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(54) **Device to adjust the articulated head of the control linkage for the heald frames of looms**

(57) The invention concerns an articulated head (5) of the control linkage for the heald frames of looms, operating on the control lever (2) of a shedding machine, comprising: a stiff long guide (8); a drawer (9) longitudinally sliding therein with precision, a portion of the control lever (2) crossing the guide (8) and the drawer (9); and at least first and second positive locking means, positioned opposite and acting on the two sides (S1, S2) of said lever (2). In said head (5) the first positive locking means comprise wedge-shaped elements (100, 101), apt to impart a direct pressure substantially transversal to the guide (8) and towards its longitudinal axis (a-a'), under the action of the adjacent side (S2) of said control lever (2) pressed on said wedge-shaped elements (100, 101) by the action of the second positive locking means.

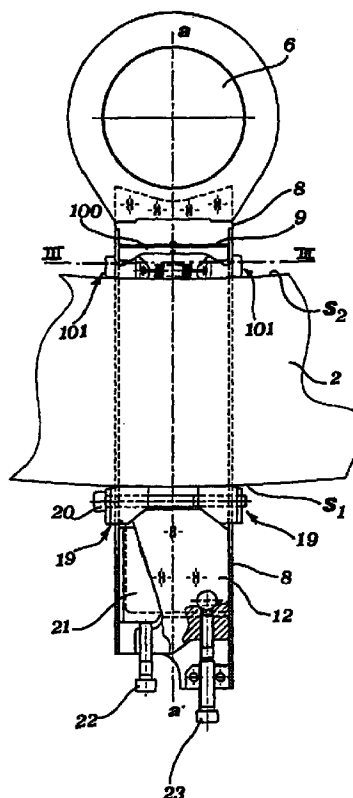


FIG.2

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Description

[0001] The present invention concerns a device to adjust the articulated head of the control linkage for the heald frames of looms and, particularly, a device to adjust and lock the linkage head on the control lever of the weave machine.

[0002] As known, in looms, the heald frames are controlled by the shedding weave machine through linkages, the articulated head of which is connected to a control rocking lever mounted directly on the weave machine.

[0003] The articulated head allows to carry out a double adjustment: a first one along its own length, and a second one along the control lever. It is thus possible to shift the articulation point of the linkage head, thereby adjusting the stroke of the corresponding heald frame (by moving the head along the control lever), or the position of the dead points of said frame (by varying the length of the head in a longitudinal sense).

[0004] There are already known to be various types of adjustable articulated heads, wherein the locking of the adjustment position is obtained by means of a single control member (as, for example, in CH-621159 and in EP-633335), or else by means of two control members acting independently on the two adjustments (as, for example, in EP-A-705926 in the name of the Applicant).

[0005] In any case, the locking of the articulated head on the control lever, once the adjustment has been carried out, is substantially obtained thanks to the action of members positioned only on one side of said head, in respect of the control lever: in particular, for easiness of access, on the side opposite to that carrying the articulation hinge.

[0006] Consequently, the locking of the articulated head on the control lever actively occurs only along one of the sides of said lever, while the other side thereof - opposite to the locking side - is simply forced to bear against a corresponding abutting surface by the indirect action of the locking members.

[0007] Although the stress imparted on the articulated head by the control lever is mainly directed orthogonally to said lever, the type of locking adopted up to date - namely, only on one side of the lever - has, in many cases, proved to be insufficient.

[0008] In fact, on increasing of the loom speed, and thus of the inertial forces involved, there is an increase in the stresses imparted on the head by the control lever; it thus becomes indispensable to provide for a more steady locking of the head onto the lever, failing which there could be slackenings and consequent malfunction, as well as wears due to sliding frictions. A single direct locking point allows the control lever to have an infinitesimal freedom of oscillation centered on the locked edge; with the recurrence of working cycles involving high stresses, this may lead to significant deformations, and thus to breakage, or at least to the start of troublesome vibrations.

[0009] In other words, the lever side which simply bears against the corresponding abutting surface does not ensure a positive locking especially lengthwise to the coupling plane. It is hence necessary for the control lever to be firmly locked on both of its sides to the articulated head, so as to obtain a direct and positive locking thereof.

[0010] The EP-744482 discloses an articulated head, which comprises two guide means apt to engage with corresponding wedge-shaped elements acting on the two opposite sides of the control lever. However, this solution is not fully satisfactory.

[0011] In fact, the guide means are inevitably stout, so as to ensure the required structural resistance to the outward pressure force imparted thereon by the wedge-shaped elements. This involves considerable distributed masses, which create vibration problems tied to the oscillations proper to the system.

[0012] Moreover, the positioning in succession - starting from the longitudinal axis of symmetry of the head and extending outwards - of a wedged element, of two further cooperating wedge-shaped elements, and of the guide means, leads to considerable transversal bulks.

[0013] The object of the present invention is to thus supply an articulated adjustment head apt to solve the aforementioned drawbacks and, in particular, an articulated head apt to be adjusted and locked on both sides of the control lever, but simultaneously involving a light structure, a simple construction and small transversal dimensions.

[0014] Said objects are reached with an articulated head of the control linkage for the heald frames of looms, operating on the control lever of a shedding machine to carry out the adjustment both of the heald frame stroke and of the starting position of said stroke, of the type comprising:

- a stiff long guide;
 - a drawer longitudinally sliding therein with precision, a portion of the control lever crossing the guide and the drawer; and
 - at least first and second positive locking means, positioned opposite and acting on the two sides of said lever;
- characterized in that, the first positive locking means comprise wedged elements apt to impart a direct pressure substantially transversal to the guide and towards its longitudinal axis, under the action of the adjacent side of said control lever pressed on said wedge-shaped elements by the action of the second positive locking means.

Further characteristics and advantages of the articulated head according to the invention will anyhow be more evident from the following detailed description of some preferred embodiments thereof, given by way of example and illustrated on the accompanying drawings,

in which:

Fig. 1 is a diagrammatic view of the controls transmitted from a weave machine to a heald frame, showing the location of the adjustable linkage head; Fig. 2 is a part section view of an embodiment of the articulated head according to the invention; Fig. 3 is a cross-section view along the line III-III of fig. 2; Fig. 4 shows a detail, on an enlarged scale, of the central locking system according to the invention illustrated in fig. 2; and Fig. 5 is a part section view of another embodiment of the articulated head according to the invention.

[0015] In loom operation - as shown in fig. 1 of the drawings - a shedding weave machine 1 causes a control lever 2 to oscillate by a fixed angle β . A linkage 3 transmits to the heald frame 4 the controls of the lever 2, to which there is fixedly connected an adjustable articulated head 5, hinged in 6 to the connecting rod 7 of the linkage 3.

[0016] To be concise, reference is made to EP-A-705926 which already widely describes the fundamental elements forming the articulated head 5, the reference numbers of the respective elements corresponding to those used herein. Summing up, the articulated head 5 comprises a stiff long guide 8 and a drawer 9 longitudinally sliding into said guide 8. The control lever 2 is inserted across the guide 8 and the drawer 9.

[0017] In EP-A-705926, the control lever 2 is positively locked merely in correspondence of its outward side S1, far from the articulation point or hinge 6 - by means of first wedge-shaped elements 19 - while its inward side S2, adjacent to the hinge 6, is simply forced to abut against the bottom of the drawer 9 by the opposing action of the locking means 19.

[0018] According to the present invention, positive locking means - centrally positioned - are provided also in correspondence of the inward side S2 of the control lever 2. For this purpose, the bottom of the drawer 9 comprises a block 100 with double chocks engaging with two hammer elements 101. Each hammer element 101 has a head 102 wider than the width of the slot 11 (fig. 3) formed into the drawer 9, and a wedge-shaped shank 103, sufficiently thin to be housed in the drawer 9 and cross the longitudinal slots 10 and 11 formed, respectively, into the guide 8 and into the drawer 9.

[0019] The shanks 103 have inner surfaces 103a, engaging with the inward side S2 of the control lever 2, and outer surfaces 103b, formed with an opposite inclination, like a wedge, and cooperating with the doublechock block 100. The inclination of the outer surfaces 103b is such that a pressure imparted thereon by the ends of the double-chock block 100 causes the approach of the two hammer elements 101, which thus snap onto the lateral sides of the guide 8.

[0020] The two shanks 103 are preferably connected together by an elastic member 104, such as a helical spring, which keeps them joined and thus inserted into the drawer 9 also when no pressure is imparted by the block 100, that is, in the absence of the control lever 2, or when the locking has not yet been performed and the lever 2 is loose inside the drawer 9.

[0021] When the articulated head 5 needs to be adjusted and locked into a new position on the lever 2, it is first of all necessary to loosen the peripheral locking system, namely the locking elements 19, 20 and 21, 22, then to reset a new reciprocal positioning between the lever 2 and the hinge 6 by means of the screw 23, and finally to again tighten the wedgedshaped locking elements 19 and 21.

[0022] This last operation forces the lever 2 to press, with its inward side S2, onto the hammer elements 101, which in turn press onto the block 100 with double chocks, positioned onto the bottom of the drawer 9. The reaction of the block 100 onto the hammer elements 101, thanks to the wedgedshaped surfaces, is converted into a transversal pressure imparted on the hammer elements 101, in an inward direction, namely towards the longitudinal axis a-a' of the articulated head 5; this leads the heads 102 of the hammer elements 101 to forcedly bear against the lateral surfaces of the guide 8.

[0023] Preferably, the lateral surfaces of the guide 8 have rims 105 bent at 90. towards the inside of the drawer 9, said rims being apt to retain and precisely guide said drawer. When the two hammer elements 101 snap onto the lateral sides of the guide 8, under the reaction of the block 100 determined by the pressure of the lever 2, the heads 102 of said hammer elements are forced to abut against the lateral surfaces of the guide 8 and, in particular, against the rims 105, thereby ensuring a first retaining and locking effect.

[0024] Moreover, the pressure of the heads 102 causes a local deformation of the rims 105, which clamp the edges of the drawer 9, thereby ensuring a further retaining action and locking of said drawer onto the guide 8, close to the hinge 6.

[0025] The excellent double locking action of the device of the invention, and its reduced transversal dimensions allowed by the two hammer elements 101 projecting from the guide 8 merely with the heads 102, as well as its structural simplicity, allow to successfully reach the intended objects.

According to another embodiment, the peripheral positive locking system no longer has - as in EP-A-705926 - a double locking element, but merely comprises the first wedge-shaped elements 19 operated by the screw 20. In fact, the solid portion 12 of the drawer 9 has a protuberance 106 which engages with the wedge-shaped element 21 by way of a surface 21A inclined in respect of the longitudinal sliding axis of the drawer 9. A further intermediate wedge-shaped element 107 is interposed between the first wedge-shaped elements 19, the solid portion 12 and the second wedge-shaped element 21.

[0026] In this way, by simply tightening the screw 20, one obtains a resetting of the wedge-shaped elements such that it simultaneously provides to lock the solid portion 12 and the second wedge-shaped element 21 into the guide 8, and to lock the lever 2 between the first wedge-shaped elements 19 and the hammer elements 101.

[0027] An additional operating member, namely the screw 22, has thus been advantageously eliminated, thereby making the construction of the articulated head 5 even simpler and lighter.

[0028] Also this second embodiment allows to obtain the positive locking of both sides S1 and S2 of the control lever 2, by means of a device easy to operate, of reduced dimensions, light, and of simple construction.

[0029] It is anyhow understood that the invention is not limited to the particular embodiments described hereabove which merely form non-limiting examples of its scope, but that a number of variants can be introduced, all within reach of a person skilled in the art, without thereby departing from the protection field of the present invention.

Claims

1. Articulated head of the control linkage for the heald frames of looms, operating on the control lever of a shedding machine, to adjust both the stroke of the heald frame and the position of the dead points of said frame, of the type comprising:
 - a stiff long guide (8);
 - a drawer (9) longitudinally sliding therein with precision, a portion of the control lever (2) crossing the guide (8) and the drawer (9); and
 - at least first and second positive locking means, positioned opposite and acting on the two sides (S1, S2) of said lever (2); characterized in that, the first positive locking means comprise wedgeshaped elements (100, 101) apt to impart a direct pressure substantially transversal to the guide (8) and towards its longitudinal axis (a-a'), under the action of the adjacent side (S2) of said control lever (2) pressed on said wedge-shaped elements (100, 101) by the action of the second positive locking means.
2. Articulated head as in claim 1), wherein said first positive locking means are centrally positioned, between the articulation point (6) of the articulated head (5) and the control lever (2).
3. Articulated head as in claim 1) or 2), wherein said first positive locking means consist of two hammer elements (101) which snap onto the lateral sides of said stiff long guide (8).
4. Articulated head as in claim 3), wherein said hammer elements (101) engage, on one side, with the inward side S2) of the control lever (2) and, on the other side, with the bottom of said drawer (9), through a block (100) with double chocks engaging with corresponding inclined surfaces (103b) of the two hammer elements (101).
5. Articulated head as in claim 4) wherein said hammer elements (101) have a head (102), which is wider than the width of slots (10, 11) formed into the lateral sides of said guide (8) and said drawer (9), and a shank (103), which is less thick than the width of said slots (10, 11) and onto which are formed said inclined surfaces (103b).
6. Articulated head as in any one of claims 3) to 5), wherein said hammer elements (101) are connected together by an elastic member (104).
7. Articulated head as in any one of the previous claims, wherein said guide (8) has, in correspondence of said slots (10, 11), deformable rims (105) bent towards the inside of the drawer (9), said rims (105) clamping the lateral sides of the drawer (9) under the pressure of the heads (102) of said hammer elements (101).
8. Articulated head as in any one of the previous claims, wherein said second positive locking means comprise:
 - a pair of first wedge-shaped locking elements (19), partially inserted into the slots (10, 11) of the guide (8) and of the drawer (9) and connected by screw means (20), said locking elements (19) acting between an adjacent side (S1) of the control lever (2) and a solid portion (12) of the drawer (9); and
 - at least another wedge-shaped element (21), acting between the solid portion (12) of the drawer (9) and the guide (8), said element (21) being operated by a screw (22) connected to said solid portion and being apt to block said solid portion (12) of the drawer (9) into said guide (8).
9. Articulated head as in any one of claims 1) to 7), wherein said second positive locking means comprise:
 - a pair of first wedge-shaped locking elements (19), partially inserted into the slots (10, 11) of the guide (8) and of the drawer (9) and connected by screw means (20), said locking elements (19) acting between an adjacent side (S1) of the control lever (2) and a solid portion, (12) of the drawer (9);

- at least a second wedge-shaped element (21), acting between the solid portion (12) of the drawer (9) and the guide (8); and
- at least a third wedge-shaped element (107), acting between the solid portion (12) of the drawer (9), the second wedge-shaped element (21) and the pair of first wedge-shaped locking elements (19);
- said second element (21) and said third element (107) being apt to lock said solid portion (12) of the drawer (9) into said guide (8) through the mere action of said screw means (20).

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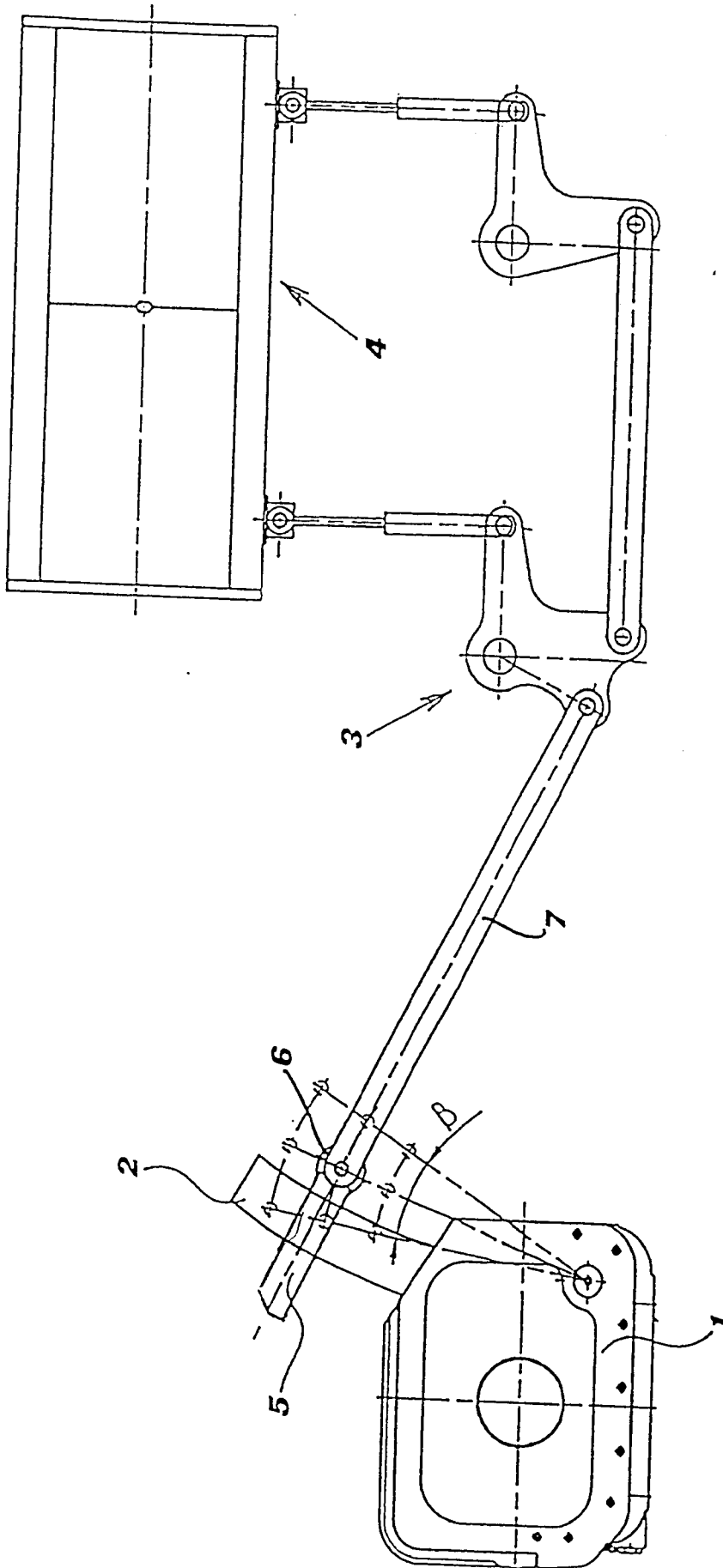


FIG.1

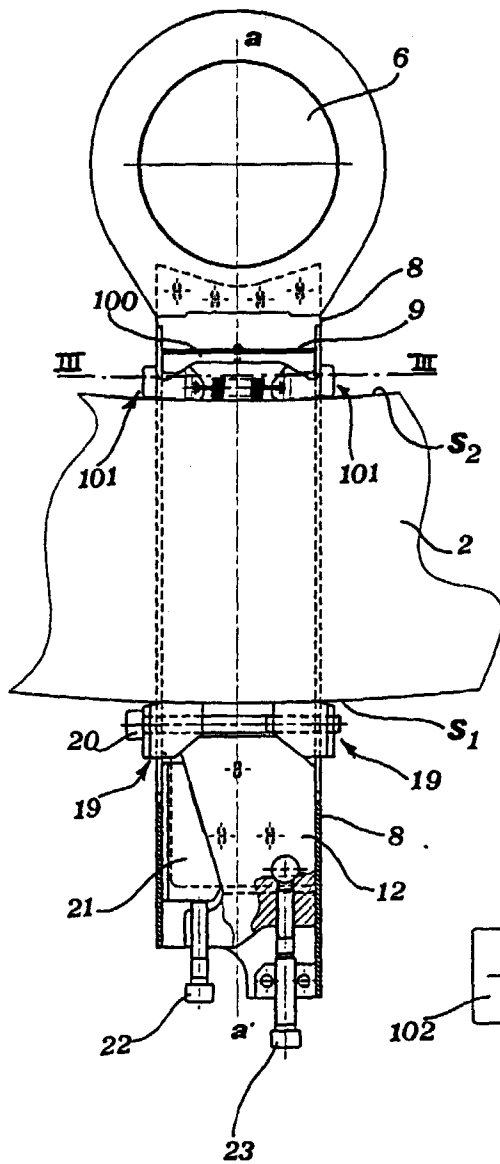


FIG. 2

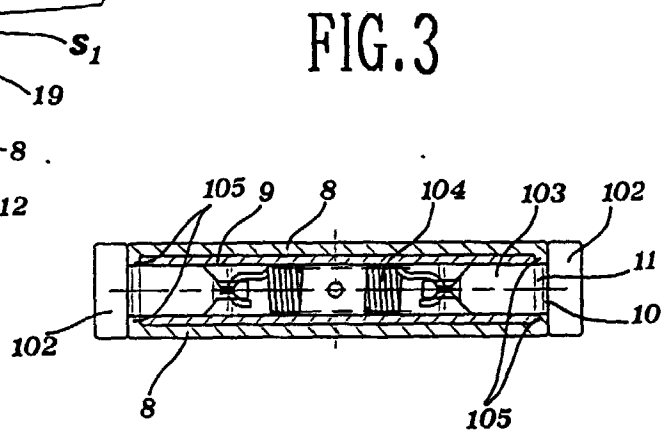
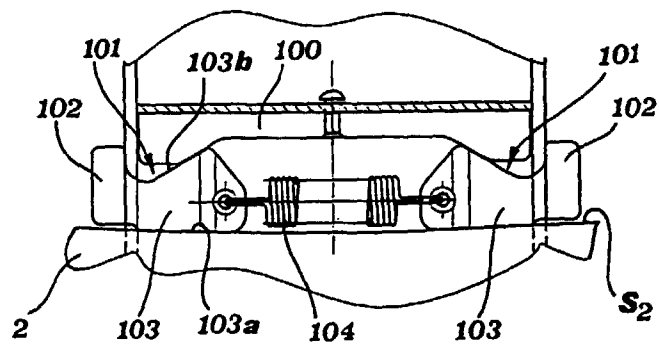


FIG. 3

FIG. 4



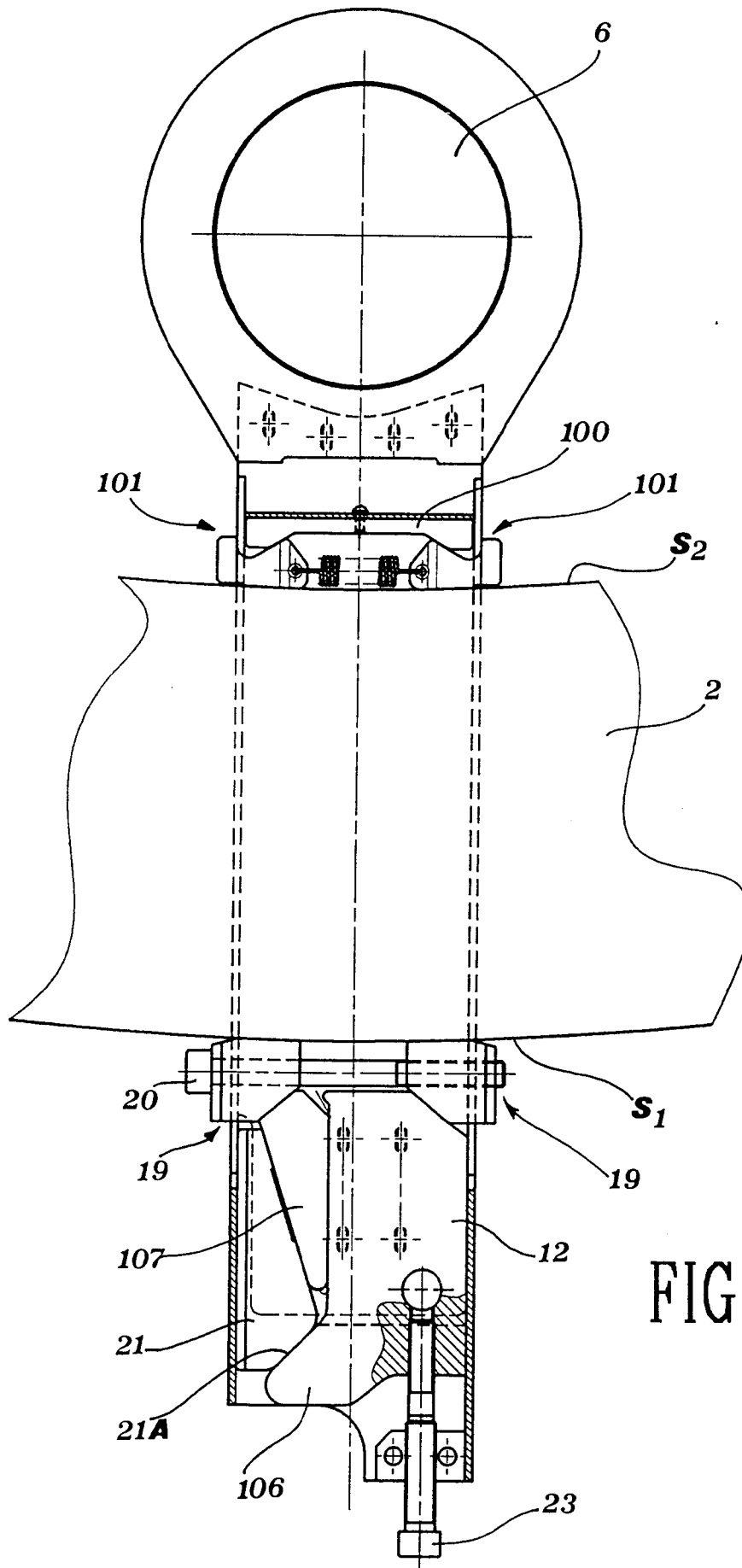


FIG. 5