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AL LT LV MK RO SI(71) Applicant: **Innovapack di Bagalini Giulio
63017 Porto S. Giorgio (AP) (IT)**(72) Inventor: **The designation of the inventor has not
yet been filed**(30) Priority: **12.03.1998 IT RM980160**(54) **Machine for flexographic printing on wooden panels, wooden pulps, plywoods and/or similar**

(57) Machine for flexographic printing on wooden panels, wooden pulps, plywoods and/or similar, comprising essentially :

a first rolling cylinder (02) having on its surface a printing plate (25);

a rolling press (03) constraining a force on a wooden panel (01) and on said printing matrix (25);

a second rolling cylinder (05) having its surface steeping in ink providing means,

the second rolling cylinder (05) has microcavities on its surface supporting an homogeneous and calibrated liquid ink smearing on the surface of said printing matrix (25) and the ink being a particular low viscosity and fast drying up fluid, so that when the surface of said printing matrix (25) comes in touch with the surface of said wooden panel (01), the printing matrix (25) directly prints an high quality image on said wooden panel (01).

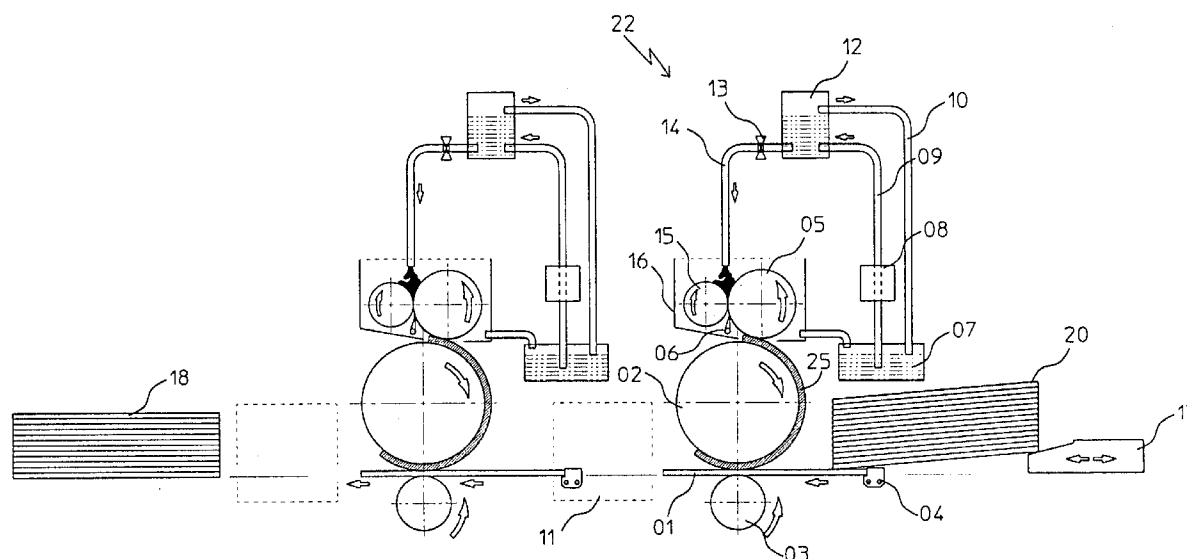


Fig. 1

EP 0 941 843 A1

Description

[0001] The present invention relates to a machine for flexographic printing on wooden panels, wooden pulps, plywoods and/or similar especially used for fruit and vegetable packings.

[0002] More particularly, the machine provides a liquid ink smearing on the surface of a printing matrix, having said ink a quick dry up process, so that, when it comes in touch with a wooden panel, an high quality image is directly printed on the surface of the same wooden panel.

[0003] The actual machines for printing on wooden panels and/or similar, comprise some mechanical printing units, one for every colour, without ink drying means installed. These printing units of typographical type, which use an oil ink, consist in an inkpot and some rolling cylinders providing a process of ink grinding, mixing and smearing on a typographical solid matrix. The ink spontaneously sticks itself on the smooth surface of every rolling cylinder providing a not homogeneous ink smearing on the printing matrix.

[0004] Usually a bronze made matrix is employed for a plywood printing while a photogravured polymeric matrix is used for a wooden pulp printing.

[0005] The actual machines for printing on wooden panels and/or similar, which use an oil ink, are suitable only for a plywood image printing (with a not fully printed background). In fact plywoods are characterized in having a good ink absorption. The process, instead, of ink drying up and ink absorption on wooden pulps is very slow. So the actual machines are not suitable for a wooden pulp image printing. One common defect in all these machines comes from the use of an oil ink, an environment pollution risk material.

[0006] The technical solutions known in solving the problem of good quality image printing on every type of wooden panels, consist in a direct sticking of a previously printed sheet on every wooden panel. But these solutions increase the production costs, in fact they introduce in the working process a new step of sheet sticking. They are, also, some not effective solutions because, after a short time, the adhesive sheet tends to unstick itself from the wooden panel, especially in a damp environment.

[0007] The object of the present invention is to provide a machine for high quality flexographic printing on wooden panels, wooden pulps, plywoods and/or similar, using quickly drying up water inks, not dangerous for the environment pollution, without introducing a cost increase in the working process and having a safe, reliable and easy to use machine.

[0008] It is therefore specific subject of the present invention a machine for flexographic printing on wooden panels, wooden pulps, plywoods and/or similar, comprising : a first rolling cylinder having on its surface a printing matrix ; a rolling press constraining a force on a wooden panel and on the same printing matrix ; a sec-

ond rolling cylinder having its surface steeping in ink providing means.

[0009] The second rolling cylinder has microcavities on its surface supporting an homogeneous and thin liquid ink smearing on the surface of the printing matrix, the ink being a particular low viscosity and fast drying up fluid, so that when the surface of the printing matrix comes in touch with the surface of the wooden panel, the printing matrix directly prints an high quality image on the same wooden panel.

[0010] Preferably, according to the invention, the ink providing means comprise, in a first case (figure 3), a small liquid ink basin with scraping out means removing the exceeding ink on the second rolling cylinder, and other supply means. In a second case (figure 2), they comprise a liquid ink flowing chamber with scraping out means, removing the exceeding ink on the second rolling cylinder, and with some ink supply means. In a third case (figure 1 and figure 4, schematic front view and perspective view) they comprise two basins having inside : the same second rolling cylinder, a third rolling cylinder and liquid ink supply means, so that a liquid ink flow arrives between the second rolling cylinder and the third rolling cylinder. In every described case the printing matrix has, on its surface, an homogeneous and thin liquid ink smearing.

[0011] The machine for flexographic printing also comprises some means, so the horizontal motion of the wooden panel could be synchronized with the rotatory motion of the first and second rolling cylinder.

[0012] The present invention will be now described for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein :

Figure 1 is a schematic front view of a two stages and colours machine for flexographic printing according to the present invention ;

Figure 2 is a schematic front view of a first modification of the machine for flexographic printing ;

Figure 3 is a schematic front view of a second modification of the machine for flexographic printing ;

Figure 4 is a schematic perspective view of the machine for flexographic printing of Figure 1.

[0013] It must at first underlined that in the following only some of the many conceivable embodiments will be described on the basis of the basic solution of the present invention.

[0014] In the different figures, the corresponding parts will be indicated by the same reference numbers.

[0015] Making first reference to the figure 1 and to the figure 4, a machine for flexographic printing according to the invention is shown. This is a quick printing process machine and it comprises two printing stages, one for each colour. The machine is suitable, in particular, for a wooden panel, wooden pulp, plywood and/or similar printing, especially used for fruit and vegetable pack-

ings. Each wooden panel 01 starts its run from a supply loader 20 and finishes the same run on a panel collector 18. The supply loader 20 comprises a panel selector 17 so that is possible to load one wooden panel 01 at time and transferring the same to the motion system 04 of the printing means. The panel selector 17 is shape tolerance for quite different panel dimensions.

[0016] The machine 22 comprise : a first rolling cylinder 02 having on its surface a printing matrix 25 ; a rolling press 03 constraining a force on a wooden panel 01 and on the printing matrix 25 ; a second rolling cylinder 05 having its surface steeping in some ink providing means. The second rolling cylinder 05 has microcavities on its surface supporting an homogeneous and thin liquid ink smearing on the surface of the printing matrix 25, the ink being a particular low viscosity and fast drying up fluid, so that when the surface of the printing matrix 25 comes in touch with the surface of the wooden panel 01, the printing matrix 25 directly prints an high quality image on the same wooden panel 01. The radial speed, at the same point of touch with the wooden panel 01, is the same for the first rolling cylinder 02 and for the rolling press 03. The rolling press 03, constraining a force on the wooden panel 01, provides the best printed image quality.

[0017] The ink providing means comprise two basins 16 having inside : the same second rolling cylinder 05, a third rolling cylinder 15 and liquid ink supply means 14, so that a liquid ink flow arrives between the second rolling cylinder 05 and the third rolling cylinder 15, with an hydrodynamic scraping out process, providing an homogeneous and thin liquid ink smearing on the surface of the printing matrix 25. A primary tank 12 and a pipe 14 make possible to an ink flow to arrive in said ink providing means. The primary tank 12 has an input pipe 09 and an output pipe 10. When the ink in the primary tank 12, pushed in the input pipe 09 by a pump 08, exceeds the maximum level, then it goes, through the output pipe 10, towards a secondary tank 07, so that in the primary tank 12 the fluid always stays at the same level.

[0018] The machine comprises some scraping out means 06, able to remove the exceeding ink on the second rolling cylinder 05, so to have an homogeneous and thin liquid ink smearing on the surface of said printing matrix 25.

[0019] In a first modification of the machine for flexographic printing, shown in figure 2, the ink providing means comprise a liquid ink flowing chamber 21 which comprises an input pipe 09 and an output pipe 10. When the ink in the chamber 21, pushed in the input pipe 09 by a pump 08, exceeds the maximum level, then it goes, through the output pipe 10 towards a secondary tank 07, so that in the chamber 21 the fluid always stays at the same level.

[0020] The machine comprises some scraping out means 06, able to remove the exceeding ink on the second rolling cylinder 05, so to have an homogeneous and thin liquid ink smearing on the surface of said printing

matrix 25.

[0021] In a second modification of the machine for flexographic printing, shown in figure 3, the ink providing means comprise a small liquid ink basin 19 with scraping out means 06, removing the exceeding ink on said second rolling cylinder 05, in order to have an homogeneous and thin liquid ink smearing on the surface of said printing matrix 25. The machine also comprises an input pipe 09 and an output pipe 10. When the ink in the small liquid ink basin 19, pushed in the input pipe 09 by a pump 08, exceeds the maximum level, then it goes, through the output pipe 10 towards a secondary tank 07, so that in the small liquid ink basin 19 the fluid always stays at the same level.

[0022] The second rolling cylinder 05 has, on its lateral surface, some microcavities. The same surface has a chromium layer to prevent the material usury. According to the present invention, part of the same surface is steeped in the ink providing means. Said ink, transported by the same microcavities, is a calibrated reserve supporting the homogeneous and constant inking of the relief parts of the printing matrix 25. In fact the ink remains sticked to the same parts and it is printed on the wooden panel 01. When the machine is stopped, some particular mechanical means move the second rolling cylinder 05 outline, so it continues its rotatory motion without staying in touch with the first rolling cylinder 02. This is necessary because quick drying up inks always require to stay in motion.

[0023] It is possible to have some cleaning means providing the best printed image quality on wooden panel surfaces. The machine could also comprise some means (not shown in figure), so to have a printing matrix 25 surface cleaning before providing a liquid ink smearing on the same printing matrix 25.

[0024] According to the fact that usually the images printed have more colours, the machines could comprise more stages, one for each colour. In the space between two stages it is possible to install some warm air blowing means which could improve the printed ink dry up process so to have some quick chromatical effects printing. The ink is a particular low viscosity and fast drying up fluid, so the machine could provide to a quick printing process.

[0025] The machine for flexographic printing also comprises some electrical or electronical, mechanical, hydraulical means, so the horizontal motion of the wooden panel 01 could be synchronized with the rotatory motion of the first 02 and second rolling cylinder 05 and with each printing stage.

[0026] So the object of the present invention is fully realized. It provides a machine for high quality flexographic printing on wooden panels, wooden pulps, plywoods and/or similar, using quickly drying up water inks, not dangerous for the environment pollution, without introducing a cost increase in the working process, and having a safe, reliable and easy to use machine.

[0027] The present invention has been described for

illustrative but not limitative purposes according to its preferred embodiments, but it is to be understood that modifications and changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

[0028] The present invention can be employed in the field of the machines for printing on wooden panels, wooden pulps, plywoods and/or similar and in the field of the printing processes on wooden panels, wooden pulps, plywoods and/or similar, used for every purpose and especially used for making fruit and vegetable packings.

Claims

1. Machine for flexographic printing on wooden panels, wooden pulps, plywoods and/or similar, comprising essentially :

a first rolling cylinder (02) having on its surface a printing matrix (25) ;
 a rolling press (03) constraining a force on a wooden panel (01) and on said printing matrix (25) ;
 a second rolling cylinder (05) having its surface steeping in ink providing means,
 the machine (22) being characterized in that said second rolling cylinder (05) has microcavities on its surface supporting an homogeneous and calibrated liquid ink smearing on the surface of said printing matrix (25), said ink being a particular low viscosity and fast drying up fluid, so that when the surface of said printing matrix (25) comes in touch with the surface of said wooden panel (01), said printing matrix (25) directly prints an high quality image on said wooden panel (01).

2. Machine for flexographic printing according to claim 1, characterized in that said ink providing means comprise a small liquid ink basin (19) with scraping out means (06), removing the exceeding ink on said second rolling cylinder (05), in order to have an homogeneous and calibrated liquid ink smearing on the surface of said printing matrix (25).

3. Machine for flexographic printing according to claim 1, characterized in that said ink providing means comprise a liquid ink chamber (21), with scraping out means (06), removing the exceeding ink on said second rolling cylinder (05), and with ink supply means (09), in order to have an homogeneous and calibrated liquid ink smearing on the surface of said printing matrix (25).

4. Machine for flexographic printing according to claim 1, characterized in that said ink providing means

comprise two basins (16) having inside : the same said second rolling cylinder (05), a third rolling cylinder (15) and liquid ink supply means (14) with scraping out means, so that a liquid ink flow arrives between said second rolling cylinder (05) and said third rolling cylinder (15), providing an homogeneous and calibrated liquid ink smearing on the surface of said printing matrix (25).

5. Machine for flexographic printing according to one of the preceding claims, characterized in that said second rolling cylinder (05) has its lateral surface with microcavities, with scraping out means, to remove the exceeding ink before the smearing on said printing matrix (25).

6. Machine for flexographic printing according to one of the preceding claims, characterized in that said machine comprises means, so that the horizontal motion of said wooden panel (01) can be synchronized with the rotatory motion of said first rolling cylinder (02) and of said second rolling cylinder (05), and with each printing stage.

7. Machine for flexographic printing on wooden panels, wooden pulps, plywoods and/or similar, according to each one of the preceding claims, substantially as illustrated and described.

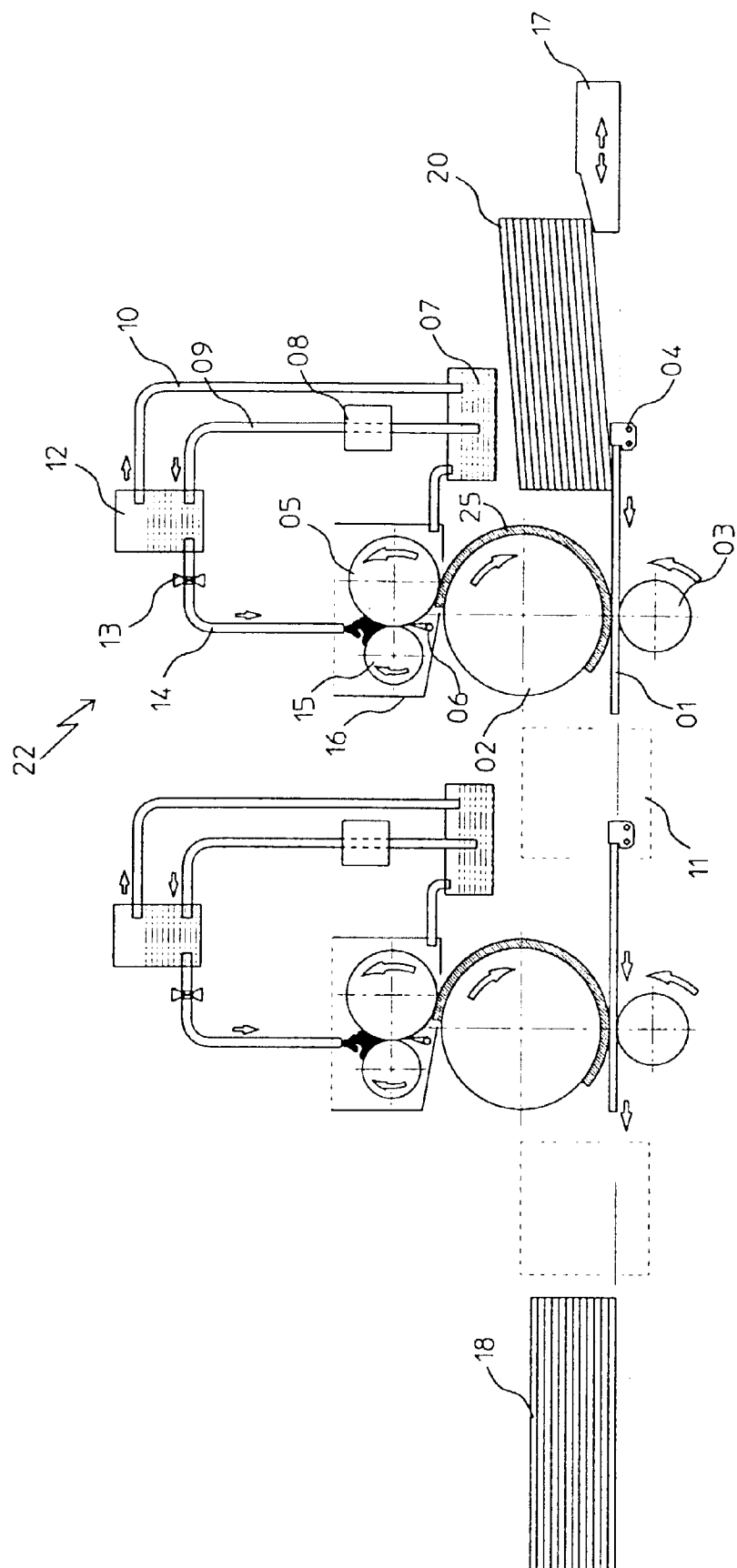


Fig. 1

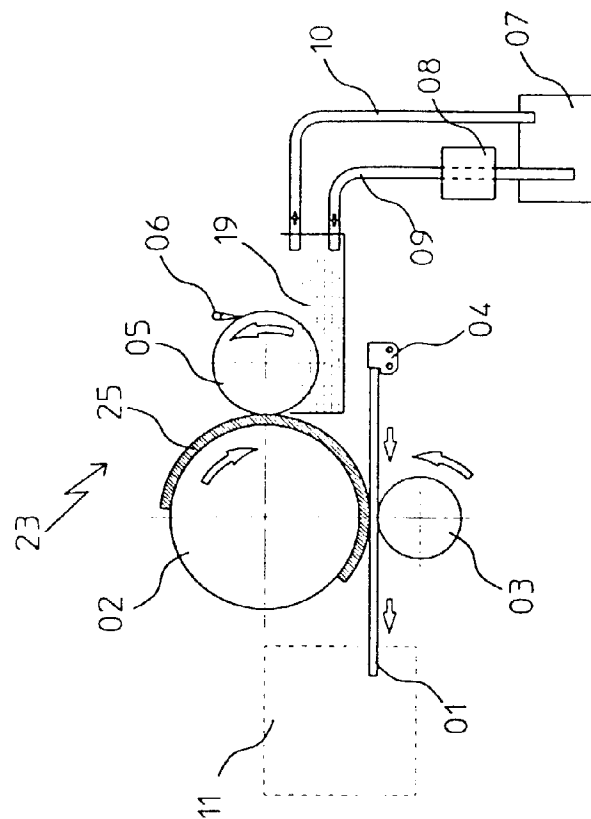


Fig. 3

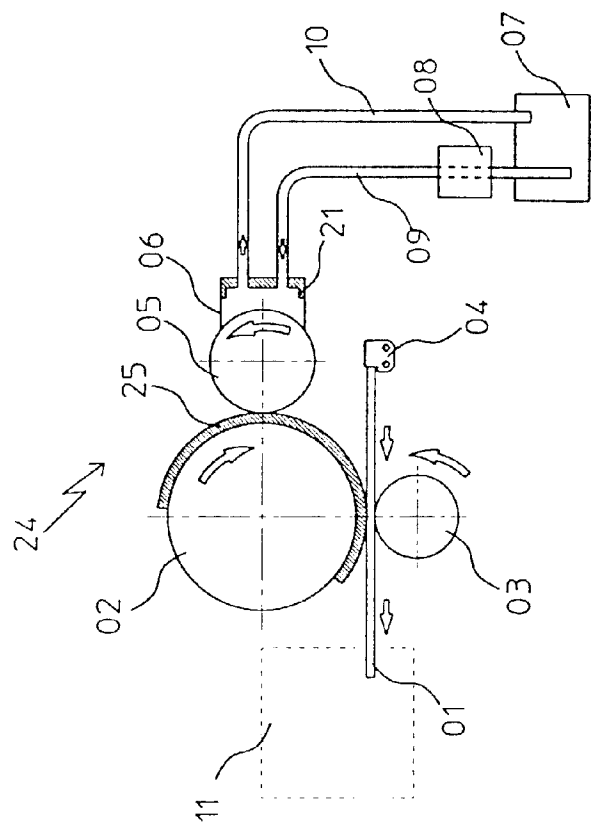


Fig. 2

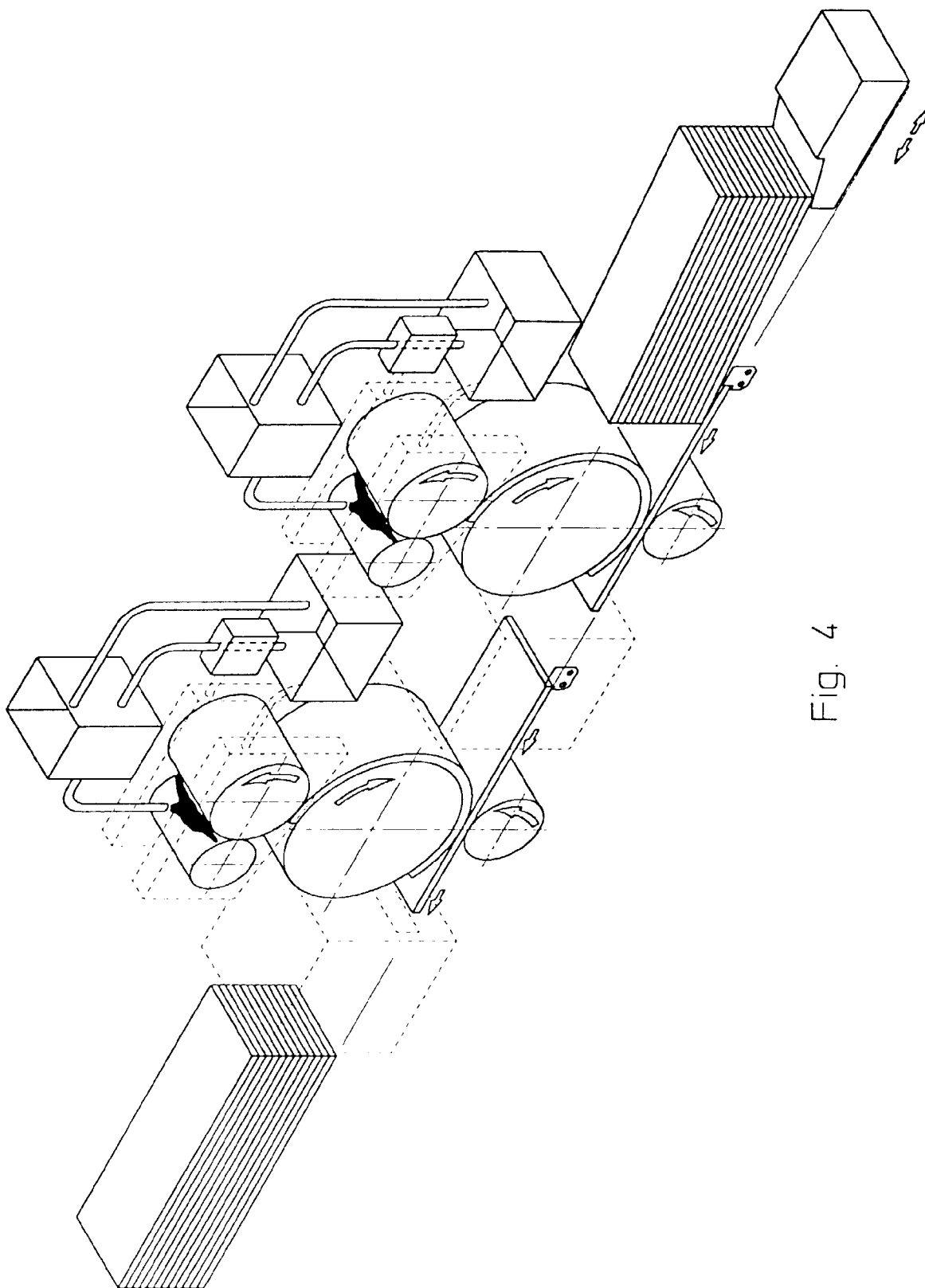


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0130

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THE HAGUE		16 July 1999	Loncke, J
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EPO FORM 1503 (03.92) (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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