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(54) SHEDDING DEVICE FOR LABELLING ON SELVEDGES OR ON FABRICS ON A WEAVING LOOM AND METHOD FOR ADJUSTING SUCH A SHEDDING DEVICE

(57) This shedding device, for labelling on selvedges or on fabrics on a weaving loom, comprises a beam meant for extending over the loom, parallel to its weft axis, and at least a Jacquard head (20). The Jacquard head comprises selectable hooks (202), driving means (208-214) for moving the selectable hooks between an upper position and a lower portion, the driving means comprising a main pulley (214), a harness (206) connected to the hooks and a harness support (203) for anchoring the harness. The shedding device also includes a main shaft (50) extending parallel to the beam for driving the main pulley (214) and a motor (312) for driving the main shaft. The Jacquard head (20) rests, via at least one pad (218), on at least one supporting rib (316) of the beam (30). Moreover, the main pulley (214) is fixed in rotation with the main shaft (50) and slidable along this shaft.

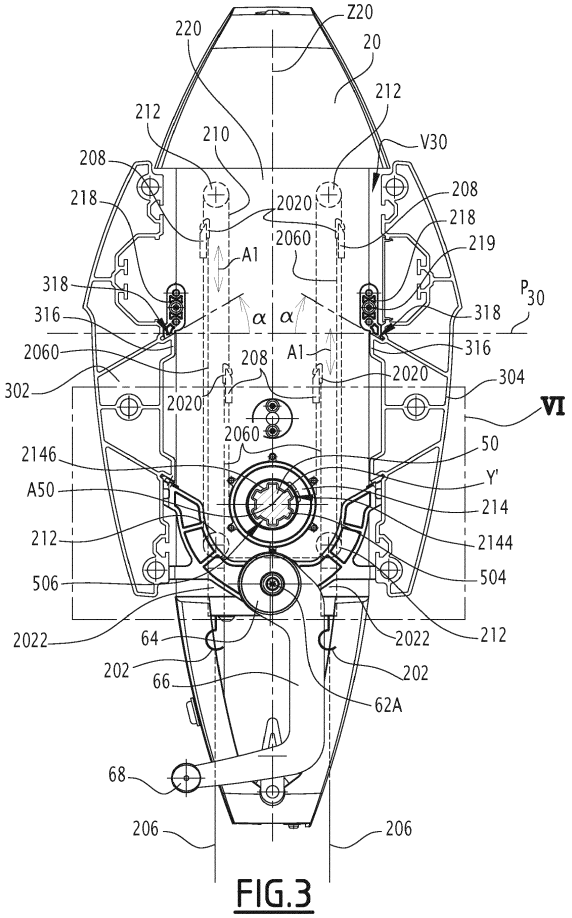

FIG.3

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] This invention relates to a shedding device for labelling on selvedges or on fabrics on a weaving loom. This invention also relates to a method for adjusting, along the weft direction of a weaving loom, the position of a Jacquard head of a shedding device.

BACKGROUND OF THE INVENTION

[0002] In the field of weaving, it is known to use one or several Jacquard heads for selvedge labelling of a fabric woven on a loom. Such a Jacquard head is known from FR-A-2 677 380 and includes selectable hooks driven by knives between an upper position and a lower position. This head includes a main pulley, which drives a belt for moving the knives with an alternative vertical translational movement.

[0003] Such a Jacquard head may also be used for weaving narrow fabrics, such as ribbons.

[0004] Usually, one or several Jacquard heads are supported by a beam above the loom and they are driven by a main shaft. Such is the case for the Staubli CX 172 Jacquard shedding device which has proven highly efficient and reliable. In particular, the main pulley of each Jacquard head is locked on the main shaft which is driven by a crank mechanism powered by an electric motor. The continuous rotation of the output shaft of the electric motor is transformed by the crank mechanism into an alternative motion of the main shaft, which is transmitted by the main pulley and the associated belt, to the knives of each Jacquard head.

[0005] Because several fabrics or ribbons can be woven on a given loom, it is sometimes necessary to adapt the position of the Jacquard heads to the actual width of a fabric or to the position of different ribbons woven on the loom.

[0006] With the Staubli CX 172 Jacquard shedding device, when it is necessary to adjust the position of the Jacquard heads along the weft axis, each Jacquard head is driven to an opened position and the crank mechanism is indexed, that is locked in position with one or several pins. Then, the Jacquard head kinematics is also indexed with one or several other pins. The Jacquard head kinematics is then loosened from the main shaft and the Jacquard head is loosened from the beam. Thereafter, the Jacquard head can be moved along the beam, that is along the weft axis.

[0007] This process is overall complex, long and needs a qualified manpower, in particular because it requires indexation of the crank mechanism and of the kinematics of each Jacquard head. Fine adjustment of the position of the Jacquard heads is not easy.

SUMMARY OF THE INVENTION

[0008] This invention aims at solving this problem with a new shedding device where the position of a Jacquard head along the weft direction of the loom can be easily and quickly adjusted, without requiring indexation of some moving parts.

[0009] To this aim, the invention relates to a shedding device for labelling on selvedges or on fabrics on a weaving loom, this shedding device comprising:

- a beam meant for extending over the loom, parallel to its weft axis;
- at least a Jacquard head, this Jacquard head comprising:
  - selectable hooks;
  - driving means for moving the selectable hooks between an upper position and a lower portion, the driving means comprising a main pulley;
  - a harness connected to the hooks;
  - a harness support for anchoring the harness;
- a main shaft for driving the main pulley in rotation, the main shaft extending parallel to the beam; and
- a motor for driving the main shaft.

[0010] According to the invention, the Jacquard head rests, via at least one pad, on at least one supporting rib of the beam and the main pulley is fixed in rotation with the main shaft and slidable along this shaft.

[0011] Owing to the invention, the position of the Jacquard head along the weft axis can be adjusted by sliding the main pulley along the main shaft, while keeping this pulley fixed in rotation with this shaft. Thus, it is no more necessary to index a crank mechanism and the Jacquard head kinematics prior to moving the Jacquard head parallel to the weft direction of the loom.

[0012] According to advantageous but optional aspects of the invention, such a shedding device may incorporate one or several of the following features, considered in any technically allowable combination:

- The main shaft and the main pulley are splined, with matching splines, and the shaft is inserted in a central bore of the pulley.
- The Jacquard head is provided with a quick locking mechanism for locking the Jacquard head along the beam and the Jacquard head is slidable along the beam when the quick locking mechanism is not active.
- The quick locking mechanism includes a clamp reversibly movable with respect to a frame of the Jacquard head between a first locked position, where the beam is pinched between the pad and the clamp, and a second released position, where the clamp does not brake a sliding movement of the Jacquard head along the beam.

- In its first position, the clamp pushes a locking rib of the beam from underneath.
- The quick locking mechanism includes an eccentric which drives, or constitutes, the clamp.
- An arm of the clamp is equipped with an elastic pad which is compressed between a longitudinal surface of the beam and the clamp, when the clamp is its first locked position.
- The clamp moves vertically with respect to the frame of the Jacquard head, between its first locked position and its second released position.
- The clamp is driven, between its first locked position and its second released position, and vice-versa, by an eccentric rotatably mounted on the Jacquard head and articulated within a nut movable in an horizontal groove of the clamp.
- The clamp is formed by an eccentric rotatably mounted on the Jacquard head and having an external surface which pushes on the beam in the first locked position of the clamp and which is separated from the beam by a gap in the second released position.
- The beam includes two crossbeams and the Jacquard head is mounted between these crossbeams and rests, via at least one pad, on a supporting rib of each crossbeam.
- The beam includes at least one crossbeam defining a supporting rib, each supporting rib has a longitudinal surface receiving the pad and this longitudinal surface forms, with respect to an horizontal plane, an angle between 0° and 45°, preferably between 10° and 30°. In such a case, preferably, the crossbeam also defines a locking rib, each locking rib has a longitudinal surface receiving a clamp and this longitudinal surface forms, with respect to an horizontal plane, an angle between 0° and 45°, preferably between 10° and 30°
- The beam includes a single crossbeam, the Jacquard head extends above and along two lateral sides of the crossbeam and a clamp of a quick locking mechanism is located underneath the crossbeam.

[0013] This invention also relates to a method for adjusting, along the weft direction of the weaving loom, the position of at least one Jacquard head of a shedding device as mentioned here-above and comprising a quick locking mechanism, this method including at least the following steps:

a) releasing the quick locking mechanism;
b) sliding the Jacquard head along the beam, while keeping the main pulley fixed in rotation with the main shaft; and
c) switching the quick locking mechanism in an applied configuration, where it locks the Jacquard head on the beam.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The invention will be better understood and other advantages thereof will appear more clearly upon reading of the following description of two embodiments of a shedding device and a method according to its principle, provided solely as an example and made in reference to the appended drawings in which:

- figure 1 is a perspective view of a shedding device according to a first embodiment of the invention mounted on a weaving loom;
- figure 2 is a perspective view of the shedding device of figure 1, where two crossbeams and a cover of a lateral plate have been removed;
- figure 3 is a cross section view taken perpendicularly to the weft axis of the loom, along plane III on figure 1, with a quick locking mechanism of the Jacquard head in a released configuration;
- figure 4 is a side view similar to figure 3 with the locking mechanism in applied configuration;
- figure 5 is a partial perspective view of the locking mechanism of the Jacquard head of figures 3 and 4;
- figure 6 is a detailed view corresponding to detail VI on figure 3, where a lever of the locking mechanism and the main pulley have been removed;
- figure 7 is a detailed view similar to figure 6, when the locking mechanism is in applied configuration; in other words, figure 7 corresponds to detail VII on figure 4;
- figure 8 is partial cut view along line VIII-VIII on figure 7;
- figure 9 is a side view, similar to figure 3 of a Jacquard head belonging to a shedding device according to a second embodiment of the invention, with its locking mechanism in a released configuration and
- figure 10 is a side view similar to figure 9, of the same Jacquard head, with the locking mechanism in applied configuration.

[0015] A weaving loom L is partially represented on figure 1 and includes a set of heddle frames 2 equipped with heddles 4 adapted for creating a shed with warp yarns 6 coming from a non-represented thread reel. A fabric F is woven on loom L.

[0016] In loom L, warp yarns 6 extend globally parallel to a longitudinal axis X of the loom and non-represented weft yarns are inserted parallel to a transverse axis Y. Axes X and Y are perpendicular to each other and globally horizontal. Axis Y is the weft axis of loom L. Heddle frames 2 are vertical and parallel to weft axis Y.

[0017] A shedding device 10 is used for weaving two selvedges S1 and S2 onto lateral edges of fabric F. Preferably, these selvedges S1 and S2 include a marking of fabric F, realized by the pattern obtained with the warp and weft yarns in each selvedge.

[0018] In this example, shedding device 10 includes two Jacquard heads 20 and a beam 30 formed of a first

crossbeam 302 and a second crossbeam 304 extending on either side of an axis Y' parallel to and located above axis Y. Preferably the two crossbeams 302 and 304 have the same geometry and they are made from the same aluminium profile. At their respective ends, 302A, 302B, 304A and 304B, crossbeams 302 and 304 are mounted on two plates 306 and 308 hidden behind respective covers 310. The two Jacquard heads 20 are located within an inner volume V30 of beam 30 defined between crossbeams 302, 304 and plates 306 and 308. Axis Y' is the longitudinal axis of this volume V30.

[0019] On figure 2, only shedding device 10 is represented. Moreover, 302 and 304 and the cover 310 associated with plate 308 are removed, in order to show some other components of shedding device 10.

[0020] In this example, the two Jacquard heads 20 are identical. Thus, unless otherwise specified, the description of one Jacquard head applies to the other Jacquard head. Herebelow, on describes in more details the Jacquard head 20 represented on the right of figures 1 and 2.

[0021] This Jacquard head 20 includes seventy-two selectable harness hooks 202 each connected to a heddle 204 by a harness cord 206. On figures 1 and 2, only one heddle 204 and three harness cords are represented below each Jacquard head 20 but, in practice, a larger number of such heddles and harness cords 206 is present. Harness cords 206 together form a harness H of loom L associated with each Jacquard head 20.

[0022] Each Jacquard head 20 has a frame 220 and is provided with a harness support 203 extending down from its frame 220 and which supports an anchoring plate 205 where a spring 207 extending down from each heddle 204 is anchored. Such a spring 207 pulls downwardly on the associated heddle 204, against the lifting action of the corresponding harness cord 206.

[0023] Non-represented selection means, such as electromagnets, are located within each Jacquard head 20 in order to hold selected hooks 202 in their upper positions, depending on the pattern to be realized on the selvedges S1 and S2 of fabric F, for labelling.

[0024] The hooks 202 are shown on figure 3 only. Each hook 202 is suspended to a pulley block 2022. Two selectable hooks 2020 lying on two opposite knives 208 moved in phase opposition between a top and a bottom positions are joined by a cord 2060 which wraps around a non-represented pulley of the pulley block 2022. Parts 208, 2020, 2022 and 2060 are shown in dotted lines, on figure 3 only, since they are included within frame 220. Every picks, a knife 208 arrives in a top position and, depending on the activation of an electromagnet, the hook 2020, can be retained in the top position or free to follow the knife 208 toward a bottom position. The respective knives 208 are fixed on a belt 210 which goes around several idle pulleys 212 and is driven by a main pulley 214. Parts 208-214 constitute the kinematics portion of Jacquard head 20.

[0025] Other constructions can be considered for driving the selectable hooks 202 of each Jacquard head 20 with a vertical alternative motion.

[0026] For the sake of clarity, the lateral face of Jacquard head 20 facing plate 308 has been represented as blank on figure 3, in order to better show some of its inner components 202-212 in dotted lines. Its actual geometry is visible on figures 2 and 4.

[0027] Plate 308 supports an electric motor 312 connected by a crank mechanism 314 to a main shaft 50 which extends parallel to axis Y' within volume V30, from plate 308 towards plate 306, with its free end 502 located in the immediate vicinity of plate 306. For instance, the distance between plate 306 and free end 502 measured parallel to axis Y' can be less than 50 mm. Alternatively, the main shaft 50 can extend to the plate 306 and have a bearing in the plate 306. Crank mechanism 314 includes a rod 313 articulated, on the one hand, to a wheel 315 driven by electric motor 312 and, on the other hand, to a lever connected to main shaft 50. Crank mechanism 314 converts the continuous rotational movement of the output shaft of motor 312 into an alternative rotation movement of main shaft 50 around its longitudinal axis A50.

[0028] In practice, the longitudinal axis A50 of main shaft 50 is superimposed with axis Y'.

[0029] Main shaft 50 is splined. In other words, the outer peripheral surface of main shaft 50 is provided with longitudinal ribs 504 separated by longitudinal grooves 506.

[0030] On the other hand, main pulley 214 has a splined central through bore 2140 provided with inner longitudinal ribs 2146 and inner longitudinal grooves 2144.

[0031] The geometries of ribs 504 and grooves 2144, on the one hand, and ribs 2146 and grooves 506, on the other hand, are complementary. Thus, main shaft 50 can be engaged within the central bore 2140 of the main pulley 214 of each Jacquard head 20, in such a way that this main pulley 214 is fixed in rotation with the main shaft 50, by cooperation of the splines, while remaining slidable along this shaft.

[0032] Using splined main shaft 50 and main pulley 214 is easy and economical to implement.

[0033] Each crossbeam 302 or 304 has a supporting rib 316 for supporting the two Jacquard heads 20.

[0034] Z20 denotes a vertical central axis of a Jacquard head 20.

[0035] 318 denotes a longitudinal upper surface of a rib 316. Longitudinal surfaces 318 are oriented upwardly. P_{30} denotes a horizontal plane defined by beam 30 and passing through an internal edge of each longitudinal surface 318, this internal edge being the closest one to axis Z20.

[0036] Longitudinal surfaces 318 are not horizontal. They converge together towards the top of volume V30 and axis Z20. α denotes an angle between a surface 318 and plane P_{30}, oriented from plane P_{30} towards a line prolonging this surface 318 towards the opposite crossbeam. According to the design chosen for crossbeams

302 and 304, this angle α can be between 0 and 45°, preferably between 10° and 30°. In this example, since longitudinal surfaces 318 are not horizontal, this angle is non-zero.

[0037] Two pads 218 are provided on the longitudinal side of the frame 220 visible on figure 2, in order to allow this Jacquard head to rest and slide on the longitudinal surface 318 of the supporting rib 316 of crossbeam 302. In the example, each pad 218 is mounted on the frame 220 of a Jacquard head 20 by a screw 219.

[0038] Two other pads 218 are provided on the opposite longitudinal side of the frame 220, hidden on figure 2, only one of them being visible on figure 2.

[0039] In the example of figures 1 to 8, each pad 218 is mounted next to an edge between a longitudinal side of the frame 220, parallel to axis Y', and end plate 222 of this frame, perpendicular to axis Y'. Alternatively, the pad(s) 218 can also be located between these two edges, on the longitudinal side of frame 220.

[0040] Thanks to the cooperation of pads 218 and longitudinal support surfaces 318 of supporting ribs 316, each Jacquard head 20 is slidably movable on crossbeams 302 and 304, along axis Y'. This sliding movement is not hindered by the transmission of movement between main shaft 50 and main pulley 214, insofar as these splined main shaft and main pulley remain in engagement with each other, thus fixed in rotation one with respect to the other, irrespective of the position of a Jacquard head 20 along axis Y', within volume V30.

[0041] Thus, adjustment of the position of the Jacquard heads 20 in the direction of axis Y', parallel to the weft axis Y, is fast and easy. In particular, it does not require indexation of the crank mechanism 314 or the internal components 208-212 which form the kinematics of the Jacquard head, in order to hold the knives 208 in position.

[0042] According to an advantageous feature of the invention, each Jacquard head 20 is provided with a quick locking mechanism 60 which includes a locking shaft 62 extending parallel to axis Y' and articulated on the two opposite end plates 222 of the Jacquard head frame 220. At each of its ends 62A and 62B, this locking shaft 62 is assembled to an eccentric 64 and to a lever 66. The two levers are joined by a handle 68 formed by a rod extending parallel to axis Y', outside of frame 220.

[0043] Each eccentric 64 is articulated within a nut 70 having an upper flat surface 70A and a lower flat surface 70B, these two flat surfaces being parallel to each other. Each nut 70 is received within a transversal groove 72A of a clamp 72, which is oblong, with its main axis horizontal. As shown by the comparison of figures 6 and 7, where pulley 214 is omitted for the sake of clarity, nut 70 can slide horizontally within groove 72A.

[0044] Each clamp 72 has two arms 72B and 72C and two heels 72D and 72E. Heels 72D and 72E cooperate with some vertical surfaces 320 of crossbeams 302 and 304 in order to guide clamp 72 in the vertical translational movement explained here-below.

[0045] Each crossbeam 302 is provided with a locking rib 326 defining a longitudinal surface 328. Longitudinal surfaces 328 are oriented downwardly. P'_{30} denotes a horizontal plane defined by beam 30 and passing through the internal edge of the two longitudinal surfaces 328, this internal edge being defined as the one of a surface 3018.

[0046] The two surfaces 328 of the two crossbeams 302 and 304 are oriented in an opposite direction with respect to their surfaces 318. Longitudinal surfaces 328 are not horizontal. They converge together towards the bottom of volume V30 and axis Z20. β denotes an angle between a surface 328 and plane P'_{30}, oriented from plane P'_{30} towards a line prolonging this surface 328 towards the opposite crossbeam. According to the design chosen for crossbeams 302 and 304, this angle β can be between 0 and 45°, preferably between 10° and 30°. In this example, since longitudinal surfaces 328 are not horizontal, this angle is non-zero.

[0047] An elastic pad 74 is mounted on the free end of each arm 72B and 72C.

[0048] In the first locked position represented on figures 4, 7 and 8, handle 68 has been moved upwardly, in close proximity to the frame 220 and the two eccentrics 64 of quick locking mechanism 60 act on nut 70. Thus, locking shaft 62 is centered within horizontal groove 72A and located in a lower portion of a vertical groove 72F of each clamp 72. In this configuration, the two clamps 72, located next to the two ends 62A and 62B of locking shaft 62, are move upwardly and elastic pads 74 are firmly pressed against longitudinal surfaces 328 of locking ribs 326, which immobilizes Jacquard head 20 on crossbeams 302 and 304, along axis Y'.

[0049] In the second released position represented on figures 3 and 6, handle 68 has been brought downwardly, which implies that the rotation of the two eccentrics 64 made nut 70 move to the left on figure 6, within horizontal groove 72A, and locking shaft 62 is located in a higher portion of grooves 72F, thus bringing clamps 72 and pads 74 downwardly, away from longitudinal surfaces 328. In this configuration, the locking mechanism is released, insofar as it does not brake Jacquard head 20 on surfaces 328. Thus, a sliding movement of Jacquard head 20 along axis Y' is possible.

[0050] The use of elastic pads 74 allows for compensating any play between clamps 72 and longitudinal surfaces 328 in the first locked position of quick locking mechanism 60 and also to adapt to a case where movement of the eccentrics 64 within the nuts 70 would induce an over-travel of the clamps 72 in the upward direction.

[0051] Nevertheless, elastic pads 74 are optional and may be omitted.

[0052] In order to facilitate detection of the locked position of quick locking mechanism 60 on figures 4, 7 and 8, on the one hand, and of its released position on figures 3 and 6, on the other hand, some balls 76 are installed in respective housings 72G provided on each clamp 72. These balls are sized and located in order to partially engage within slots 66A provided on each lever 66, when

these slots come in alignment with the balls 76 and the housings 72G. Non-represented elastic means, such as springs, elastically urge the balls 76 into the slots 66A. Thus, when handle 68 is in the position of figure 3, two slots 66A are in alignment with housings 72G, so that the balls 76 can be engaged between these slots. In the other configuration of figure 4, the same balls are engaged within the other two slots 66A. Thus, when levers 66 and handle 68 are held in the first locked position or in the second released position, the balls 76 create a hard spot sensible for the user, when leaving either the first locked position or the second released position of the quick locking mechanism 60.

[0053] Balls 76 are not represented on figures 6 and 7.

[0054] In the locked position of the quick locking mechanism 60, each crossbeam 302 or 304 is pinched between pads 218 and 74, which guarantees a safe and permanent immobilization of the Jacquard head 20 on this crossbeam. Angles α and β contribute to this immobilization effect. Moreover, since the two crossbeams are pinched between pads 218 and 74 on the front and back longitudinal sides of the frame 220, immobilization of a Jacquard head 20 in the locked position of the quick locking mechanism is even more efficient.

[0055] In this embodiment, the two clamps 72 located at each end 62A or 62B of the locking shaft have a translational vertical movement between their first locked position, corresponding to the applied configuration of the quick locking mechanism 60, and their second released position, corresponding to the non-active configuration of this mechanism.

[0056] In the second embodiment of the invention represented on figures 9 and 10, the same elements as in the first embodiment have the same references. Hereafter, one describes mainly the differences between this second embodiment and the first embodiment.

[0057] On figures 9 and 10, an end cover of the Jacquard head 20 has been removed, thus allowing visualization of its internal kinematics.

[0058] In the second embodiment, the main pulley 214 is provided with two teeth 2146 which cooperate with corresponding longitudinal grooves 506 of the main shaft 50. Splined main shaft 50 and main pulley 214 are also used is this embodiment, but with a different geometry.

[0059] As in the first embodiment, a belt 210 driven by the main pulley 214 goes over four idle pulleys 212 and drives some knives 208 in order to move selectable hooks 202 with a vertical alternative motion. These selectable hooks 202 are suspended to pulley blocks 2022, themselves suspended to cords 2060 driven by hooks 2020 lying on knives 208, as in the first embodiment. Here again, parts 208, 2020, 2022 and 2060 are represented in dotted lines on figure 9 only, since they are included within the frame 220 of Jacquard head 20.

[0060] In this embodiment, beam 20 is made of a single crossbeam 302, which defines an upper supporting rib 316 and a lower locking rib 326.

[0061] A slidable pad 218, mounted on a frame 220 of the Jacquard head, rests on a longitudinal upper surface 318 and defined by supporting rib 316. Actually several pads 218 may be provided over the longitudinal dimension, parallel to axis Y', of the Jacquard head frame 220.

[0062] A quick locking mechanism 60 includes a locking shaft 62 articulated on two end plates 222 of the Jacquard head 20, an eccentric 64 mounted at each end of the locking shaft 62, a lever 66 fast with the locking shaft and an handle 68.

[0063] The outside helix surface 64A of each eccentric 64 is supposed to directly interact with a longitudinal lower surface 328 defined by the locking rib 326 in the locked configuration of the quick locking mechanism. Longitudinal lower surface 328 receives helix surface in abutment in the locked configuration of quick locking mechanism 60. In other words, in this second embodiment, a clamp 72 is formed by each eccentric 64 and this clamp moves in rotation between its first locked position and its second released position, instead of in translation as in the first embodiment.

[0064] Thus, in this second embodiment of the invention, Jacquard head 20 extends above and along two lateral sides 302A and 302B of crossbeam 302 and the clamps 72 formed by eccentrics are located underneath this crossbeam.

[0065] In this embodiment, the two longitudinal surfaces 318 and 328 of the crossbeam 302, respectively interacting with the slidable pads 218, on the one hand, and with the clamp 72, on the other hand, are parallel to each other and horizontal.

[0066] In the released configuration of the quick locking mechanism 60 represented on figure 9, a vertical gap G exists between helix surface 64A of clamp 64-72 and locking rib 326. Thus, locking mechanism 60 does not oppose a translational movement of Jacquard head 20 along axis Y', this movement being possible thanks to pad 218 sliding on supporting rib 316.

[0067] In the locked configuration of figure 10, handle 68 has been rotated by 90° around the longitudinal axis of locking shaft 62, with respect to its position on figure 9 and in the clockwise direction, which has brought surface 64A into firm contact with locking rib 326, from underneath, thus blocking any displacement of Jacquard head 20 along axis Y'.

[0068] In the two embodiments of the invention, in the applied configuration of the quick locking mechanism 60 a crossbeam 302, and possibly two crossbeams 302 and 304, is/are pinched between the pads 218 born by the Jacquard head 20 and the clamp 72 of the quick locking mechanism, possibly equipped with one or several elastic pads 74. In this applied configuration, the clamp 72 pushes upwardly the locking rib 326 of each crossbeam 302 or 304, via a vertical effort exerted, from underneath, on the corresponding longitudinal surface 328.

[0069] In the two embodiments of the invention mentioned, when it is necessary to adjust the position of a Jacquard head 20 along the weft direction Y of weaving loom L, one starts by releasing the quick locking mech-

anism 60, by moving its handle 68 towards the position represented on figure 3 in the first embodiment or on figure 9 in the second embodiment. This occurs by rotation of handle 68 around the central axis of locking shaft 62, in the anti-clockwise direction on figures 3, 4, 6, 7, 9 and 10.

[0070] Then, one can slide the Jacquard head 20 along the beam 30 while keeping the main pulley 214 fixed in rotation with the main axis 50, by cooperation of the splines, ribs or teeth, 2146 or 504 with the splines or grooves 2144 or 506 of members 214 and 50. When the right position of this Jacquard head 20 has been reached, along the weft direction, it can be firmly immobilized on the beam 30 by switching the quick locking mechanism 60 back in an applied configuration, where it locks the Jacquard head 20 on the beam 30. This occurs by rotation of handle 68 around the central axis of locking shaft 62, in the clockwise direction on figures 3, 4, 6, 7, 9 and 10.

[0071] The invention is represented on the figures in case the shedding device includes two Jacquard heads. However, the number of Jacquard heads can be equal to one or larger than or equal to three.

[0072] Irrespective of the embodiment of the invention, the pad 218 is advantageously made from a material with a low friction coefficient with the material of the beam 30. For instance, this pad 218 can be made of plastic material, such as PEEK. Alternatively, this pad can be made by a roller.

[0073] According to a non-represented embodiment of the invention, the beam 30 might have a single crossbeam 302 with inclined surfaces, as in the first embodiment, and the Jacquard heads can be mounted on this crossbeam in a cantilever manner.

[0074] The embodiments and variants mentioned here-above can be combined in order to generate new embodiments of the invention.

Claims

1. Shedding device (10) for labelling on selvedges (S1, S2) or on fabrics on a weaving loom (L), the shedding device comprising:

   - a beam (30) meant for extending over the loom, parallel to its weft axis (Y);
   - at least a Jacquard head (20), the Jacquard head comprising:

     • selectable hooks (202);
     • driving means (208-214) for moving the selectable hooks between an upper position and a lower portion, the driving means comprising a main pulley (214);
     • a harness (H) connected to the hooks; and
     • a harness support (203) for anchoring the harness;

   - a main shaft (50) for driving the main pulley in rotation, the main shaft extending parallel to the beam (30); and
   - a motor (312) for driving the main shaft,

   characterized in that

   - the Jacquard head (20) rests, via at least one pad (218), on at least one supporting rib (316) of the beam (30); and
   - the main pulley (214) is fixed in rotation with the main shaft (50) and slidable along this shaft.

2. Shedding device according to claim 1 wherein the main shaft (50) and the main pulley (214) are splined, with matching splines (504/2144, 506/2146), and the shaft is inserted in a central bore (2140) of the pulley.

3. Shedding device according to any preceding claim, wherein the Jacquard head (20) is provided with a quick locking mechanism (60) for locking the Jacquard head along the beam (30) and wherein the Jacquard head is slidable along the beam when the quick locking mechanism is not active.

4. Shedding device according to claim 3, wherein the quick locking mechanism includes a clamp (72) reversibly movable with respect to a frame (220) of the Jacquard head (20) between a first locked position, where the beam (30) is pinched between the pad (218) and the clamp, and a second released position, where the clamp does not brake a sliding movement of the Jacquard head along the beam.

5. Shedding device according to claim 4, wherein, in its first position, the clamp (72) pushes a locking rib (326) of the beam (30) from underneath.

6. Shedding device according to one of claims 4 and 5, wherein the quick locking mechanism (60) includes an eccentric (64) which drives, or constitutes, the clamp (72).

7. Shedding device according to one of claims 4 to 6, wherein an arm (72B, 72C) of the clamp (72) is equipped with an elastic pad (74) which is compressed between a longitudinal surface (328) of the beam (30) and the clamp when the clamp is its first locked position.

8. Shedding device according to one of claims 4 to 7, wherein the clamp (72) moves vertically with respect to the frame (220) of the Jacquard head (20), between its first locked position and its second released position.

9. Shedding device according to one of claims 4 to 8, wherein the clamp (72) is driven, between its first

locked position and its second released position, and vice-versa, by an eccentric (64) rotatably mounted on the Jacquard head (20) and articulated within a nut (70) movable in an horizontal groove (72A) of the clamp.

10. Shedding device according to one of claims 4 to 6, wherein the clamp (72) is formed by an eccentric (64) rotatably mounted on the Jacquard head (20) and having an external surface (64A) which pushes on the beam (30) in the first locked position of the clamp and which is separated from the beam by a gap (G) in the second released position.

11. Shedding device according to any preceding claim, wherein the beam (30) includes two crossbeams (302, 304) and the Jacquard head (20) is mounted between these crossbeams and rests, via at least one pad (218), on a supporting rib (316) of each crossbeam.

12. Shedding device according to any preceding claim, wherein the beam (30) includes at least one crossbeam (302, 304) defining a supporting rib (316), wherein each supporting rib has a longitudinal surface (318) receiving the pad (218) and wherein this longitudinal surface forms, with respect to an horizontal plane (P_{30}), an angle (α) between 0° and 45°, preferably between 10° and 30°.

13. Shedding device according to claim 12, wherein the crossbeam (302, 304) also defines a locking rib (326), wherein each locking rib has a longitudinal surface (328) receiving a clamp (72) and wherein this longitudinal surface forms, with respect to an horizontal plane (P'30), an angle (β) between 0° and 45°, preferably between 10° and 30°.

14. Shedding device according to one of claims 1 to 10 wherein the beam (30) includes a single crossbeam (302), the Jacquard head (20) extends above and along two lateral sides (302A, 302B) of the crossbeam and a clamp (302) of a quick locking mechanism (60) is located underneath the crossbeam.

15. A method for adjusting, along the weft direction (Y, Y') of a weaving loom (L), the position of at least one Jacquard head (20) of a shedding device (10) according to one of claims 3 to 10, **characterized in that** it includes at least the following steps:

a) releasing the quick locking mechanism (60);
b) sliding the Jacquard head along the beam (30), while keeping the main pulley (214) fixed in rotation with the main shaft (50); and
c) switching the quick locking mechanism (60) in an applied configuration, where it locks the Jacquard head (20) on the beam (30).

Amended claims in accordance with Rule 137(2) EPC.

1. Shedding device (10) for labelling on selvedges (S1, S2) or on fabrics on a weaving loom (L), the shedding device comprising:

- a beam (30) meant for extending over the loom, parallel to its weft axis (Y);
- at least a Jacquard head (20), the Jacquard head comprising:

  • selectable hooks (202);
  • driving means (208-214) for moving the selectable hooks between an upper position and a lower portion, the driving means comprising a main pulley (214);
  • a harness (H) connected to the hooks; and
  • a harness support (203) for anchoring the harness;

- a main shaft (50) for driving the main pulley in rotation, the main shaft extending parallel to the beam (30); and
- a motor (312) for driving the main shaft,

characterized in that

- the Jacquard head (20) rests, via at least one pad (218) having a low friction coefficient with the material of the beam (30), on at least one supporting rib (316) of the beam (30);
- the main pulley (214) is fixed in rotation with the main shaft (50) and slidable along this shaft.
- the main shaft (50) and the main pulley (214) are splined, with matching splines (504/2144, 506/2146), and
- the main shaft is inserted in a central bore (2140) of the main pulley.

2. Shedding device according to claim 1, wherein the Jacquard head (20) is provided with a quick locking mechanism (60) for locking the Jacquard head along the beam (30) and wherein the Jacquard head is slidable along the beam when the quick locking mechanism is not active.

3. Shedding device according to claim 2, wherein the quick locking mechanism includes a clamp (72) reversibly movable with respect to a frame (220) of the Jacquard head (20) between a first locked position, where the beam (30) is pinched between the pad (218) and the clamp, and a second released position, where the clamp does not brake a sliding movement of the Jacquard head along the beam.

4. Shedding device according to claim 3, wherein, in its first position, the clamp (72) pushes a locking rib

(326) of the beam (30) from underneath.

5. Shedding device according to one of claims 3 and 4, wherein the quick locking mechanism (60) includes an eccentric (64) which drives, or constitutes, the clamp (72).

6. Shedding device according to one of claims 3 to 5, wherein an arm (72B, 72C) of the clamp (72) is equipped with an elastic pad (74) which is compressed between a longitudinal surface (328) of the beam (30) and the clamp when the clamp is its first locked position.

7. Shedding device according to one of claims 3 to 6, wherein the clamp (72) moves vertically with respect to the frame (220) of the Jacquard head (20), between its first locked position and its second released position.

8. Shedding device according to one of claims 3 to 7, wherein the clamp (72) is driven, between its first locked position and its second released position, and vice-versa, by an eccentric (64) rotatably mounted on the Jacquard head (20) and articulated within a nut (70) movable in an horizontal groove (72A) of the clamp.

9. Shedding device according to one of claims 3 to 7, wherein the clamp (72) is formed by an eccentric (64) rotatably mounted on the Jacquard head (20) and having an external surface (64A) which pushes on the beam (30) in the first locked position of the clamp and which is separated from the beam by a gap (G) in the second released position.

10. Shedding device according to any preceding claim, wherein the beam (30) includes two crossbeams (302, 304) and the Jacquard head (20) is mounted between these crossbeams and rests, via at least one pad (218), on a supporting rib (316) of each crossbeam.

11. Shedding device according to any preceding claim, wherein the beam (30) includes at least one crossbeam (302, 304) defining a supporting rib (316) with a longitudinal surface (318) receiving the pad (218) and wherein this longitudinal surface forms, with respect to an horizontal plane (P_{30}), an angle (α) between 0° and 45°, preferably between 10° and 30°.

12. Shedding device according to claim 11, wherein the crossbeam (302, 304) also defines a locking rib (326) with a longitudinal surface (328) receiving a clamp (72) and wherein this longitudinal surface forms, with respect to an horizontal plane (P'_{30}), an angle (β) between 0° and 45°, preferably between 10° and 30°.

13. Shedding device according to one of claims 1 to 9 wherein the beam (30) includes a single crossbeam (302), the Jacquard head (20) extends above and along two lateral sides (302A, 302B) of the crossbeam and a clamp (302) of a quick locking mechanism (60) is located underneath the crossbeam.

14. A method for adjusting, along the weft direction (Y, Y') of a weaving loom (L), the position of at least one Jacquard head (20) of a shedding device (10) according to one of claims 2 to 9, **characterized in that** it includes at least the following steps:

a) releasing the quick locking mechanism (60);
b) sliding the Jacquard head along the beam (30), while keeping the main pulley (214) fixed in rotation with the main shaft (50); and
c) switching the quick locking mechanism (60) in an applied configuration, where it locks the Jacquard head (20) on the beam (30).

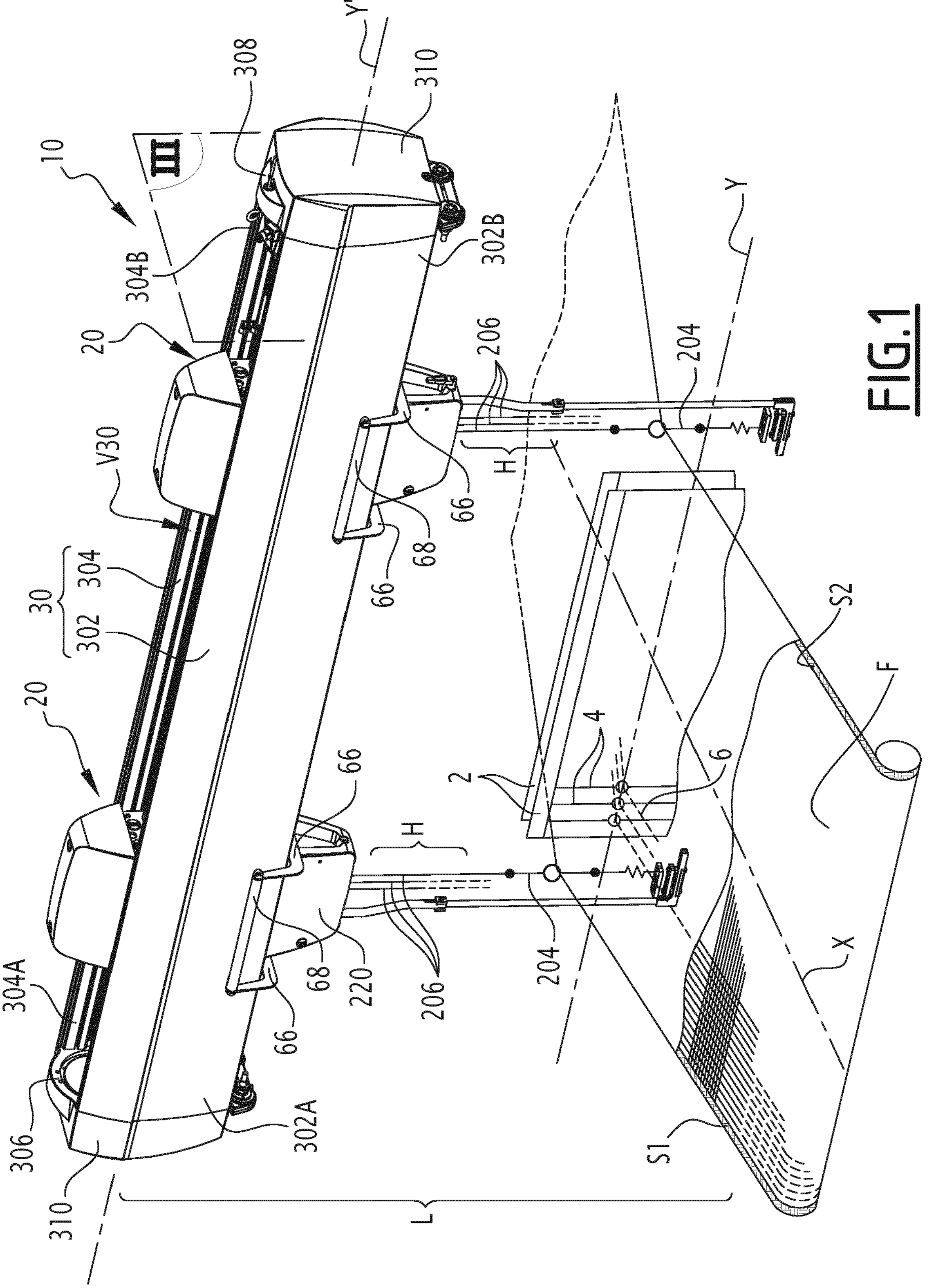
10
III
308
Y'
310
304B
302B
20
V30
30
304
302
206
204
H
66
68
Y
S2
F
4
2
6
304A
306
310
302A
220
L
X
S1

FIG.1

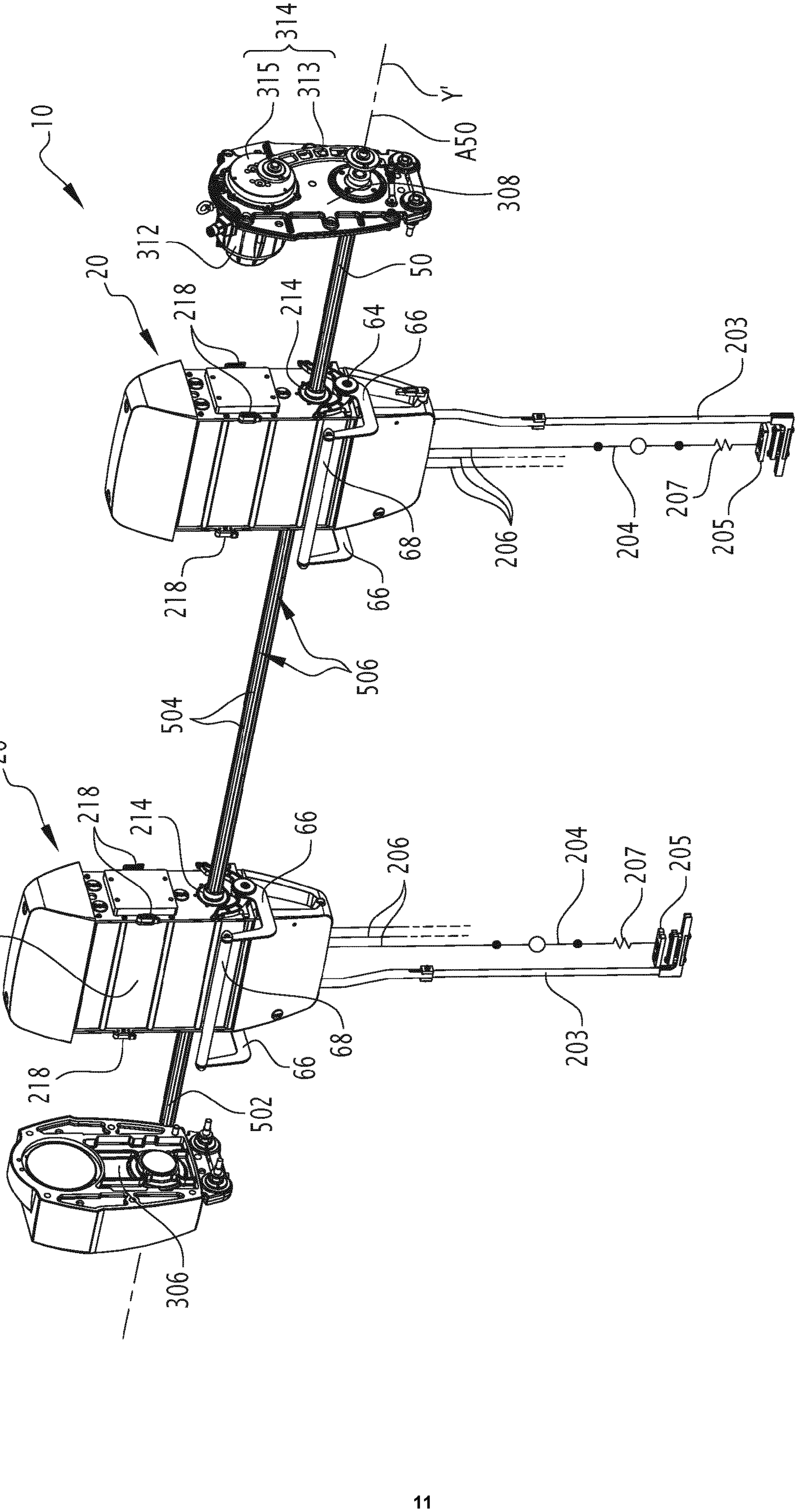
10
314
315
313
Y'
A50
308
312
50
20
218
214
64
66
203
68
206
204
207
205
66
218
506
504
20
218
214
66
206
204
207
205
220
68
203
218
66
502
306

FIG.2

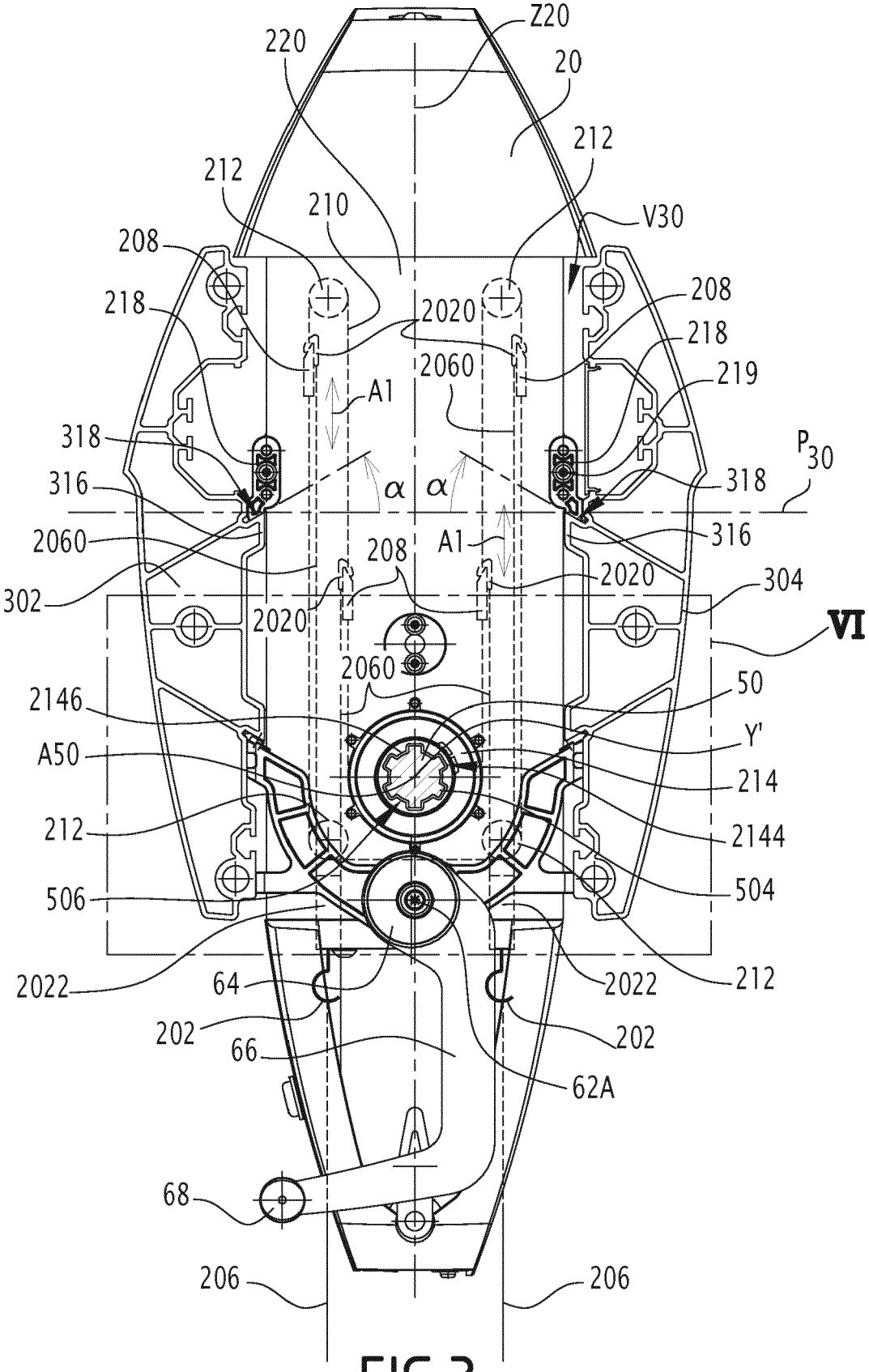
Z20
220
20
212
212
210
V30
208
208
218
2020
218
2060
219
A1
318
P30
α
α
316
318
2060
A1
316
208
2020
304
302
2020
VI
2060
50
2146
Y'
A50
214
212
2144
506
504
2022
64
2022
212
202
202
66
62A
68
206
206

FIG.3

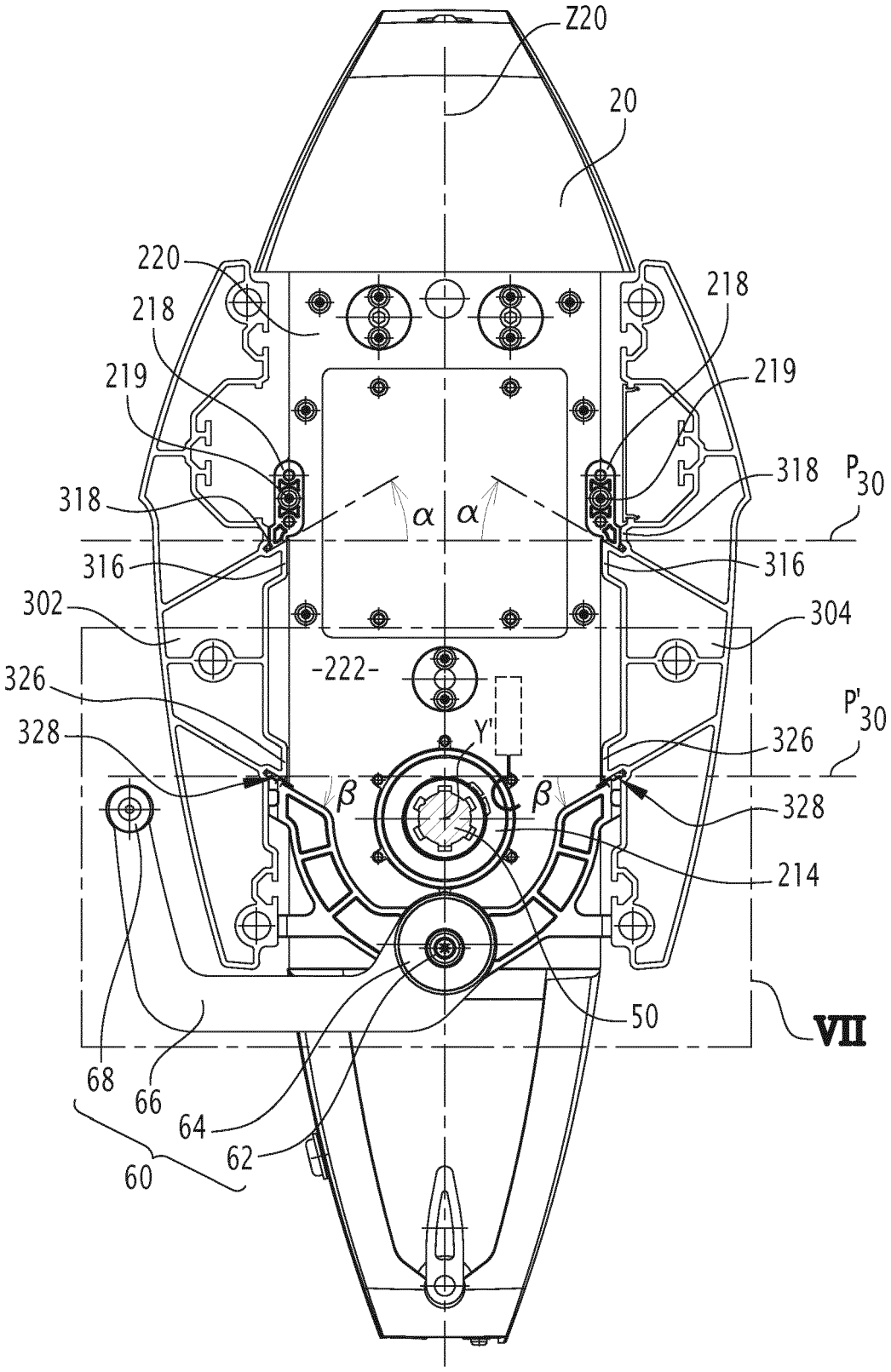
Z20
20
220
218
219
318
316
302
326
328
-222-
Y'
α
α
β
β
P30
P'30
304
214
50
VII
68
66
64
62
60

FIG.4

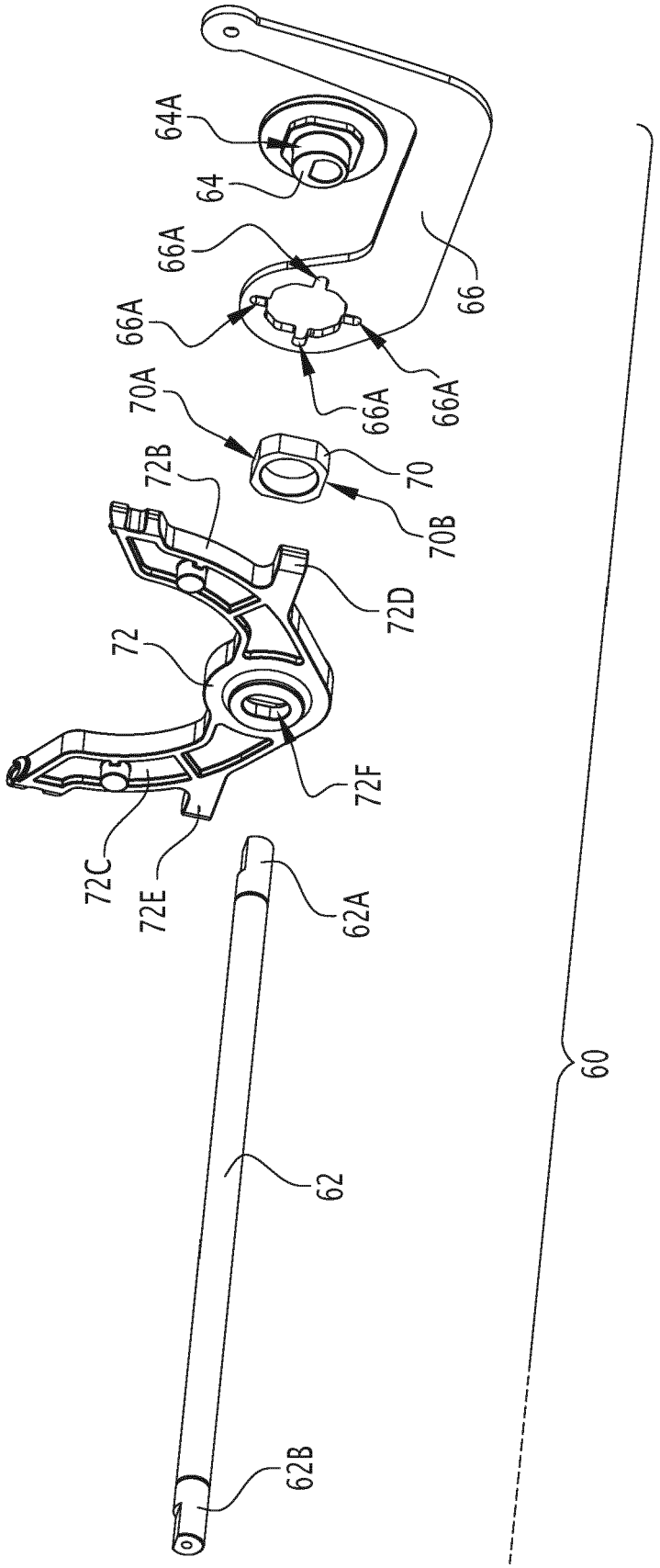
64A
64
66A
66A
66
66A
66A
70A
70
70B
72B
72D
72
72F
72C
72E
62A
62
62B
60

FIG.5

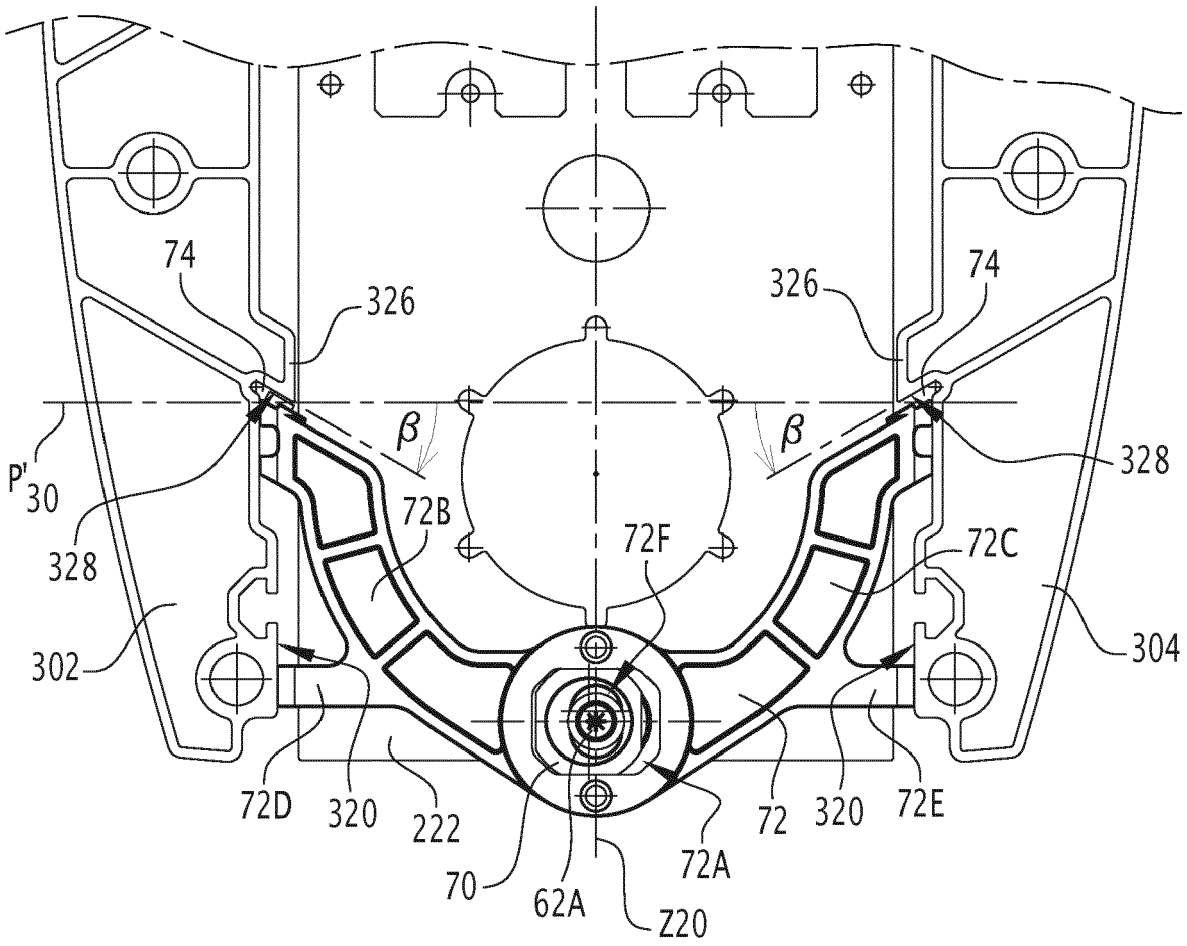
74
326
326
74
P'
30
328
β
β
328
72B
72F
72C
302
304
72D
320
222
70
62A
Z20
72A
72
320
72E

FIG.6

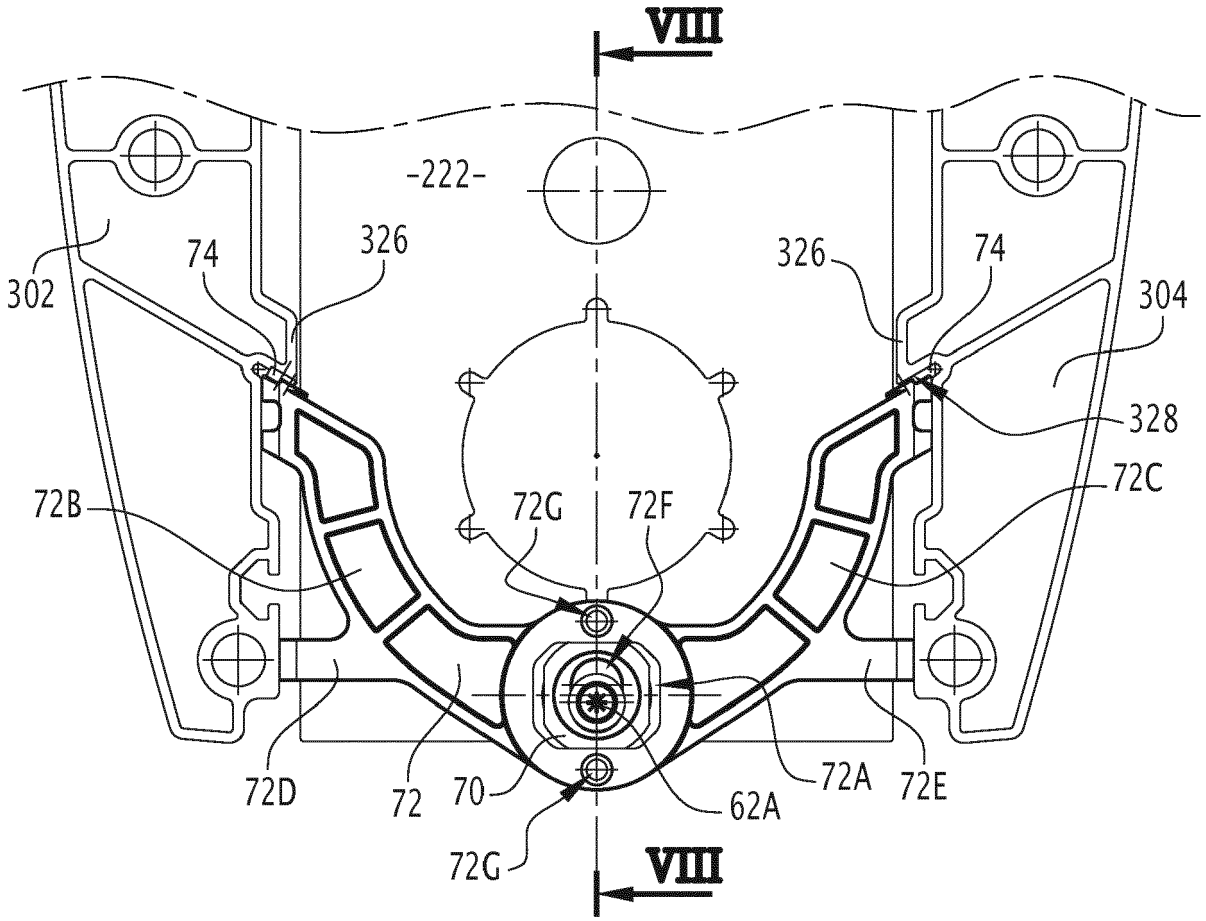
VIII
-222-
302
74
326
326
74
304
328
72C
72B
72G
72F
72D
72
70
62A
72A
72E
72G
VIII

FIG.7

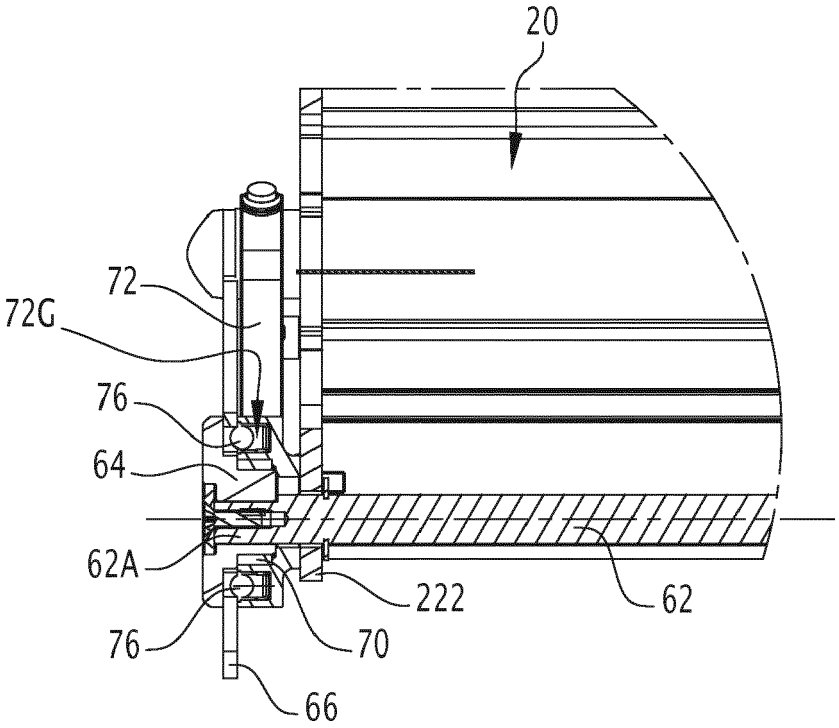

FIG.8

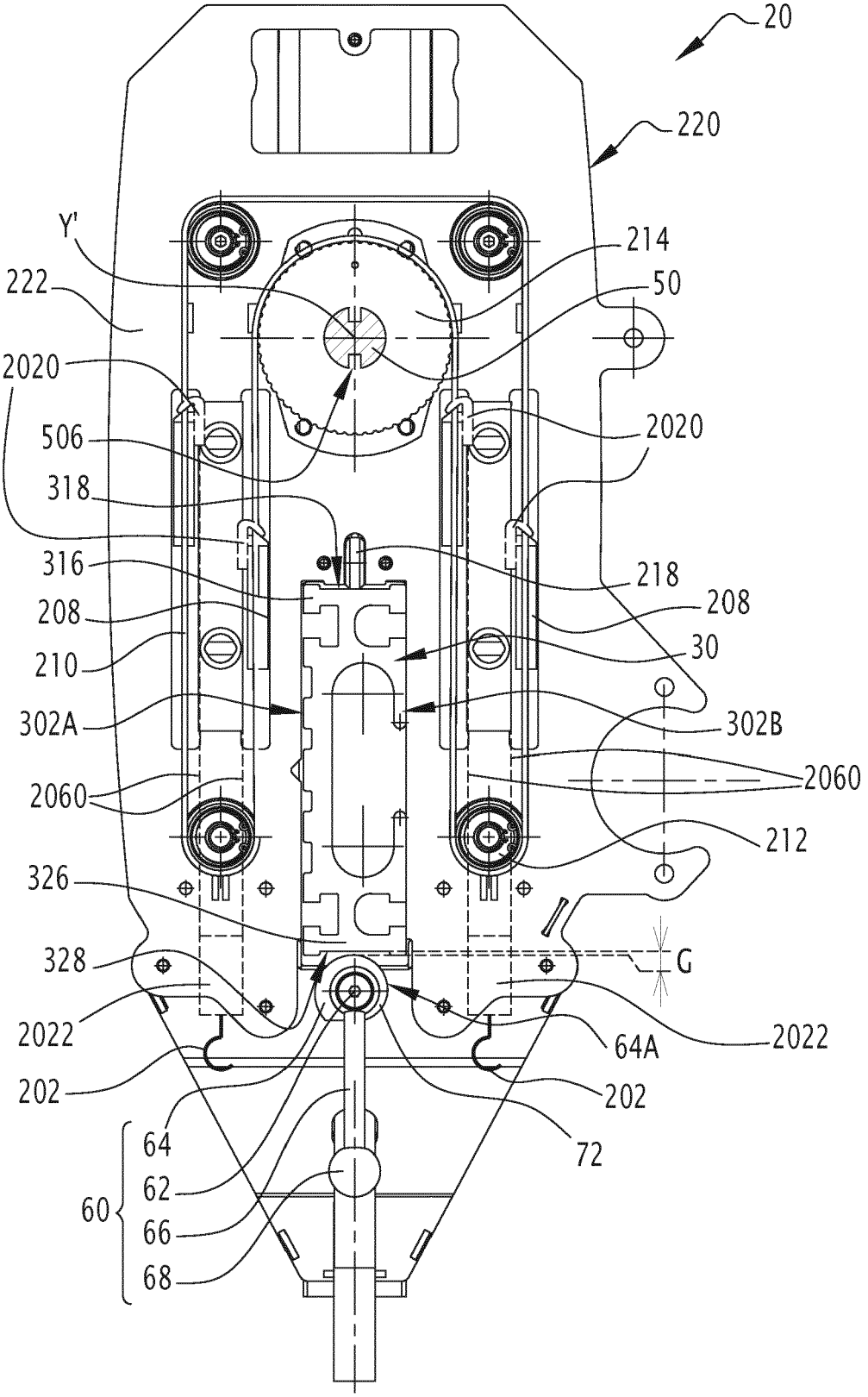
20
220
Y'
214
222
50
2020
2020
506
318
316
218
208
208
210
30
302A
302B
2060
2060
212
326
328
G
2022
2022
64A
202
202
72
64
62
66
68
60

FIG.9

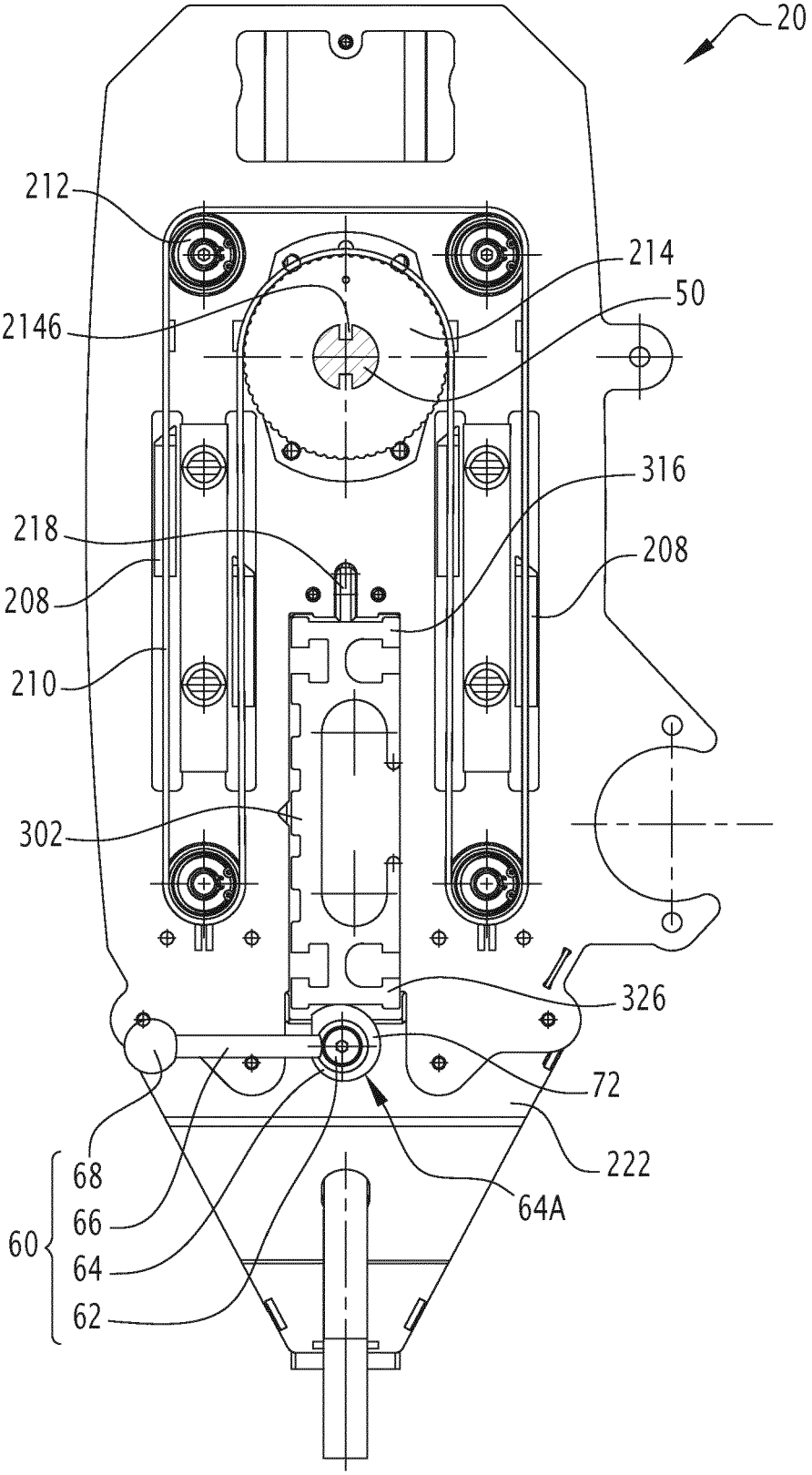
20
212
214
50
2146
316
218
208
208
210
302
326
72
222
68
66
64
62
60
64A

FIG.10

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EUROPEAN SEARCH REPORT

Application Number
EP 19 17 4202

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 257 649 A (FROMENT JEAN-PAUL [FR]) 2 November 1993 (1993-11-02) * abstract * * claims 1-3 * * figures 1-3 * * the whole document * -----	1-3,11, 14,15	INV. D03C3/18
X	CN 2 641 075 Y (SONGHESONG SCI TECH APPLIED EN [CN]) 15 September 2004 (2004-09-15) * abstract * * claim 1 * * figures 1-6 * * paragraphs [0001] - [0010], [0014], [0024], [0025] * -----	1-3,11, 14,15	
A	JP H05 106142 A (NISSAN MOTOR) 27 April 1993 (1993-04-27) * abstract * * claim 1 * * figures 1-6 * * paragraphs [0001], [0003], [0005] - [0007], [0010] - [0012], [0017] * -----	1	TECHNICAL FIELDS SEARCHED (IPC) D03C D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 September 2019	Heinzelmann, Eric

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06-09-2019

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