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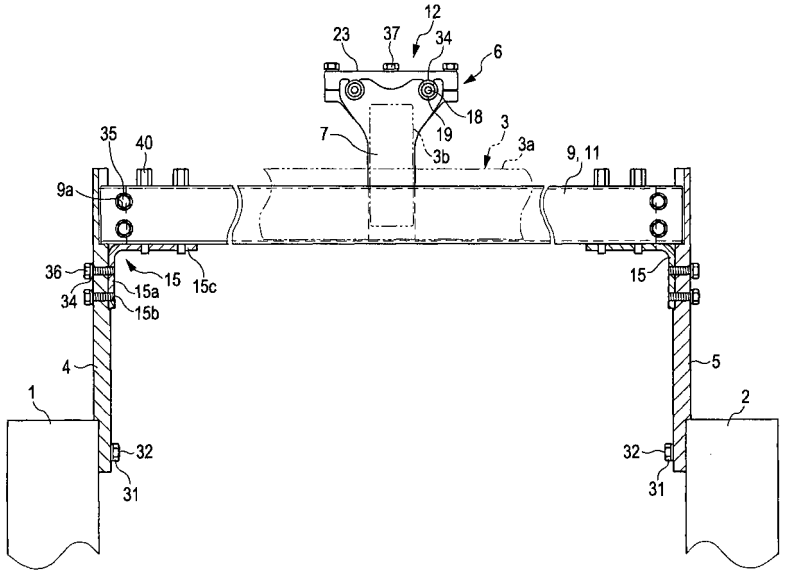
(54) **Vibration control apparatus for heald frames of loom**

(57) A vibration control apparatus (6) for heald frames (3) of a loom includes a pair of guide plates (7, 8) disposed so as to face each other in a front-rear direction of the loom, the heald frames (3) being disposed between the guide plates (7, 8) so that vibration of the heald frames (3) in the front-rear direction is suppressed. A pair of stays (9, 11) is provided so as to extend between left and right frame members (1, 2) of the loom, the stays (9, 11) being spaced from each other in the front-rear direction, provided with respective guide plates (7, 8), and connected to each other with a connecting member (12). At least the stay (11) disposed in rear of the other stay (9) is fixed to the left and right frame members (1, 2) such that the position of the stay (11) is adjustable in the front-rear direction. The connecting member (12) extends in the front-rear direction and at least one of connecting positions at which the connecting member (12) is connected to the stays (9, 11) is adjusted in the front-rear direction when the position of the stay (11) disposed in rear of the other stay (9) is adjusted.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a vibration control apparatus for heald frames of a loom in which the heald frames are arranged in a front-rear direction and guided by being clamped between a pair of guide plates in the front-rear direction.

2. Description of the Related Art

[0002] In general, to suppress vibration generated during shedding motion of a plurality of heald frames arranged in a front-rear direction of a loom, left and right frame portions of a frame body of each heald frame are respectively placed in grooves formed so as to extend in a vertical direction in guide members provided on left and right frame members of the loom. Thus, vibration of the heald frames in a cloth width direction and the front-rear direction is suppressed. In addition, a pair of guide plates including a front guide plate and a rear guide plate is placed at a central position in the cloth-width direction or at each of positions that substantially proportionally divide the cloth width. The heald frames are placed between each pair of guide plates so that the guide plates serve to suppress the vibration of the heald frames in the front-rear direction.

[0003] More specifically, each heald frame has a slide plate made of wood or plastic on an upper frame portion of a frame body of the heald frame at a position corresponding to the guide plates. The foremost and rearmost heald frames move up and down (shedding motion) while forward movement of the foremost heald frame and rearward movement of the rearmost heald frame are regulated by the guide plates facing the slide plates on the foremost and rearmost heald frames. Thus, vibration of the upper frame portions of the heald frames is suppressed by the pair of guide plates at a position separated from the left and right frame members. Therefore, vibration of each heald frame in the front-rear direction generated in the shedding motion can be suppressed over the entire body thereof. As a result, abrasion and damage of the heald frames and guide members thereof can be suppressed, and noise can be reduced.

[0004] Japanese Unexamined Patent Application Publication No. 2001-181938 describes a vibration control apparatus for heald frames. In this device, a single stay is disposed so as to extend between left and right frame members, and a pair of guide plates spaced from each other in the front-rear direction is provided on the stay. One of the guide plates, hereinafter called a first guide plate, is fixed to the stay. The other guide plate, hereinafter called a second guide plate, is supported by the first guide plate with a shaft disposed therebetween. The shaft is disposed at an upper position where the shaft does not interfere with the heald frames. The pair of guide plates and the shaft are formed as an integral body having the shape of an inverted letter U with two sides defined by the pair of guide plates.

[0005] The second guide plate projects from the stay in the vertical direction and the front-rear direction, and is singly supported by the stay with the first guide plate and the shaft disposed therebetween. During the shedding motion of the heald frames, the pair of guide plates receives force in the front-rear direction generated when the heald frames vibrate and move in the front-rear direction and force in the vertical direction generated when the heald frames come into contact with the guide plates as a result of vibration thereof in the front-rear direction and slide along the surfaces of the guide plates. The second guide plate is singly supported by the stay, and is held by the shaft at a position separated from the first guide plate by a distance corresponding to the total thickness of the heald frames. Therefore, a large moment is applied to the stay due to the force in the front-rear direction and the force in the vertical direction. In addition, the number of heald frames differs in accordance with the weaving conditions, and a considerably large moment is applied if the number of heald frames is large. Therefore, even if the above-mentioned forces in the two directions are relatively weak, the stay is easily twisted and deformed. When the stay which supports the pair of guide plates is twisted, the guide plates move in the front-rear direction while tilting in the front-rear direction. Therefore, vibration of the heald frames in the front-rear direction cannot be reliably suppressed. In particular, the second guide plate largely moves in the front-rear direction since the twisting of the stay is magnified, and vibration of the heald frames in the front-rear direction cannot be effectively suppressed.

[0006] The above-described phenomenon is significant in the case of weaving a wide cloth, a cloth that requires a large number of heald frames to be used, or a heavy cloth with which warp tension is high and a strong force is applied to the heald frames. In such a case, the level of vibration of the heald frames and the level of noise caused by the vibration are increased and there is a risk that the heald frames will break. To avoid this, the rotational speed of the loom must be reduced. As a result, the production efficiency will be degraded.

SUMMARY OF THE INVENTION

[0007] An object of the present invention is to reliably suppress, irrespective of the number of heald frames, vibration of the heald frames in a front-rear direction and noise caused by the vibration during shedding motion, thereby allowing the loom to be operated at a high speed.

[0008] According to the present invention, a vibration control apparatus for heald frames of a loom includes a pair of guide plates disposed so as to face each other in a front-rear direction of the loom. A plurality of heald frames are disposed between the guide plates so that

vibration of the heald frames in the front-rear direction is suppressed.

[0009] According to an aspect of the present invention, a pair of stays is provided so as to extend between left and right frame members of the loom, the stays being spaced from each other in the front-rear direction, provided with respective guide plates, and connected to each other with a connecting member. At least the stay disposed in rear of the other stay is fixed to the left and right frame members such that the position thereof is adjustable in the front-rear direction. The connecting member extends in the front-rear direction and at least one of connecting positions at which the connecting member is connected to the stays is adjusted in the front-rear direction when the position of the stay disposed in rear of the other stay is adjusted.

[0010] The connecting member extends in the front-rear direction at a position above the uppermost position of the heald frames in the shedding motion so as not to hinder the shedding motion of the heald frame.

[0011] According to the aspect of the present invention, the guide plates are provided on the front and rear stays, and the stays are connected to each other. Therefore, unlike the structure according to the related art, displacement of the guide plates in the front-rear direction due to twisting of the stay can be minimized. As a result, vibration of the heald frames can be effectively suppressed. In addition, the rear stay is provided such that the position thereof can be adjusted in the front-rear direction and at least one of the connecting positions of the connecting member is adjusted in accordance with the adjustment of the position of the rear stay. Therefore, the above-mentioned displacement can be minimized irrespective of the number of heald frames and vibration of the heald frames can be reliably suppressed.

[0012] The stays may be connected to each other with the connecting member and the guide plates disposed therebetween.

[0013] In such a case, since the guide plates are connected to each other by the connecting member, displacement of the guide plates and vibration of the heald frames in the front-rear direction can be more reliably suppressed.

[0014] One end of the connecting member may be fixed to one of the guide plates, and the other end of the connecting member may be connected to the other one of the guide plates such that only the connecting position thereof is adjustable in the front-rear direction.

[0015] In such a case, only the connecting position between the connecting member and the guide plate at the other end of the connecting member is adjusted in accordance with the adjustment of the position of the rear stay in the front-rear direction. Thus, the operation can be facilitated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Fig. 1 is a front view showing the overall structure of a vibration control apparatus for heald frames of a loom according to a first embodiment of the present invention;

Fig. 2 is a side view of a left side section of the structure shown in Fig. 1, seen from a central position of the loom;

Fig. 3 is a top view of the left side section of the structure shown in Fig. 1;

Fig. 4 is a front view of the left side section and a central section in the cloth width direction of the structure shown in Fig. 1 in the state in which a front stay and a front stay holder are removed;

Fig. 5 is a side view corresponding to Fig. 2, illustrating the state in which the number of heald frames is increased;

Fig. 6 is a side view of a vibration control apparatus for heald frames of a loom according to a second embodiment of the present invention; and

Fig. 7 is a top view of the structure shown in Fig. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] Figs. 1 to 5 illustrate a vibration control apparatus 6 for heald frames 3 according to a first embodiment of the present invention. Fig. 1 is a front view showing the overall structure in a left-right direction of a loom. Fig. 2 is a partially sectioned side view of a left side section of the structure shown in Fig. 1, seen from a central position in a cloth width direction. Fig. 2 shows a main part of the vibration control apparatus 6. Fig. 3 is a partially sectioned plan view of the left side section of the structure shown in Fig. 1. Fig. 3 also shows the main part of the vibration control apparatus 6. Fig. 4 is a front view of the left side section and a central section in the cloth width direction of the structure shown in Fig. 1 in the state in which a front stay 9 is removed. Fig. 5 is a diagram corresponding to Fig. 2, illustrating the state in which the number of heald frames 3 is increased. The vibration control apparatus 6 is symmetrical in the left-right direction. Therefore, in some parts of the following description, only the left side section of the vibration control apparatus 6 will be explained and explanation of a right side section thereof will be omitted.

[0018] As shown in Fig. 1, which is a front view of the overall structure, a loom includes a left frame member 1 and a right frame member 2 at left and right positions in the cloth width direction. A plurality of heald frames 3 arranged in the front-rear direction are disposed between the left and right frame members 1 and 2. The left and right frame members 1 and 2 have guide members (not shown) with which a left frame portion (not shown) and a right frame portion (not shown) of a frame body of each heald frame 3 are guided. Thus, the heald frames 3 are supported such that the heald frames 3 are movable in the vertical direction. Side stands 4 and 5 are provided so as to project upward from the frame members 1 and 2, respectively. The side stands 4 and 5 are detachably

fixed to the frame members 1 and 2, respectively, with bolts 32 and nuts 31, and are thereby integrated with the frame members 1 and 2, respectively. Thus, a left frame structure and a right frame structure according to the present invention are obtained. In Fig. 1, only an upper frame portion 3a of the frame body of each heald frame 3 is shown. A slide plate 3b made of wood or plastic is fixed to each of the upper frame portions 3a of the heald frames 3 at an intermediate position thereof in the cloth width direction. The slide plates 3b have a larger thickness than that of the upper frame portions 3a, and are provided with grooves that are rectangular in cross section and that open at the bottom ends of the slide plates 3b. The slide plates 3b are fixed to the upper frame portions 3a such that the upper frame portions 3a are fitted to the grooves in the slide plates 3b. Thus, upper portions of the slide plates 3b project from the upper frame portions 3a. The slide plates 3b of the heald frames 3 are disposed at the same position in the cloth width direction, and serve to mutually regulate the displacements thereof in the front-rear direction.

[0019] The vibration control apparatus 6 according to the first embodiment includes a pair of guide plates including a front guide plate 7 and a rear guide plate 8, a pair of stays including a front stay 9 and a rear stay 11 that support the guide plates 7 and 8, respectively, and a connecting member 12 that connects the front guide plate 7 and the rear guide plate 8 to each other at two positions separated from each other in the cloth width direction. Among the heald frames 3 arranged in the front-rear direction, a front surface of the slide plate 3b of the heald frame 3 at the foremost position (position closest to the cloth fell) is guided by the front guide plate 7, and a rear surface of the slide plate 3b of the heald frame 3 at the rearmost position is guided by the rear guide plate 8. The front guide plate 7 and the rear guide plate 8 are integrally bonded to the front stay 9 and the rear stay 11, respectively, by means of bolts, welding, etc. In the present embodiment, the guide plates 7 and 8 are integrally bonded to the stays 9 and 11, respectively, by welding.

[0020] Each of the left and right side stands 4 and 5 has a front stay holder 13 with an L-shaped cross section on an inner surface thereof. Each front stay holder 13 has a side portion 13a and a front portion 13c and is fixed to the inner surface of the corresponding side stand such that the position of the front stay holder 13 can be adjusted in the front-rear direction, that is, in the warp direction. More specifically, the side portion 13a of each front stay holder 13 has two long holes 13b extending in the front-rear direction, and bolts 36 are provided so as to extend through the long holes 13b and are screwed into internal threads 4a formed in the side stand 4. Thus, the front stay holders 13 are fixed to the respective side stands 4 and 5 of the frame structures with the bolts 36 and washers 34 such that the positions of the front stay holders 13 can be adjusted in the front-rear direction.

[0021] The front portion 13c of each front stay holder 13 has internal threads 13d formed therein. The front stay 9 is formed of a rectangular pipe, and bolt holes 9a are coaxially formed so as to extend through front and rear surfaces of the front stay 9 in the front-rear direction at each end of the front stay 9. The bolt holes 9a in the front surface have a larger diameter than that of the bolt holes 9a in the rear surface, so that head portions of bolts 35 can be inserted through the bolt holes 9a in the front surface. The bolts 35 are inserted through the bolt holes 9a in the front stay 9 and are screwed into the internal threads 13d in the front stay holders 13. Thus, the front stay 9 is fixed to the front portions 13c of the left and right front stay holders 13 at the ends thereof. As described above, the front stay holders 13 are fixed to the side stands 4 and 5 such that the positions thereof can be adjusted in the front-rear direction. Thus, the front stay 9 is fixed to the frame members 1 and 2 with the front stay holders 13 such that the position of the front stay 9 can be adjusted in the front-rear direction.

[0022] The side stand 4 has two long holes 4b extending in the front-rear direction and an attachment groove 4c formed in an inner surface of the side stand 4 over an area including the two long holes 4b. A rear stay holder 15 with an L-shaped cross section including a side portion 15a and a top portion 15c is fixed to the attachment groove 4c such that the position thereof can be adjusted in the front-rear direction. The rear stay holder 15 is provided on each of the left and right side stands 4 and 5. More specifically, the side portion 15a of each rear stay holder 15 has internal threads 15b, and bolts 33 are inserted through the long holes 4b and screwed into the internal threads 15b. Thus, the rear stay holders 15 are fixed to the respective side stands 4 and 5 with the bolts 33 and washers 34 such that the positions of the rear stay holders 15 can be adjusted in the front-rear direction and such that the bottom end of the side portion 15a of each rear stay holder 15 is in contact with a groove wall 4d of the corresponding attachment groove 4c.

[0023] The top portion 15c of each rear stay holder 15 has internal threads 15d formed therein. The rear stay 11 is formed of a rectangular pipe, and bolt holes 11a are coaxially formed so as to extend through top and bottom surfaces of the rear stay 11 in the vertical direction at each end of the rear stay 11. The bolt holes 11a in the top surface have a larger diameter than that of the bolt holes 11a in the bottom surface, so that head portions of bolts 40 can be inserted through the bolt holes 11a in the top surface. The bolts 40 are inserted through the bolt holes 11a in the rear stay 11 and are screwed into the internal threads 15d in the top portions 15c of the rear stay holders 15. Thus, the rear stay 11 is fixed to the top portions 15c of the left and right rear stay holders 15 at the ends thereof. As described above, the rear stay holders 15 are fixed to the side stands 4 and 5 such that the positions thereof can be adjusted in the front-rear direction. Thus, the rear stay 11 is fixed to the frame members 1 and 2 with the rear stay holders 15 such that the position of the rear stay 11 can be adjusted in the front-rear di-

rection.

[0024] The front guide plate 7 is symmetrical in the left-right direction, and the slide plate 3b of the foremost heald frame 3 slides along the front guide plate 7. A bottom portion of the front guide plate 7 is integrated with the front stay 9 by being welded to a rear surface of the front stay 9 such that the front guide plate 7 projects upward from the front stay 9. An upper portion of the front guide plate 7 is wide, and two arc-shaped recesses 7a are formed in the top edge of the front guide plate 7 such that the recesses 7a are spaced from each other and are symmetrical to each other in the cloth width direction.

[0025] The rear guide plate 8 is symmetrical in the left-right direction, and the slide plate 3b of the rearmost heald frame 3 slides along the rear guide plate 8. A bottom portion of the rear guide plate 8 is integrated with the rear stay 11 by being welded to a front surface of the rear stay 11 such that the rear guide plate 8 projects upward from the rear stay 11. An upper portion of the rear guide plate 8 is wide, and the thickness of the rear guide plate 8 at an upper edge portion 8b thereof is larger toward the rear than that of a lower portion. Two arc-shaped recesses 8a are formed in the top edge portion 8b at positions corresponding to the arc-shaped recesses 7a in the front guide plate 7. In addition, a plurality of internal screws 8c are formed in the top edge portion 8b at positions separated from each other in the cloth width direction.

[0026] The front guide plate 7 and the rear guide plate 8 are connected to each other with two shafts 18. More specifically, each of the shafts 18 includes an external thread portion 18a and a cylindrical portion 18b. The diameter of the cylindrical portion 18b is larger than that of the external thread portion 18a, and thus a step surface is formed at the boundary between the external thread portion 18a and the cylindrical portion 18b. The external thread portion 18a of each shaft 18 is fitted to the corresponding arc-shaped recess 7a in the front guide plate 7, and the cylindrical portion 18b of each shaft 18 is fitted to the corresponding recess 8a in the rear guide plate 8. Nuts 19 are screwed onto the external thread portions 18a of the shafts 18 and the front guide plate 7 is clamped between the step surfaces of the shafts 18 and the nuts 19. Thus, the shafts 18 are fixed to the front guide plate 7. In addition, the cylindrical portions 18b of the shafts 18 are clamped between the top edge portion 8b of the rear guide plate 8 and a shaft pressing member 23 fixed to the top edge portion 8b with bolts 37. Thus, the shafts 18 are fixed to the rear guide plate 8. More specifically, the shaft pressing member 23 has two arc-shaped grooves 23a formed therein at positions corresponding to the arc-shaped recesses 8a in the rear guide plate 8. The shaft pressing member 23 also has bolt holes 23b corresponding to internal threads 8c. The shaft pressing member 23 is placed on the rear guide plate 8 while the cylindrical portions 18b of the shafts 18 are fitted to the respective recesses 8a. In that state, the bolts 37 are inserted through the bolt holes 23b and are screwed into the internal threads 8c. Thus, the cylindrical portions 18b of the shafts 18 are clamped between the rear guide plate 8 and the shaft pressing member 23, and the shafts 18 are fixed to the rear guide plate 8. In this manner, the cylindrical portions 18b of the shafts 18 are fixed to the rear guide plate 8 at a desired position in the front-rear direction. In the present embodiment, to increase the rigidity of the connecting member 12 and to avoid interference with the slide plates 3b of the heald frames 3, the two shafts 18 are provided at positions separated from each other and spaced from the slide plates 3b in the cloth width direction. The shafts 18 extend in the front-rear direction at positions above the uppermost position of the upper frame portions 3a in the shedding motion.

[0027] The length of the long holes 4b and 5b formed in the side stands 4 and 5, respectively, are greater than that of the long holes 13b in the front stay holders 13. Therefore, an adjustable distance of the rear stay 11 in the front-rear direction is longer than that of the front stay 9. Thus, the position at which the front stay 9 is fixed can be finely adjusted to a position where the foremost heald frame 3 is as close as possible to the reed but does not interfere with the beating motion. In addition, the position where the rear stay 11 is fixed can be adjusted in accordance with the position of the rearmost heald frame 3 in the front-rear direction when the number of heald frames 3 is changed in accordance with the cloth to be woven.

[0028] Fig. 5 is a diagram corresponding to Fig. 2, illustrating the state in which the number of heald frames 3 is increased. The rear stay holder 15 is moved rearward toward the let-off section. As the rear guide plate 8 is moved rearward, the positions where the cylindrical portions 18b of the shafts 18 are connected to the rear guide plate 8 are also moved rearward.

[0029] In the present embodiment, the connecting member 12 for connecting the pair of stays 9 and 11 includes the two shafts 18, the shaft pressing member 23, the bolts 37, and the nut 19. The connecting member 12 also includes the two recesses 7a in the front guide plate 7, the two recesses 8a in the rear guide plate 8, and the three internal threads 8c. In the present embodiment, the cylindrical portions 18b of the shafts 18 are fixed to the rear guide plate 8 at a desired position in the front-rear direction. However, the structure may also be such that the cylindrical portions 18b are fixed to the front guide plate 7 at a desired position in the front-rear direction. In addition, according to the present embodiment, the cylindrical portions 18b of the shafts 18 are fixed to the rear guide plate 8 by being clamped between the rear guide plate 8 and the shaft pressing member 23. However, the structure may also be such that shaft through holes are formed in the rear guide plate 8 and the cylindrical portions 18b are fixed to the rear guide plate 8 with setscrews at a desired position in the front-rear direction. Alternatively, the shafts 18 may also have external threads at the end opposite to the external thread portions 18a, and two nuts may be screwed onto the external thread of each shaft 18 so as to clamp the rear guide plate 8 therebetween. In this case, the shafts 18 can be

fixed to the rear guide plate 8 at a desired position in the front-rear direction by adjusting the positions of the two nuts. Alternatively, a plurality of types of shafts 18 having different lengths may be prepared and the shafts 18 may be switched in accordance with the number of heald frames 3. The shafts 18 replaced by other shafts 18 and the newly attached shafts 18 both serve as components of the connecting member 12. Thus, the position at which the shafts 18 are connected to the rear guide plate 8 in the front-rear direction can be adjusted by switching the shafts 18.

[0030] In the present embodiment, the side stands 4 and 5 having the long holes 4b and 5b which extend in the front-rear direction are provided on the left and right frame members 1 and 2, respectively. The side stands 4 and 5 and the frame members 1 and 2 form the left and right frame structures. The side stands 4 and 5 are detachably fixed to the left and right frame members 1 and 2 with bolts. Therefore, a plurality of types of side stands 4 and 5 having long holes 4b and 5b formed at different positions in accordance with the number of heald frames 3 can be prepared for the frame members 1 and 2. In such a case, the length of the long holes 4b and 5b in the front-rear direction can be prevented from being increased. In addition, in the case where the number of heald frames 3 is small, the length of the side stands 4 and 5 in the front-rear direction can be prevented from being increased. For example, three types of side stands 4 and 5 may be respectively provided for the cases where the number of heald frames 3 is 4 to 10, 8 to 14, and 12 to 18. The side stands 4 and 5 are switched in accordance with the weaving specification.

[0031] Next, a vibration control apparatus 6 for heald frames according to a second embodiment of the present invention will be described with reference to Figs. 6 and 7. Fig. 6 is a side view corresponding to Fig. 2 showing the first embodiment, and illustrates a left side section seen from a central position in the cloth width direction. Fig. 7 is a plan view corresponding to Fig. 3 showing the first embodiment, and illustrates the left side section.

[0032] The side stand 4 has no long holes extending in the front-rear direction. Instead, a pair of circular bolt holes 4e is formed in the side stand 4. Bolts 33 are inserted through the bolt holes 4e, and are screwed into internal threads 15b formed in a side portion 15a of a rear stay holder 15. Thus, the side portion 15a of the rear stay holder 15 is fixed to the side stand 4. The rear stay holder 15 has a plurality of internal threads 15d formed in a top portion 15c thereof at a constant pitch in the front-rear direction. The rear stay holder 15 is provided at each end of the rear stay 11, and each end of the rear stay 11 is fixed to the rear stay holder 15 by inserting a bolt 40 through bolt holes 11a and screwing the bolt 40 into one of the internal threads 15d formed in the rear stay holder 15. Thus, the rear stay 11 is fixed to the frame members 1 and 2 with the rear stay holders 15 at the both ends thereof. The rear stay 11 is fixed to the frame members 1 and 2 such that the position thereof in the front-rear direction can be adjusted by moving the rear stay 11 in the front-rear direction and changing the internal thread 15d into which the bolt 40 is screwed at each end thereof. The constant pitch at which the internal threads 15d are arranged in the front-rear direction in the top portion 15c of each rear stay holder 15 is preferably equal to the arrangement pitch of the heald frames 3. In addition, similar to the first embodiment, long holes 4b that extend in the front-rear direction may be formed in the side stand 4 instead of the bolt holes 4e. In such a case, the number of heald frames 3 that can be arranged can be increased. Alternatively, a plurality of pairs of bolt holes 4e may be formed at different positions along the front-rear direction. Also in this case, the number of heald frames 3 that can be arranged can be increased.

[0033] The present invention is not limited to the above-described embodiments. For example, in addition to or instead of connecting the guide plates 7 and 8 to each other with the shafts 18, a pair of first connecting bodies may be provided on the stays 9 and 11 as well as the guide plates 7 and 8, and the first connecting bodies may be connected to each other. More specifically, a pair of first connecting bodies may be provided so as to extend upward from the front and rear stays 9 and 11, and be connected to each other with a second connecting body at an upper position where the connecting bodies do not interfere with the upper frame portions 3a of the heald frames 3. In this case, the second connecting body and the pair of first connecting bodies form the connecting member 12 according to the present invention.

Claims

1. A vibration control apparatus (6) for heald frames (3) of a loom, comprising a pair of guide plates (7, 8) disposed so as to face each other in a front-rear direction of the loom, the heald frames (3) being disposed between the guide plates (7, 8) so that vibration of the heald frames (3) in the front-rear direction is suppressed, wherein the vibration control apparatus (6) is **characterized in that**:

a pair of stays (9, 11) is provided so as to extend between left and right frame members (1, 2) of the loom, the stays (9, 11) being spaced from each other in the front-rear direction, provided with respective guide plates (7, 8), and connected to each other with a connecting member (12), at least the stay (11) disposed in rear of the other stay (9) is fixed to the left and right frame members (1, 2) such that the position of the stay (11) is adjustable in the front-rear direction, and
the connecting member (12) extends in the front-rear direction and at least one of connecting positions at which the connecting member (12) is connected to the stays (9, 11) is adjusted in the front-rear direction when the position of the stay

(11) disposed in rear of the other stay (9) is adjusted.

2. The vibration control apparatus (6) according to claim 1, wherein the stays (9, 11) are connected to each other with the connecting member (12) and the guide plates (7, 8) disposed therebetween.

3. The vibration control apparatus (6) according to claim 2, wherein one end of the connecting member (12) is fixed to one of the guide plates (7, 8), and the other end of the connecting member (12) is connected to the other one of the guide plates (7, 8) such that only the connecting position at which said other end of the connecting member (12) is connected to said other one of the guide plates (7, 8) is adjustable in the front-rear direction.

FIG. 1

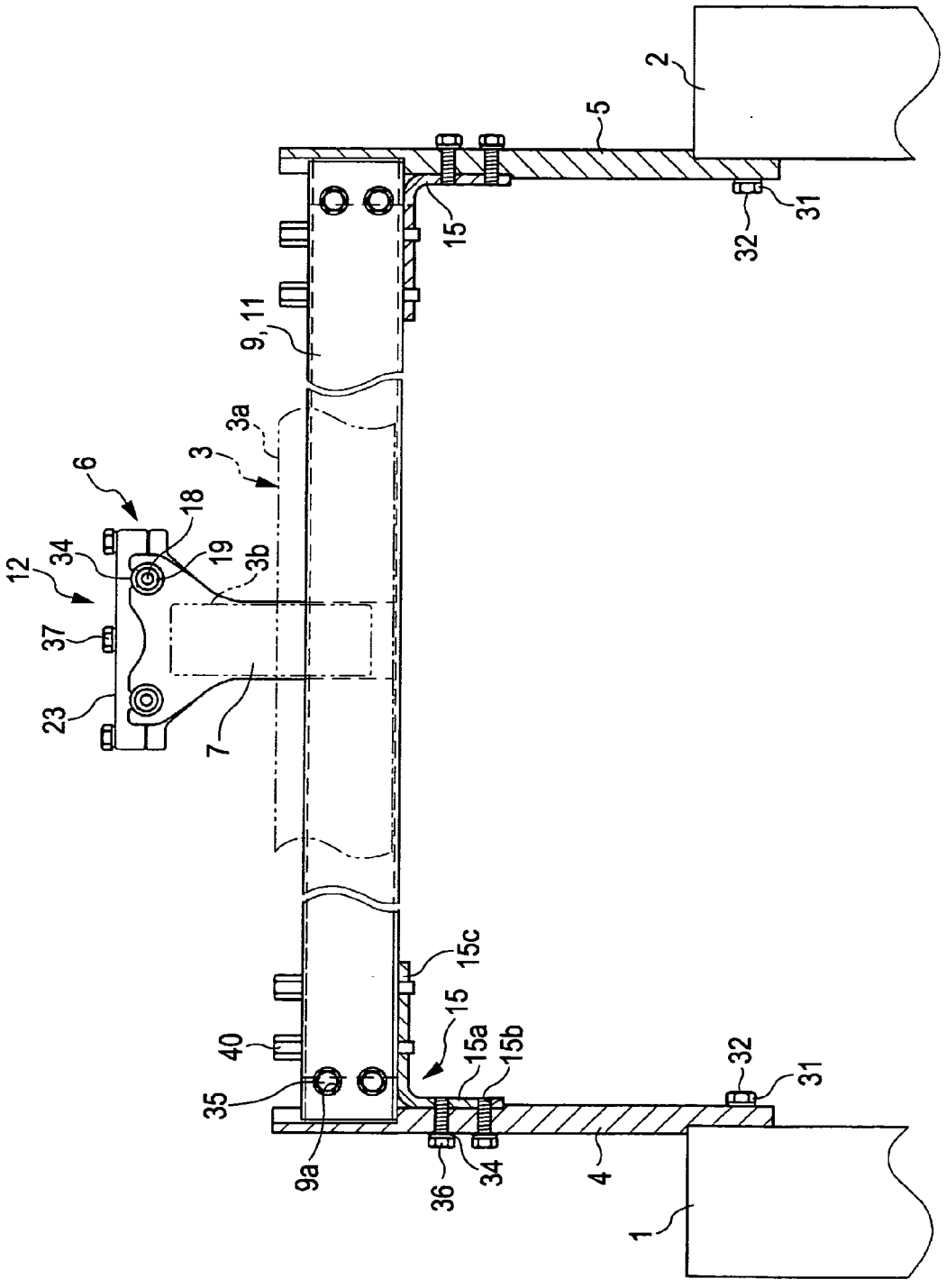
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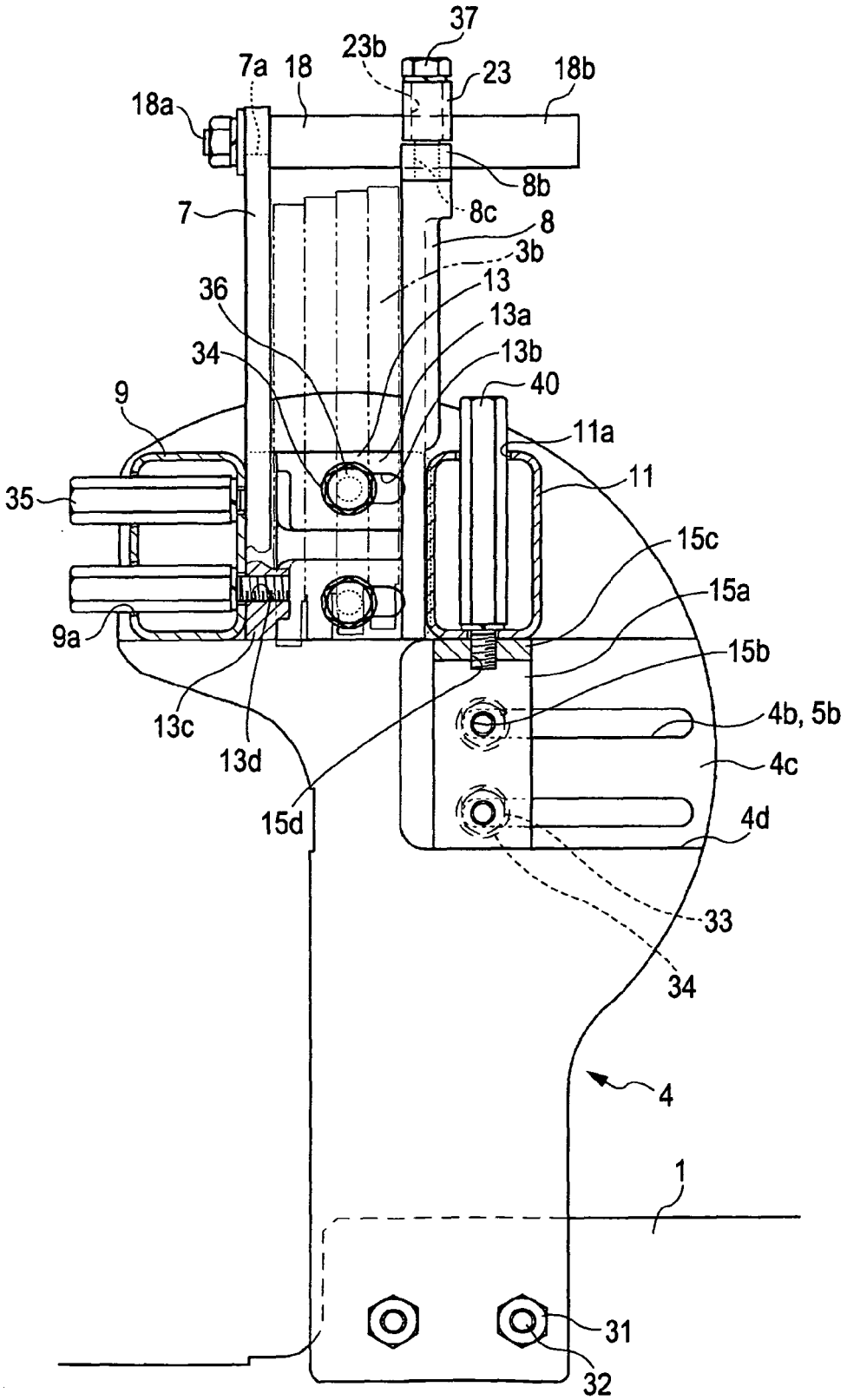
FIG. 2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13c
13d
4c
15d
4d
33
34
4
1
31
32

FIG. 3

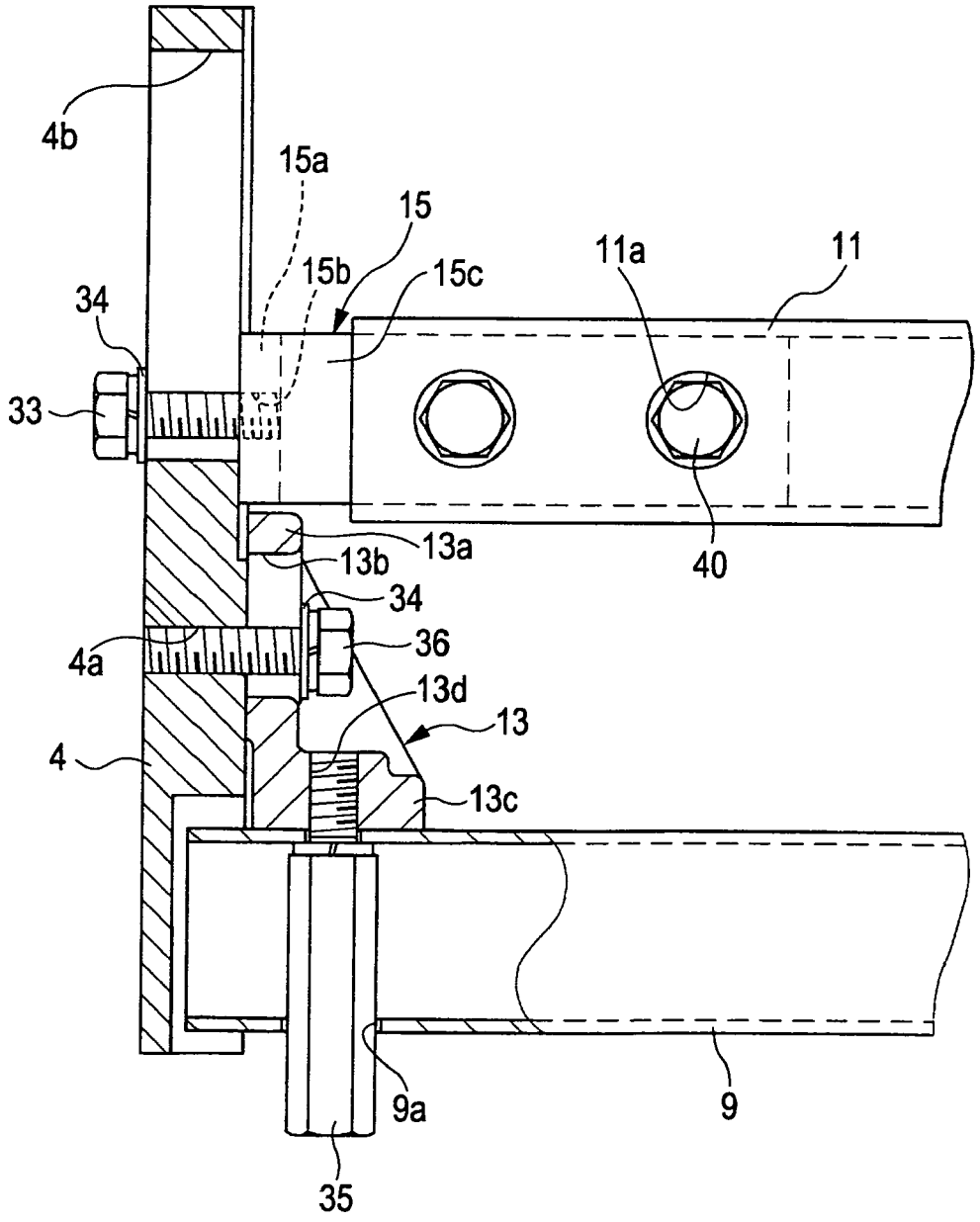

4b
15a
15
15b
15c
11a
11
34
33
13a
13b
34
40
36
4a
13d
13
4
13c
9a
9
35

FIG. 4

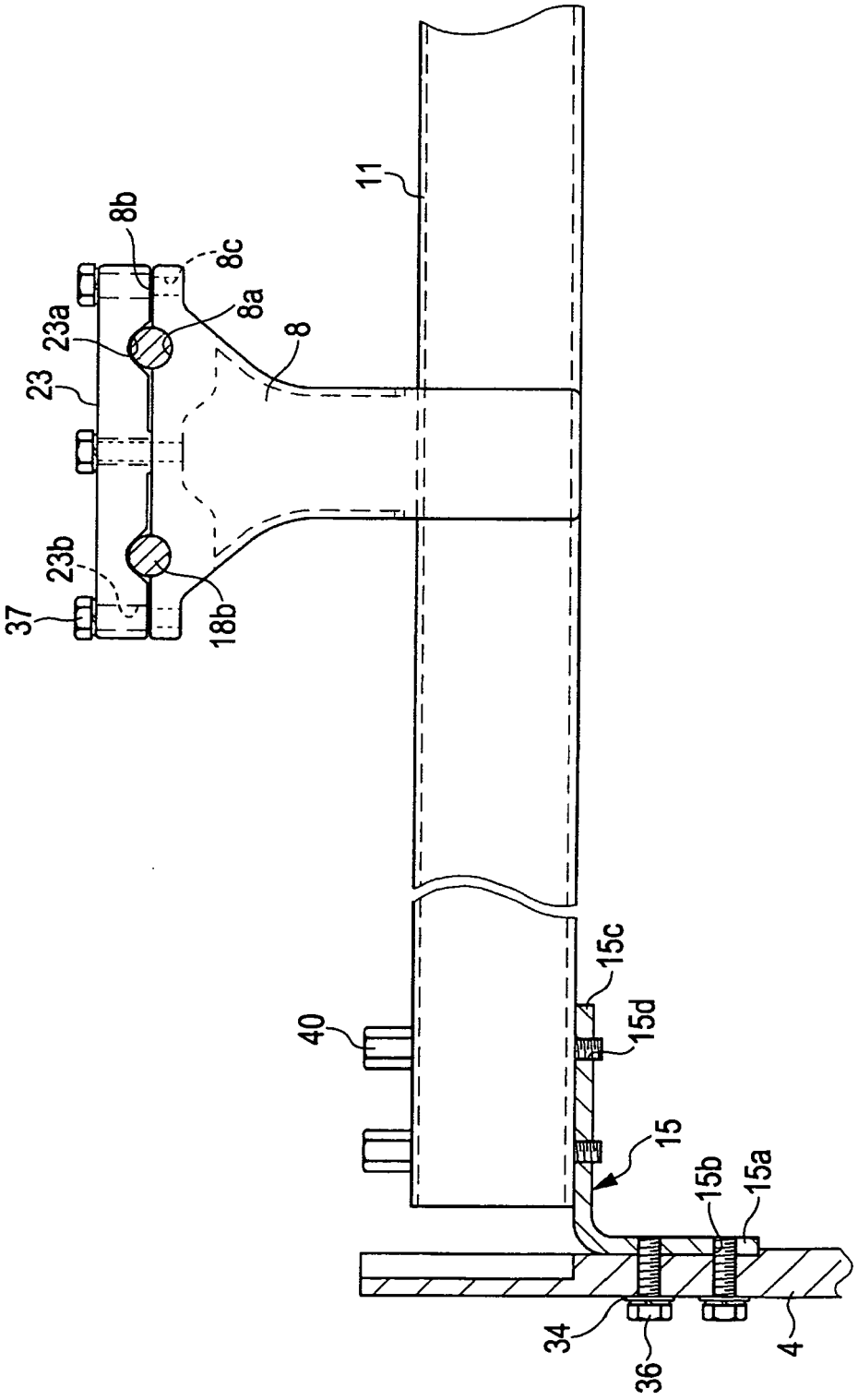


FIG. 5

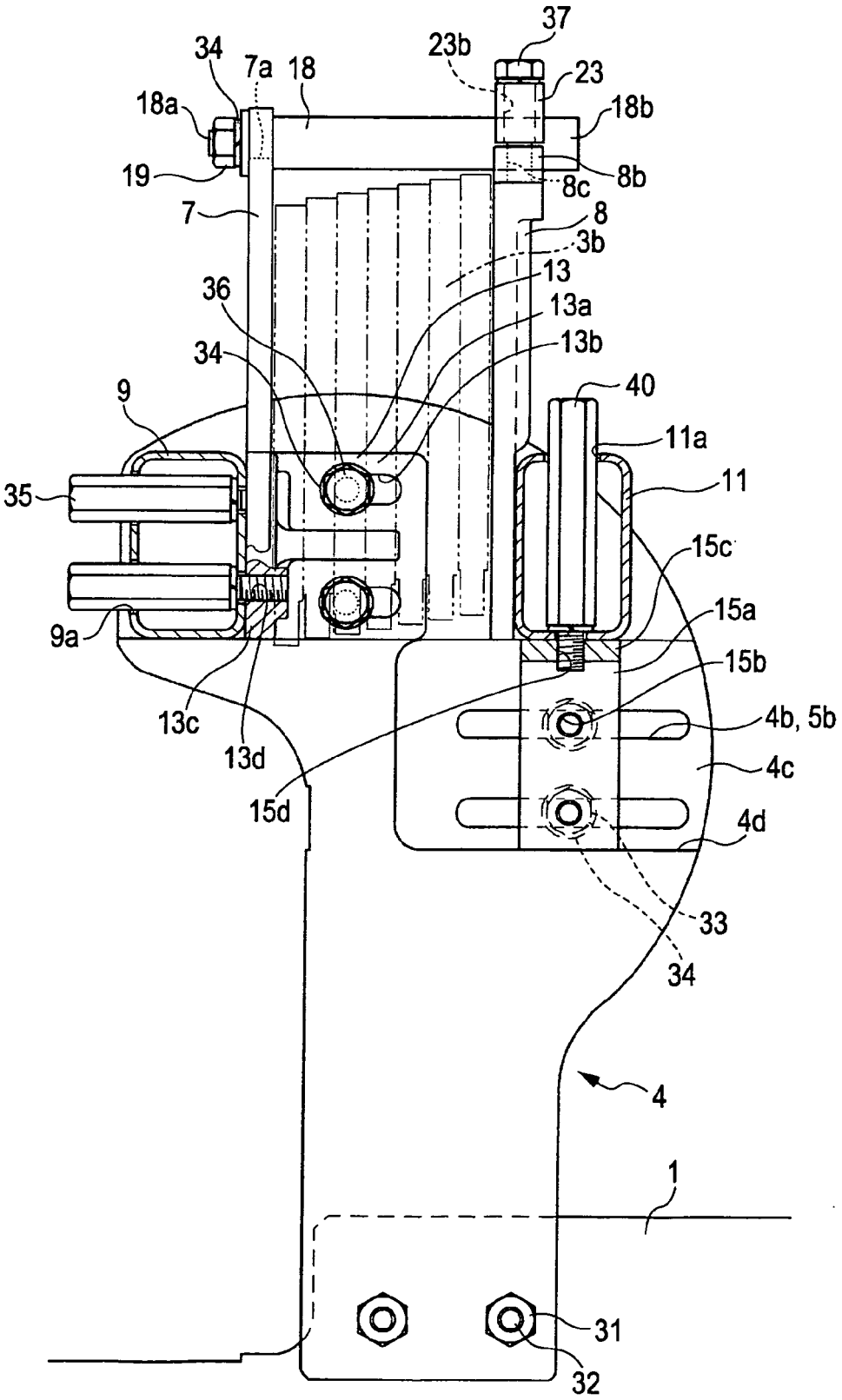

37
34
7a
18
23b
23
18a
18b
19
8c
8b
7
8
3b
13
36
13a
34
13b
9
40
11a
35
11
15c
15a
9a
15b
13c
4b, 5b
13d
4c
15d
4d
33
34
4
1
31
32

FIG. 6

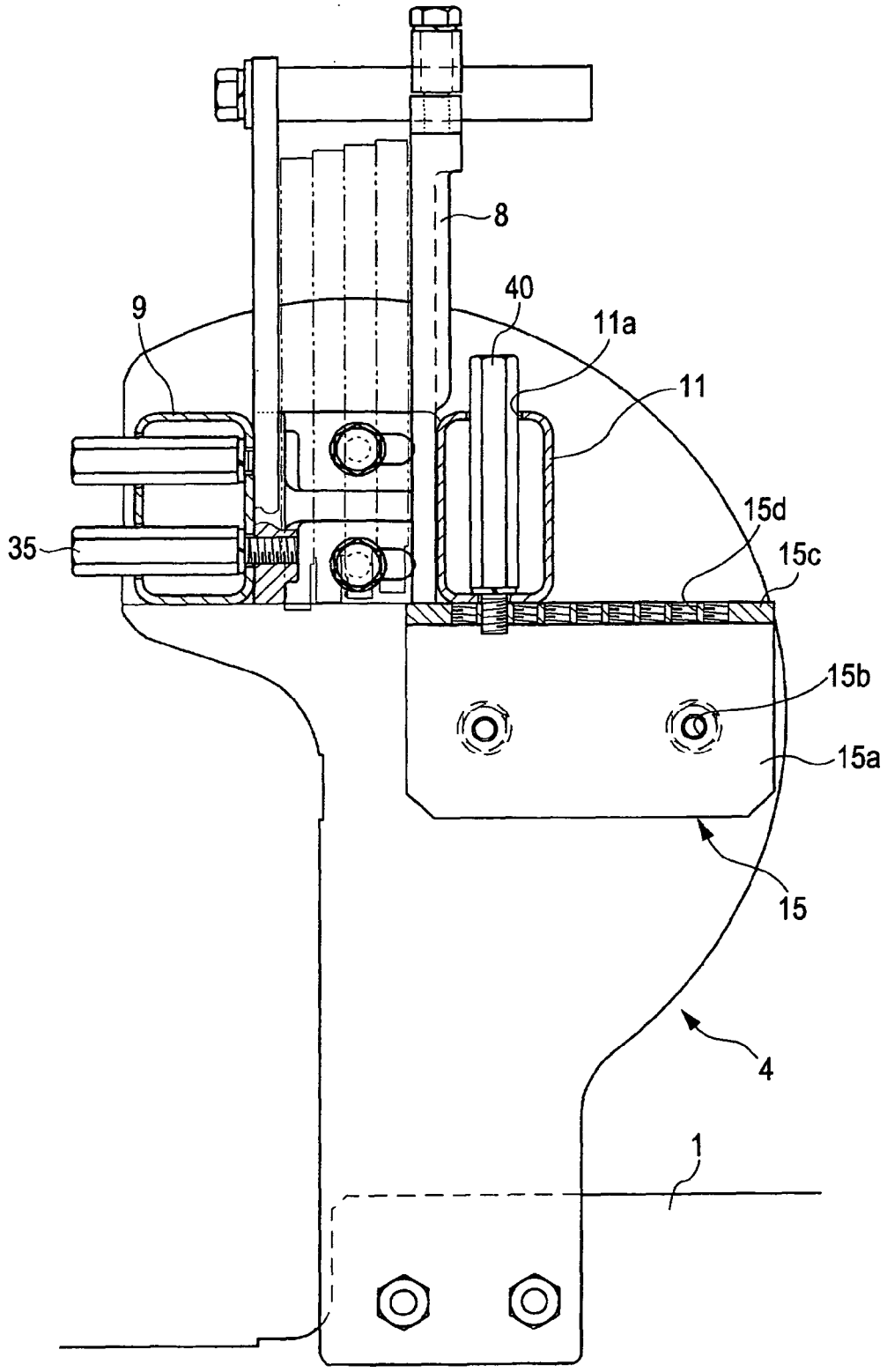
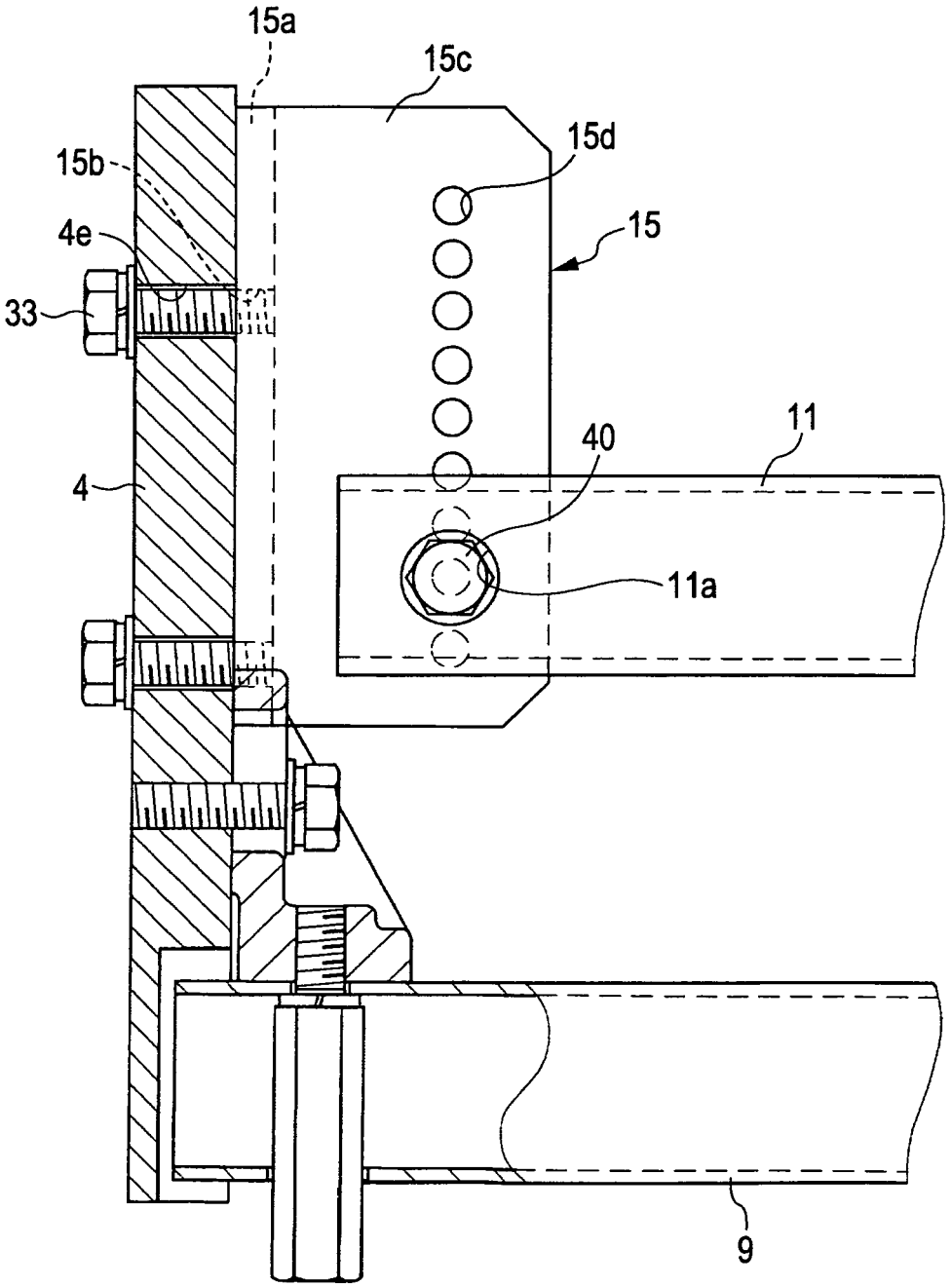


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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