(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 473 392 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.11.2004 Bulletin 2004/45

(51) Int Cl.[7]: **D03D 49/02**

(21) Application number: **04101799.7**

(22) Date of filing: **28.04.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

(30) Priority: **29.04.2003 IT MI20030859**

(71) Applicant: **Promatech S.p.A.**
24020 Colzate (Bergamo) (IT)

(72) Inventors:
- **MUTTI, Matteo**
  24069, TRESCORE BALNEARIO (IT)
- **NETTUNO, Boris**
  80126, NAPOLI (IT)

(74) Representative: **Faggioni, Marco, Dr. Ing. et al**
Fumero Studio Consulenza Brevetti Snc
Pettenkoferstrasse 20-22
80336 München (DE)

(54) Reduced-noise weaving loom

(57) A weaving loom comprises a noise-absorbing cover (1) encasing the top side and, at least in part, the lateral sides of the shed-forming and weft-inserting devices and the reed. The noise-absorbing cover is equipped with control means (4) apt to shift said cover from a working position - wherein it is close to the warp yarns and to the fabric being woven - to a position granting access to the operator, wherein it is far from all the above-described fabric-weaving devices to allow the operator to have free access thereto.

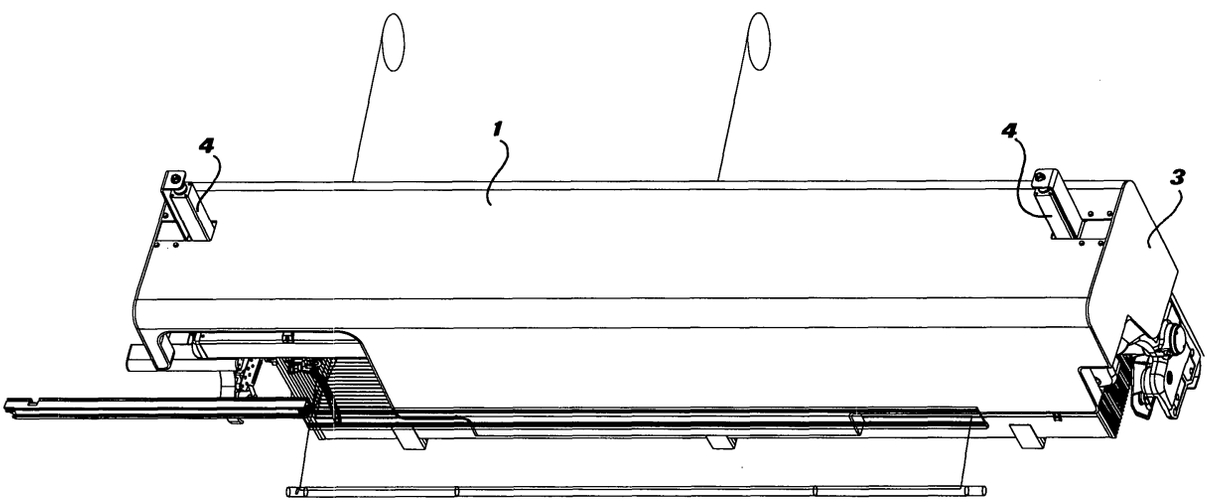

FIG. 1

EP 1 473 392 A2

Description

[0001] The present invention relates to a weaving loom equipped with means capable of lowering the noise level of the loom itself during the operation thereof.

[0002] Weaving looms, as is known, are machines which, due to the nature and type of movement of the mechanical elements and devices they consist of, and to the high working speed accomplished today, are characterised by extremely high noise levels. In weaving rooms therefore - even in those where looms are employed that are equipped with the most up-to-date and sophisticated devices for shock reduction and/or absorption, and for the taking up of the slacks of alternately moving parts - the noise level (sound pressure) remains in any case extremely high, for example between 90 and 100 dB. Not only, thus, must the operators working in weaving rooms constantly wear personal ear protection equipment, but even uttering short pieces of information between operators is made difficult.

[0003] From specific research carried out by the Applicant regarding the problem of loom noise levels, it resulted clearly that from a point of view of noise production the most critical areas of a textile loom are the shed-forming area among the warp yarns, i.e. the area where the heald frames operate, and the area where the reed beats the weft onto the fabric.

[0004] The heald frames, as is well-known to operators in this field, are rectangular frames within which are hooked a plurality of thin rod-like elements, the healds, each one housing a warp yarn in a central eye thereof. The rapid alternate movement of the healds allows the continuous shed formation among the warp yarns to insert the weft threads, all according to a preset programme which determines the kind of weave between weft threads and warp yarns and hence the final pattern of the fabric.

[0005] For reasons of heald functionality, the healds have a certain slack with respect of the heald frames to which they are connected, so that the rapid alternate movement of the latter ones determines a continuous beating of the healds onto the respective supports and consequently a high level of noise.

[0006] Repeated attempts were made to reduce the intensity of this noise source, in particular working on the materials of which the healds or the heald frames are made. However, the results of these attempts were generally very limited. As a matter of fact, the same elements described above, again due to the particular type of movement which they undergo, are also subject to particularly intense wear. Employing materials which might, at least in theory, cause a reduction of noise levels, is prevented by the much lower resistance of these materials to wear and tear or to the fatigue stresses and by their worse interaction with the yarns sliding within the healds. The reduction of noise levels achieved up until today with this kind of approach has hence been overall unsatisfying, i.e. the healds manufactured with these new materials proved to have an excessively short life-span to be considered economically viable.

[0007] It is an object of the present invention to provide a device apt to noticeably reduce noise levels in looms, and in particular in the shed-forming and reed-beating areas, where highest loom noise sources were found to be concentrated, without altering the mechanical structure of the heald frames or of the healds themselves.

[0008] Another object of the present invention is to provide a device of the type described above which does not interfere with the normal weaving activities of the loom, therefore allowing full accessibility to any part thereof for ordinary maintenance activities, as well as for any repairs of the warp yarns or weft threads that may need to be carried out by the operator.

[0009] Such object is achieved, according to the present invention, by means of a weaving loom of the type comprising devices for forming the shed among the warp yarns, devices for inserting the weft into the shed, and an oscillating reed for beating the new wefts against the fabric being woven, characterised in that it comprises a noise-absorbing cover encasing the top side and, at least in part, the lateral sides of said shed-forming devices and the reed, and in that said cover is provided with control means apt to shift said cover from a working position - wherein it is close to the warp yarns and to the fabric being woven - to an access position, wherein it is far from all the above-said fabric-weaving devices to allow the operator to have free access thereto.

[0010] Further features and advantages of the present invention will anyhow become apparent from the following detailed description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, wherein:

[0011] fig. 1 is a diagrammatic axonometric top view of a loom comprising a noise-absorbing cover according to the present invention, in a lowered working position;

[0012] fig. 2 is a front diagrammatic view of the loom of fig. 1;

[0013] fig. 3 is a lateral diagrammatic view of the weft-inserting side of the loom of fig. 1, wherein the raised position of the cover providing access to the weaving devices is also shown by a broken line;

[0014] fig. 4 is a diagrammatic lateral view of the weft-receiving side of the loom of fig. 1, wherein the raised position of the cover is also shown by a broken line;

[0015] fig. 5 is a cross-section view of the loom of fig. 1, along the line V-V of fig. 2.

[0016] As is clearly shown in the drawings, the reduced-noise loom according to the present invention comprises a noise-absorbing cover 1 extending to cover only the shed-forming and the weft-inserting area, i.e. the area wherein all the alternate-movement members of the loom are concentrated that are responsible, more than others, for noise production, for the reasons already mentioned before.

[0017] The cover 1 is formed as a cylindrical element

with a substantially U-shaped section, the wings of the U-shaped section ending with a rear edge 1p immediately upstream of the heald-carrying frame assembly Q and, respectively, with a front edge 1a immediately downstream of reed P. Under the cover 1, extending along the whole width of the loom, are therefore found the heald-carrying frames Q, the weft-inserting members (the main and secondary air jets in an air jet loom, or the grippers in a gripper loom such as the one illustrated here), and the reed P.

[0018] The noise-absorbing cover 1 is located - in its working position, shown by a continuous line - in such a way that its rear edge 1p is very close to the warp yarns O and its front edge is very close to the fabric being woven, without causing the cover to be in contact with any loom member, to avoid resonance or vibration transmission. Small plates 2 and 3 close the noise-absorbing cover 1 laterally as far as possible, loom operation permitting; thus, in the case of an air jet loom, the small plate 2 on the weft-inserting side has an opening only sufficient for the movement of the weft-presenting device carrying the wefts in front of the main launching jet, whereas the small plate 3, on the weft-receiving side, completely closes the noise-absorbing cover 1. In the case of a gripper loom, the small plates 2 and 3 must instead be provided with openings large enough to allow the grippers themselves to travel through, as shown in the drawings or, alternatively, have such a design as to also cover, as far as possible, the stand-by area of the gripper outside the fabric being woven.

[0019] Supporting and moving the noise-absorbing cover 1 - between a working position and a position allowing the operator to gain access to the parts shielded by said cover - are effectively performed by two fluidodynamic cylinder-piston assemblies 4, placed near the two lateral ends of the noise-absorbing cover 1, the base of the cylinder 4c and the top of the piston 4p of each cylinder-piston assembly 4 being fixed to the loom structure and, respectively, to the noise-absorbing cover 1. In the illustrated embodiment, the latter connection is performed by extension brackets, so as to allow the noise-absorbing cover a wide travel. Fixing of the pistons 4p to said cover occurs in a barycentric position of the cover itself, so that during the movement of the pistons there is no travel torque, and the lifting and lowering of the cover occurs smoothly.

[0020] With this type of design, and thanks to the simultaneous operation of the two cylinder-piston assemblies 4, the noise-absorbing cover 1 is easily and swiftly translated from its normal working position, shown in the drawings by continuous lines, to the position of access by the operator, shown by broken lines in figg. 2 and 3. In this position the noise-absorbing cover 1 is well above the loom plane and does therefore not hamper the operator (apart from the negligible obstacle represented by the cylinders 4c) to carry out the usual maintenance or repair operations of the loom. Preferably, the controls of the cylinder-piston assemblies 4 provide, in addition to a manual control, also an automatic control causing the lifting of the cover 1 every time the loom stops and the lowering of the same cover when the loom resumes its function, so that the presence of the noise-absorbing cover 1 is substantially not even noticed by the operator. As a matter of fact, when the operator is alerted by a loom stop signal to perform a maintenance or repair operation, he already finds the noise-absorbing cover 1 in the access position shown in figg. 2 and 3 by a broken line.

[0021] The structure of the walls forming the noise-absorbing cover 1, clearly visible in the cross-section of fig. 5, was designed so as to combine in the best possible way structural rigidity, lightness and noise-absorbing power. The cover thus comprises an outer shell 5, consisting of a composite sandwich-like panel formed by two outer aluminium alloy sheets, for example of the type marketed under the brand PERALUMAN-100, between which is inserted a black, LDPE-type polyethylene core. A composite panel of this type is available on the market under the brand name DIBOND, manufactured by Alusuisse Singen GmbH, and displays excellent structural and lightness features, thanks to the double aluminium alloy wall, together with pronounced noise-absorbing properties, due to the polyethylene core.

[0022] Finally, to the outer shell 5 is fixed - through spacer blocks 6 - an inner lining 7 made of noise-absorbing material, preferably a melamine-based, foamed plastic material; a suitable material is for example foamed melamine marketed under the brand name FONITEK, manufactured by the SOGIMI Group; plates of this material having a thickness of 20 mm are sufficient for the purposes of the invention.

[0023] The same structure described here for the main part of the cover 1 is also used for the manufacturing of the lateral small plates 2 and 3.

[0024] The noise-absorbing cover device described above fully achieves all the objects of the present invention. In experimental trials carried out with such device applied to a latest-generation air-jet weaving loom, a remarkable reduction of noise levels was observed, averaging from about 106-107 dB down to about 101 dB, with no appreciable reduction of accessibility to the loom by the operator, thanks to the swiftness and simplicity of the operations of opening and closing the noise-absorbing cover 1 and to the easy automation of the same.

Claims

1. Weaving loom of the type comprising devices for forming the shed among the warp yarns, devices for inserting the weft into the shed, and an oscillating reed for beating the new wefts against the fabric being woven, **characterised in that** it comprises a noise-absorbing cover encasing the top side and, at least in part, the lateral sides of said shed-forming

and weft-inserting devices and the reed, and **in that** said cover is provided with control means apt to shift said cover from a working position - wherein it is close to the warp yarns and to the fabric being woven - to a position allowing access to the operator, wherein it is far from all the above-mentioned fabric-weaving devices to allow the operator to have free access thereto.

2. Weaving loom as claimed in claim 1), wherein said control means consist of two fluidodynamic cylinder-piston assemblies 4 positioned at the two lateral ends of the noise-absorbing cover 1, the cylinder base and the piston top of each cylinder-piston assembly being fixed to the loom frame and to the noise-absorbing cover 1, respectively.

3. Weaving loom as claimed in claim 2), wherein said pistons are fixed to the noise-absorbing cover in a barycentric position of the same.

4. Weaving loom as claimed in claim 2), wherein driving said cylinder-piston assemblies into an operational or non-operational state is automatically controlled according to the stationary or running condition of the loom.

5. Weaving loom as claimed in claim 1), wherein said noise-absorbing cover comprises an outer shell having a structural function, and an inner lining having a noise-absorbing function.

6. Weaving loom as claimed in claim 4), wherein said outer shell consists of a composite sandwich panel formed by two outer light-alloy sheets, between which is inserted a noise-absorbing plastic core.

7. Weaving loom as claimed in claim 5), wherein said light alloy is an aluminium alloy and said plastic material is black polyethylene.

8. Weaving loom as claimed in claim 4), wherein said inner lining consists of foamed plastic plates having a thickness of at least 20 mm.

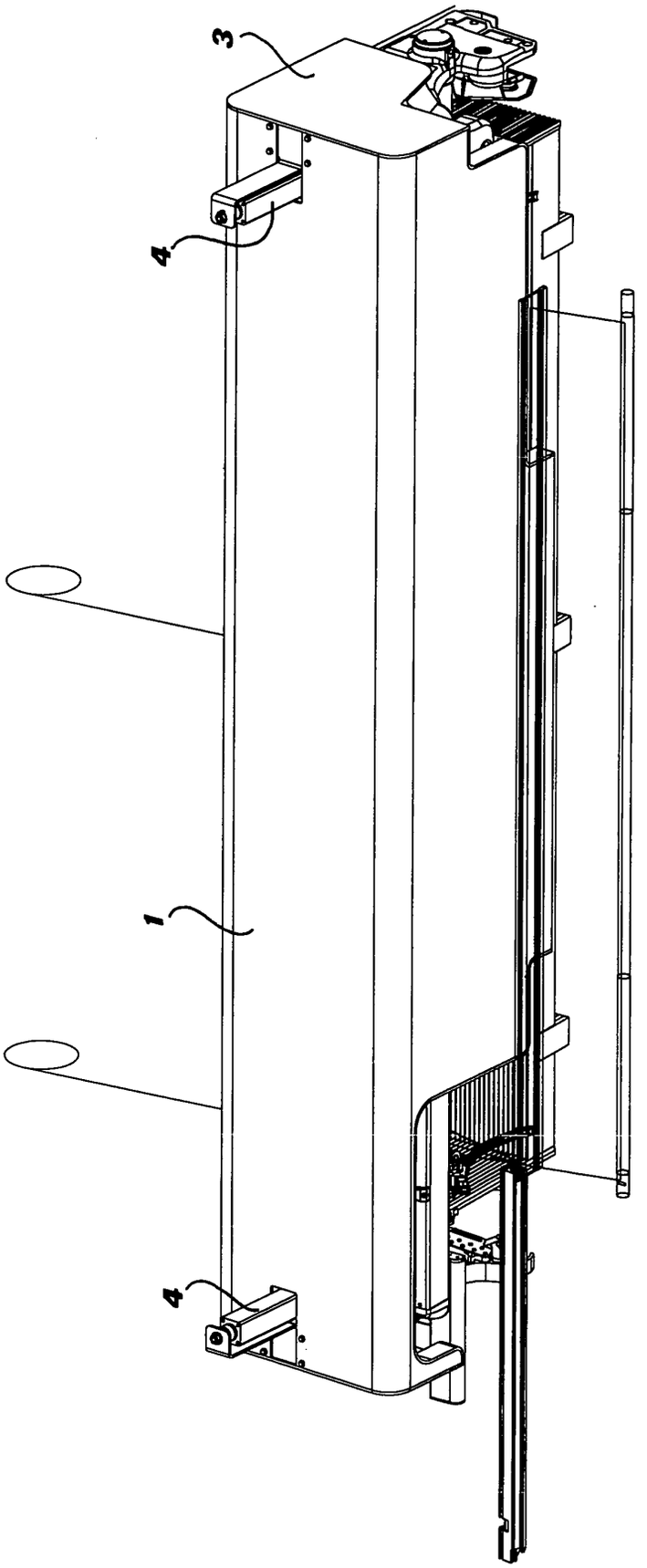

FIG. 1

FIG. 2

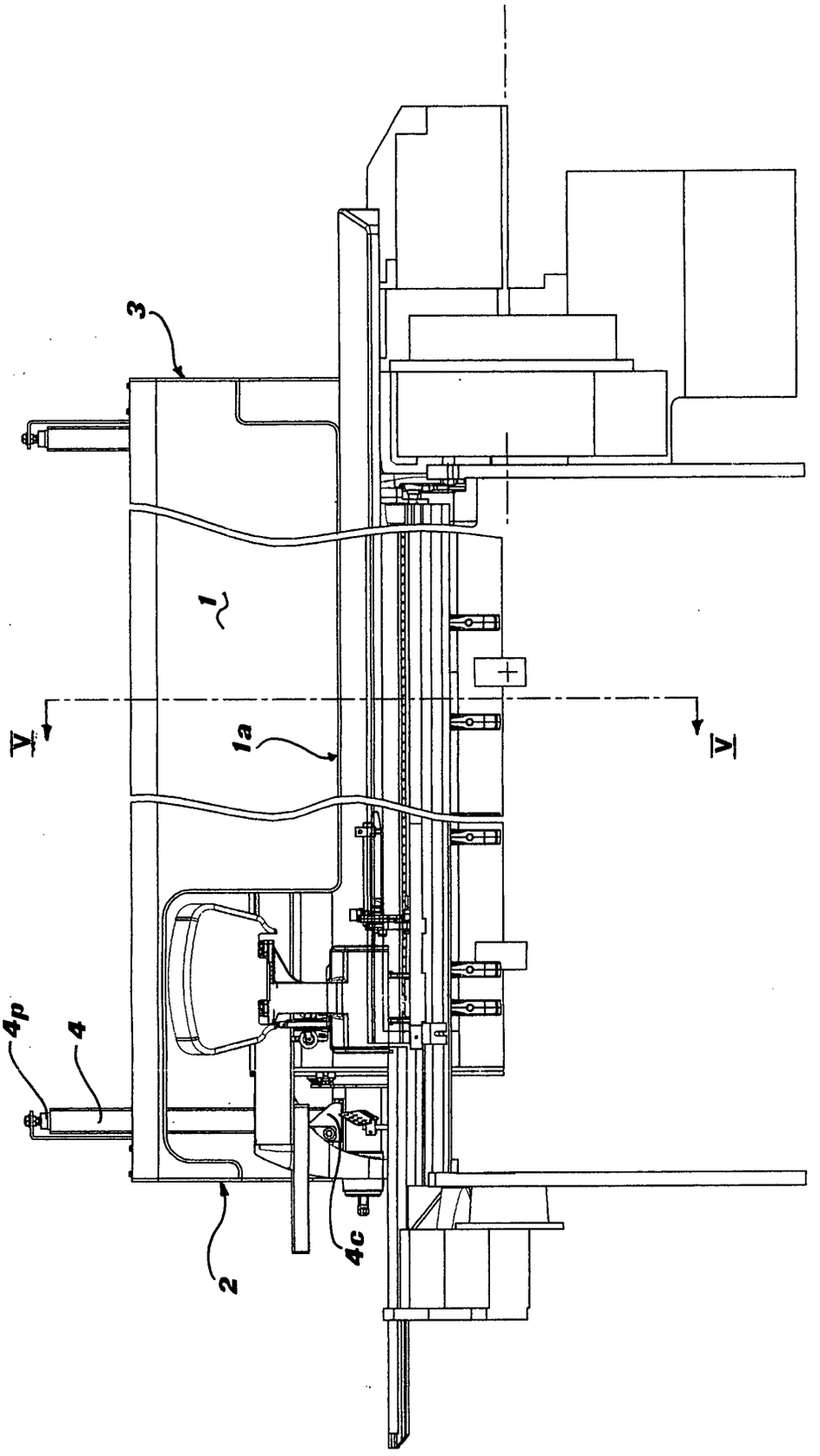

FIG. 3

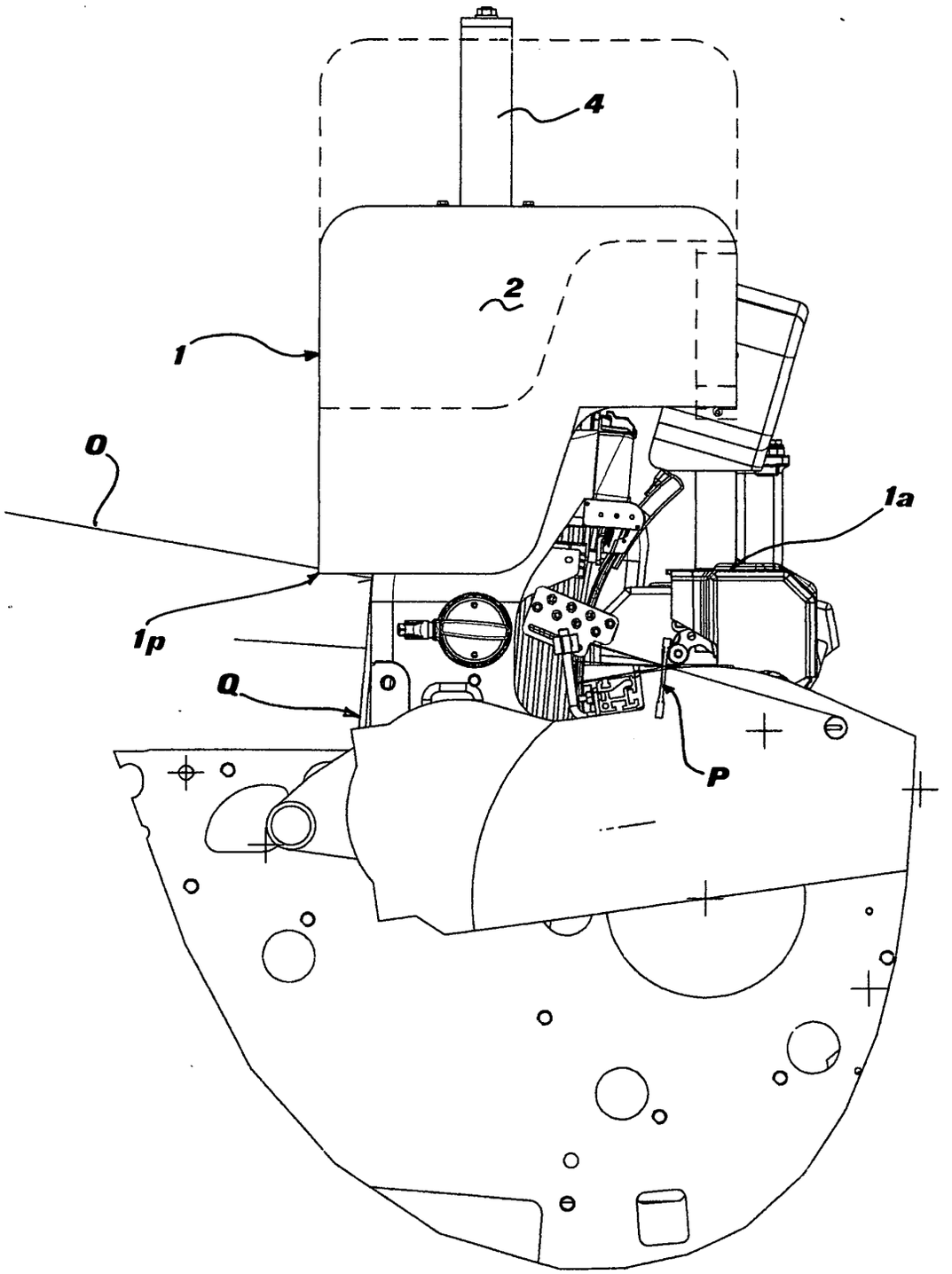

FIG. 4

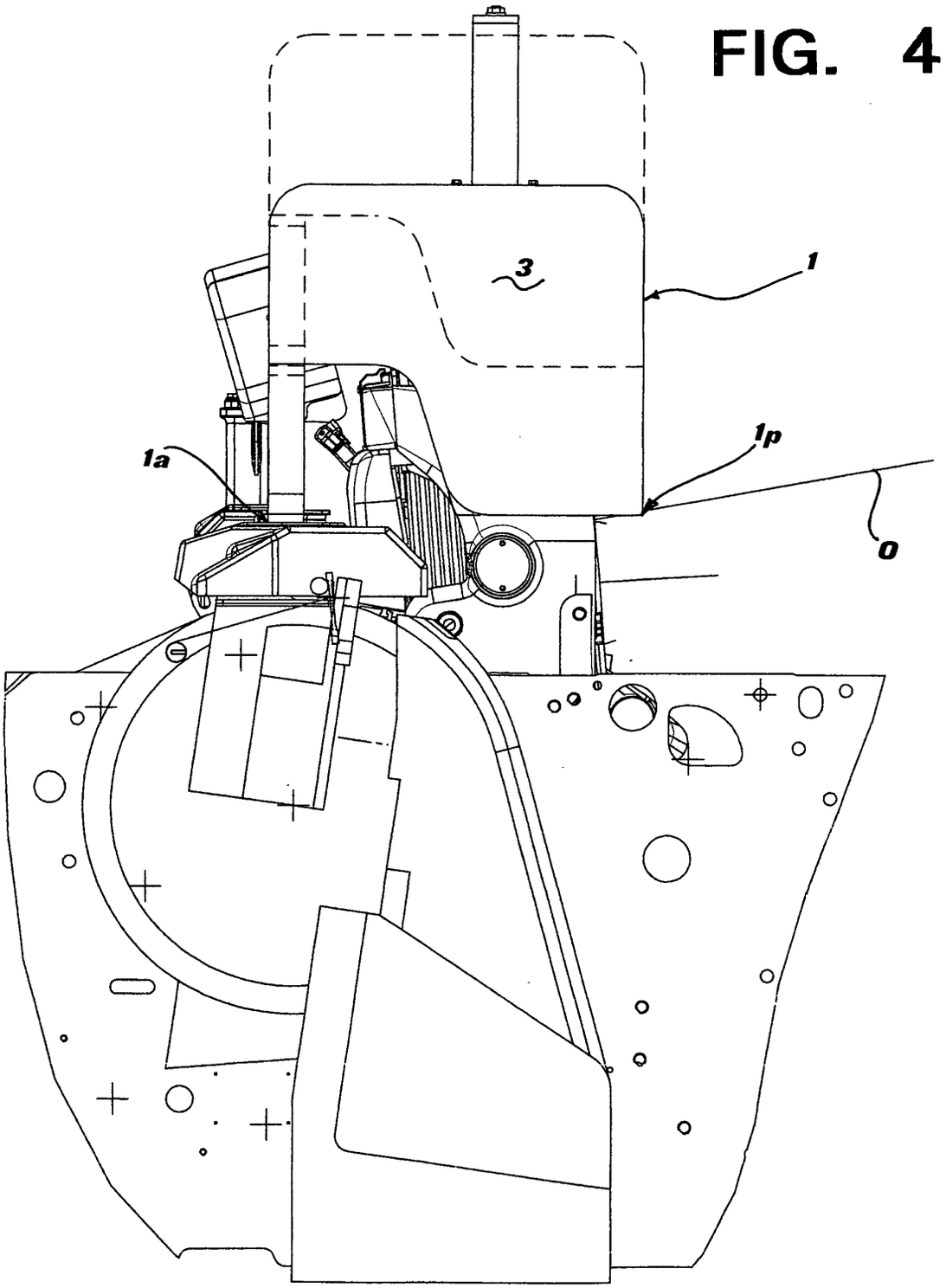

FIG. 5