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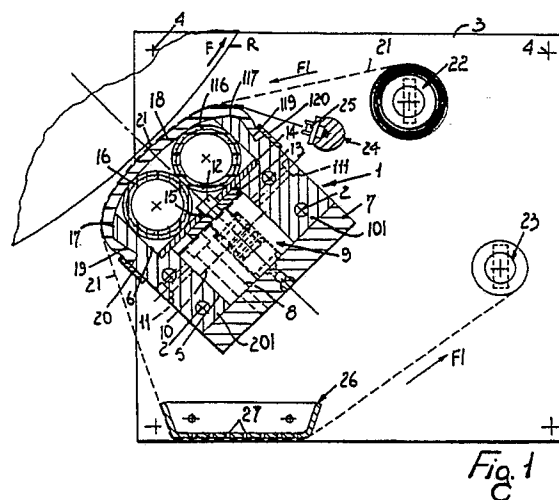
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**Pressing device in an apparatus for cleaning the rubber blanket cylinder of a printing press.**

The pressing device provided for pressing the cleaning web (21) against the rubber blanket cylinder (R) of a printing machine comprises a sheet (18) of natural rubber, with its longitudinal side edges being fastened to a supporting straight-sided body (1) arranged parallel to the said cylinder. A cleaning web is lead over the outward face of this sheet, and upon control the said sheet is deformed by the pushing action of a plurality of small cylinder-and-piston units (9) housed in the said body (1) in a properly equispaced relation, and acting upon the entire length of said sheet, with the interposition of washers (13) for widening the said piston units pushing surface, and of a steel strip (14) for longitudinally and transversely distributing this pushing action, and of a pair of rectilinear parallel beads (16, 116) of elastic-yieldable material, which perform their function by contacting the sheet (18), and are provided for localizing the said pushing action on parallel, near sections of the cylinder, the said beads preferably consisting of internally armored rubber hoses.



## Pressing device in an apparatus for cleaning the rubber blanket cylinder of a printing press

The invention relates to those apparatus which are used for a mechanized cleaning of rubber blanket cylinders in offset printing machines, and relates particularly to an apparatus comprising a pressing device arranged parallel to the rubber blanket cylinder, which is at least of a same length as this cylinder, with a continuous web of woven or not woven material being lead thereover, which web is delivered from a supply roll, and has its opposite end connected with a take-up roll which is driven in rotation by suitable means. The pressing device is normally arranged in such a position that the web will not interfere with this cylinder, so that the same is allowed to freely transfer the ink to the printing cylinder. However, when the rubber blanket cylinder wants to be cleaned, the pressing device will cause the web that is lead thereover, to interfere with the said cylinder, and will properly press the same, so as to ensure the most uniformly distributed contact possible of the web over the entire length of this cylinder, while the said web is being wetted with a solvent, and is being gradually transferred from the supply roll to the take-up roll, so that clean web portions will be always acted upon thereby.

The cylinder to be cleaned is kept rotating at the proper speed, and its direction of rotation is contrary to the direction in which the web gradually removing the stain is advanced, the said web being no more wetted with solvent in the last part of the cycle, whereby to promote a substantial drying of this cylinder.

The pressing devices used in the apparatus of known type do not solve the following problems of:

1. ensuring a rest position of the pressing device at such a proportionate distance from the blanket cylinder, as to prevent the pressing device from undesirably interfering with the cleaning web,
2. ensuring the best adaptation of the pressing device to the surface of the blanket cylinder to be cleaned, with a wide, uniform, and continuous pressure distribution, even in the event of a considerable distortion of this cylinder and/or also in the event of remarkable errors of parallelism and alignment made in the step of assembling the cleaning apparatus with the printing machine,
3. guaranteeing a high reliability from the technical standpoint and, at the same time, a relatively simplified construction.

The invention solves these and other problems by providing a pressing device for a cleaning apparatus of the aforementioned type, which is fitted with a rubber sheet that differently from the known art, is not deformed by a pressure fluid, but is deformed by the pushing action being applied

thereon by a plurality of fluid-pressure operated cylinder-and-piston units closely arranged in an equispaced, side-by-side aligned relation, which are such as to act upon the pressing device throughout its length. Interposed between the moving elements of the pushing units and the said rubber sheet, is at least one suitably thick steel strip that distributes the pressure along the length and across the width of the pressing device, and there are preferably interposed at least two armored rubber hoses, or equivalent beads, arranged side-by-side and placed between the said strip and the rubber sheet, in order to improve the elastic/yieldable properties of the pressing device, and to localize the pushing action of the pressing device on two near parallel areas.

Further features of the invention, and the advantages arising therefrom will more clearly appear from the following specification of one preferred embodiment thereof, which is shown merely by way of a non-limiting example in the Figures of the one sheet of drawing, in which:

Figure 1 is a cross-sectional view of the cleaning apparatus shown in its rest condition.

Figure 2 shows the pressing device according to Figure 1, in its working, active condition.

Figure 3 is a diagrammatic plan view showing the arrangement of the pressing device pushing elements along the length of the blanket cylinder to be cleaned.

Referring first of all to Figure 1, by numeral R there is designated the rubber blanket cylinder to be cleaned, which is partly broken away. The pressing device of the invention comprises a body 1 which is suitably longer than the said cylinder R, is arranged parallel thereto, at a predetermined suitable distance therefrom (see hereinafter), and is formed by a pair of profiled, parallel longitudinal members 101, 201 which by their ends are secured by means of screws 2, to plates 3 which in turn are provided with bores 4 for securing them by means of screws, to the side frames or shoulders of a printing machine. In lieu of the bores 4, also slots may be provided for allowing the body 1 to be positioned in an as much as possible parallel and trued relation with the axis of cylinder R. The longitudinal members 101, 201 have their inward sides so profiled that a first parallelepipedal through chamber 5 is thus delimited, and a further parallelepipedal chamber 6 is delimited thereover, which is less high, but is wider than the lower chamber 5. The bottom side of chamber 5 is closed throughout its length by a plate 7 which by means of screws (not shown) is secured to the longitudinal members 101, 201. Single-acting or

double-acting, fluid-pressure operated, equal, small cylinder-and-piston units 9 are secured by their bodies, by means of screws 8, to the said plate 7, and are housed in chamber 5, and are mutually connected in parallel, such as by means of ducts formed in the said plate 7, and/or in the longitudinal members 101, 201. The units 9 have the projecting end of their stems directed toward the chamber 6 and, as much as possible, radially to the cylinder R to be cleaned. The said units 9 are set in an equispaced relation, at a suitable distance from each other. Sixteen piston-and-cylinder units 9 are, for example, used for acting upon a 1200 mm long cylinder R, which are symmetrically arranged relative to the said cylinder, and are equispaced by a distance of 80 mm from each other, according to the example shown in Figure 3.

In order that the body 1 be best stiffened, the longitudinal members 101, 201 forming the same, are transversely interconnected by spacer elements 10 arranged at a same distance from each other, and secured to the said longitudinal members by means of screws 11, 111.

Steel washers 13 are each secured by means of a screw 12 on to the stem of each unit 9, and perform a stem lengthening function, and especially the function of suitably widening the stems, so as to have a better distribution of the pressure as applied by the said stems on the overlying element that engages the chamber 6 substantially over its whole dimension in plan view, and that consists of a steel strip 14 provided with equispaced bores 15 along its center line, through which the heads of screws 12, which also prevent the said strip from being undesirably displaced in the longitudinal direction, are passed with a sufficient play. Merely in an indicative way, it should be noted that in the prototype of the pressing device as made by the Applicant, the diameter of the stems of units 9 is in the order of 12mm, and a washer 13 having a diameter of 3 cm and a thickness of 4mm, is secured on to the said stems. The strip 14 is 6 cm wide and about 2mm thick.

Two equally sized hoses 16, 116 are housed in chamber 6 and extend throughout the length thereof, and the said hoses bear both against the said strip 14, contact each other, and contact the sidewalls of the said chamber 6, or are received therein with a small side play, and protrude from the top of this chamber by a proper amount. Good results have been attained, for example, by making the elements 16, 116 with lengths of hoses for high pressure hydraulic circuits, with rubber hoses internally armored with steel, and/or with any like suitable material. These hoses are characterized by a considerable elastic memory, and by a yieldability which is fit for the purpose of the invention. The said hoses have an outside diameter of, for exam-

ple, 3 cm. It is however understood that suitable elastic/yieldable beads may be used in place of the said hoses. The hoses 16, 116 are held in chamber 6 by plates 3 that close the said chamber at both opposite ends.

As shown in Figure 1, the top end of the longitudinal members 101, 201 is suitably rounded at 17, 117, so that on the said longitudinal members there can be laid, throughout its length, a suitably thick sheet 18 of elastic material, preferably of natural rubber, which by means of fastening platelets 20, 120 and screws, is fastened at 19, 119 by its longitudinal side edges to the suitably undercut side portions of the said longitudinal members, the whole arrangement being conceivable and easily achievable by those skilled in the art. According to a modified embodiment of the invention, reinforcing members of metal may be respectively incorporated in the longitudinal edges of sheet 18, whereby these edges are fastened to the external sides of body 1 in a simpler and firmer manner. Indicatively, the sheet 18 has been, for example, made from an India rubber sheet of a thickness of about 5 mm.

The sheet 18 bears on the hoses 16-116, and when the device is in its rest condition, as shown in Figure 1, the outward face of said sheet is at a distance from the cylinder R of about 5 to 10 mm.

The web 21 is lead over the sheet 18, and is supplied from a supply roll 22 that is removably fitted on friction supports associated with the plates 3, and is connected with a take-up roll 23 that upon control is driven in rotation by suitable means for winding up the said sheet. A bar 24 provided upstream of the pressing device and arranged parallel thereto, is attached to plates 3 and is fitted with a plurality of nozzles 25 directed toward the region at which the web 21 is lead over the sheet 18, and is connected to a source for delivering any suitable detergent liquid under pressure. Downstream of the pressing device, before the web 21 being wound up on the take-up roll 23, the web 21 is caused to slide on the outer faces of a vessel 26, with the ends thereof being secured to plates 3, also for a stiffening function. The said vessel is so positioned and sized that any drops of liquid which during the operation of the apparatus may drop down from the pressing device, are collected therein, and the vessel bottom is formed with holes 27, through which the collected liquid is brought back on to the web in a uniformly dispersed manner. Anyhow, it is understood that the details relating to the leading of web 21 over the sheet 18, the driving of this web, the wetting of the same with a detergent, the collection of the detergent drops and the possible evacuation thereof, are not within the scope of the present invention, so that all this may be suitably achieved anyway, however without al-

tering the protection deriving from the present Patent Application.

The operation of the thus conceived apparatus is simple and apparent. Any time the cylinder R wants to be cleaned, this cylinder is kept rotating at the proper speed, as indicated in figure 1 by arrow F, and the simultaneous feeding is controlled of all the microcylinders 9 for their stems to be extended. Through its washer 13, each cylinder acts upon the steel strip 14, and this strip lifts the hoses 16, 116 which in turn push the sheet 18 outwardly. In Figure 2 there is shown that thanks to the provision of the two hoses 16, 116, the sheet 18 is moved into a wide contact with the cylinder R, and the web 21 is efficiently pressed into contact with the said cylinder, so that this web is caused to uniformly bear thereagainst, and any surface unevenness, and any possible misalignment is thus recovered, especially in the straight areas as determined by the presence of the said hoses 16, 116, on which pressure is applied. The web 21 is cyclically moved in the direction of arrow F1, and the same is initially wetted with solvent by the unit 24, 25. On the cleaning cycle being completed, the wetting with solvent is ceased, and the web 21 is moved forward for drying the cylinder, the whole according to a known method.

By relieving the pressure from cylinders 9, or by feeding them so as to have their stems retracted, according to whether the said cylinders be single-acting or double-acting cylinders, the pressing device is returned into its retracted position shown in Figure 1, with the web 21 away from the cylinder R, that is thus allowed to resume its operative condition.

The body 1 may be a one-piece body. Only one, or three or more hoses may be used in place of the two hoses 16, 116. The surface of sheet 18 may be smooth, or the same may be formed, for example, with small reliefs in a slanting fishbone arrangement, so as to ensure the transversal extension of web 21, and also in order to have a better adaptation of this web to the surface of the blanket cylinder to be cleaned. The cylinder-and-piston units 9 instead of having their stems aligned along only one row, may be aligned along two or more parallel rows.

## Claims

1. A pressing device with a uniformly distributed pressing action, provided in an apparatus for cleaning the ink-transferring rubber blanket cylinder of a printing machine, which apparatus is of the type comprising at least one pressing device arranged parallel to the said cylinder and extending throughout the length thereof, over which a continu-

ous web (21) delivered from a supply roll (22) is lead, and out of the pressing device this web is connected with a take-up roll (23), and comprising a bar (24) fitted with nozzles (25) for wetting with a liquid the zone at which the web is caused to contact the pressing device, so that in order to have the said rubber blanket cylinder cleaned, which is kept rotating at the proper speed, the pressing device causes this web to contact the said cylinder, so as to clean and then dry the same, characterized in that the pressing device comprises a straight-sided supporting structure (1) with a one-piece or composite configuration, which is secured directly, or through plates (3), to the shoulders carrying the cylinder (R) to be cleaned, and is parallel thereto, with a housing (5) being provided for a plurality of fluid-pressure operated, equal, small cylinder-and-piston units (9) to be received therein, which are arranged in an equispaced side-by-side relation, with their stems being located in an ideal plane that is as much as possible oriented radially to the cylinder to be cleaned, it being foreseen that the stems of the cylinders will act directly, or preferably with the interposition of a respective washer or any like means (13) for widening the stems surface, upon the center line of a steel strip (14) fitted throughout its length in a parallelepipedal chamber (5, 6) on which there are longitudinally arranged two equal parallel beads (16, 116) with suitable properties of elasticity and yieldability, and being preferably round in cross-section, which perform their function by contacting a sheet (18) preferably of India rubber, which covers the top of said chamber and is fastened to the sides thereof by means of suitable brackets (20, 120), the whole arrangement being so provided that when the microcylinders are in rest position, the India rubber sheet and the web which is lead thereover, are at a suitable, safe distance from the ink-transferring cylinder, while when the microcylinders are operated for their stems to be extended, they will lift the steel strip (14), which with the interposition of the two elastic, yieldable beads (16, 116), will act upon the India rubber sheet (18), thus forcing the interposed web (21) to intimately bear against at least two respective longitudinal parallel areas of the cylinder (R), and making up for any possible difference in planarity on the cylinder, and any possible misalignment between, and errors in the trueing of the pressing device and the said cylinder, whereby to ensure a uniformly distributed, perfect contact between the cylinder and the cleaning and drying web, which is used in known manner.

2. The pressing device according to Claim 1, characterized in that according to a different embodiment of the same, only one, or three or more beads may be provided in place of the two beads

(16, 116) of elastic yieldable material.

3. The pressing device according to Claim 1, wherein the beads (16, 116) consist of hoses of natural and/or synthetic rubber, and are internally armored.

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4. The pressing device according to Claim 1, wherein the beads consist of lengths of internally armored rubber hoses, of the type which is used in high pressure hydraulic circuits.

5. The pressing device according to the preceding Claims, in which the beads (16, 11) have an outside diameter of, for example, about 30 mm.

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6. The pressing device according to Claim 1, wherein the rubber sheet (18) is, for example, 5 mm thick.

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7. The pressing device according to Claim 1, wherein the microcylinders (9) are fixed to bottom plate (7) preferably carrying the connections for feeding in parallel the said cylinders, and which is prepared for being removably attached to the pressing device body (1), it being provided for this purpose that the washers (13) for widening the cross-section of the microcylinder stems be each secured to the said stems by a screw (12) which, when it is in relief, is passed through a respective bore (15) provided in the steel strip (14).

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8. The pressing device according to Claim 1, characterized in that according to a different embodiment of same, the microcylinders (9) may be aligned with their stems along more parallel rows, so that they will act in a symmetrical arrangement upon the steel strip (14) acting upon the elastic/yieldable beads (16, 116) for deforming the rubber sheet (18).

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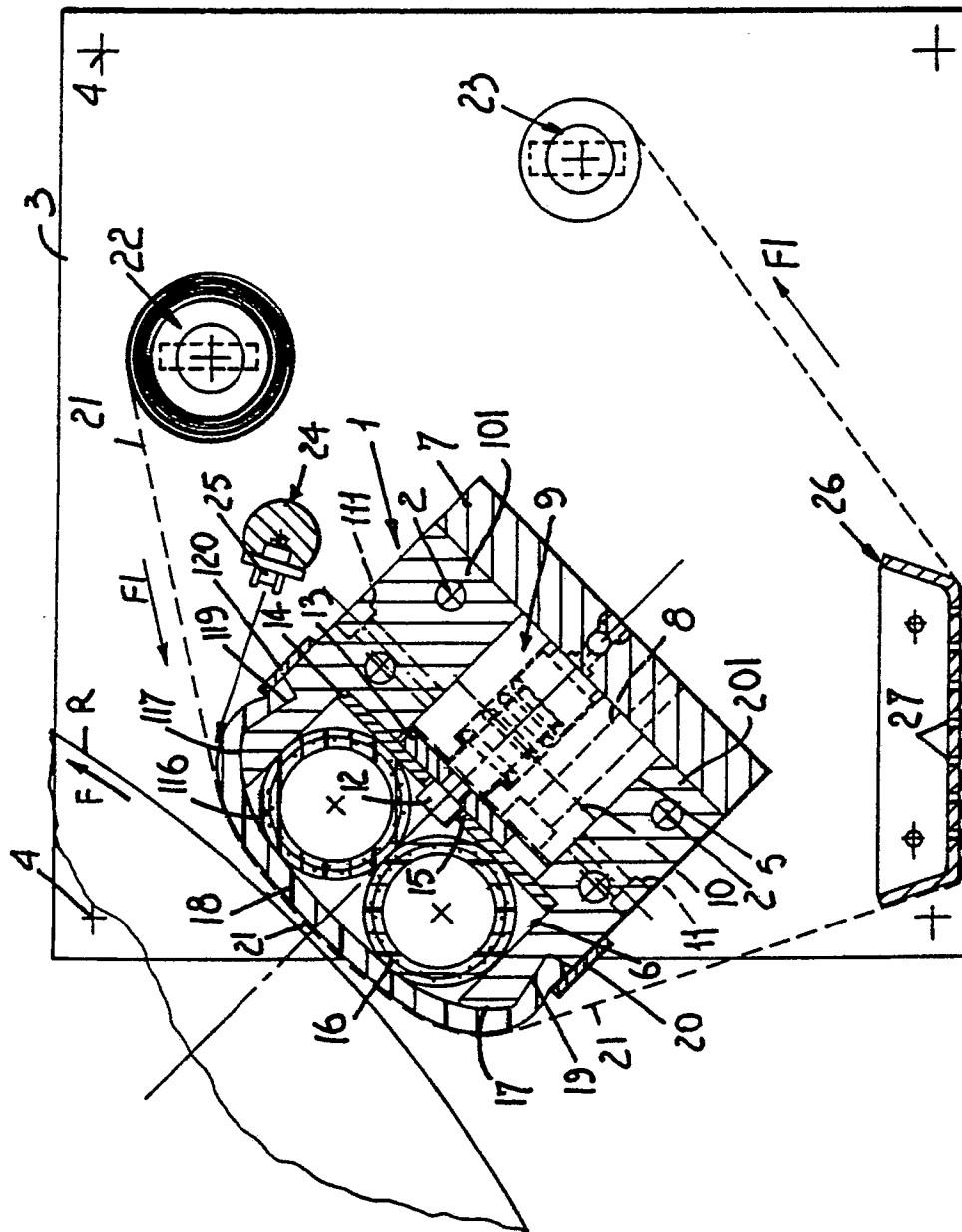


Fig. 1

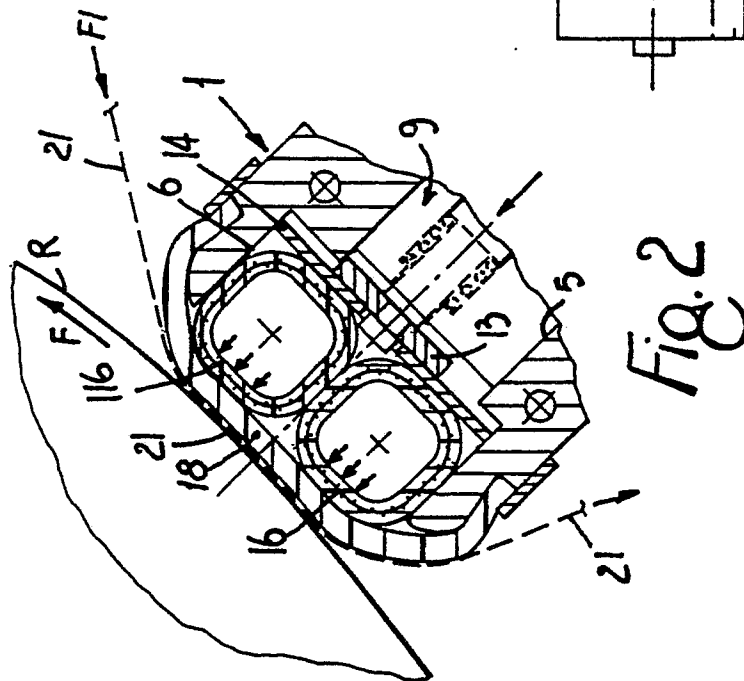


Fig. 2

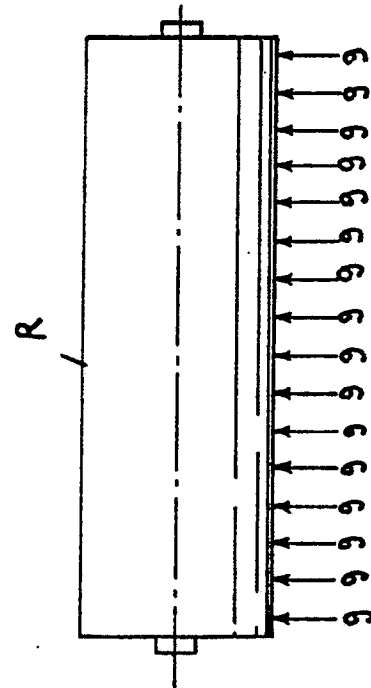


Fig. 3



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## EUROPEAN SEARCH REPORT

Application Number

EP 90 10 4696

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                     |                                                                               |                                                                                                                                                                                                                                                                                       |                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Category                                                                                                                                                                                                                | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim                                                                                                                                                                                                                                                                     | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| A                                                                                                                                                                                                                       | EP-A-291745 (BALDWIN JAPAN LTD.)<br>* the whole document *                    | 1                                                                                                                                                                                                                                                                                     | B41F35/06                                     |
| A                                                                                                                                                                                                                       | EP-A-299193 (BALDWIN JAPAN LTD.)<br>* the whole document *                    | 1                                                                                                                                                                                                                                                                                     |                                               |
| A                                                                                                                                                                                                                       | EP-A-180134 (HARRIS GRAPHICS CORPORATION)<br>* the whole document *           | 1                                                                                                                                                                                                                                                                                     |                                               |
| A                                                                                                                                                                                                                       | US-A-4211147 (PANISSIDI, SHELTON, WILL)<br>* the whole document *             |                                                                                                                                                                                                                                                                                       |                                               |
|                                                                                                                                                                                                                         |                                                                               |                                                                                                                                                                                                                                                                                       | TECHNICAL FIELDS SEARCHED (Int. Cl.5)         |
|                                                                                                                                                                                                                         |                                                                               |                                                                                                                                                                                                                                                                                       | B41F<br>B41L<br>F15B                          |
| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                               |                                                                                                                                                                                                                                                                                       |                                               |
| Place of search<br>THE HAGUE                                                                                                                                                                                            |                                                                               | Date of completion of the search<br>28 JUNE 1990                                                                                                                                                                                                                                      | Examiner<br>EVANS A.J.                        |
| <b>CATEGORY OF CITED DOCUMENTS</b>                                                                                                                                                                                      |                                                                               |                                                                                                                                                                                                                                                                                       |                                               |
| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                               | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>I : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                               |