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[54] **REMOVABLE CYLINDER CARRYING CARRIAGE, FOR ROTARY MACHINES FOR THE TREATMENT OF BAND MATERIAL**

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[51] **Int. Cl.** **B41f 9/18**

[58] **Field of Search** ..... 214/38 CC, 38 C, DIG. 4, 214/515, 38 B, 38 BA, 38 BB, 130 R; 101/153, 216; 105/177; 180/11; 242/58.6

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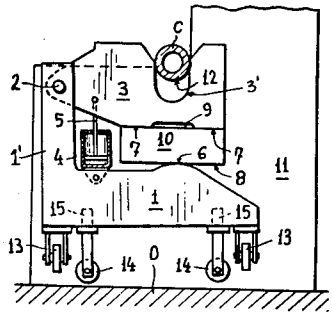
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Attorney, Agent, or Firm—Young & Thompson

[57] **ABSTRACT**

In a rotary machine for the treatment of band material, a carriage carrying the working cylinder, the doctor and other correlative parts, which during the working periods remains integral with the machine and in order to allow removal of the carried components has two sets of wheels, one of which has a mechanism for lowering and lifting the wheels in order to render operative either the one or the other of the sets of wheels, whilst power means are provided for clamping a fixed part of the machine in an operative position wherein the working cylinder rests on supporting means of the machine thus discharging the carriage.

6 Claims, 5 Drawing Figures



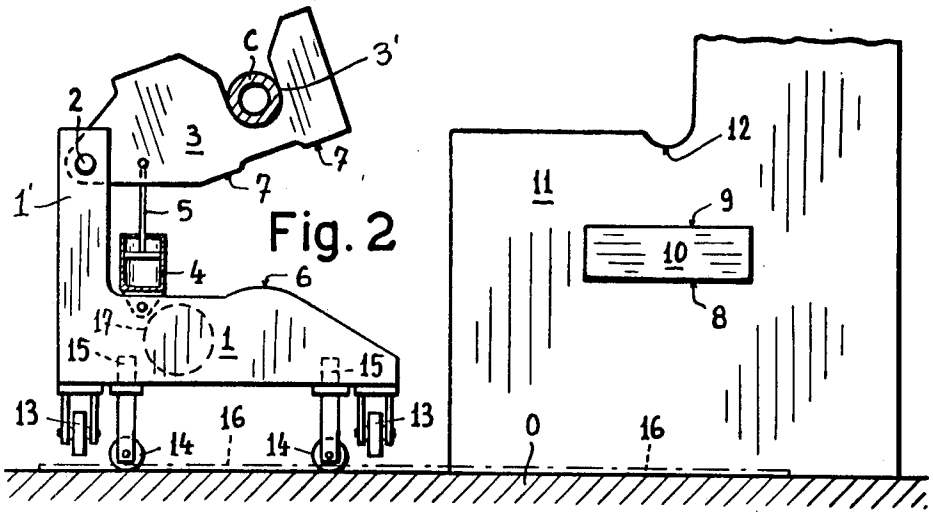


Fig. 2

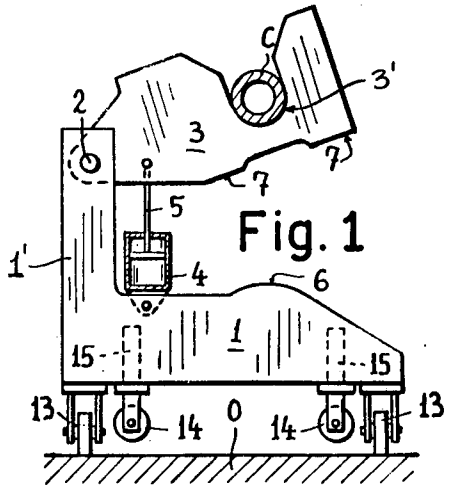
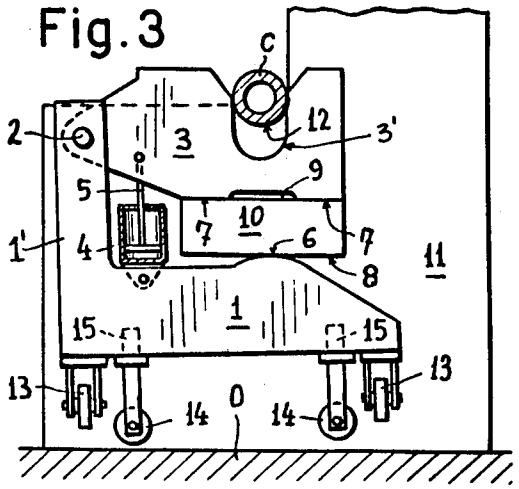


Fig. 1

Fig. 3



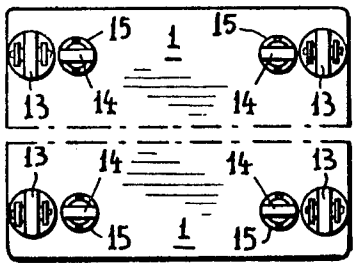


Fig. 4

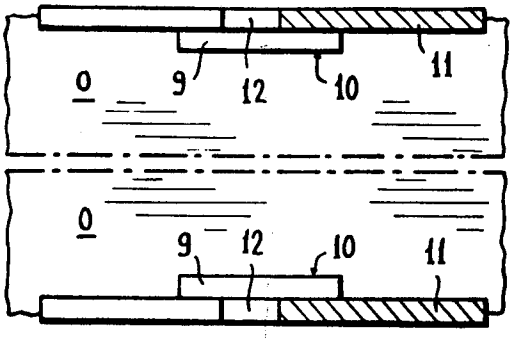


Fig. 5

REMOVABLE CYLINDER CARRYING CARRIAGE, FOR ROTARY MACHINES FOR THE TREATMENT OF BAND MATERIAL

BACKGROUND OF THE INVENTION

The present invention relates to a removable carriage, carrying a working cylinder with the respective doctor and other correlative components intended to be used in machines for treating band shaped materials, such as for example rotary presses, rotogravure presses, coating machines, laminating machines and other equipment having similar requirements, acting on band of paper, paperboard, cardboard, plastics or other material.

In the machines of the above mentioned kind, when changing the type of work to be performed, and also in other occasions, the working cylinders, the relative troughs for ink, varnish, bonding agents and the like, have to be replaced with other correlative components, and still other parts, such as doctors, have to be submitted to an accurate cleaning or even they have to be replaced. In order to facilitate the replacement of the working cylinder, in many improved machines the cylinder is mounted on a removable carriage provided with four wheels which usually are of the swiveling type to allow a variation of 90° of the movement direction of the carriage in a very restricted space as is required in all such machines in which the carriage cannot cross the sides of the machine. When the carriage is positioned in place, it is rendered stationary in its whole or at least in that part of it which supports the cylinder. These well known carriages have various disadvantages. The fact that their wheels are of the swiveling type renders difficult the correct positioning in the operative position after the carriage has been introduced into the machine. Difficulties arise when rendering stationary the carriage in its position with the very restricted tolerances which are required for the positioning of the cyclinder. The high pressure which is applied onto the working cylinder during operation is discharged onto the carriage, whose construction therefore has to be sturdy and heavy.

BRIEF SUMMARY OF THE INVENTION

The object of the present invention is to provide in a rotary machine for the treatment of band material a carriage of the above mentioned type, which is free from the disadvantages of the prior art carriages, and particularly a carriage which can be of a relatively lighter construction, is easy to be displaced externally of the machine but at the same time can be positioned accurately into its operative position, can easily be rendered stationary in said position and is not subject to overloadings during operation.

These objects are attained according to the invention by means of a removable carriage carrying a working cylinder and the correlative components and intended to be used in a machine for the treatmenet of band shaped materials, characterized in that it comprises a frame, means mounted on this frame to support the working cylinder and the correlative parts, a fist set of wheels, eventually of the swiveling type, serving to allow the displacements of the carriage on the ground outside the machine, a second set of wheels fixedly positioned with their axes parallel to the axis of the supported cylinder and serving to allow the displacements of the carriage on the floor of the machine in order to move it into its operative position, and means for lowering one of said sets of wheels in order to render it operative, thereby lifting the entire carriage with the other set of wheels in order to render it inoperative, and viceversa.

Thanks to this feature the carriage can be displaced externally of the machine by means of one of the sets of wheels in the same conditions as the prior art carriages but within the machine, after the other set of wheels has been made operative, the carriage moves in a fixed direction perpendicular to the axis of the cylinder, thereby allowing to reach the exact operative position.

Furthermore, said frame and the means for supporting the cylinder are hinged to each other, they both have suitable reference surfaces adapted to cooperate with complementary reference surfaces provided on guides fixed to the casing of the machine, and are provided with power means adapted to bring near to each other under stress the reference surfaces of the frame and of the means supporting the cylinder, thereby clamping the guide fixed to the casing and rendering stationary the carriage in the operative position.

With this arrangement it becomes very easy to fix the carriage exactly in its operative position and to prevent it from any accidental successive displacement.

Finally, the casing of the machine is provided with support means for the cylinder, and the reference surfaces of the carriage and the reference surfaces of the casing, respectively, are arranged in such a mutual relationship that when the carriage clamps scarfs the guide of the casing the supporting means pertaining to the carriage lay down the cylinder onto the supporting means pertaining to the casing, thereby ensuring an exact positioning independently from the positioning of the carriage, and discharging directly onto the casing the operative pressures applied onto the cylinder.

This allows a relatively light construction of the carriage, which facilitates greatly the manipulation of the carriage, besides reducing its cost.

BRIEF DESCRIPTION OF THE DRAWING

These and other features of the invention will appear clearer from the following description relative to an illustrative and not limitative embodiment diagrammatically shown in the accompanying drawing, wherein:

FIG. **1** is a side elevational view of the carriage according to the invention, represented outside the machine;

FIG. **2** shows the same carriage introduced into the machine and ready to be brought into the operative position;

FIG. **3** shows the carriage positioned within the machine and rendered stationary in its operative position;

FIG. **4** is a broken view of the carriage frame as seen from the bottom, illustrating the two sets of wheels;

FIG. **5** is a broken top view of the machine casing, showing the support means for the cylinder and the reference guides for the frame and the locking means of the carriage.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The carriage according to the invention is provided with a frame **1** forming the carrying structure of the carriage. Said frame **1** has a portion which extends horizontally in the lower part of the carriage, and from

which vertically extends at least one upright 1', to which a part 3 is pivotally connected at 2. Said hinged part has a seat 3' forming a support for the working cylinder C, and said hinged part 3 may further carry the doctor, the means for the alternate displacement of the doctor, the troughs containing ink, varnish, bonding agents or other substances serving to wet the cylinder, the pumps relative to said troughs, as well as any other component correlative to the working cylinder, the removal of which together with the cylinder is deemed to be useful; these parts, which are well known per se and which can be supported by the carriage in any suita-ble manner, as not shown.

Mounted between the frame 1 and the hinged part 3 is a power means which in the example shown is formed by a pneumatic cylinder 4 pivotally fixed to the frame 1 and having its piston rod 5 pivotally connected to the hinged part 3. The power means 4–5 permits moving the parts 1–3 away from each other, as shown in FIGS. 1 and 2, or approaching them to each other as shown in FIG. 3.

The horizontal portion of frame 1 is provided on the top with a reference surface 6 to which corresponds a reference surface 8 provided on the bottom of a guide 10 fixed to the casing 11 of the machine to which the carriage is destined; in a similar manner, the hinged part 3 is provided on its bottom with reference surfaces 7 to which corresponds a reference surface 9 provided on the top of the guide 10. Of course, this arrangement is repeated in an identical manner on both sides of the carriage. Furthermore, the casing 11 of the machine is provided laterally on both sides with a seat 12 forming a supporting means for the cylinder C. The distance of the seat 12 from the reference surface 9 is greater than the distance of the seat 3' from the reference surfaces 7 in the carriage.

Mounted below the frame 1 is a first set of four wheels 13, which can be positioned fixedly with their axes perpendicular to the axis of cylinder C, or they can be of the swiveling type known as in the prior art carriages, according to the displacement requirements of the carriage outside the machine. Furthermore, mounted below the frame 1 is also a second set of wheels 14, also four in number, whose axes are fixedly positioned parallel to the axis of the cylinder C. These wheels 14 are supported by displacement means, such as pneumatic cylinders 15, vertically mounted in the horizontal portion 1 of the frame, which allow to lift these wheels into the position shown in FIG. 1, in which the carriage rests on the wheels 13 in order to allow displacing it on the ground outside the machine, or to lower them into the position shown in FIG. 2 when the carriage is being inserted into the machine. The stroke of the cylinders 15 is long enough to bring the wheels 14 under the level of the wheels 13, as shown in FIG. 2, so that the entire carriage is slightly lifted when resting on the wheels 14. Then the wheels 13, lifted with the carriage, rest no more on the ground, thereby permitting movements of the carriage on the floor 0 of the machine in a direction perpendicular to the axis of cylinder C and thus ensuring reaching the exact operative position. For this displacement inside the machine, the wheels 14, if desired, can also cooperate with special rails 16.

The guide 10 is positioned at such a height that its lower reference surface 8 will be situated slightly above the level of the reference surfaces 6 of the carriage frame 1 when the carriage rests on the wheels 14; on the other hand, the reference surface 7 of the hinged part 3 are situated above the level of the upper reference surface 9 of the guide 10 when the power means 4–5 is in extended position. Accordingly, in such conditions (FIG. 2) the carriage can be moved between the side walls 11 of the machine up to its operative position. At this point the power means 4–5 is contracted and the hinged part 3 is lowered. During this lowering, cylinder C resting on the supporting seat 3' comes to meet the support means 12 fixed to the casing 11 and remains resting on them; the hinged part 3 moves downwardly a little more, thereby ceasing to form a bearing for the cylinder C but maintaining itself centered laterally in respect of the cylinder; the reference surfaces 7 of the part 3 are brought to rest on the surfaces 9 of guide 10. Accordingly, the further contraction of the piston and cylinder assembly 4–5 causes the frame 1, which up to that time was resting on the wheels 14, to be lifted from the floor 0 until the reference surface 6 rests against the surface 8 of guide 10 and the guide 10 is clamped between the frame 1 and the hinged part 3. Thus, the carriage is effectively immobilized in its operative position. The same operations effected in the opposed direction disengage the carriage, causing the cylinder to rest again on the hinged part 3 in order to allow removing said cylinder from the machine.

It is obvious that the level differences between the parts intended to engage with each other, and consequently the stroke of the piston and cylinder assembly 4–5, can actually be much smaller in respect of how they have been represented for the sake of clarity.

Preferably, the carriage is designed in such a way as to be able to be inserted, locked and disengaged in respect of the casing 11 of the machine by positioning it either with the pivot 2 mounting side turned away from the casing 11, as shown, or with said pivot 2 mounting side facing the casing, i.e. in a position which is specularly symmetrical in respect of the position shown in the drawings. The use of the carriage in the one or the other position does not require any shape or size variations of the parts of the machine casing 11.

The carriage can be suitably provided with compressed air tanks 17 for its pneumatic actuation. However, the actuation of the displacements of both the hinged part 3 and the lowerable wheels 14 could also be effected by mechanical, hydraulic or other means. Also, the arrangements and all constructive parts of the carriage can vary within wide limits in respect of the embodiment which has been described and illustrated herein, in accordance with the requirements of the various applications, without departing from the scope of the invention and the present patent.

Having thus described my invention, what I claim is:

1. In a rotary machine for the treatment of band material, having a removable working cylinder and stationary guide means, a carriage comprising a frame, support means mounted on said frame for supporting said cylinder, mounted on the bottom of said frame a first set of wheels, also mounted on the bottom of said frame a second set of wheels, the wheels of said second set of wheels being fixedly positioned with their axes parallel to the axis of said supported cylinder, displacement means connected to said frame and to the wheels of said second set of wheels, whereby said second set of wheels can be lifted with respect to said first set of

wheels by said displacement means thus rendering operative said first set of wheels in order to allow displacement of the carriage on the ground outside the machine, and said second set of wheels can be lowered with respect to said first set of wheels by said displacement means thus rendering operative said second set of wheels to allow displacement of the carriage, along a fixed direction perpendicular to the axis of the supported cylinder, on the ground inside said machine, said support means being hinged to said frame, means defining first reference surfaces on said frame, means defining second reference surfaces on said support means, said first and second reference surfaces cooperating with reference surfaces on said guide means fixed to the machine, and power means connected to said frame and support means for bringing near to each other under stress said first and second reference surfaces, whereby, when said first and second reference surfaces are arranged facing the reference surfaces of the machine, operation of said power means allows clamping said guide means of the machine thus rendering stationary the carriage in operative position.

2. A machine as set forth in claim **1**, wherein said machine has supporting means for the working cylinder, and the distance between said first reference surfaces and the support means of the carriage is less than the distance between the reference surfaces of the guide means and the supporting means of the machine, whereby when the carriage clamps said guide means the support means of the carriage lay down the supported cylinder onto the supporting means provided on the machine.

3. A machine as set forth in claim **1**, wherein said displacement means for the wheels and said power means are pneumatic piston and cylinder assemblies, and the carriage further comprises at least one compressed air reservoir for supplying compressed air to said piston and cylinder assemblies.

4. A machine as set forth in claim **1**, wherein the distance between said reference surfaces on said guide means and the ground is greater than the distance between said first reference surfaces and the ground whereby operation of said power means raises said frame into contact with said guide means and out of contact with the ground.

5. In a rotary machine for the treatment of band material, having a removable working cylinder and stationary guide means, a carriage comprising a frame, support means mounted on said frame for supporting said cylinder, wheel means mounted on the bottom of said frame, said support means being hinged to said frame, means defining first reference surfaces on said support means, said first and second reference surfaces cooperating with reference surfaces on said guide means fixed to the machine, and power means connected to said frame and support means for bringing near to each other under stress said first and second reference surfaces, whereby, when said first and second reference surfaces are arranged facing the reference surfaces of the machine, operation of said power means allows clamping said guide means of the machine thus rendering stationary the carriage in operative position.

6. A machine as set forth in claim **5**, wherein the distance between said reference surfaces on said guide means and the ground is greater than the distance between said first reference surfaces and the ground whereby operation of said power means raises said frame into contact with said guide means and out of contact with the ground.

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