is formed of an elastomeric material.

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