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(54) **Automated descaling machine**

(57) An automated descaling machine (1) includes a support (11), a brushing member (13), an adjusting unit (14), and a control unit (15). The support (11) has a guide rail unit (111). The brushing member (13) includes a carriage (141) slidable along the guide rail unit (111), a motor (133) mounted on the carriage (141) and having an output shaft (131), and a brush wheel (132) mounted on the output shaft (131) and contacting frictionally a workpiece (2) so as to apply a frictional force

thereto. The adjusting unit (14) adjusts the frictional force, and includes a moving member (143) connected to the carriage (141) to move the brush wheel (132) relative to the workpiece (2), and a power supply member (142) for driving the moving member (143). The control unit (15) is electrically connected to the power supply member (142) and the motor (133) for detecting current level of the motor (133), for producing a signal, and for actuating the power supply member (142) in response to the signal.

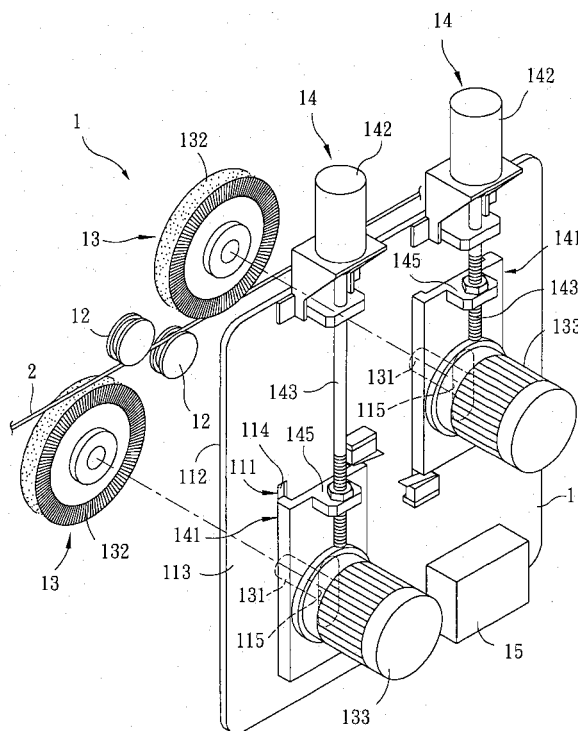


FIG. 3

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Description

[0001] The invention relates to a descaling machine, more particularly to an automated descaling machine for removing scale from a workpiece through operation of a control unit.

[0002] A metal workpiece, such as an iron wire and the like, is liable to produce scale, such as rust, due to oxidation thereof during storage or transport. Therefore, it is required to remove the scale prior to further processing of the workpiece.

[0003] Referring to Figures 1 and 2, a conventional descaling machine 4 includes a support 42, two brushing members 46, and two adjusting units 47. The support 42 has two guide rail units 461. Each of the brushing members 46 has a carriage 462 mounted on the support 42 and slidable along a corresponding one of the guide rail units 461, a motor 45 mounted on the carriage 462 and having an output shaft 451, and a brush wheel 44 mounted on the output shaft 451 and adapted to contact frictionally a workpiece 8. The brush wheel 44 is capable of applying a frictional force to the workpiece 8. Each of the adjusting units 47 is operable for adjusting the frictional force between a corresponding one of the brush wheels 44 and the workpiece 8, and has a screw rod 471 connected to a corresponding one of the carriages 462 to move the carriage 462 along the corresponding guide rail unit 461 to thereby move the corresponding brush wheel 44 relative to the workpiece 8, and a hand wheel 472 for manually actuating the screw rod 471 to rotate so as to move the brush wheel 44 relative to the workpiece 8. The carriage 462 has a nut member 473 projecting from the carriage 462 transversely of the screw rod 471 and threadedly engaging the screw rod 471.

[0004] Since the frictional force between the brush wheels 44 and the workpiece 8 is manually controlled using the hand wheels 472 of the adjusting units 47, it is difficult to precisely adjust the frictional force to a desired level and to achieve a good descaling effect. Furthermore, the brush wheels 44 and the motors 45 are liable to break down if the frictional force is not properly adjusted.

[0005] Therefore, the object of the present invention is to provide a descaling machine for removing scale from a workpiece, which is capable of being automatically controlled by an adjusting unit.

[0006] The automated descaling machine according to this invention includes a support, at least one brushing member, at least one adjusting unit, and a control unit. The support has at least one guide rail unit. The brushing member includes a carriage mounted on the support and slidable along the guide rail unit, a motor mounted on the carriage and having an output shaft, and a brush wheel mounted on the output shaft and adapted to contact frictionally the workpiece. The brush wheel is capable of applying a frictional force to the workpiece. The adjusting unit is operable for adjusting the frictional

force between the brush wheel and the workpiece, and includes a moving member connected to the carriage to move the carriage along the guide rail unit to thereby move the brush wheel via the first motor relative to the workpiece in a fixed contacting area to keep the workpiece clean, and a power supply member for driving the moving member. The control unit is electrically connected to the power supply member and the motor for detecting current level of the motor, for producing a signal based on a relation between the current level of the motor and a preset reference current value for the motor, and for actuating the power supply member in response to the signal.

[0007] The frictional force between the brush wheel and the workpiece is adjusted automatically by the adjusting unit through operation of the control unit so as to precisely adjust the frictional force to a desired level and to achieve a good descaling effect.

[0008] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiment with reference to the accompanying drawings, of which:

Figure 1 is a schematic view of a conventional descaling machine;

Figure 2 is a perspective view of the conventional descaling machine;

Figure 3 is a partly exploded perspective view of the preferred embodiment of an automated descaling machine for removing scale from a workpiece according to this invention;

Figure 4 is a schematic view of the preferred embodiment; and

Figures 5 and 6 are schematic views to illustrate operation of the preferred embodiment.

[0009] Referring to Figures 3 and 4, the preferred embodiment of an automated descaling machine 1 for removing scale from a workpiece 2 according to this invention is shown to include a support 11, two brushing members 13, two positioning units 12, two adjusting units 14, and a control unit 15.

[0010] The support 11 has a first surface 112, a second surface 113 opposite to the first surface 112, and two guide rail units 111 parallel to each other. Each of the guide rail units 111 includes a pair of guide rails 114 and a guide slot 115 disposed between the guide rails 114. The guide rails 114 and the guide slot 115 are parallel to one another.

[0011] Each of the brushing members 13 includes a carriage 141 mounted on the second surface 113 of the support 11 and slidable along the guide slot 115 of a corresponding one of the guide rail units 111, a first motor 133 mounted on the carriage 141 and having an output shaft 131 penetrating through the guide slot 115 of the corresponding one of the guide rail units 111, and a brush wheel 132 mounted on the output shaft 131 and adapted to contact frictionally the workpiece 2. The

brush wheel 132 is driven to rotate by the first motor 133, and is capable of applying a frictional force to the workpiece 2.

[0012] The positioning units 12 are disposed between the brush wheels 132 proximate to the first surface 112 of the support 11 for ensuring proper movement of the workpiece 2.

[0013] The adjusting units 14 are operable for adjusting the frictional forces between the brush wheels 132 and the workpiece 2 independently. Each of the adjusting units 14 includes a moving member 143 connected to a corresponding one of the carriages 141 to move the carriage 141 along the corresponding guide rail unit 111 to thereby move a corresponding one of the first motors 133 and a corresponding one of the brush wheels 132 relative to the workpiece 2 in a fixed contacting area to keep the workpiece 2 clean, and a power supply member 142 for driving the moving member 143. In the preferred embodiment, the power supply member 142 is a second motor mounted on the support 11 at a fixed location distant from the corresponding one of the carriages 141. The moving member 143 is a screw rod driven by the second motor and connected threadedly to the corresponding one of the carriages 141. Each of the screw rods 143 moves the corresponding one of the carriages 141 along the corresponding one of the guide rail units 111 when rotated by the corresponding second motor 142. Furthermore, each of the screw rods 143 extends along a direction substantially parallel to the corresponding one of the guide rail units 111. Each of the carriages 141 has a bracket plate 145 which projects therefrom transversely of the corresponding one of the screw rods 143, and has a threaded hole 146 threadedly engaging the corresponding one of the screw rods 143.

[0014] The control unit 15 is electrically connected to the power supply members 142 and the first motors 133, respectively, detects current levels of the first motors 133 independently, produces signals independently based on a relation between the current level of each of the first motors 133 and a preset reference current value for each one of the first motors 133, i.e., when the current level is lower or higher than the preset reference current value, and actuates the power supply members 142 in response to the signals independently.

[0015] Referring to Figure 5, in use, the workpiece 2 is positioned by the cooperative action of the brush wheels 132 and the positioning units 12. The brush wheels 132 are then rotated by the first motors 133 respectively to conduct the descaling operation. The control unit 15 is preset with a reference current value for the first motor 133 of each of the brushing members 13 according to the optimal friction between each of the brush wheels 132 and the workpiece 2. During the descaling operation, when the friction between each of the brush wheels 132 and the workpiece 2 is lower than the optimal friction, each of the first motors 133 has a current level lower than the preset reference current value. When the current level from each of the first motors 133

is detected by the control unit 15, a signal is produced by the control unit 15 to the power supply member 142 of each of the adjusting units 14 according to the difference between each of the current levels and the preset reference current value. The power supply member 142 of each of the adjusting units 14 is thus actuated in response to the signal to rotate the moving member 143 so as to move the carriage 141 and the first motor 133 of each of the brushing members 13 to thereby move the brush wheel 132 of each of the brushing members 13 relative to the workpiece 2 (best shown by the arrows in Figure 5) to achieve the optimal friction.

[0016] Referring to Figure 6, when the friction between each of the brush wheels 132 and the workpiece 2 is higher than the optimal friction, each of the first motors 133 has a current level higher than the preset reference current value. When the current level from each of the first motors 133 is detected by the control unit 15, a signal is produced by the control unit 15 to the power supply member 142 of each of the adjusting units 14 according to the difference between each of the current levels and the preset reference current value. The power supply member 142 of each of the adjusting units 14 is thus actuated in response to the signal to rotate the moving member 143 so as to move the carriage 141 and the first motor 133 of each of the brushing members 13 to thereby move the brush wheel 132 of each of the brushing members 13 relative to the workpiece 2 (best shown by the arrows in Figure 6) to achieve the optimal friction.

[0017] It is noted that the current levels of the first motors 133 are detected independently by the control unit 15. Therefore, the brush wheels 132 are adjusted by the adjusting units 14, respectively.

[0018] In view of the aforesaid, since the friction between each of the brush wheels 132 and the workpiece 2 is adjusted automatically by each of the adjusting units 14 through operation of the control unit 15, the shortcomings of the prior art can be overcome by the automated descaling machine of the present invention.

Claims

1. An automated descaling machine (1) for removing scale from a workpiece (2), **characterized by:**

a support (11) having at least one guide rail unit (111);

at least one brushing member (13) including a carriage (141) mounted on said support (11) and slidable along said guide rail unit (111), a first motor (133) mounted on said carriage (141) and having an output shaft (131), and a brush wheel (132) mounted on said output shaft (131) and adapted to contact frictionally the workpiece (2), said brush wheel (132) being capable of applying a frictional force to the work-

piece (2);

at least one adjusting unit (14) for adjusting said frictional force between said brush wheel (132) and the workpiece (2), said adjusting unit (14) including a moving member (143) connected to said carriage (141) to move said carriage (141) along said guide rail unit (111) to thereby move said brush wheel (132) via said first motor (133) relative to the workpiece (2) in a fixed contacting area to keep the workpiece (2) clean, and a power supply member (142) for driving said moving member (143); and a control unit (15) electrically connected to said power supply member (142) and said first motor (133) for detecting current level of said first motor (133), for producing a signal based on a relation between the current level of said first motor (133) and a preset reference current value for said first motor (133), and for actuating said power supply member (142) in response to said signal,

whereby said frictional force between said brush wheel (132) and the workpiece (2) is adjusted automatically by said adjusting unit (14) through operation of said control unit (15) so as to precisely adjust said frictional force to a desired level and to achieve a good descaling effect.

2. The automated descaling machine (1) as claimed in Claim 1, **characterized in that** said power supply member (142) is a second motor mounted on said support (11) at a fixed location distant from said carriage (141), and said moving member (143) is a screw rod driven by said second motor (142) and connected threadedly to said carriage (141).
3. The automated descaling machine (1) as claimed in Claim 2, **characterized in that** said screw rod (143) extends along a direction substantially parallel to said guide rail unit (111), said carriage (141) having a bracket plate (145) which projects from said carriage (141) transversely of said screw rod (143) and which has a threaded hole (146) threadedly engaging said screw rod (143).

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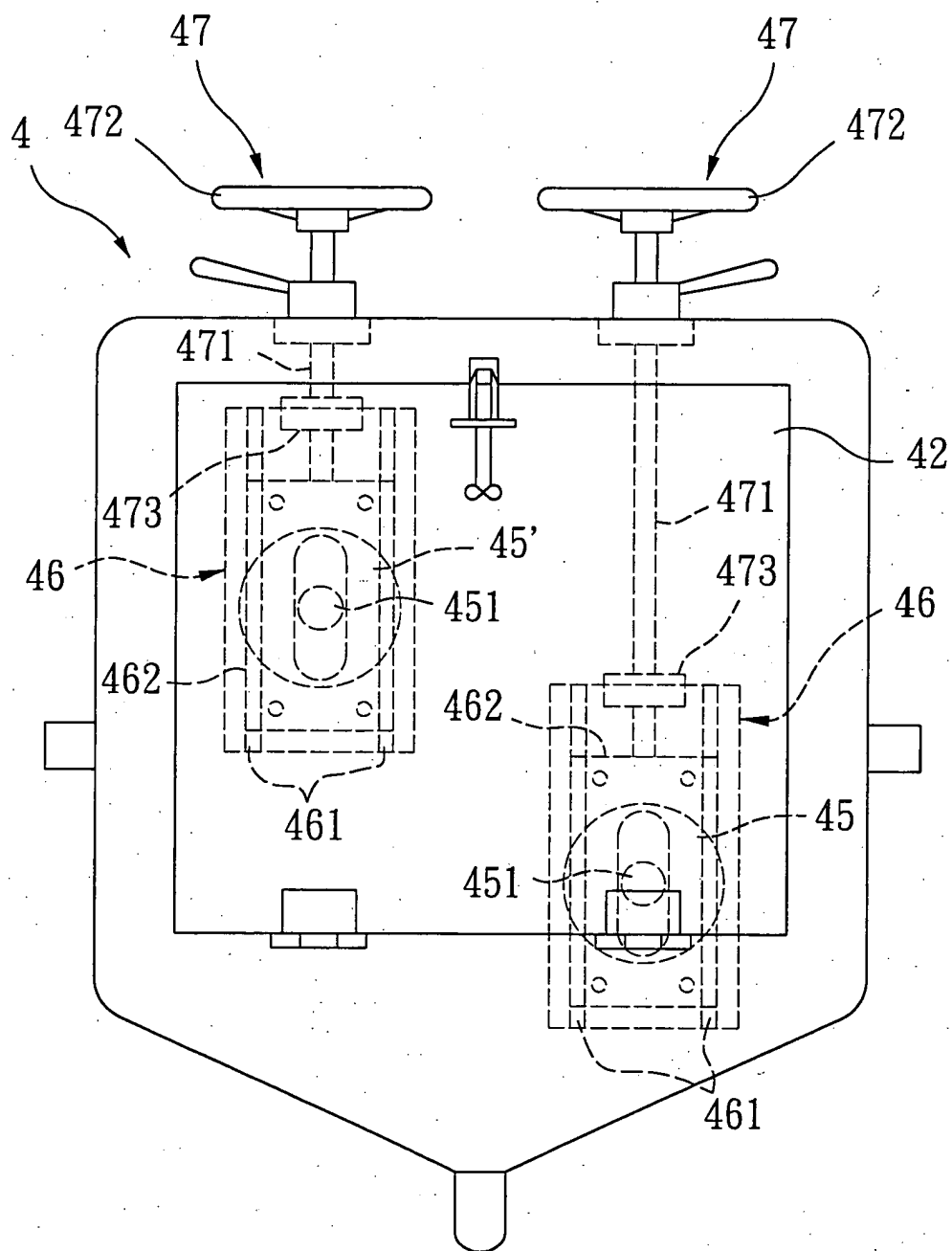


FIG. 1
PRIOR ART

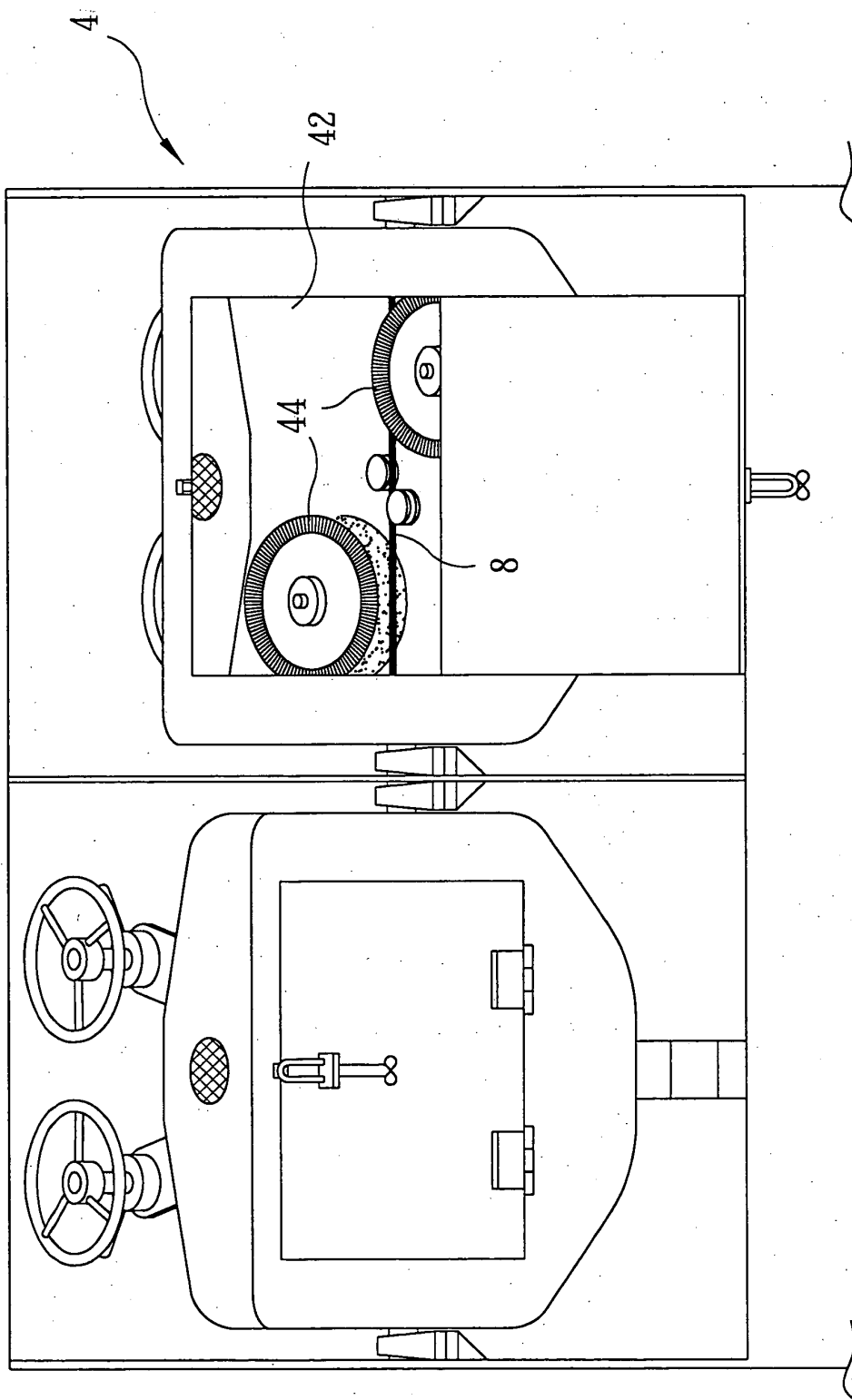


FIG. 2
PRIOR ART

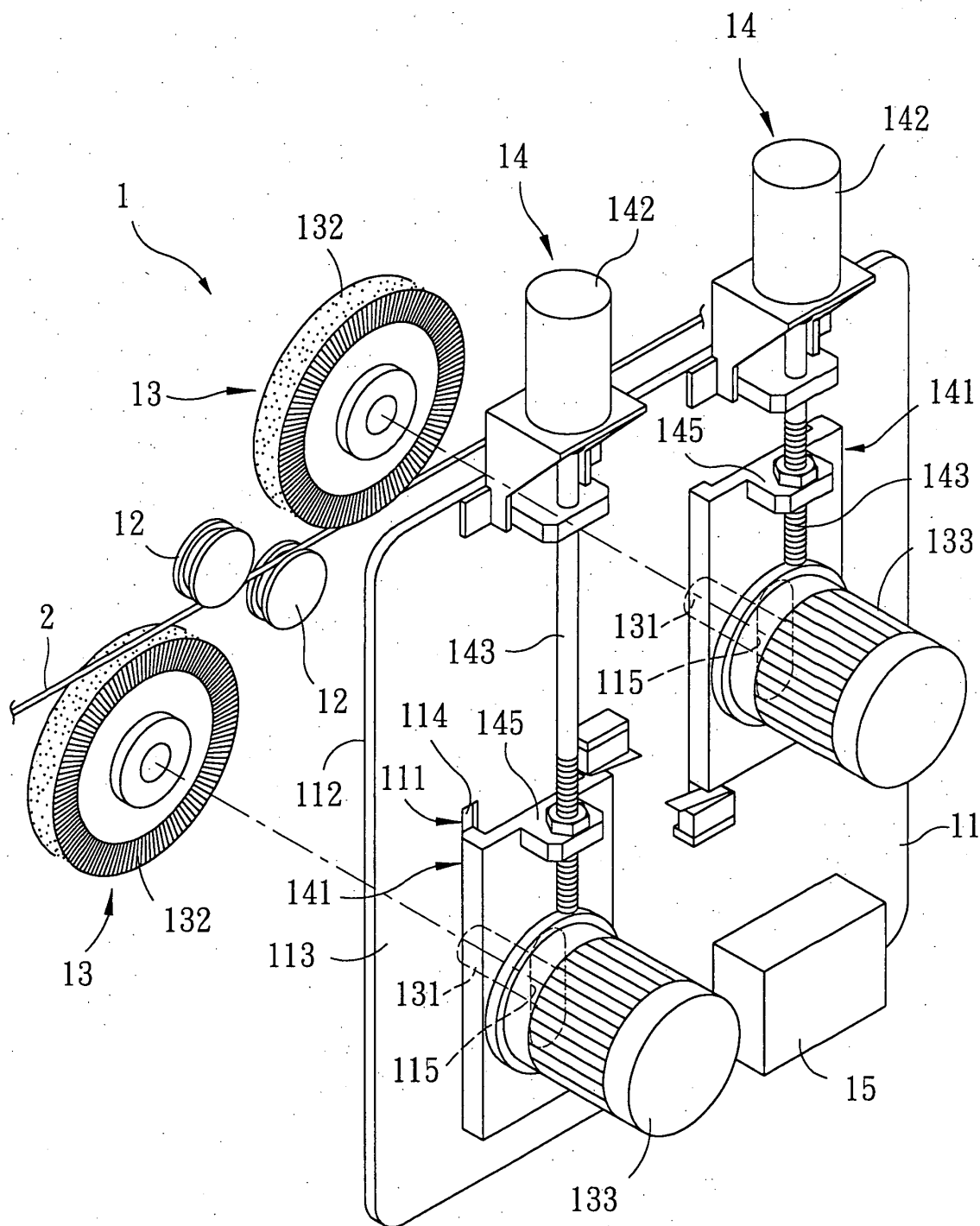


FIG. 3

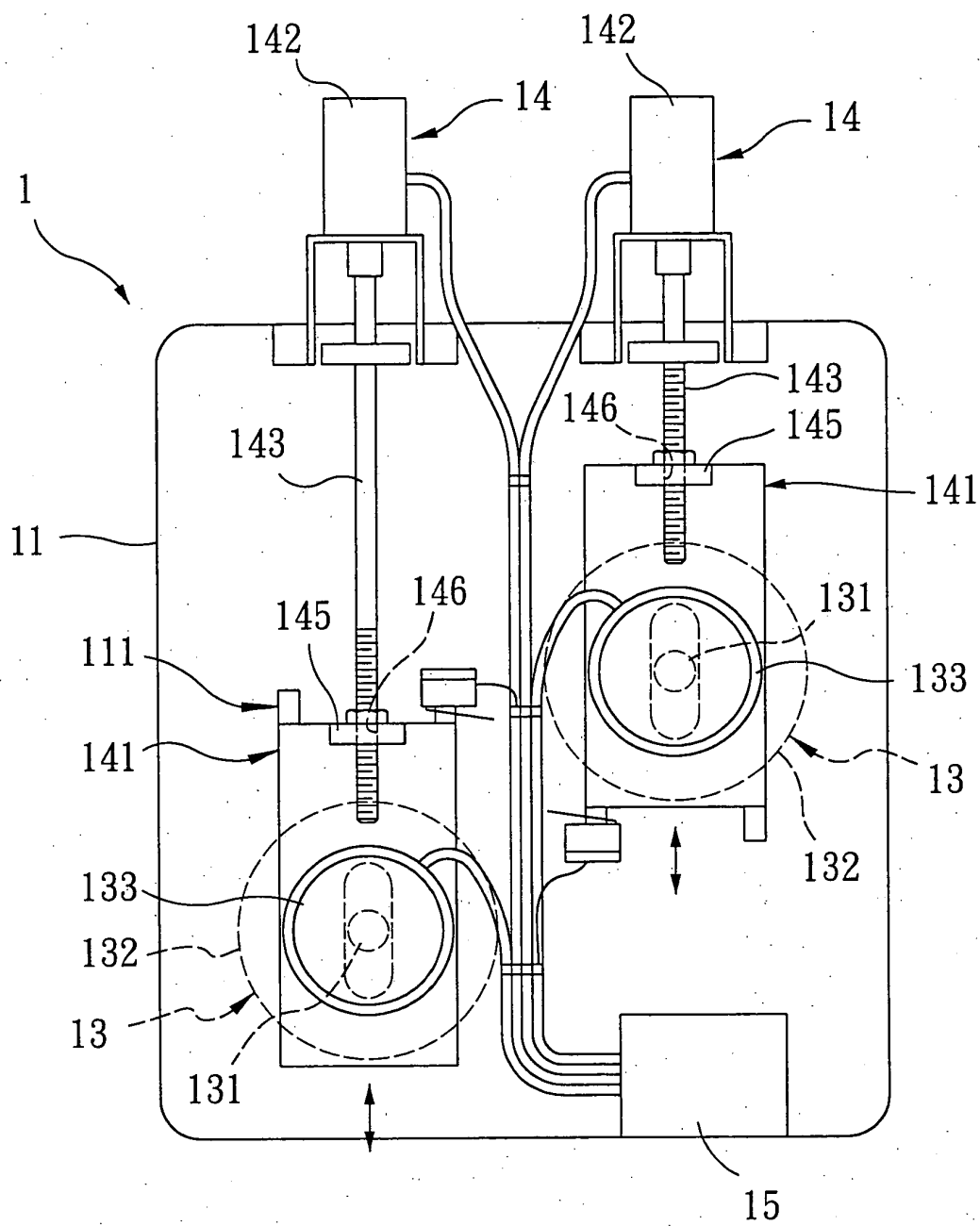


FIG. 4

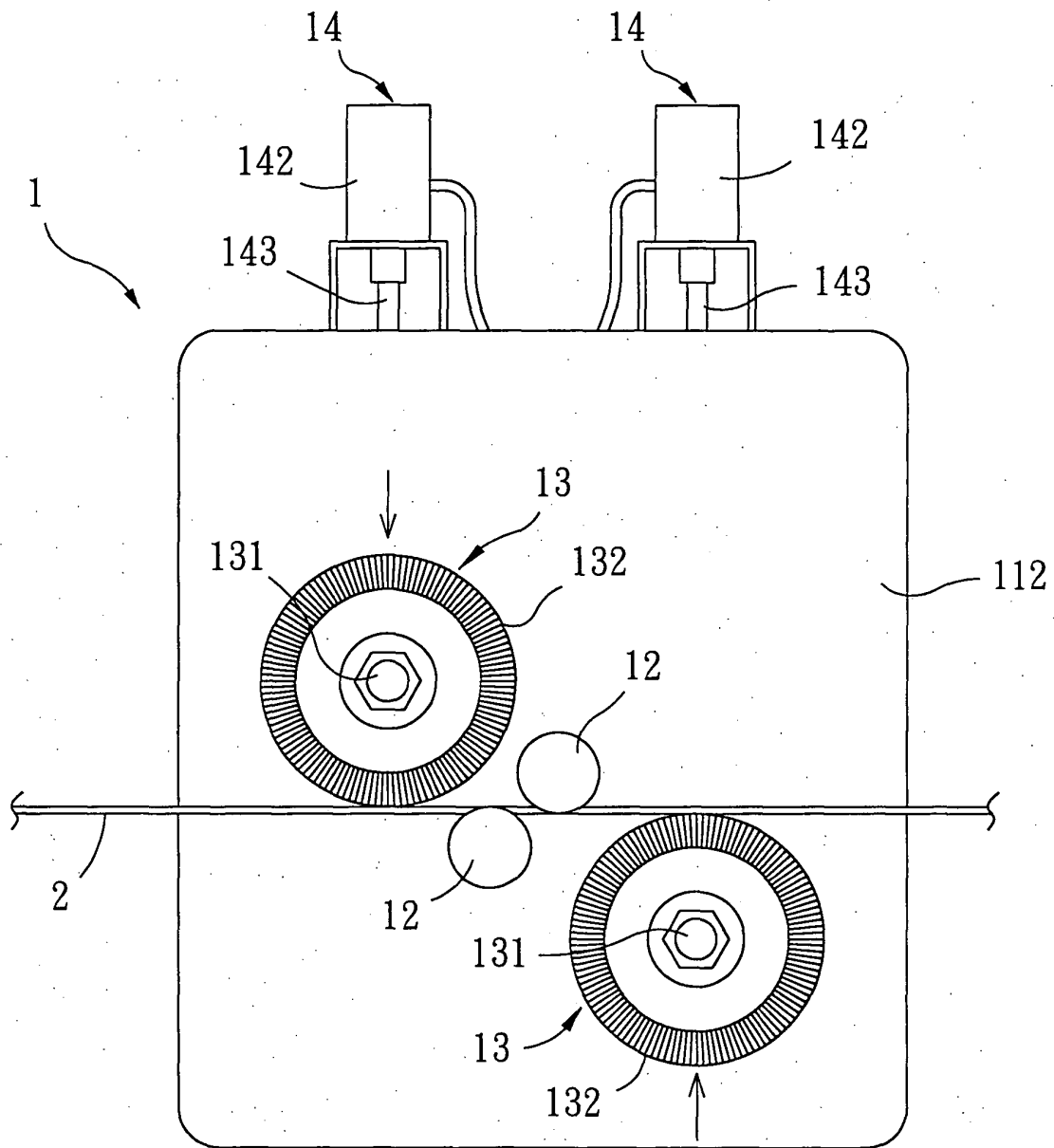


FIG. 5

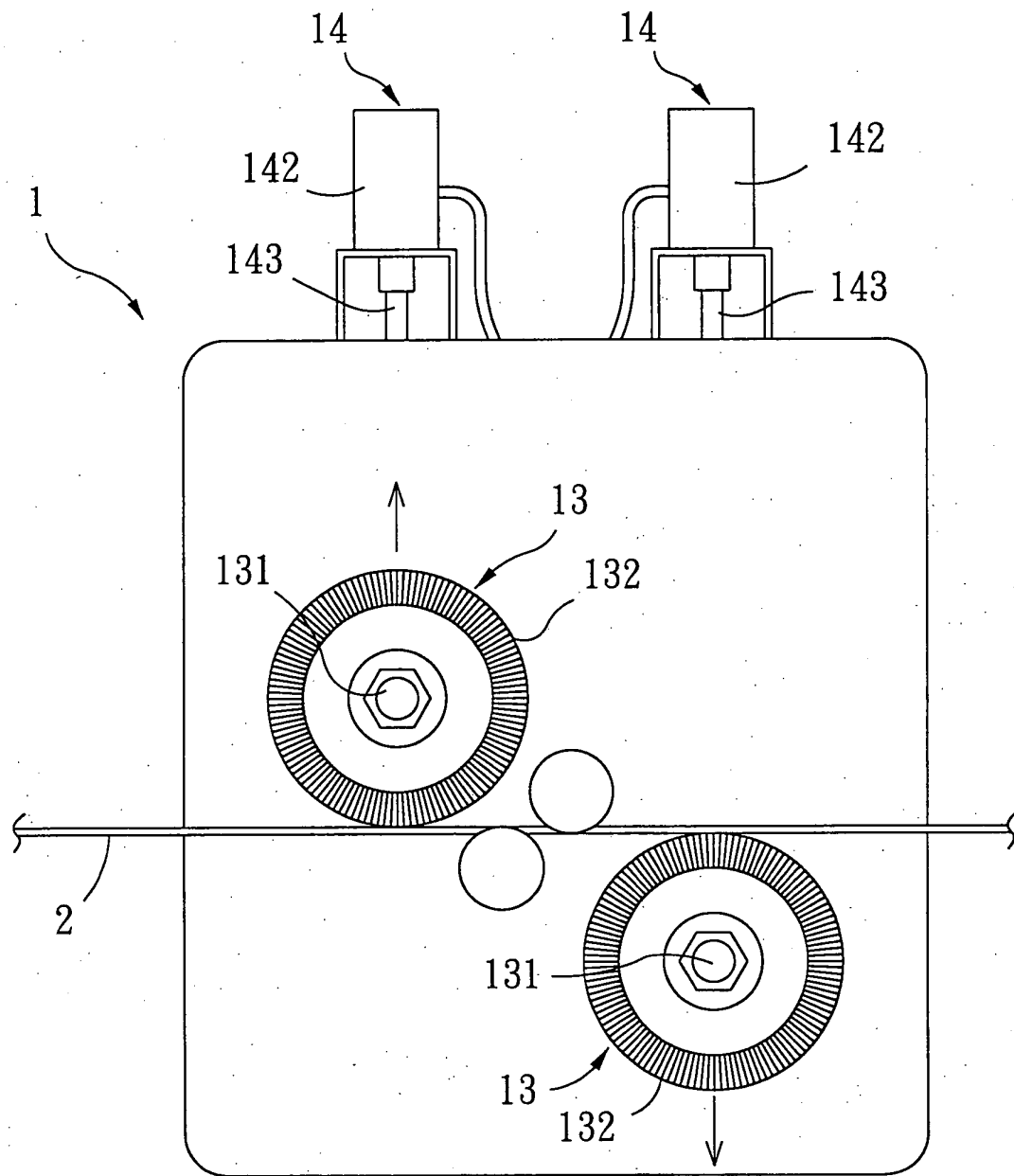


FIG. 6



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Application Number
EP 04 00 4675

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EUROPEAN SEARCH REPORT

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