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(54) **WRAPPING UNIT AND METHOD**

(57) A wrapping unit (15) and method for folding a wrap (10) around an article (3); there are provided: a wrapping conveyor (29), which supports a pocket (31), which is designed to contain the article (3) partially wrapped in the wrap (10), and a seat (33), which is arranged opposite the pocket (31) and is designed to hold the sole wrap (10); a first feeding station (S4), wherein the wrap (10) is fed to the seat (33); a second feeding station (S5), which is arranged downstream of the first feeding station (S4) and wherein the article (3) is fed into

the pocket (31) together with the wrap (10) previously arranged in the seat (33) opposite the pocket (31); a pusher (36), which, in the second feeding station (S5), rests against the article (3) on the side opposite the wrap (10) and pushes the article (3) into the pocket (31) together with the wrap (10); and a moving device, which, in the second feeding station (S5), at first moves the wrap (10) away from the pocket (31), thus moving the wrap (10) close to the article (3), before the article (3) is pushed into the pocket (31) together with the wrap (10).

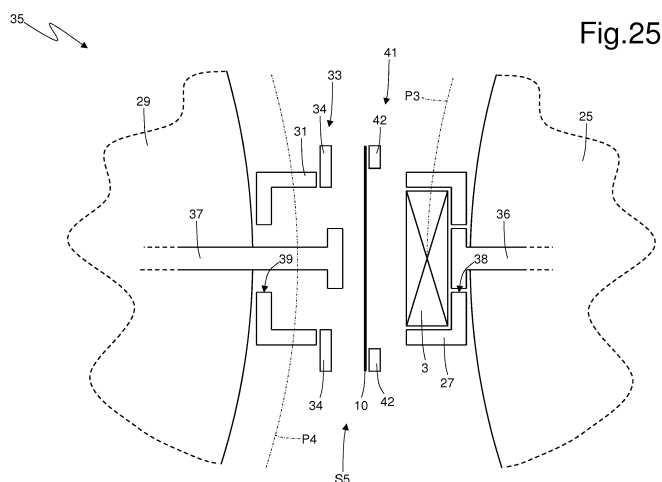


Fig.25

Description

TECHNICAL FIELD

[0001] The present invention relates to a unit and a method for folding a wrap around an article.

[0002] The present invention finds advantageous application in a wrapping unit for folding a blank around a wrapped group of cigarettes, to which the following description will make explicit reference without thereby losing generality.

PRIOR ART

[0003] A packet of cigarettes normally comprises an inner wrapping, which consists of a group of cigarettes wrapped in a wrap of metallized paper or heat-sealable plastic material, and an outer container, which houses the inner wrapping and may be of the soft type (i.e. consisting of a flexible wrap that surrounds the inner wrapping) or of the rigid type (i.e. consisting of a rigid cardboard blank and generally equipped with a hinged lid).

[0004] A known packing machine for the manufacture of a packet of cigarettes comprises a forming unit that provides the group of cigarettes, a first wrapping unit that provides the inner wrapping around the group of cigarettes by folding a wrap, and a second wrapping unit that provides the outer container around the inner wrapping by folding a blank.

[0005] Generally, the second wrapping unit comprises a wrapping wheel which rotates in steps about a rotation axis and is provided with a plurality of pockets, each of which is fed along a circular wrapping path to receive, in the same feeding station, a blank and an inner wrapping coupled to a collar. In the known packing machines, the blank and the inner wrapping are fed into the pocket of the wrapping wheel in the same feeding station (i.e. simultaneously) by means of a transferring device which comprises a pusher and an accompanying device (or counter-pusher), which are arranged on opposite sides of the inner wrapping and retain (clamp) between them the inner wrapping (coupled to the collar) together with the blank, thus engaging two opposite faces of the inner wrapping itself (with the interposition of the blank), and insert the inner wrapping (coupled to the collar) together with the blank in the pocket of the wrapping wheel. However, feeding the blank and the inner wrapping into the pocket of the wrapping wheel in the same feeding station makes the feeding station itself difficult to implement, as in the same limited space both the feeding means which feed the blank and the feeding means which feed the inner wrapping (coupled to the collar) have to co-exist.

[0006] To try to simplify the construction of the feeding means of the blank and of the inner wrapping, it was proposed to provide a first feeding station, in which the blank is inserted in the pocket of the wrapping wheel, and a second feeding station (which is separate and distinct from the first feeding station and arranged downstream

of the first feeding station itself), in which the inner wrapping (coupled to the collar) is inserted in the pocket of the wrapping wheel; in this way, the feeding means which feed the blank are far away from the feeding means which feed the inner wrapping (coupled to the collar), thus avoiding adverse mutual interference.

[0007] However, by separating the two feeding stations, in the second feeding station the corresponding transferring device can no longer include an accompanying device (or counter-pusher), since the presence of the blank inside the pocket of the wrapping wheel prevents the accompanying device from reaching the inner wrapping (coupled to the collar) on the opposite side of the pusher; consequently, due to the absence of the accompanying device in the second feeding station, insertion of the inner wrapping (coupled to the collar) in the pocket of the wrapping wheel is less controlled and therefore less precise with a consequent possible deterioration in the quality of the wrapping operations due to a misalignment between the blank and the inner wrapping (coupled to the collar). In addition, in the event of an unsealed inner wrapping, the inner wrapping itself is normally glue-less, and hence, when it is engaged by the pusher alone it is relatively free and may slightly lose the correct conformation of the folds due to spring back of the wrap.

[0008] The patent application EP0792805A1 discloses a wrapping wheel 5 for folding a wrap F around a group G of cigarettes. The wrapping wheel 5 supports a pocket 6 designed to contain the group G of cigarettes partially wrapped in the wrap F, and a suction seat 305, which is associated with the pocket 6, is arranged opposite the pocket 6 and is designed to hold the sole wrap F. In a first feeding station, the wrap F is fed to the suction seat 305, and subsequently, in a second feeding station which is arranged downstream of the first feeding station, the group G of cigarettes is fed into the pocket 6 together with the wrap F previously arranged in the seat 305 opposite the pocket 6. In particular, in the second feeding station a pusher 15 rests against the group G of cigarettes on the opposite side of the wrap F and pushes the group G of cigarettes into the pocket 6 together with the wrap F.

[0009] The patent US4646508A discloses a wrapping wheel 39 for folding a wrap around a group 22 of packets of cigarettes. The wrapping wheel 39 supports a pocket 65 designed to contain the group 22 of packets of cigarettes partially wrapped in the wrap, and a suction seat 70, which is associated with the pocket 65, is arranged opposite the pocket 65 and is designed to hold the sole wrap. In a first feeding station, the wrap is fed to the suction seat 70, and subsequently, in a second feeding station which is arranged downstream of the first feeding station, the group 22 of packets of cigarettes is fed into the pocket 65 together with the wrap previously arranged in the seat 70 opposite the pocket 65. In particular, in the second feeding station a pusher 96 rests against the group 22 of packets of cigarettes on the opposite side of the wrap and pushes the group 22 of packets of cigarettes

into the pocket 65 together with the wrap.

DESCRIPTION OF THE INVENTION

[0010] The object of the present invention is to provide a wrapping unit and method for folding a wrap around an article, which wrapping unit and method are free from the drawbacks described above and are, at the same time, easy and inexpensive to manufacture.

[0011] In accordance with the present invention, a wrapping unit and method are provided for folding a wrap around an article, as claimed in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The present invention will now be described with reference to the accompanying drawings, which illustrate a non-limiting embodiment thereof, in which:

- Figure 1 is a front perspective view in a closed configuration of a rigid packet of cigarettes with a hinged lid;
- Figure 2 is a rear perspective view of the packet of cigarettes of Figure 1;
- Figure 3 is a perspective view of a group of cigarettes contained in the packet of cigarettes of Figure 1;
- Figure 4 is a front perspective view of a sealed inner wrapping contained in the packet of cigarettes of Figure 1;
- Figure 5 is a rear perspective view of the sealed inner wrapping of Figure 4;
- Figure 6 is a perspective view of a rigid reinforcement element surrounding the group of cigarettes of Figure 3 inside the sealed inner wrapping of Figure 4;
- Figure 7 is a plan view of a stretched wrap which is folded around the group of cigarettes of Figure 3 to form the sealed inner wrapping of Figure 4;
- Figure 8 is a front perspective view of an unsealed inner wrapping that can be contained in the packet of cigarettes of Figure 2 as an alternative to the sealed inner wrapping of Figure 4;
- Figure 9 is a plan view of a stretched wrap which is folded around the group of cigarettes of Figure 3 to form the unsealed inner wrapping of Figure 8;
- Figure 10 is a blank which is folded around the sealed inner wrapping of Figure 4 or the unsealed inner wrapping of Figure 8 to form an outer container of the packet of cigarettes of Figure 1;
- Figure 11 is a collar that can be glued inside the outer container of the packet of cigarettes of Figure 1;
- Figure 12 is a perspective view of a packing machine for manufacturing the packet of cigarettes of Figure 1 containing the sealed inner wrapping of Figure 4 or, alternatively, the unsealed inner wrapping of Figure 8;
- Figure 13 is a front view of a wrapping unit of the packing machine of Figure 12;
- Figure 14 is a perspective and schematic view of an

inner wrapping at an input station of an orienting unit of the wrapping unit of Figure 13 and of an inner wrapping at an output station of the orienting unit;

- Figures 15-21 are corresponding schematic views in enlarged scale of a pocket of a wrapping wheel of the wrapping unit of Figure 13 during the feeding of a blank, and subsequently, of an inner wrapping containing a group of cigarettes;
- Figures 22-28 are corresponding schematic views in enlarged scale of a pocket of a wrapping wheel of an alternative embodiment of the wrapping unit of Figure 13 during the feeding of a blank, and subsequently, of an inner wrapping containing a group of cigarettes; and
- Figures 29-35 are corresponding schematic views in enlarged scale of a pocket of a wrapping wheel of a further embodiment of the wrapping unit of Figure 13 during the feeding of a blank, and subsequently, of an inner wrapping containing a group of cigarettes.

PREFERRED EMBODIMENTS OF THE INVENTION

[0013] Number 1 in Figures 1 and 2 indicates, as a whole, a rigid packet of cigarettes. The packet 1 of cigarettes comprises an outer container 2, made up of a cup-shaped cardboard or rigid cardboard sheet, and an inner wrapping 3 (illustrated in Figures 4 and 5 or in Figure 8), which is housed inside the container 2 and encloses a parallelepiped group 4 of filter cigarettes (shown in Figure 3).

[0014] In the embodiment illustrated in Figures 4-7, the inner wrapping 3 is sealed and has at the top and front an opening 5 to extract the cigarettes, which is closed by a reusable closure label 6; the inner wrapping 3 is formed by using a heat-sealable wrap 7 (shown in Figure 7), which has a rectangular shape, is folded around the group 4 of cigarettes, and once folded, is stabilized by heat sealing (i.e. superimposed portions of the wrap 7 are firmly connected together by means of heat sealing). Preferably (but not necessarily), a rigid reinforcement element 8 (shown in Figure 6) is arranged around the group 4 of cigarettes, which therefore is located inside the inner wrapping 3 (i.e. it is completely surrounded by the inner wrapping 3). In the alternative embodiment shown in Figures 8 and 9, the inner wrapping 3 is not sealed and is formed by folding a wrap 9 (shown in Figure 9) of metallized paper around the group 4 of cigarettes; once folded, the wrap 9 is not normally stabilized, i.e. it is entirely devoid of glue or welds.

[0015] The outer container 2 of the packet 1 of cigarettes is obtained by folding a blank 10, i.e. a wrap 10, (shown in Figure 10) around the inner wrapping 3 (of the sealed type, as shown in Figures 4-7, or of the unsealed type, as shown in Figures 8 and 9). According to a possible embodiment, the packet 1 of cigarettes may comprise a collar 11 (shown extended in Figure 11), which is fixed (normally by gluing) U-folded inside the outer container 2 so as to partially protrude outside of an upper

open end and engage a corresponding inner surface of a lid when said lid 4 is arranged in a closed position. Generally, but not necessarily, the collar 11 is absent when the inner wrapping 3 is sealed (and therefore is provided internally with the reinforcing element 8 which partly also performs the function of the collar 11) and the collar 11 is present when the inner wrapping 3 is not sealed.

[0016] In Figure 12, the numeral 12 indicates, as a whole, an intermittent packing machine (i.e. operated by intermittent motion that provides a cyclic alternation of motion steps and resting steps) which is designed to manufacture the packet 1 of cigarettes. The packing machine 1 comprises a forming unit 13 of a known type in which the group 4 of cigarettes is formed, a wrapping unit 14 in which the inner wrapping 3 is formed by folding the wrap 7 around the group 4 of cigarettes (to form the inner wrapping 3 of the sealed type) or by folding the wrap 9 around the group 4 of cigarettes (to form the inner wrapping 3 of the unsealed type), and a wrapping unit 15 in which the outer container 2 is formed by folding the blank 10 around the inner wrapping 3. The packing machine 1 further comprises an orienting unit 16 which connects the wrapping units 14 and 15 to each other by imparting a change in orientation to the inner wrapping 3, i.e. it receives the inner wrapping 3 from the wrapping unit 14 at an input station S in which the inner wrapping 3 is oriented along an input plane A (shown in Figure 14) and feeds the inner wrapping 3 to the wrapping unit 15 at an output station S2 in which the inner wrapping 3 is oriented along an output plane B (shown in Figure 14), which is different from the input plane A (in particular, perpendicular to the input plane A).

[0017] As shown in Figure 13, the orienting unit 16 comprises an orientation wheel 17, which is rotatably mounted (with intermittent motion) about a horizontal rotation axis 18 and supports a plurality of peripheral pockets 19, each of which has a parallelepiped shape and is adapted to contain an inner wrapping 3. The rotation of the orientation wheel 17 about the rotation axis 18 moves each pocket 19 along a circular orientation path P1 that starts from the input station S1, where the pocket 19 receives an inner wrapping 3 (containing a group 4 of cigarettes) from the wrapping unit 14, and ends at the output station S2, in which the inner wrapping 3 is delivered to the wrapping unit 15.

[0018] As shown in Figure 12, the forming unit 13 comprises a hopper 20 provided with a plurality of mouths from which the groups 4 of cigarettes are cyclically extracted; a forming belt conveyor 21 is arranged in front of the hopper 20, which conveyor supports a plurality of forming pockets 22, each of which receives a corresponding group 4 of cigarettes from a mouth of the hopper 20. According to a preferred embodiment, the reinforcement elements 8 (obviously when provided) are inserted in the forming pockets 22 upstream of the hopper 20 and are thus coupled to the corresponding groups 4 of cigarettes when said groups 4 of cigarettes are inserted in

the forming pockets 22 in the area of the hopper 20.

[0019] As shown in Figure 12, the wrapping unit 14 comprises a rectilinear wrapping conveyor 23 which receives each group 4 of cigarettes from a forming pocket 22 of the forming conveyor 21 together with a wrap 7 which folds into a "U" around the group 4 of cigarettes, thereby entering the wrapping conveyor 23. A feeding conveyor 24 is interposed between the forming conveyor 21 and the wrapping conveyor 23, which feeding conveyor vertically feeds the stretched wraps 7 so as to insert each wrap 7 between a forming pocket 22 of the forming conveyor 21 and the wrapping conveyor 23. The wrapping conveyor 23 feeds the group 4 of cigarettes along a rectilinear wrapping path P2 extending from the forming conveyor 21 to the orientation wheel 17.

[0020] As best shown in Figure 13, the wrapping unit 15 comprises a wrapping wheel 25, which rotates in steps about a horizontal rotation axis 26 and is provided with a plurality of pockets 27, each of which is fed along a circular wrapping path P3 to receive a collar 11 at a feeding station S3, and subsequently, to receive an inner wrapping 3 from a pocket 19 of the orientation wheel 17 at the output station S2 (arranged between the orientation wheel 17 and the wrapping wheel 25). In the feeding station S3, each collar 11 folds into a "U" inside a corresponding pocket 27 ("empty", i.e. devoid of an inner wrapping 3); subsequently, in the output station S2 arranged downstream of the feeding station S3, an inner wrapping 3 enters the pocket 27, thus coupling to the previously fed collar 11. According to a possible embodiment, the feeding unit 28, in addition to a collar 11, could also feed a coupon into each pocket 27 of the wrapping wheel 25.

[0021] The wrapping unit 15 comprises a wrapping wheel 29, which rotates in steps about a horizontal rotation axis 30 and is provided with a plurality of pockets 31, each of which is fed along a circular wrapping path P4 to receive a blank 10 at a feeding station S4, and subsequently, to receive an inner wrapping 3 coupled to a collar 11 from a pocket 27 of the wrapping wheel 25 at a feeding station S5 (arranged between the wrapping wheel 25 and the wrapping wheel 29 downstream of the feeding station S4).

[0022] A feeding unit 32 (shown schematically in Figure 12) is arranged in the area of the feeding station S4, which feeding unit cyclically feeds the blanks 10 into the pockets 31 of the wrapping wheel 29.

[0023] As illustrated in Figures 15-21, each pocket 31 of the wrapping wheel 29 comprises a seat 33, which is arranged opposite the pocket 31 and is designed to hold the sole blank 10. In the preferred embodiment illustrated in the attached figures, each seat 33 is adapted to hold the blank 10 in a plane configuration (flat), i.e. the blank 10 does not undergo any type of folding when coupled to the seat 33. In the preferred embodiment illustrated in the attached figures, each seat 33 comprises two sucking-holding heads 34 arranged on opposite sides of the pocket 31 (obviously, a different number of sucking-holding heads 34 could be provided); each sucking-holding

head 34 holds, through suction, a corresponding portion of the blank 10.

[0024] As illustrated in Figures 17-21, a transferring device 35 is arranged in the feeding station S5, which device transfers each inner wrapping 3 (containing a group 4 of cigarettes) coupled to a collar 11 from the respective pocket 27 of the wrapping wheel 25 to the respective pocket 31 of the wrapping wheel 29. The transferring device 35 comprises a pusher 36 and an accompanying device 37 (i.e. a counter-pusher 37), which are independent of the wrapping wheels 25 and 29 (i.e. they do not move together with the wrapping wheels 25 and 29, they always remain in the feeding station S5 and they cyclically cooperate with all of the pockets 27 and 31 of the wrapping wheels 25 and 29). The pusher 36 and the accompanying device 37 are arranged on opposite sides of the feeding station S5, i.e. on opposite sides of the inner wrapping 3; each pocket 27 of the wrapping wheel 25 has a central through hole 38 through which the pusher 36 can pass, and similarly, each pocket 31 of the wrapping wheel 29 has a central through hole 39 through which the accompanying device 37 can pass.

[0025] As illustrated in Figures 17-21, the pusher 36 arranged in the feeding station S5 rests against the inner wrapping 3 (coupled to the collar 11) contained in the pocket 27 of the wrapping wheel 25 on the opposite side of the blank 10 and pushes the inner wrapping 3 (coupled to the collar 11) towards the pocket 31 of the wrapping wheel 29 (in particular, Figures 19 and 20); at the same time, the accompanying device 37 arranged in the feeding station S5 rests against the blank 10 on the opposite side of the inner wrapping 3 (coupled to the collar 11) and accompanies the movement of the blank 10 towards the inside of the pocket 31 of the wrapping wheel 29, clamping the blank 10 and the inner wrapping 3 (coupled to the collar 11) together with the pusher 36 (in particular, Figures 19 and 20). That is, in the feeding station S5, the pusher 36 and the accompanying device 37 are arranged on opposite sides of the inner wrapping 3 and clamp the inner wrapping 3 between them (with the interposition of the blank 10), thus engaging two opposite faces of the inner wrapping 3 itself, and horizontally move the inner wrapping 3 (coupled to the collar 11) from the respective pocket 27 of the wrapping wheel 25 to the pocket 31 of the wrapping wheel 29 (in particular, Figures 19 and 20).

[0026] As illustrated in Figures 17-21, each seat 33 is mounted radially movable with respect to the wrapping wheel 29 (i.e. with respect to the pocket 31 of the wrapping wheel 29) so as to move perpendicularly to the wrapping path P4 (i.e. to translate along a rectilinear direction perpendicular to the wrapping path P4) both relative to the wrapping wheel 29 and relative to the pocket 31, in order to move close to/away from the corresponding pocket 27 of the wrapping wheel 25 in the feeding station S5.

[0027] The wrapping wheel 29 is provided with an actuator 40, which, when the pocket 31 is in the feeding station S5, moves the seat 33 towards the outside, thus

moving the seat 33 away from the pocket 31, so as to cause the blank 10 to rest against the inner wrapping 3 (as shown in Figures 18 and 19); the actuator 40 can be mechanical (typically by means of cams) or electrical.

[0028] When a pocket 31 of the wrapping wheel 29 is in the feeding station S5, the actuator 40 moves the seat 33 towards the outside, thus moving the seat 33 away from pocket 31 of the wrapping wheel 29 (as shown in Figures 18 and 19), so as to cause the blank 10 retained by the seat 33 to rest against the inner wrapping 3 (coupled to the collar 11) carried by the pocket 27 of the wrapping wheel 25 before the inner wrapping 3 (coupled to the collar 11) is pushed towards the pocket 31 of the wrapping wheel 29. Consequently, once the movement of the seat 33 has caused the blank 10 to rest against the inner wrapping 3 (coupled to the collar 11) carried by the pocket 27 of the wrapping wheel 25, the accompanying device 37 is brought into contact with the blank 10 on the opposite side of the inner wrapping 3 (as shown in Figure 19). At this point, once the accompanying device 37 is in contact with the blank 10 on the opposite side of the inner wrapping 3 (coupled to the collar 11) carried by the pocket 27 of the wrapping wheel 25, the pusher 36 and the accompanying device 37 move together, with the same law of motion, to insert the inner wrapping 3 (coupled to the collar 11) and the blank 10 in the pocket 31 of the wrapping wheel 29 (as shown in Figures 20 and 21), i.e. to transfer the inner wrapping 3 (coupled to the collar 11) and the blank 10 from the pocket 27 of the wrapping wheel 25 to the pocket 31 of the wrapping wheel 29.

[0029] During the transfer of the inner wrapping 3 (coupled to the collar 11) together with the blank 10 from the pocket 27 of the wrapping wheel 25 to the pocket 31 of the wrapping wheel 29, the seat 33 preferably moves synchronously with the pusher 36 and the accompanying device 37 towards the pocket 31 of the wrapping wheel 29 (as shown in Figure 20) in order to keep the blank 10 in a plane configuration (flat) until the blank 10 enters the pocket 31 of the wrapping wheel 29 (i.e. until the seat 33 goes back to the starting position in contact with the edge of the pocket 31 of the wrapping wheel 29).

[0030] As clearly shown in Figures 15-21, the blank 10 is plane (flat) up to the feeding station S5 and folds into a "U" around the inner wrapping 3, thus entering, together with the inner wrapping 3 itself, the pocket 31 of the wrapping wheel 29.

[0031] According to a possible embodiment, an elastic element is provided, which pushes the seat 33 into a retracted position of minimum distance from the wrapping wheel 29 and retains the seat 33 in the retracted position throughout the wrapping path P4, with the exception of the feeding station S5, in which the actuator 40 moves the seat 33 towards the outside starting from the retracted position and compressing the elastic element.

[0032] According to a possible embodiment, the actuator 40 causes, with a single source of motion, the movement of both the seat 33 and the accompanying device

37. According to an alternative embodiment, the actuator 40 only causes the movement of the seat 33, whereas the movement of the accompanying device 37 is caused by a further actuator device, which is different and separate from the actuator 40.

[0033] In the embodiment illustrated in Figures 15-21, each seat 33 associated with a pocket 31 of the wrapping wheel 29 is movable radially (i.e. perpendicularly to the rotation axis 30 of the wrapping wheel 29 and perpendicularly to the wrapping path P4) so that in the feeding station S5 the seat 33 moves from the pocket 31 towards a pocket 27 of the wrapping wheel 25, in order to move the corresponding blank 10 towards the inner wrapping 3 until the blank 10 rests against the inner wrapping 3 itself. In other words, in the feeding station S5, the seat 33 moves the corresponding blank 10 from the pocket 31 of the wrapping wheel 29 towards the pocket 27 of the wrapping wheel 25 (housing the inner wrapping 3) so that the blank 10 is rested against the inner wrapping 3. Only after the blank 10 has been rested against the inner wrapping 3, the inner wrapping 3 together with the blank 10 are transferred together from the pocket 27 of the wrapping wheel 25 towards the pocket 31 of the wrapping wheel 29, while they are clamped on one side by the pusher 36 and on the opposite side by the accompanying device 37.

[0034] In the variant illustrated in Figures 22-28, each seat 33 associated with a pocket 31 of the wrapping wheel 29 is fixed, i.e. is firmly mounted on the pocket 31 of the wrapping wheel 29 (or, alternatively, directly on the wrapping wheel 29), and therefore, does not perform any type of movement with respect to the pocket 31 of the wrapping wheel 29. A transferring device 41 is provided in the feeding station S5, which takes the blank from the seat 33 associated with the pocket 31 of the wrapping wheel 29 and, by means of a radial translational movement (i.e. perpendicularly to the rotation axis 30 of the wrapping wheel 29 and perpendicularly to the wrapping path P4) moves from the pocket 31 of the wrapping wheel 29 to the pocket 27 of the wrapping wheel 25 (as shown in Figure 25) so that the blank 10 is rested against the inner wrapping 3 (as shown in Figure 26). In other words, in this embodiment, each seat 33 only has the task of retaining the blank 10 at the pocket 31 of the wrapping wheel 29 from the feeding station S4 to the feeding station S5, while, in the feeding station S5, it is the transferring device 41 which takes the blank 10 from the seat 33 (as shown in Figure 25) and rests it against the inner wrapping 3 (as shown in Figure 26).

[0035] According to a preferred, although non-binding, embodiment illustrated in the accompanying figures, a single transferring device 41 is provided, which always remains in the area of the feeding station S5 and operates with all the pockets 31 of the wrapping wheel 29 (and of course, with all the pockets 27 of the wrapping wheel 25). Furthermore, according to a preferred, although non-binding, embodiment illustrated in the attached figures, the transferring device 41 comprises two sucking-holding

heads 42 arranged on opposite sides of the pocket 31 (obviously, a different number of sucking-holding heads 42 could be provided); each sucking-holding head 42 holds, through suction, a corresponding portion of the blank 10.

[0036] Also in the variant illustrated in Figures 29-35, each seat 33 associated with a pocket 31 of the wrapping wheel 29 is fixed, i.e. is firmly mounted on the pocket 31 of the wrapping wheel 29 (or, alternatively, directly on the wrapping wheel 29), and therefore, does not perform any type of movement with respect to the pocket 31 of the wrapping wheel 29. However, in the variant illustrated in Figures 29-35, the transferring device 41 is not provided, the function of which is performed by the accompanying device 37 that ends with a sucking-holding head 43 designed to hold the blank 10. In the feeding station S5, the sucking-holding head 43 of the accompanying device 37 engages the blank 10 and pushes the blank 10 towards the pocket 27 of the wrapping wheel 25 (as shown in Figure 32) so that the blank 10 is rested against the inner wrapping 3 (as shown in Figure 33). In other words, in this embodiment, too, each seat 33 only has the task of retaining the blank 10 at the pocket 31 of the wrapping wheel 29 from the feeding station S4 to the feeding station S5, while, in the feeding station S5, it is the accompanying device 37 which takes the blank 10 from the seat 33 (as shown in Figure 32) and rests it against the inner wrapping 3 (as shown in Figure 33).

[0037] What unites the three embodiments described above and illustrated in Figures 15-35 is the presence of a moving device (constituted by the actuator device 40 in the embodiment illustrated in Figures 15-21, the transferring device 41 in the embodiment illustrated in Figures 22-28, and the accompanying device 37 provided with the sucking-holding head 43 in the embodiment illustrated in Figures 29-35) which, in the feeding station S5, at first moves the blank 10 away from the pocket 31 of the wrapping wheel 29, thus moving (resting) the blank 10 close to (against) the inner wrapping 3 before the inner wrapping 3 is pushed into the pocket 31 of the wrapping wheel 29 together with the blank 10; in this way, when the inner wrapping 3 is pushed into the pocket 31 of the wrapping wheel 29 together with the blank 10, the assembly constituted by the inner wrapping 3 and the blank 10 is clamped on one side by the pusher 36 and on the opposite side by the accompanying device 37. Thanks to the fact that, during the transfer from the pocket 27 of the wrapping wheel 25 to the pocket 31 of the wrapping wheel 29, the assembly constituted by the inner wrapping 3 and the blank 10 is clamped on one side by the pusher 36 and on the opposite side by the accompanying device 37, both a very precise mutual positioning between the inner wrapping 3 and the blank 10 and an adequate containment of the inner wrapping 3, which prevents unwanted movements of the wrap 9 (forming the inner wrapping 3) due to spring back, are guaranteed.

[0038] In the embodiments shown in the accompanying figures, the longitudinal and transversal edges of the

outer container 2 are straight; alternatively, the longitudinal and/or transversal edges of the outer container 2 may be rounded or blunted.

[0039] In the embodiments illustrated in the accompanying figures, the packet 1 of cigarettes contains a group 4 of cigarettes; alternatively, the packet 1 of cigarettes may contain any other type of tobacco articles, such as for example cigars, electric or electronic cigarettes (i.e. cigarettes that generate an aerosol without combustion), cartridges and refills for electronic cigarettes, next-generation cigarettes.

[0040] The wrapping unit 15 described above has many advantages.

[0041] Firstly, the wrapping unit 15 described above allows for feeding each pocket 31 of the wrapping wheel 29 with the blank 10 at a feeding station S4 which is distinct and separate from the feeding station S5, in which the pocket 31 of the wrapping wheel 29 is fed with the inner wrapping 3 (coupled to the collar 11); in this way, the feeding unit 32 (which provides the blank 10) is suitably far away from the wrapping wheel 25 (which provides the inner wrapping 3) to avoid adverse mutual interference.

[0042] Furthermore, in the wrapping unit 15 described above the transferring device 35 has both the pusher 36 and the accompanying device 37, to ensure that the position of the inner wrapping 3 is always very well controlled while travelling from the pocket 27 of the wrapping wheel 25 to the pocket 31 of the wrapping wheel 29; in this way, both a very precise mutual positioning between the inner wrapping 3 and the blank 10 and an adequate containment of the inner wrapping 3, which prevents unwanted movements of the wrap 9 due to spring back, are guaranteed.

[0043] Lastly, the wrapping unit 15 described above is simple and inexpensive to manufacture as it provides for relatively modest and scarcely invasive changes to the sole wrapping wheel 29.

Claims

1. A wrapping unit (15) to fold a wrap (10) around an article (3); the wrapping unit (15) comprises:

a wrapping conveyor (29), which is fed along a wrapping path (P4) and supports:

at least one pocket (31), which is designed to contain the article (3) partially wrapped in the wrap (10), and a seat (33), which is associated with the pocket (31), is arranged opposite the pocket (31), is designed to hold the sole wrap (10), and moves together with the pocket (31) along the wrapping path (P4);
a first feeding station (S4), where the wrap (10) is fed to the seat (33);

a second feeding station (S5), which is arranged downstream of the first feeding station (S4) along the wrapping path (P4) and where the article (3) is fed into the pocket (31) together with the wrap (10) previously arranged in the seat (33) opposite the pocket (31); and

a pusher (36), which, in the second feeding station (S5), rests against the article (3) on the side opposite the wrap (10) and pushes the article (3) into the pocket (31) together with wrap (10);

the wrapping unit (15) is **characterized in that** it comprises a moving device, which, in the second feeding station (S5), at first moves the wrap (10) away from the pocket (31), thus moving the wrap (10) close to the article (3), before the article (3) is pushed into the pocket (31) together with the wrap (10).

2. A wrapping unit (15) according to claim 1, wherein the moving device causes the wrap (10) to rest against the article (3), before the article (3) is pushed into the pocket (31) together with the wrap (10).

3. A wrapping unit (15) according to claim 2 and comprising an accompanying device (37), which, in the second feeding station (S5), rests against the wrap (10) on the side opposite the article (3) and accompanies the movement of the wrap (10) towards the inside of the pocket (31) clamping the wrap (10) and the article (3) together with the pusher (36).

4. A wrapping unit (15) according to claim 3, wherein:

the pocket (31) has a through hole (39), through which the accompanying device (37) can move; and

the accompanying device (37) is movable between a retracted position, in which the accompanying device (37) is arranged behind the pocket (31), and an extracted position, in which the accompanying device (37) is arranged in front of the pocket (31).

5. A wrapping unit (15) according to claim 3 or 4, wherein, when the wrap (10) rests against the article (3), the accompanying device (37) is arranged in contact with the wrap (10) on the side opposite the article (3).

6. A wrapping unit (15) according to claim 5, wherein, once the accompanying device (37) is in contact with the wrap (10) on the side opposite the article (3), the pusher (36) and the accompanying device (37) move together, with the same law of motion, to insert the article (3) and the wrap (10) into the pocket (31).

7. A wrapping unit (15) according to any one of claims 3 to 6, wherein the accompanying device (37) is completely separate from and independent of the moving device.
8. A wrapping unit (15) according to claim 7, wherein the accompanying device (37) rests against the wrap (10) on the side opposite the article (3) only after the moving device has caused the wrap (10) to rest against the article (3).
9. A wrapping unit (15) according to any of the claims from 1 to 8, wherein the moving device comprises a transferring device (41), which takes the wrap (10) from the seat (33) and moves towards the article (3) dragging the wrap (10) with it.
10. A wrapping unit (15) according to claim 9, wherein the transferring device (41) is independent of and separate from the wrapping conveyor (29) and always remains in the area of the second feeding station (S5).
11. A wrapping unit (15) according to claim 9 or 10, wherein the transferring device (41) comprises two first sucking-holding heads (42), which are designed to hold, through suction, corresponding portions of the wrap (10) and are arranged on opposite sides of the pocket (31).
12. A wrapping unit (15) according to any of the claims from 1 to 8, wherein the moving device comprises an actuator (40), which, when the pocket (31) is in the second feeding station (S5), moves the seat (33) perpendicularly to the wrapping path (P4) both relative to the wrapping conveyor (29) and relative to the pocket (31), thus moving the seat (33) away from the pocket (31) in order to move the wrap (10) close to the article (3).
13. A wrapping unit (15) according to any of the claims from 1 to 6, wherein the moving device comprises an accompanying device (37), which is provided with a second sucking-holding head (43), which is designed to hold the wrap (10), is movable between a retracted position, in which the accompanying device (37) is arranged behind the pocket (31), and an extracted position, in which the accompanying device (37) is arranged in front of the pocket (31), and, in the second feeding station (S5), rests against the wrap (10) on the side opposite the article (3), thus pushing the wrap (10) towards the article (3) and clamping the wrap (10) and the article (3) together with the pusher (36).
14. A wrapping unit (15) according to any of the claims from 1 to 13, wherein the seat (33) comprises two third sucking-holding heads (34), which are de-

signed to hold, through suction, corresponding portions of the wrap (10) and are arranged on opposite sides of the pocket (31).

- 5 15. A wrapping method to fold a wrap (10) around an article (3); the wrapping method comprises the steps of:

feeding, along a wrapping path (P4), a wrapping conveyor (29), which supports:

a pocket (31), which is designed to contain the article (3) partially wrapped in the wrap (10), and a seat (33), which is associated with the pocket (31), is arranged opposite the pocket (31), is designed to hold the sole wrap (10), and moves together with the pocket (31) along the wrapping path (P4); feeding the wrap (10) to the seat (33) in a first feeding station (S4); and feeding the article (3) to the pocket (31) together with the wrap (10) previously arranged in the seat (33) opposite the pocket (31) in a second feeding station (S5), which is arranged downstream of the first feeding station (S4) along the wrapping path (P4); wherein a pusher (36) is provided, which, in the second feeding station (S5), rests against the article (3) on the side opposite the wrap (10) and pushes the article (3) into the pocket (31) together with wrap (10); the wrapping method is **characterized in that** it comprises the further step of moving, at first and in the second feeding station (S5), the wrap (10) away from the pocket (31), thus moving the wrap (10) close the article (3), before the article (3) is pushed into the pocket (31) together with the wrap (10).

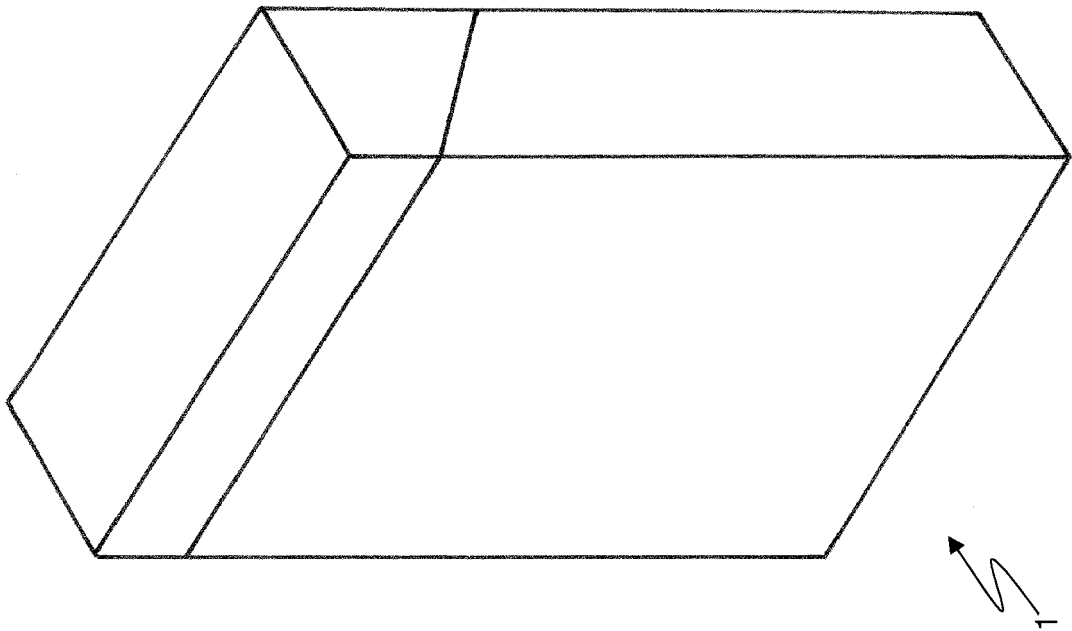


Fig. 2

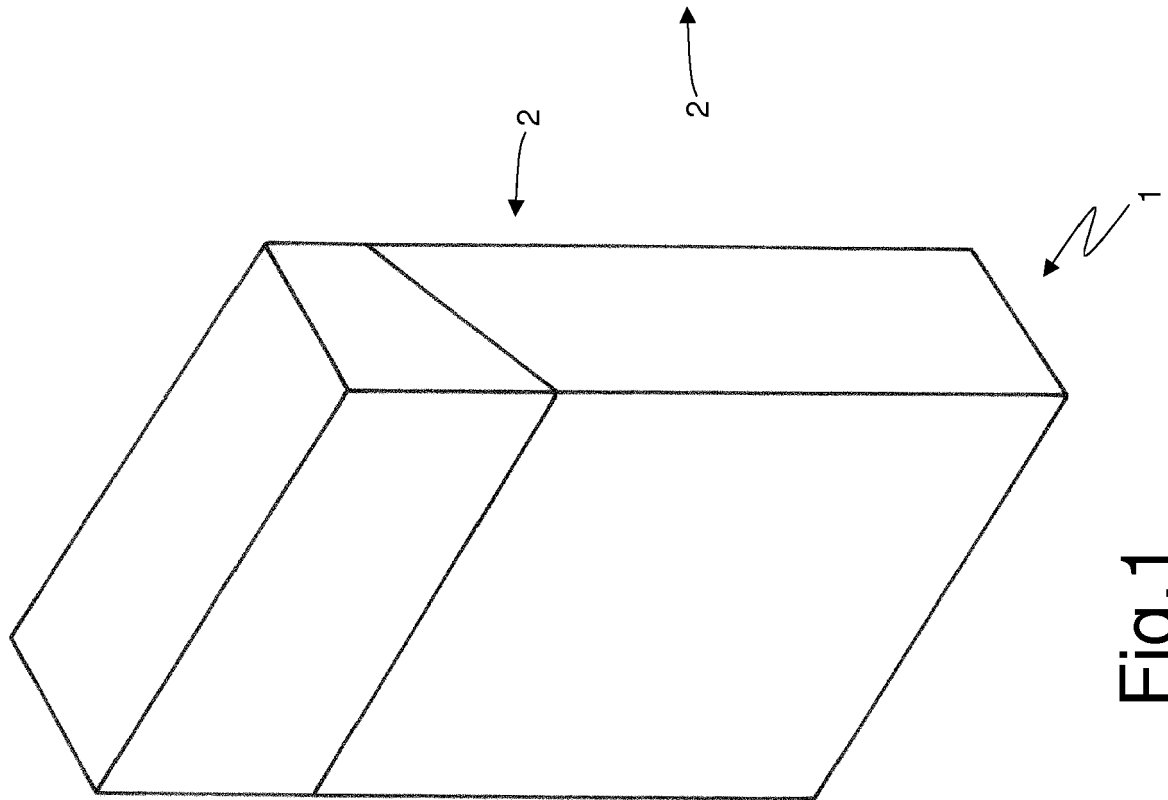


Fig. 1

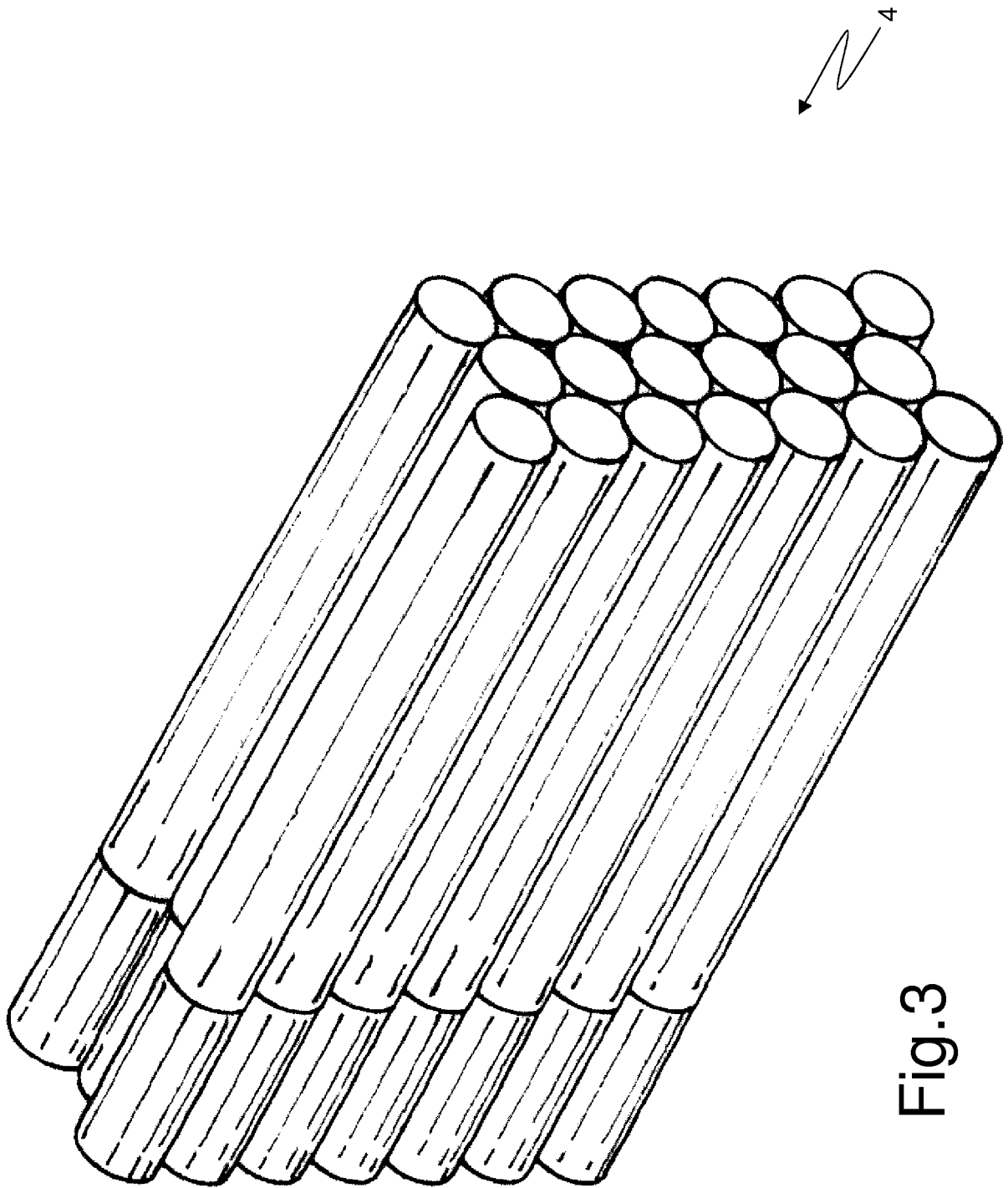
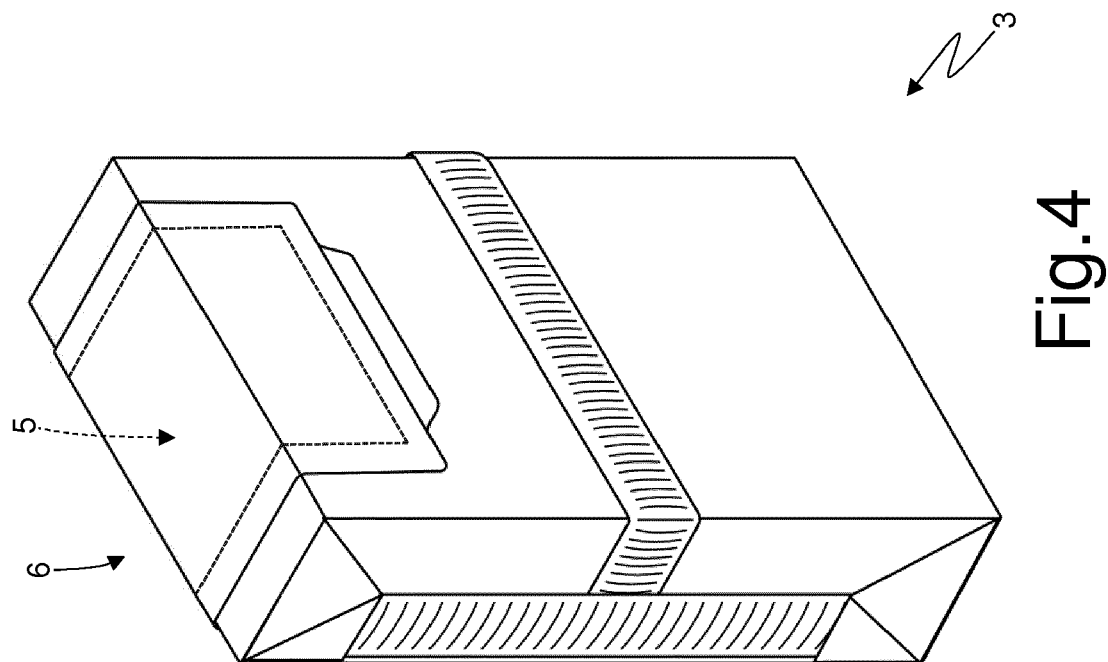
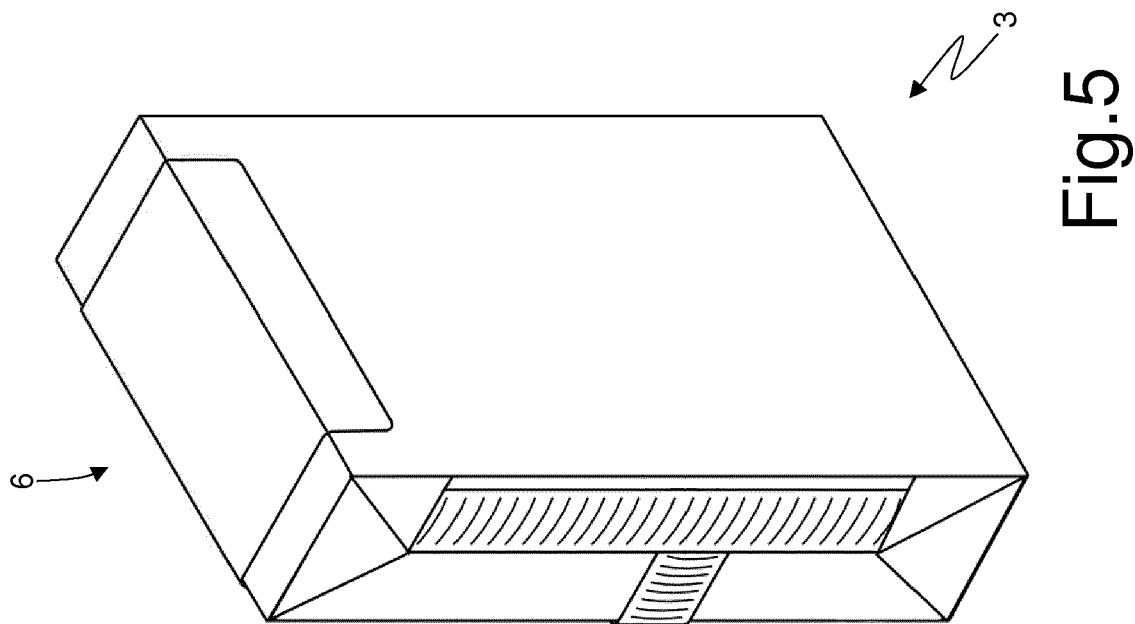


Fig.3



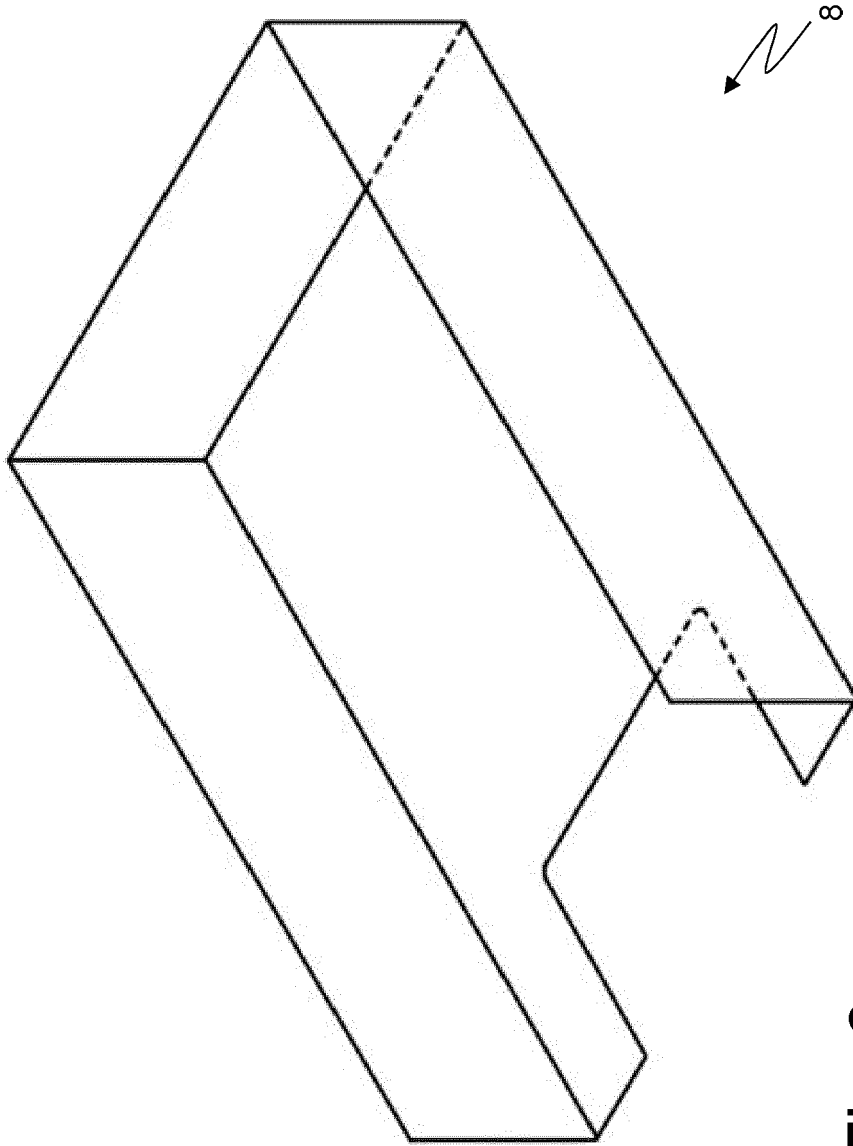


Fig.6

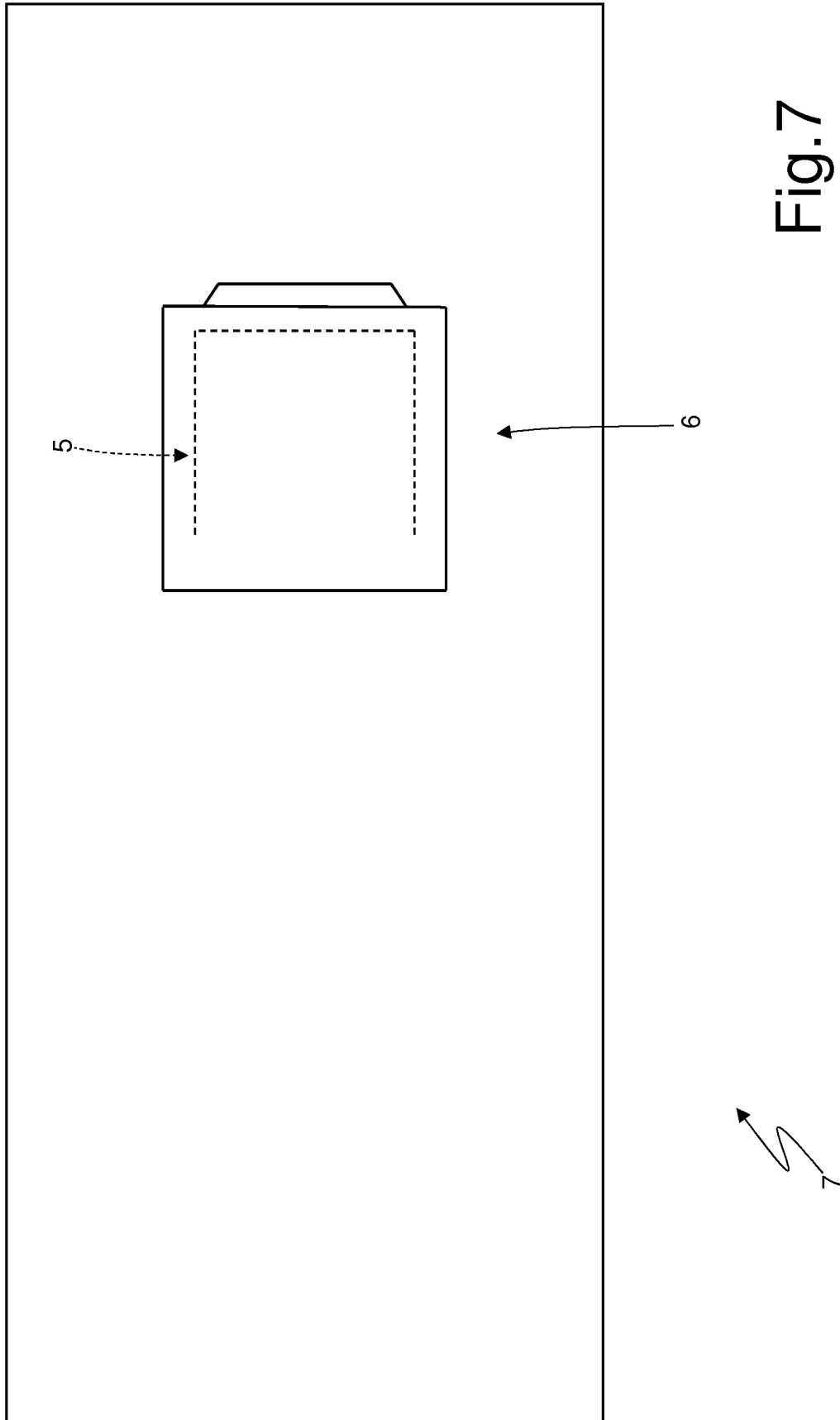


Fig. 7

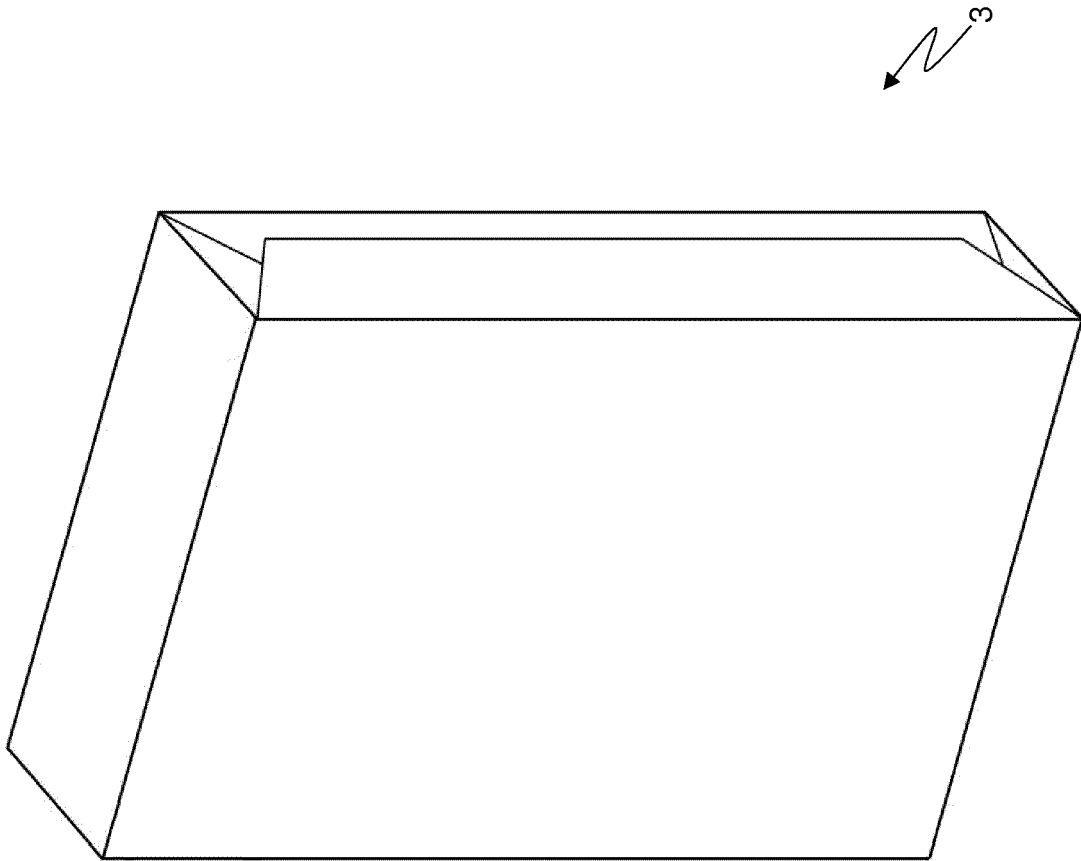


Fig.8

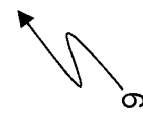
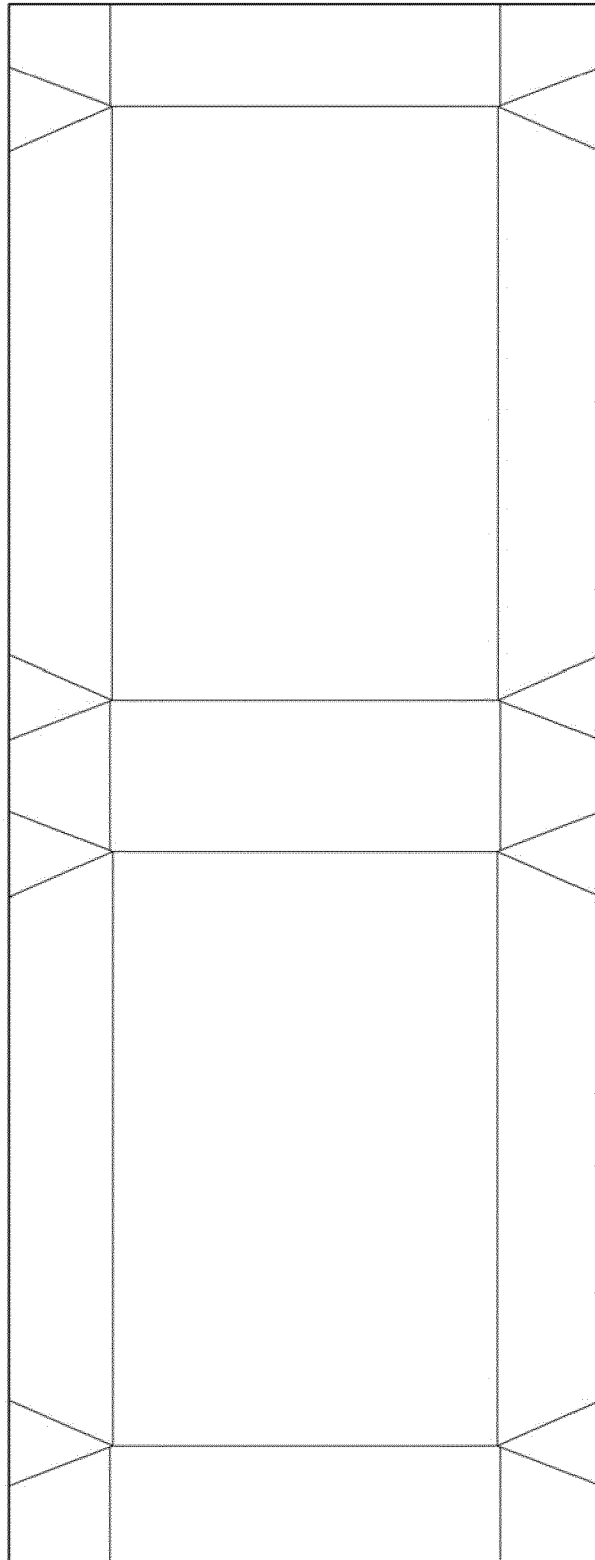


Fig.9

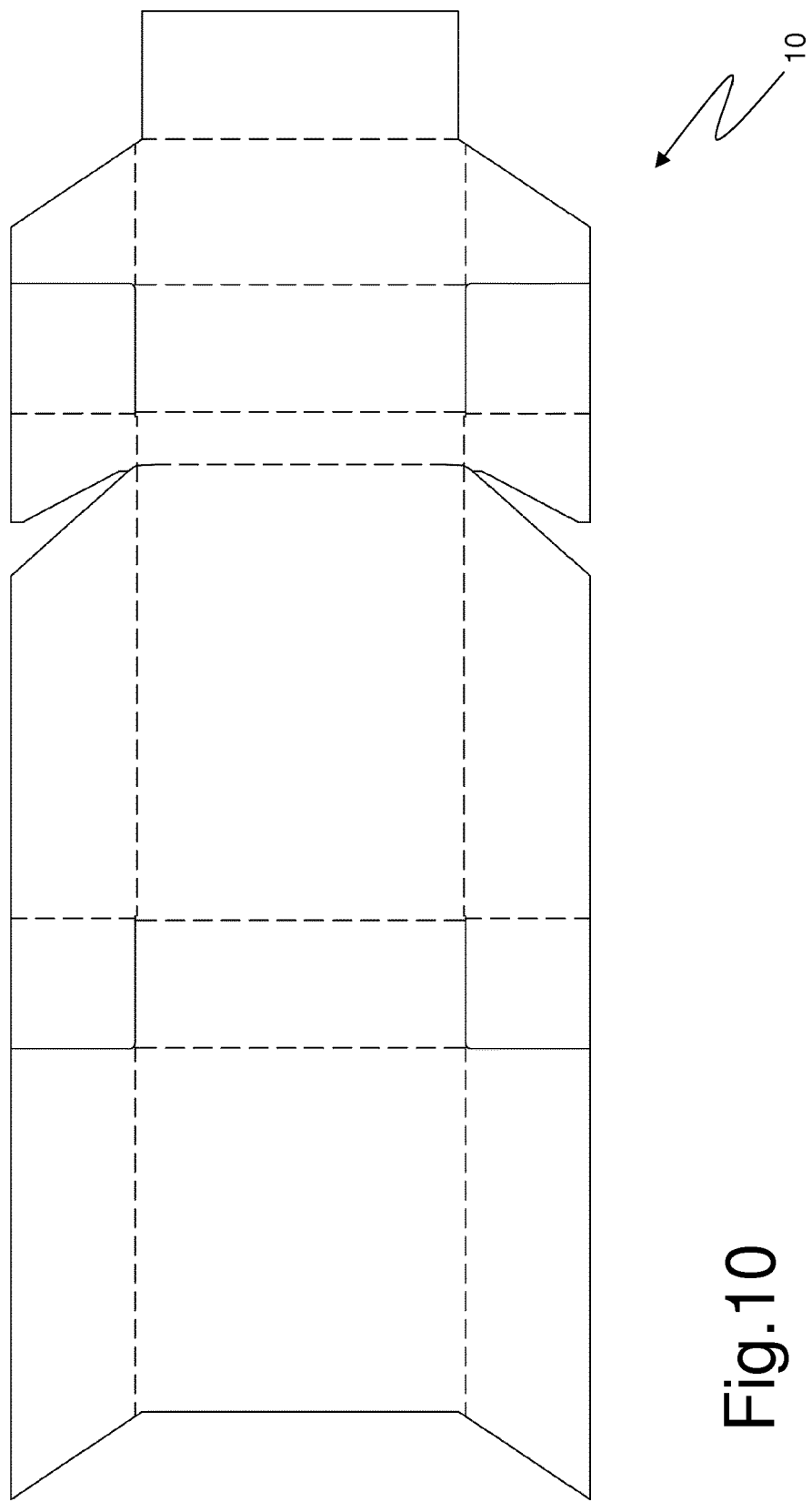


Fig.10

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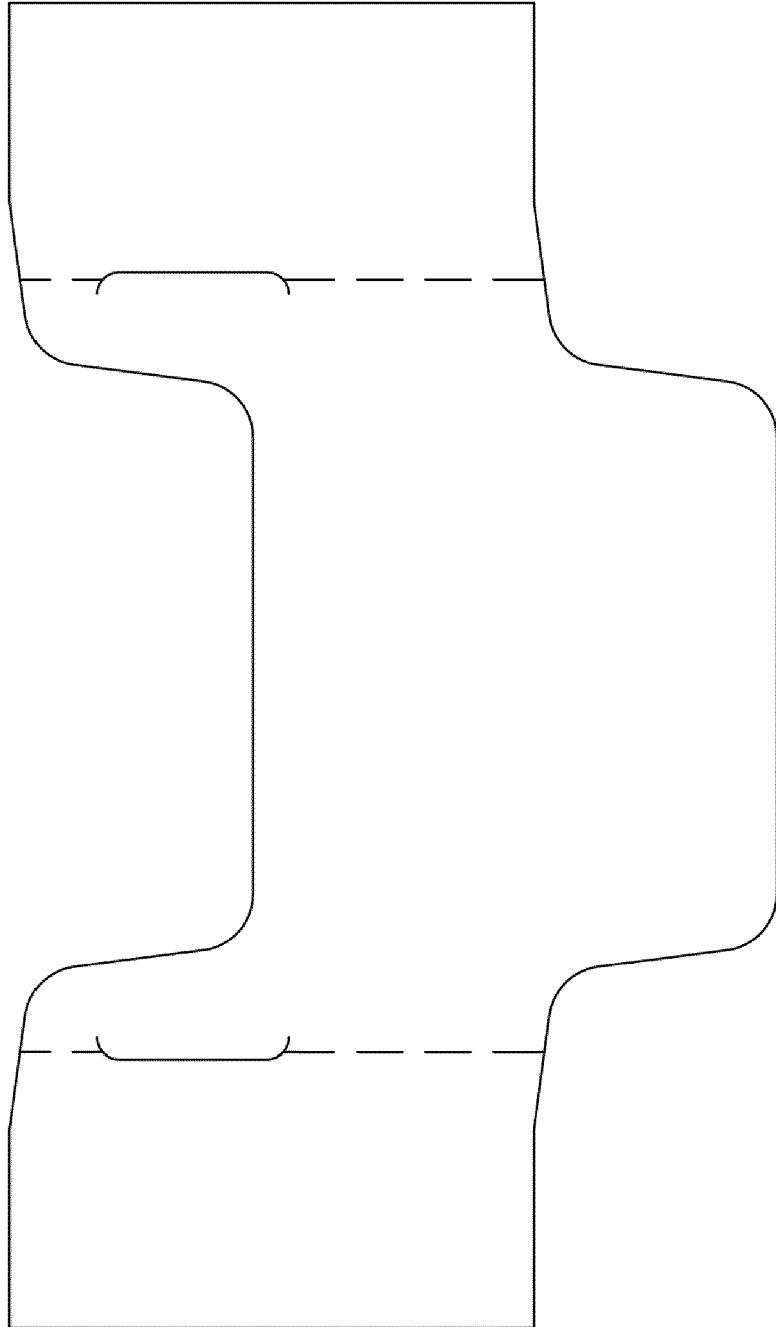


Fig. 11

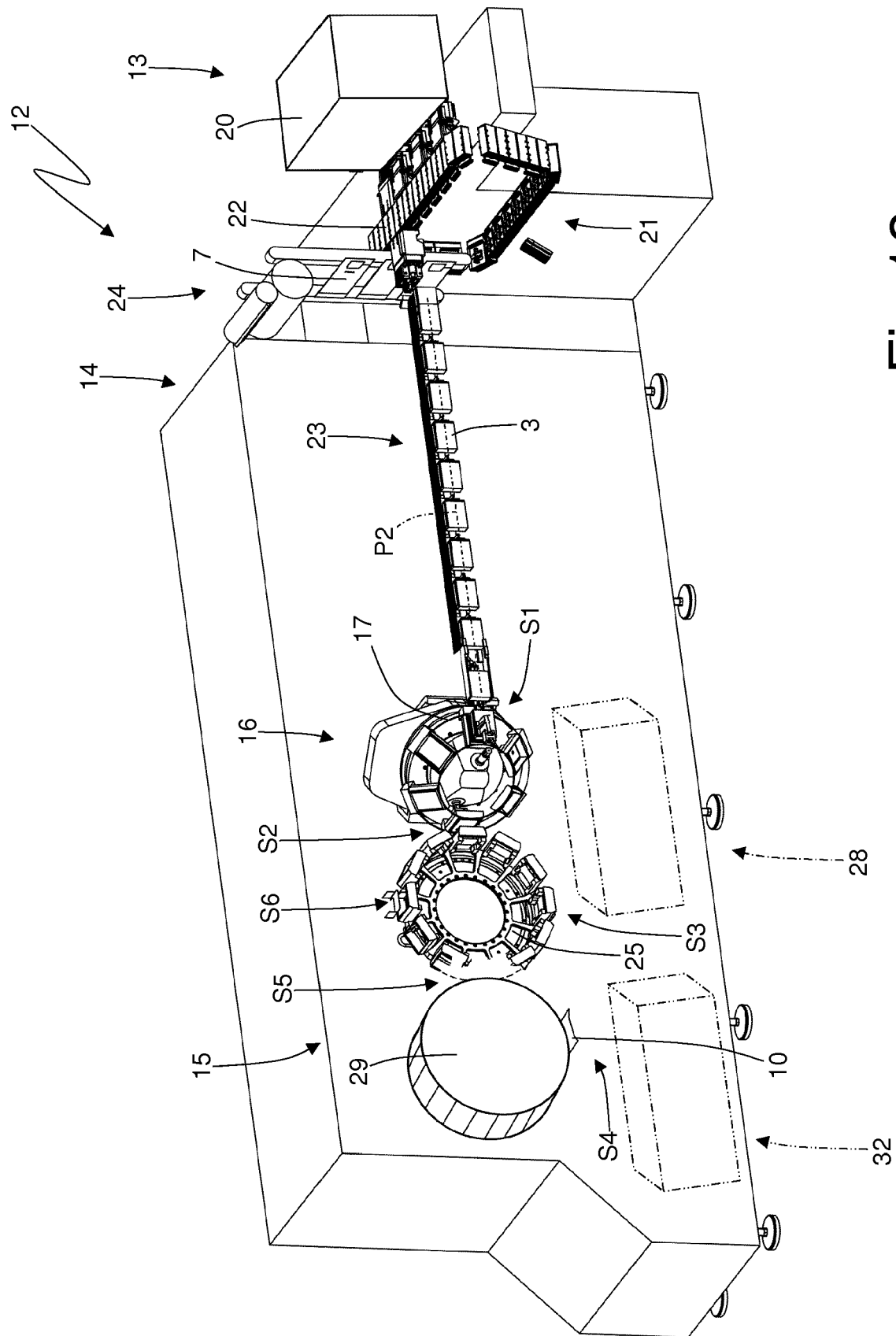


Fig.12

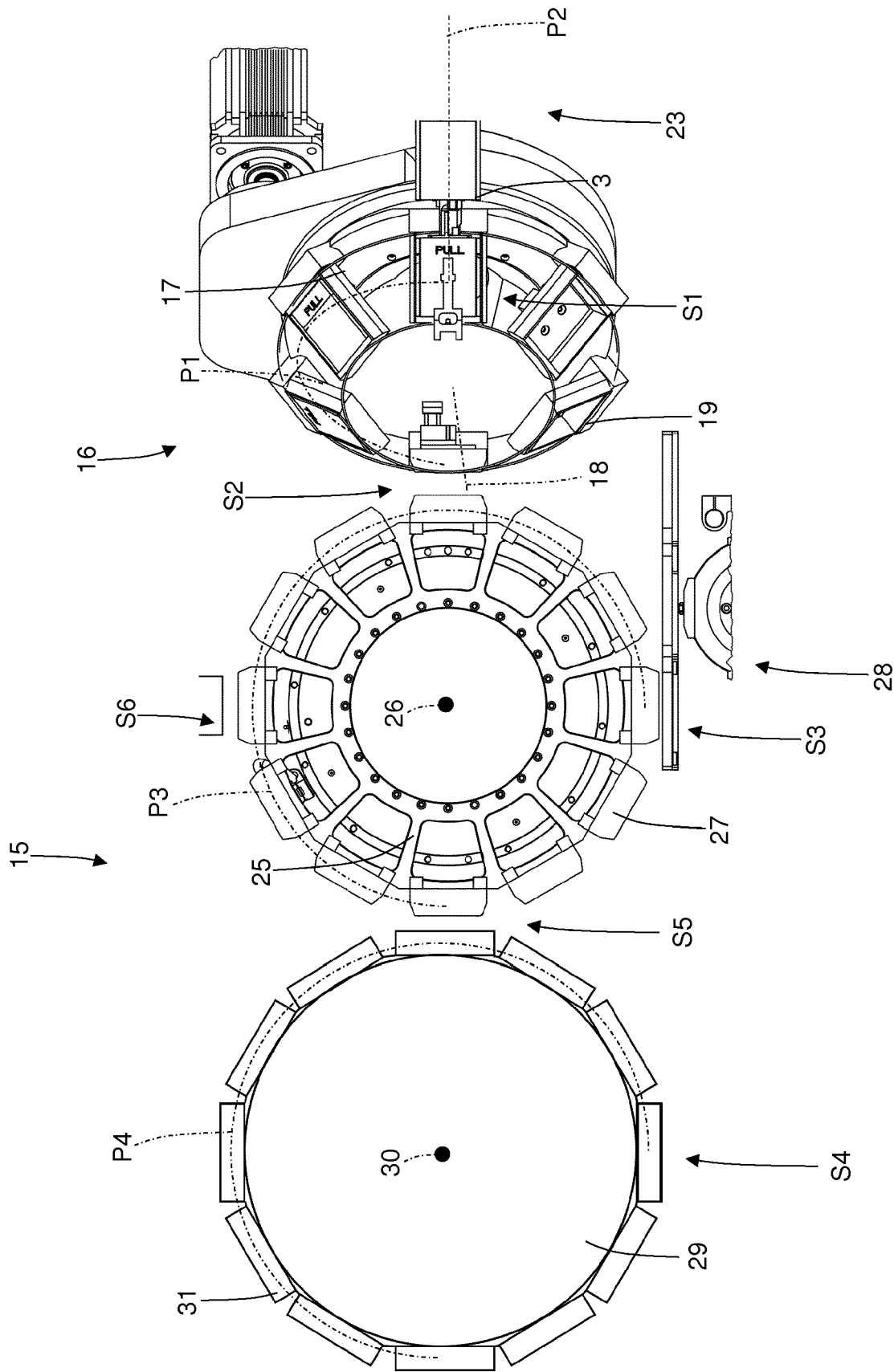


Fig.13

Fig.14

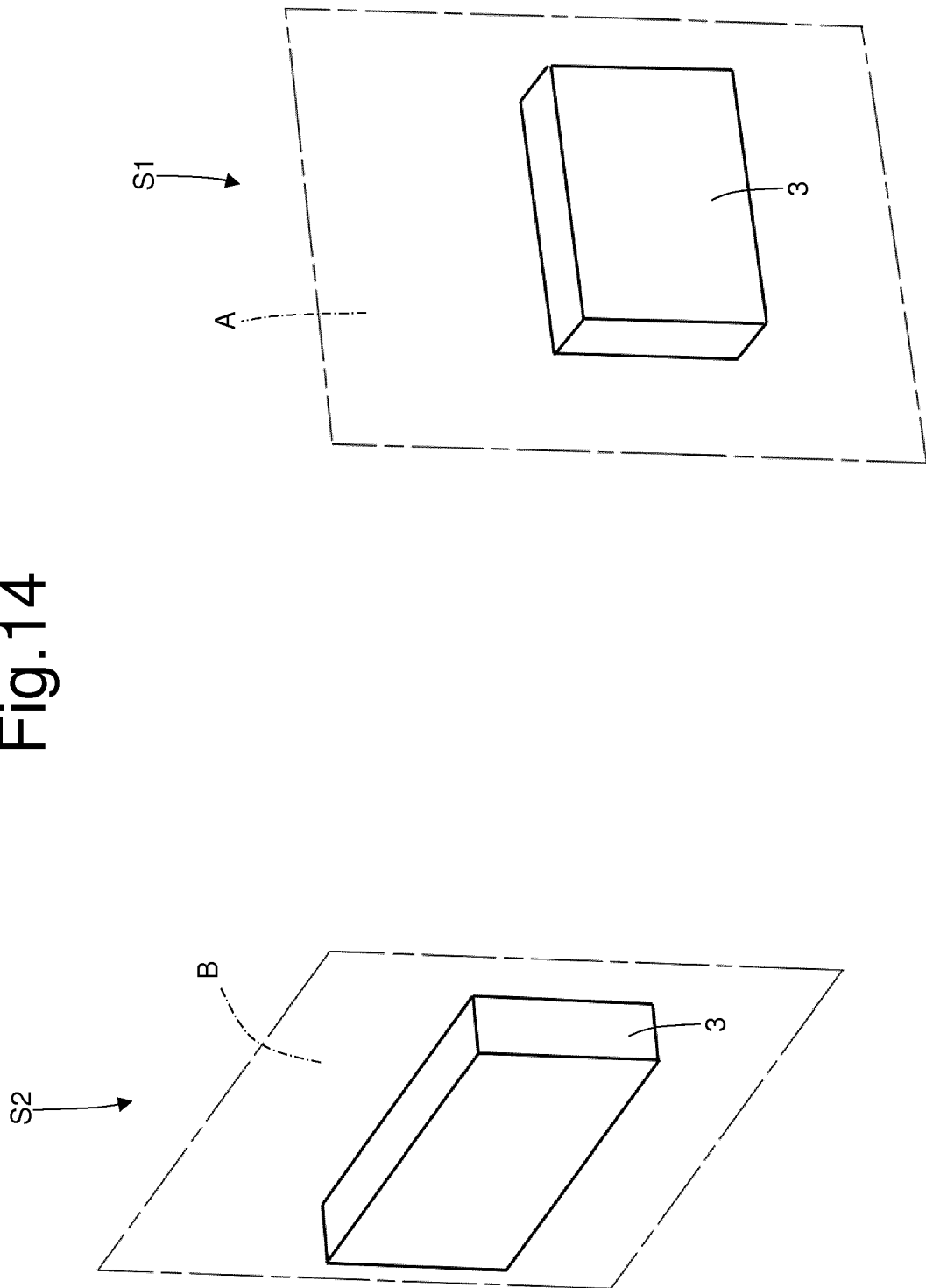


Fig.15

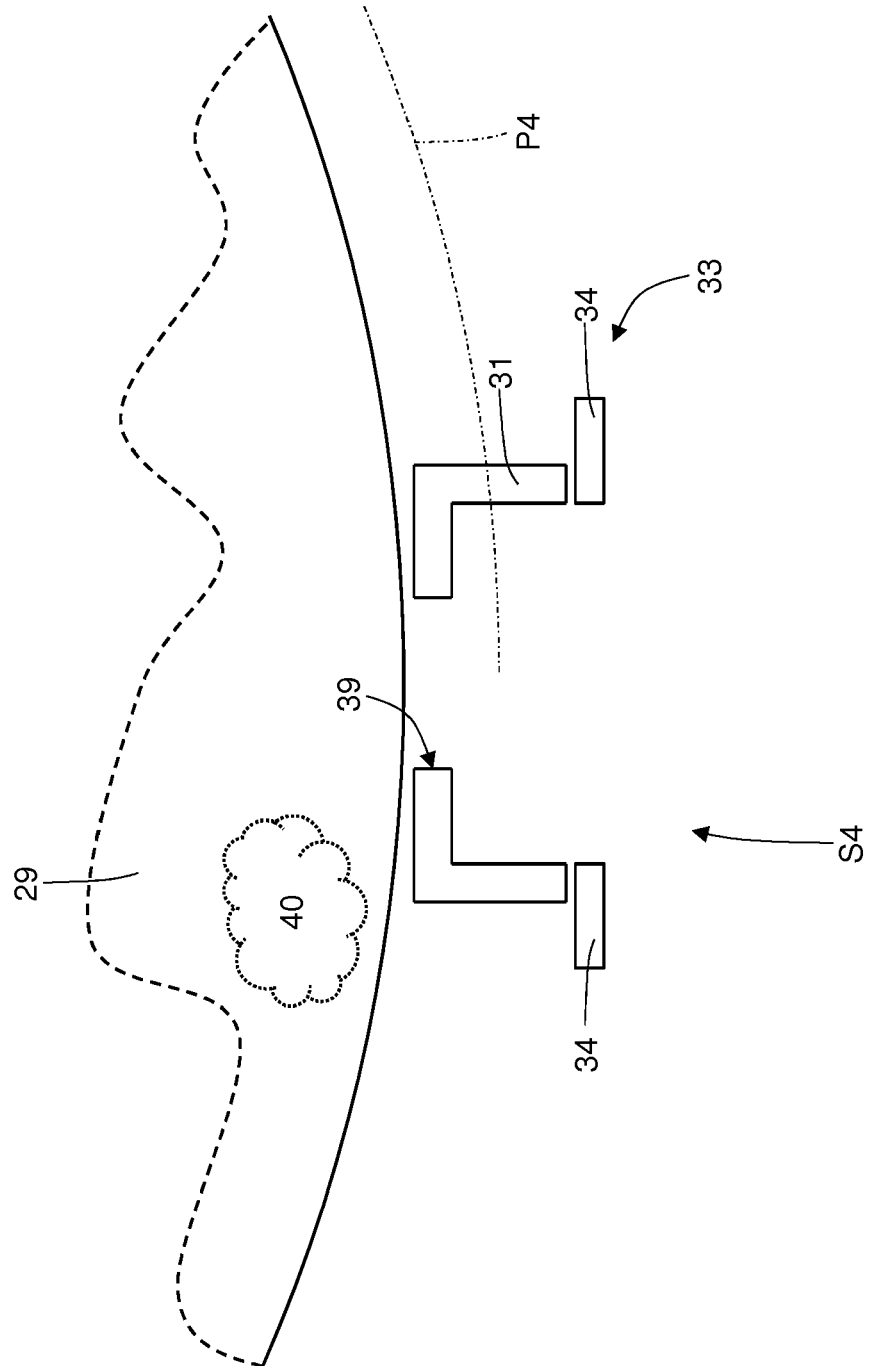


Fig.16

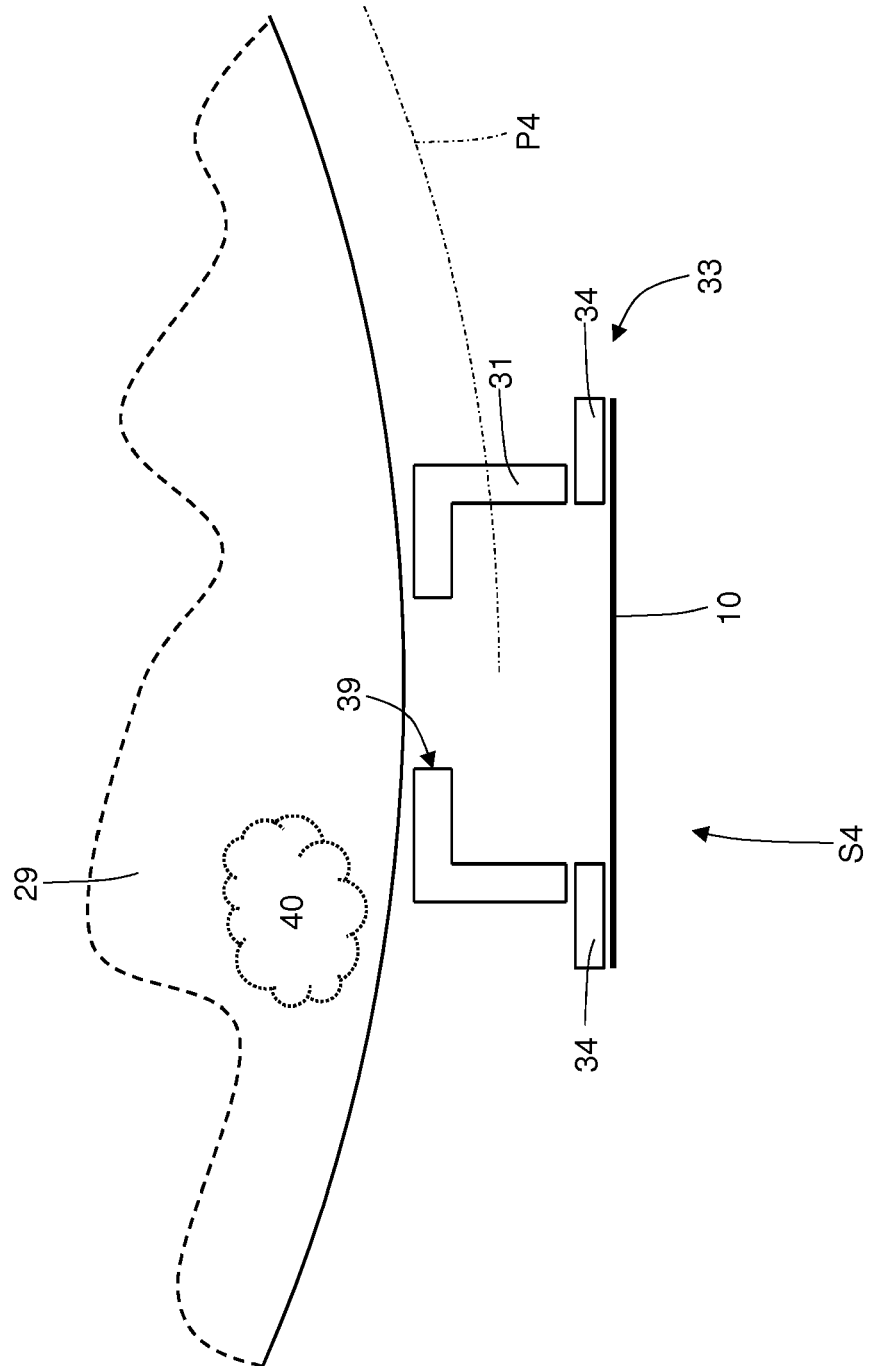


Fig.17

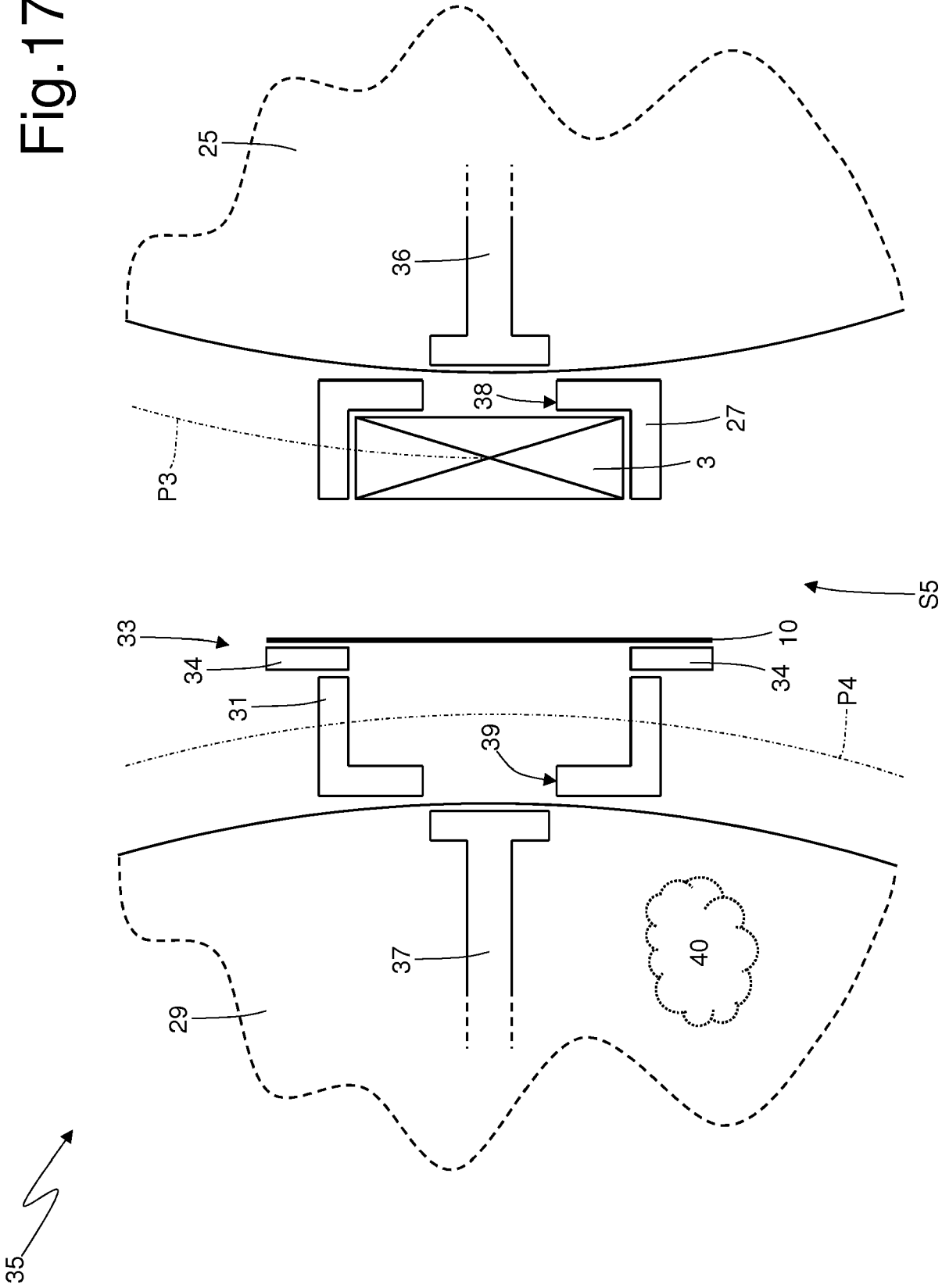


Fig.18

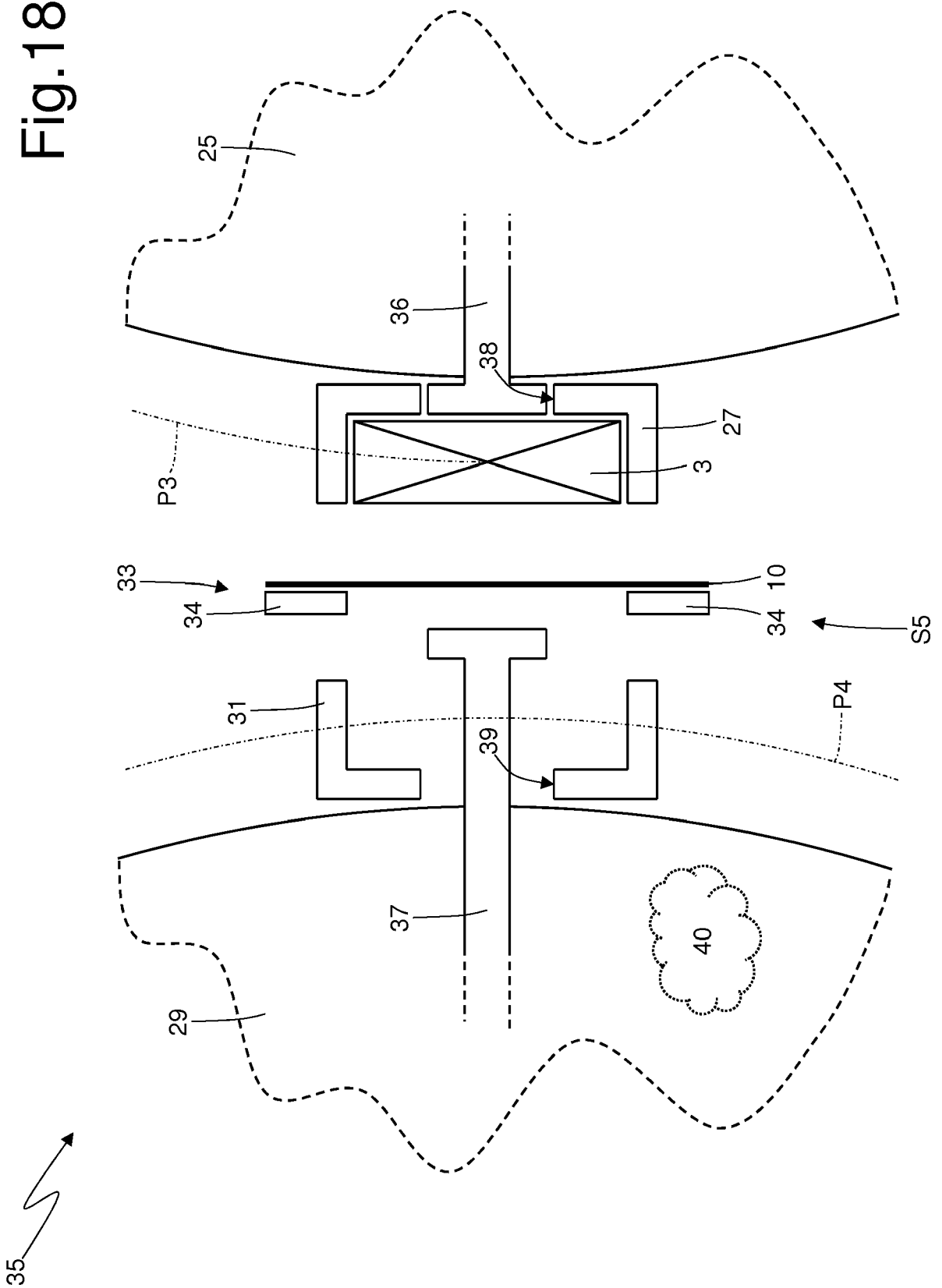


Fig.19

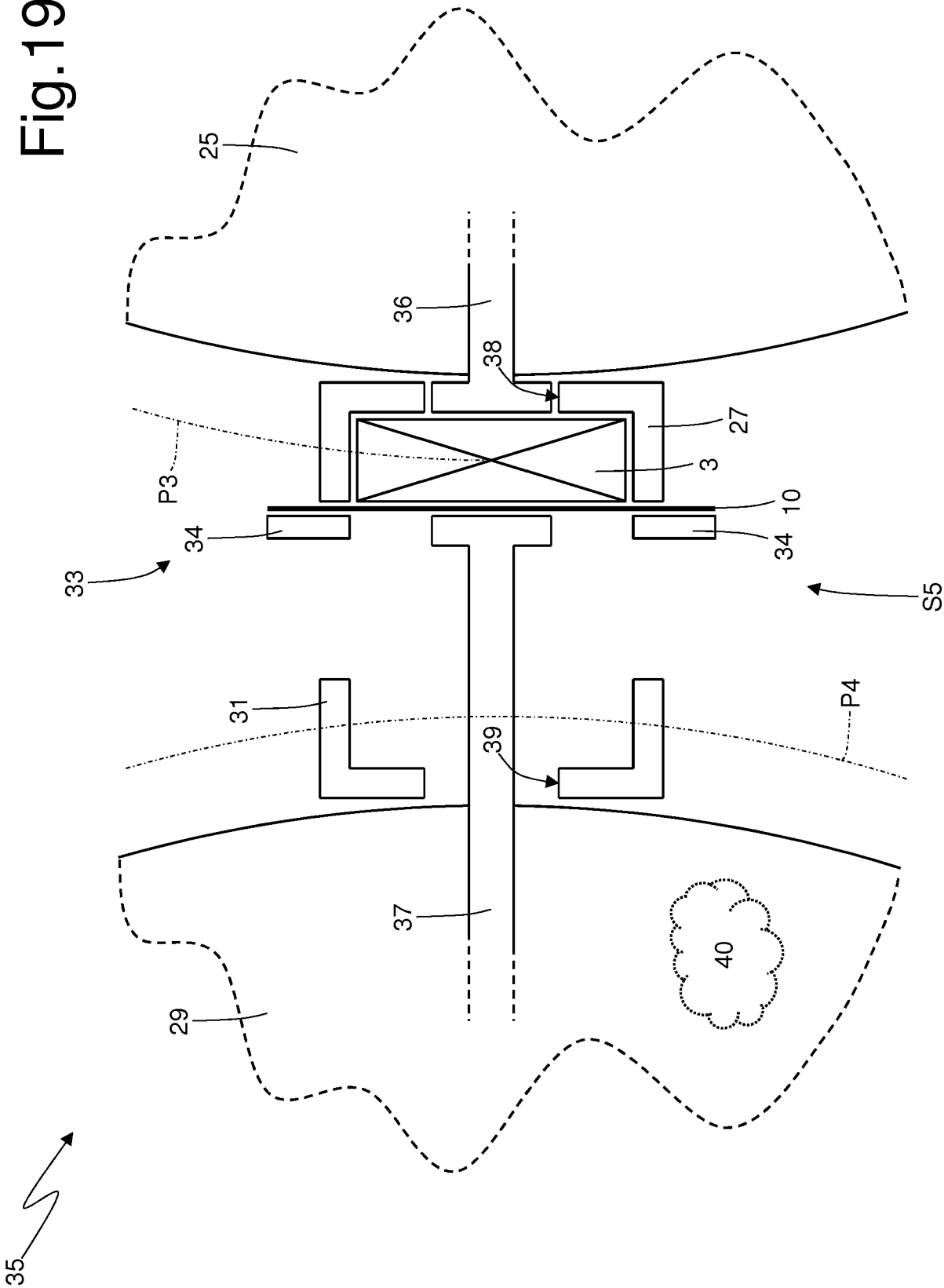


Fig.20

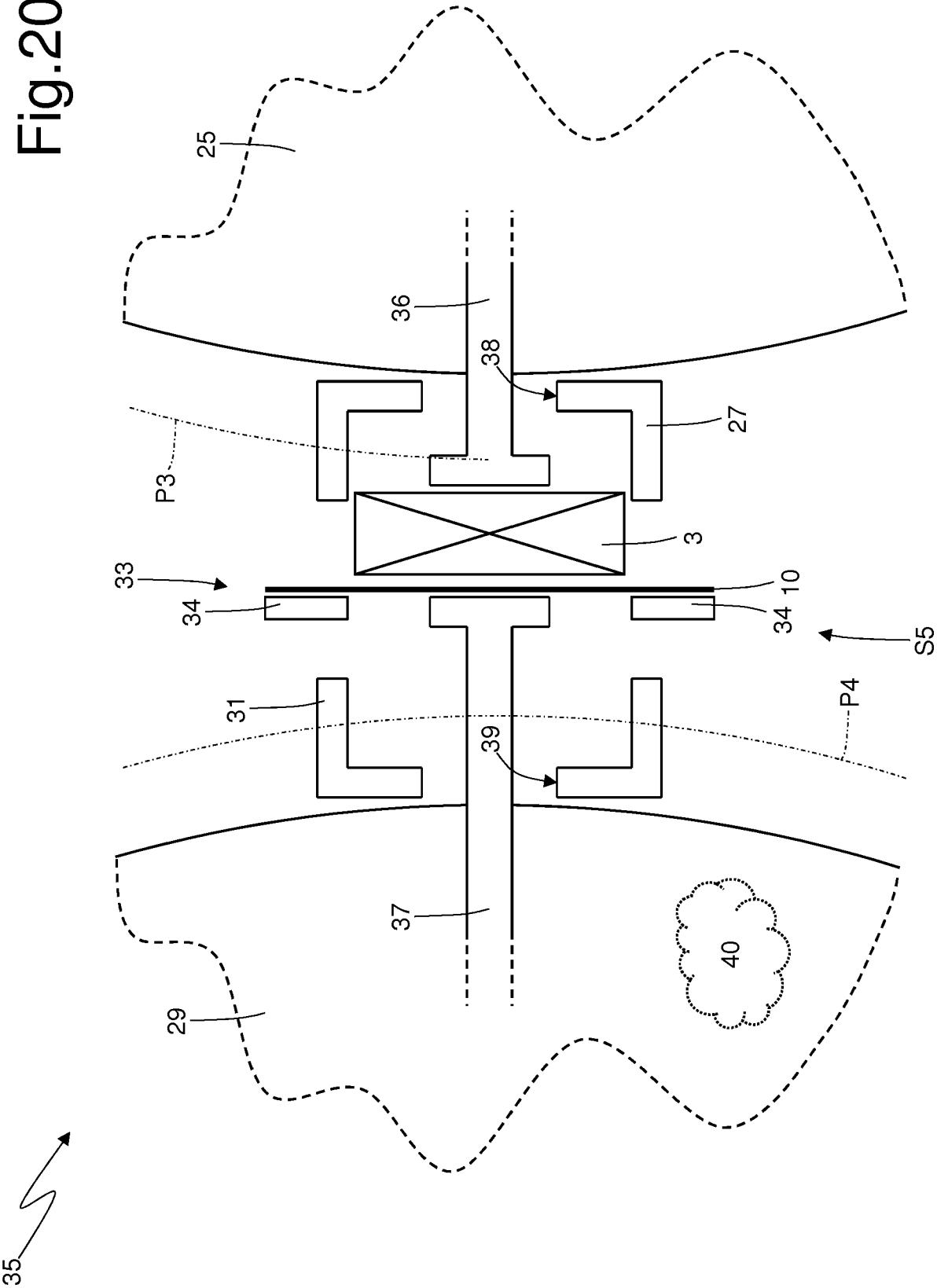


Fig. 21

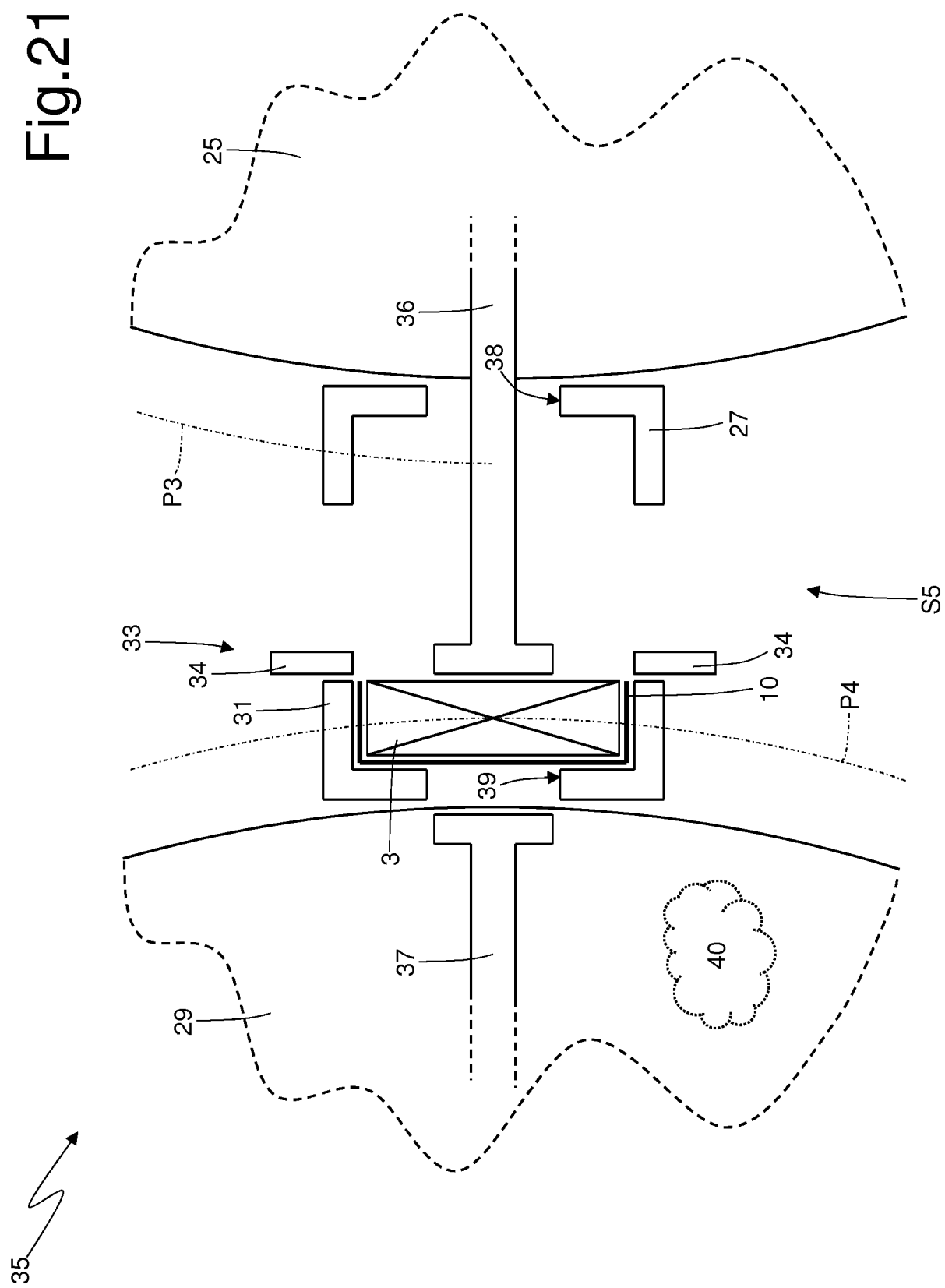


Fig.22

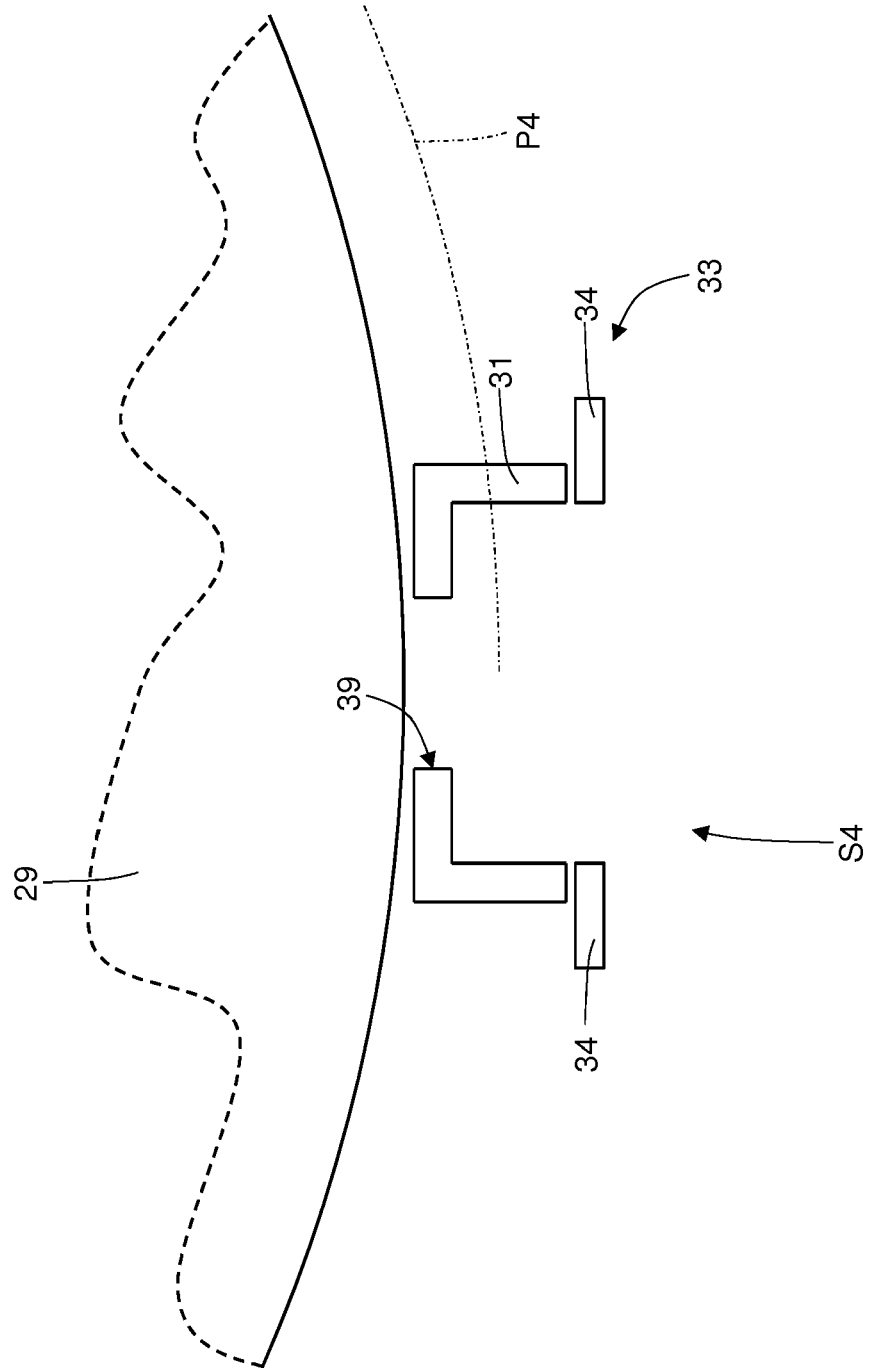


Fig.23

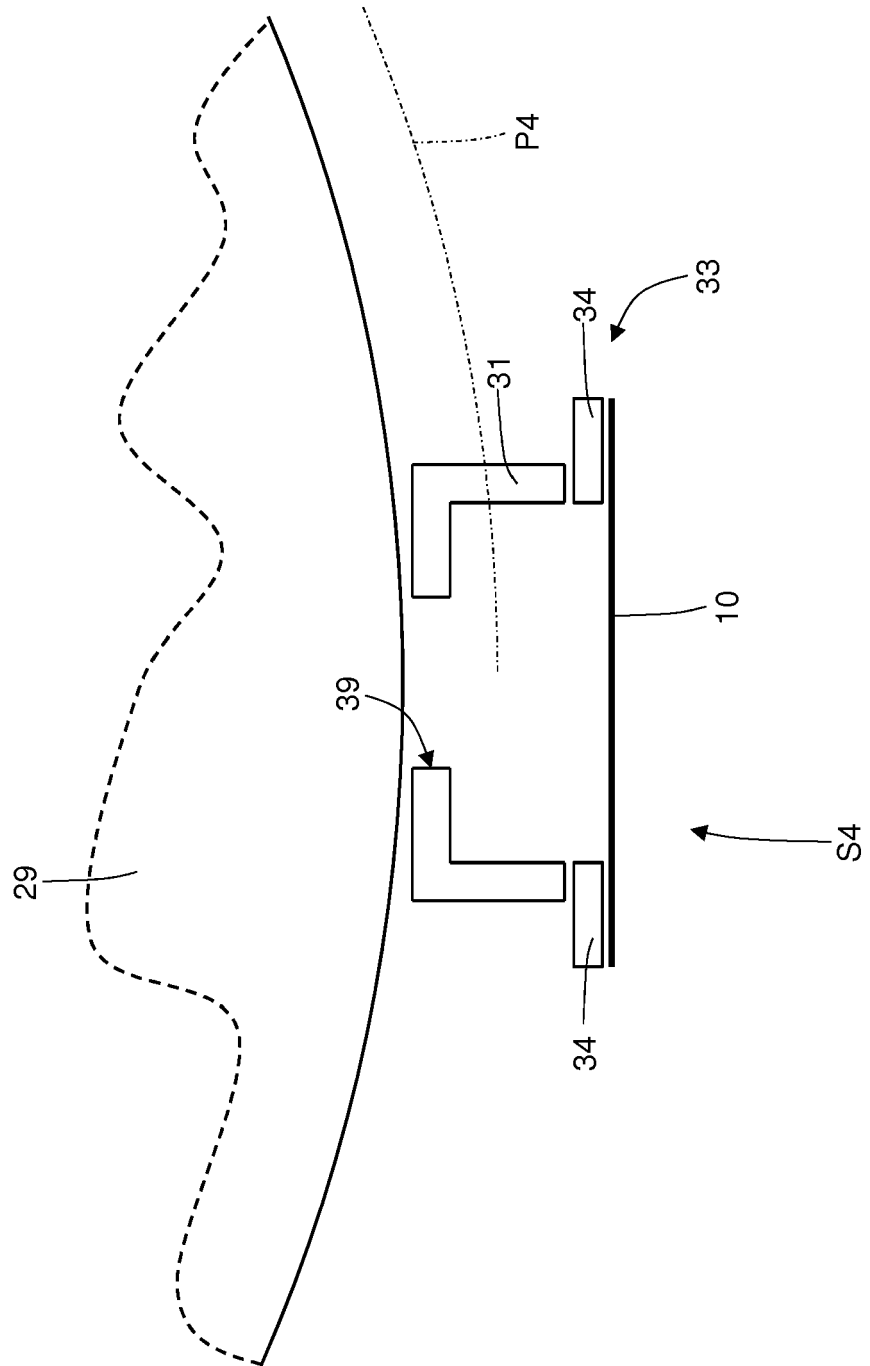


Fig.24

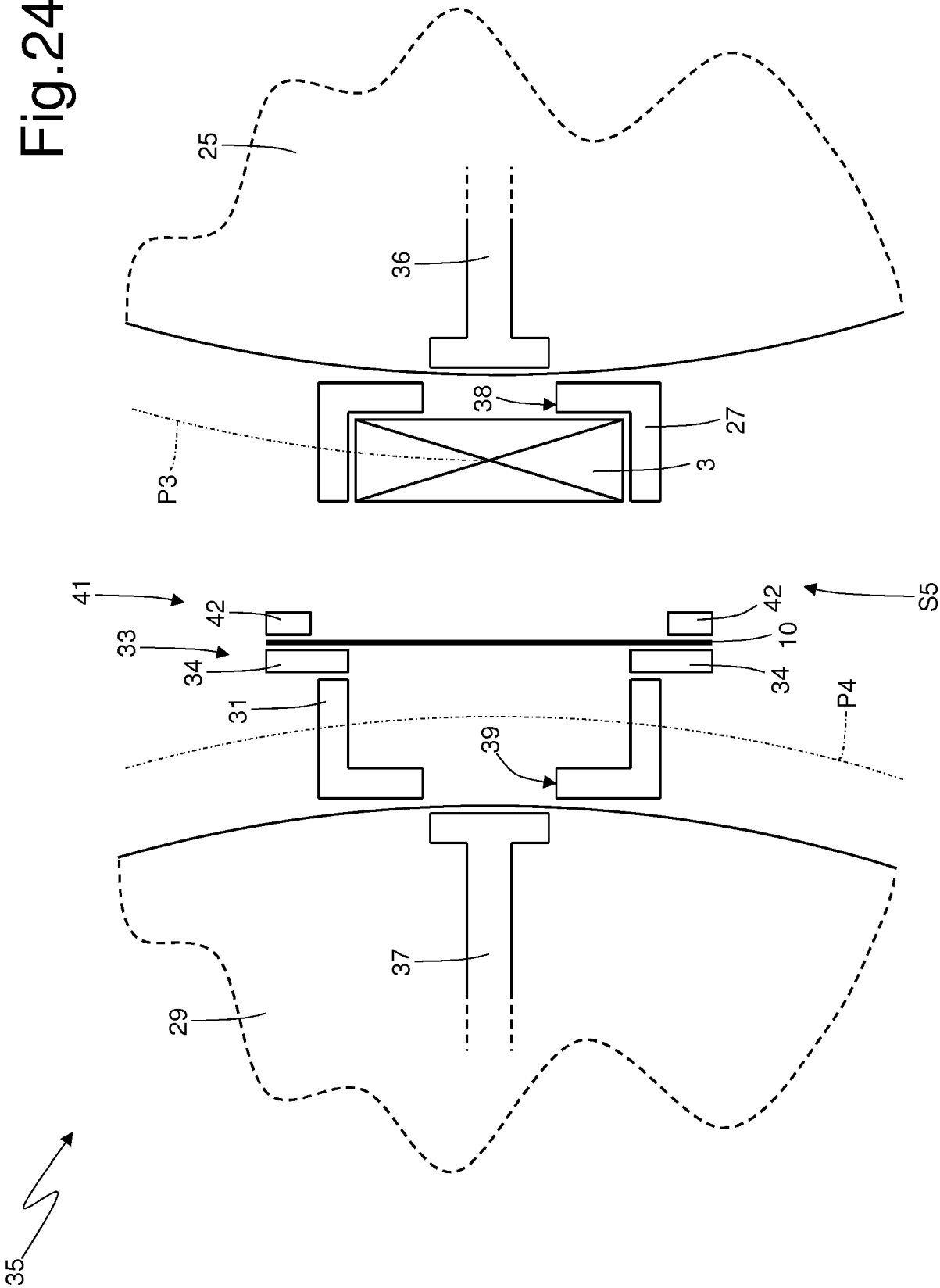


Fig. 25

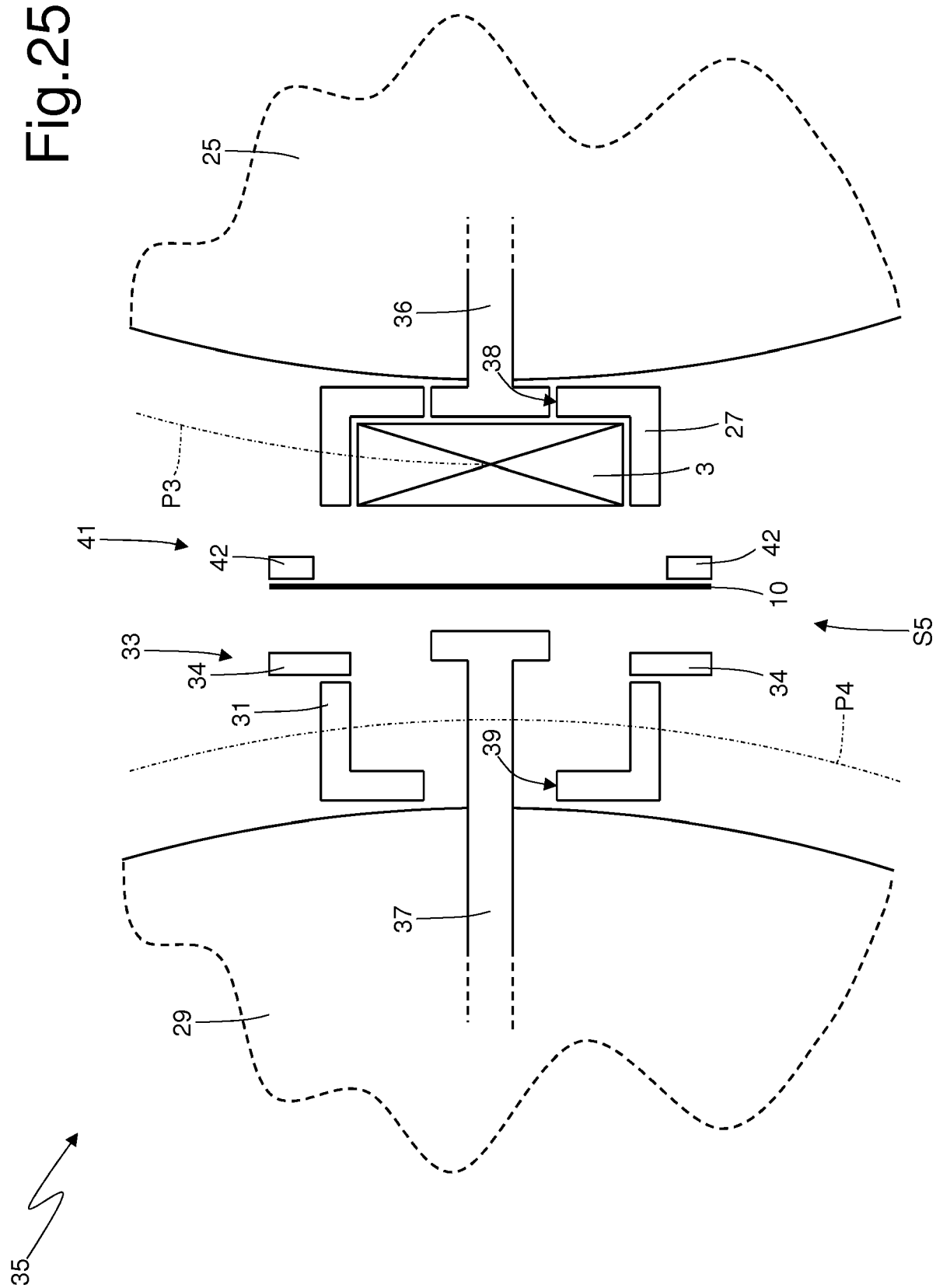


Fig. 26

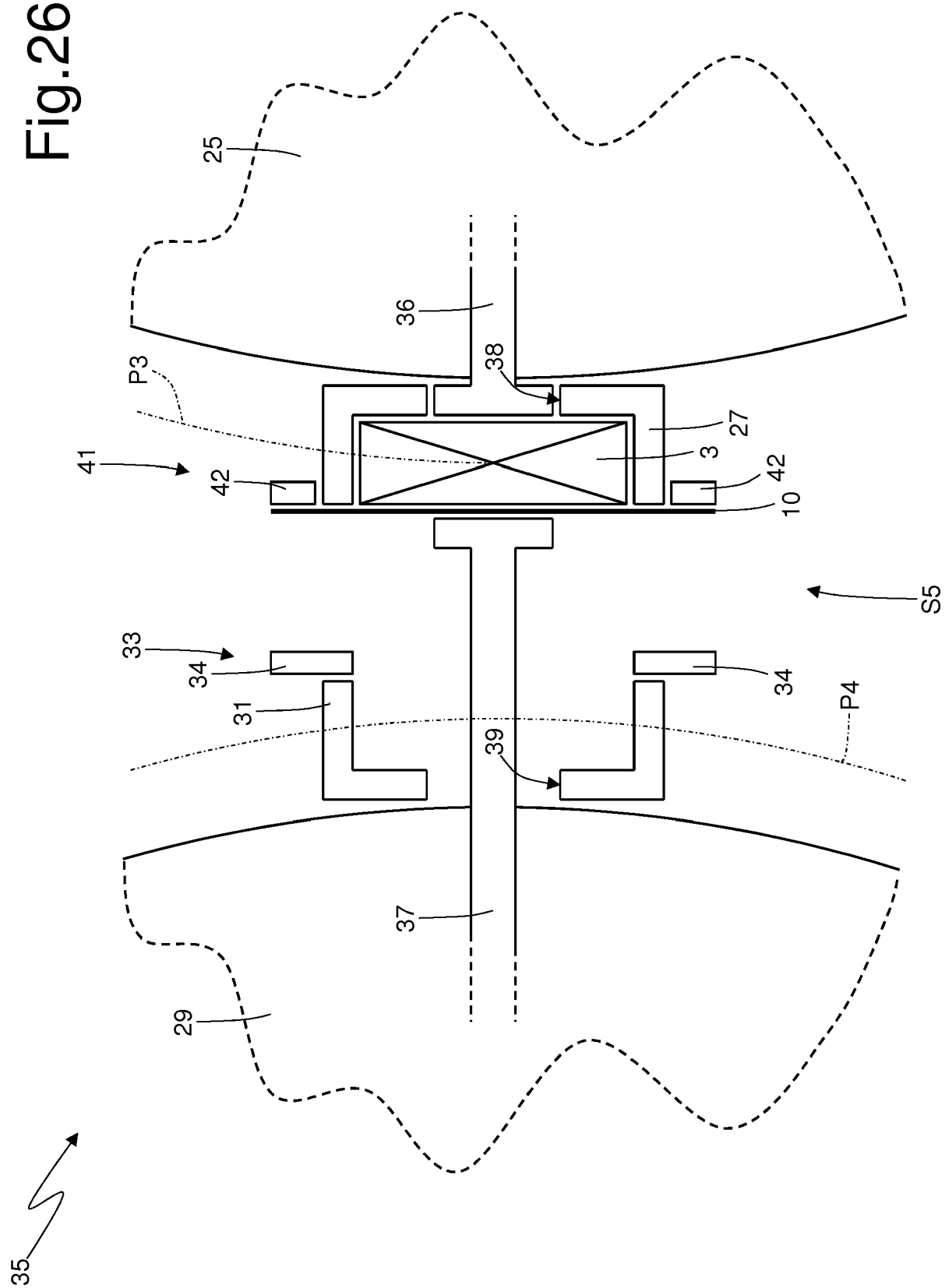


Fig. 27

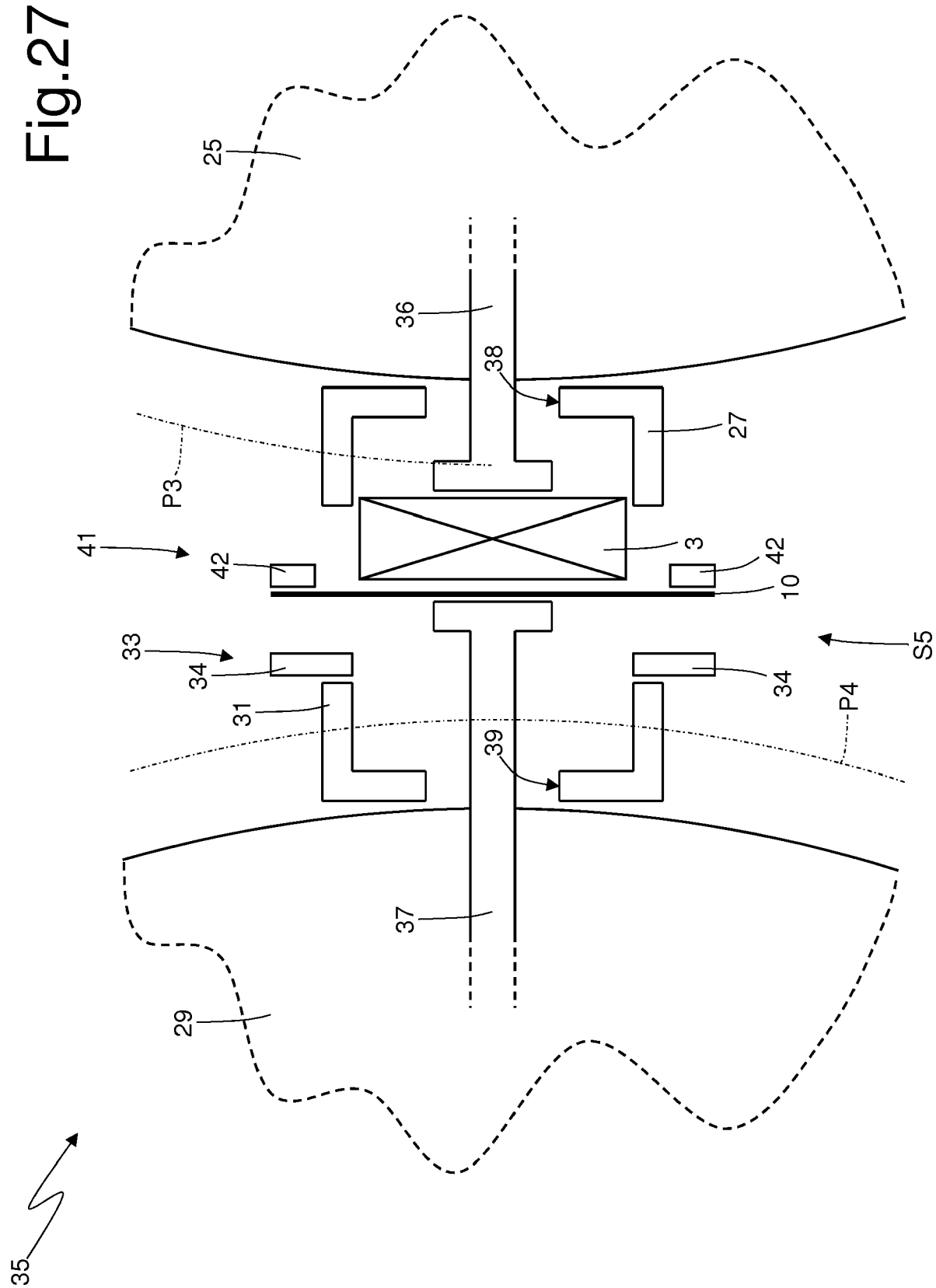


Fig.28

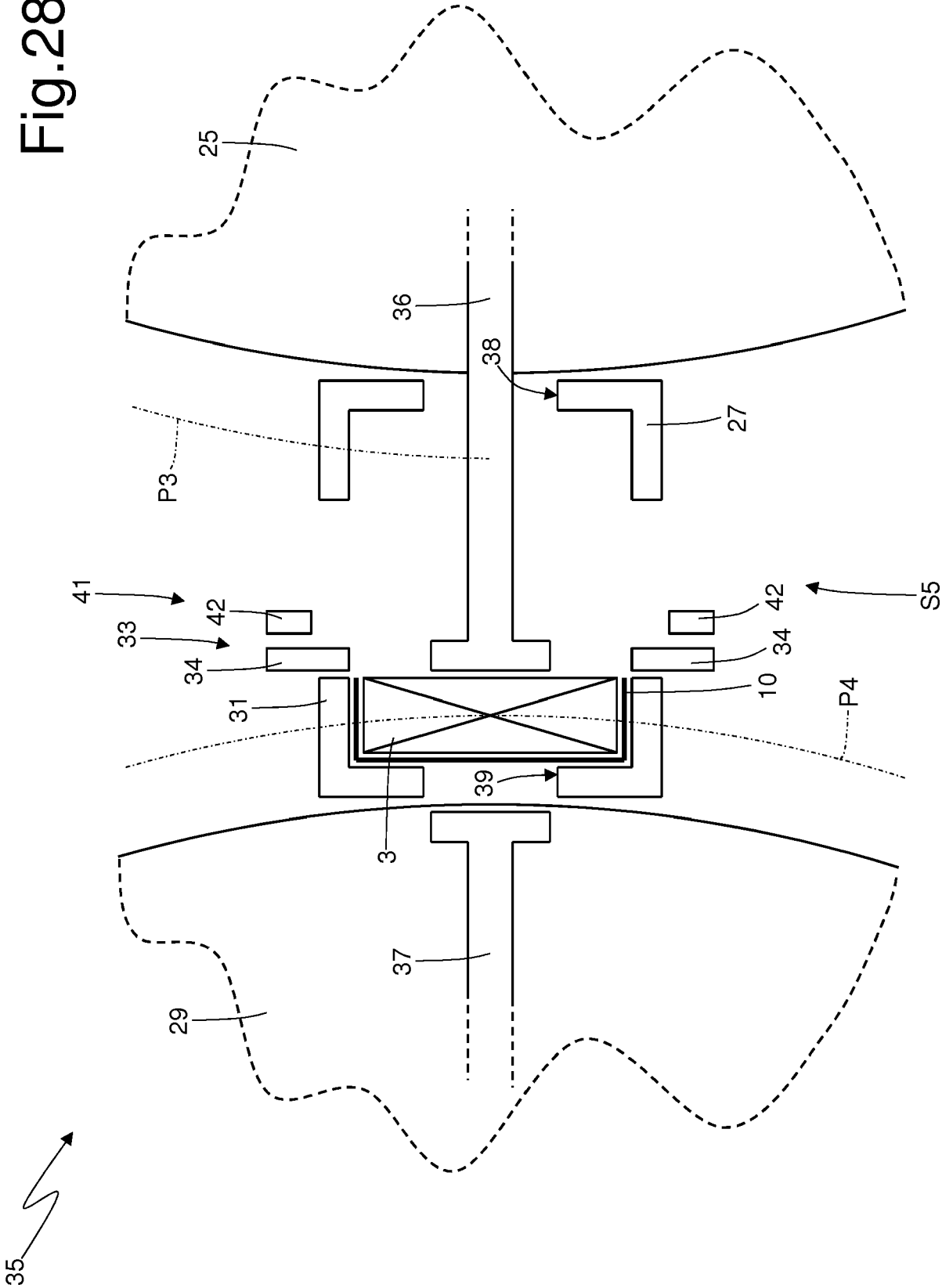


Fig.29

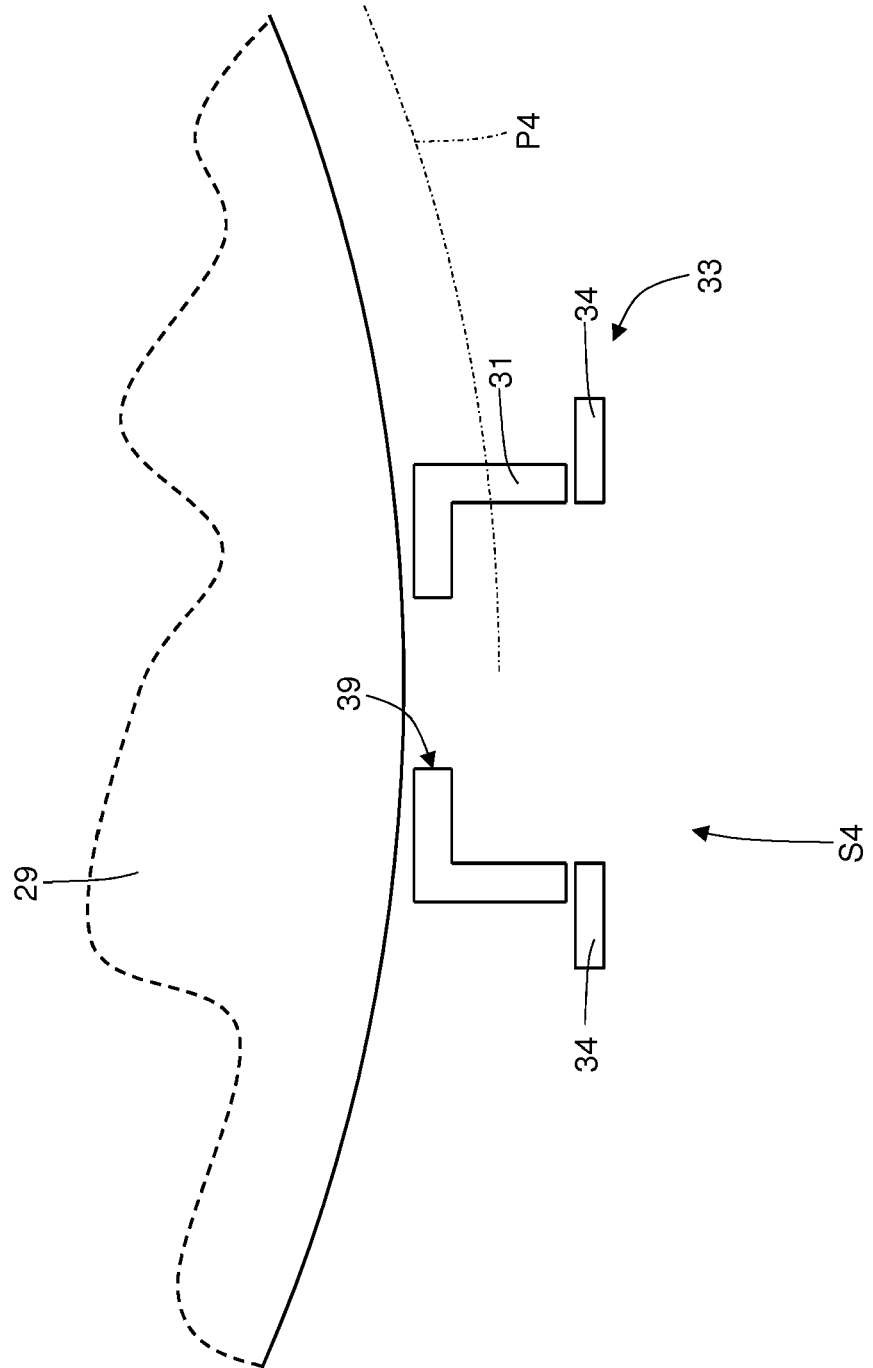


Fig.30

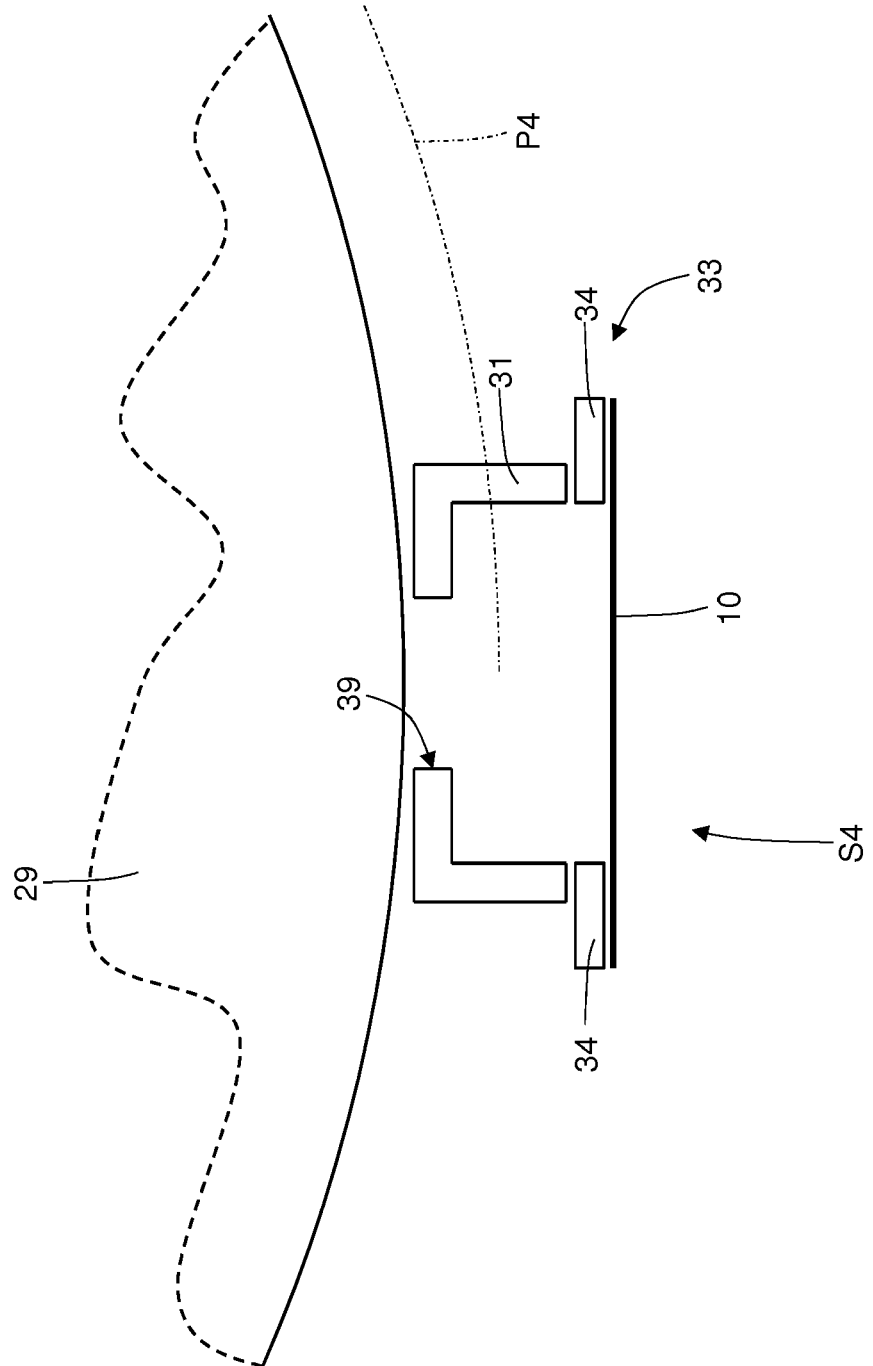


Fig.31

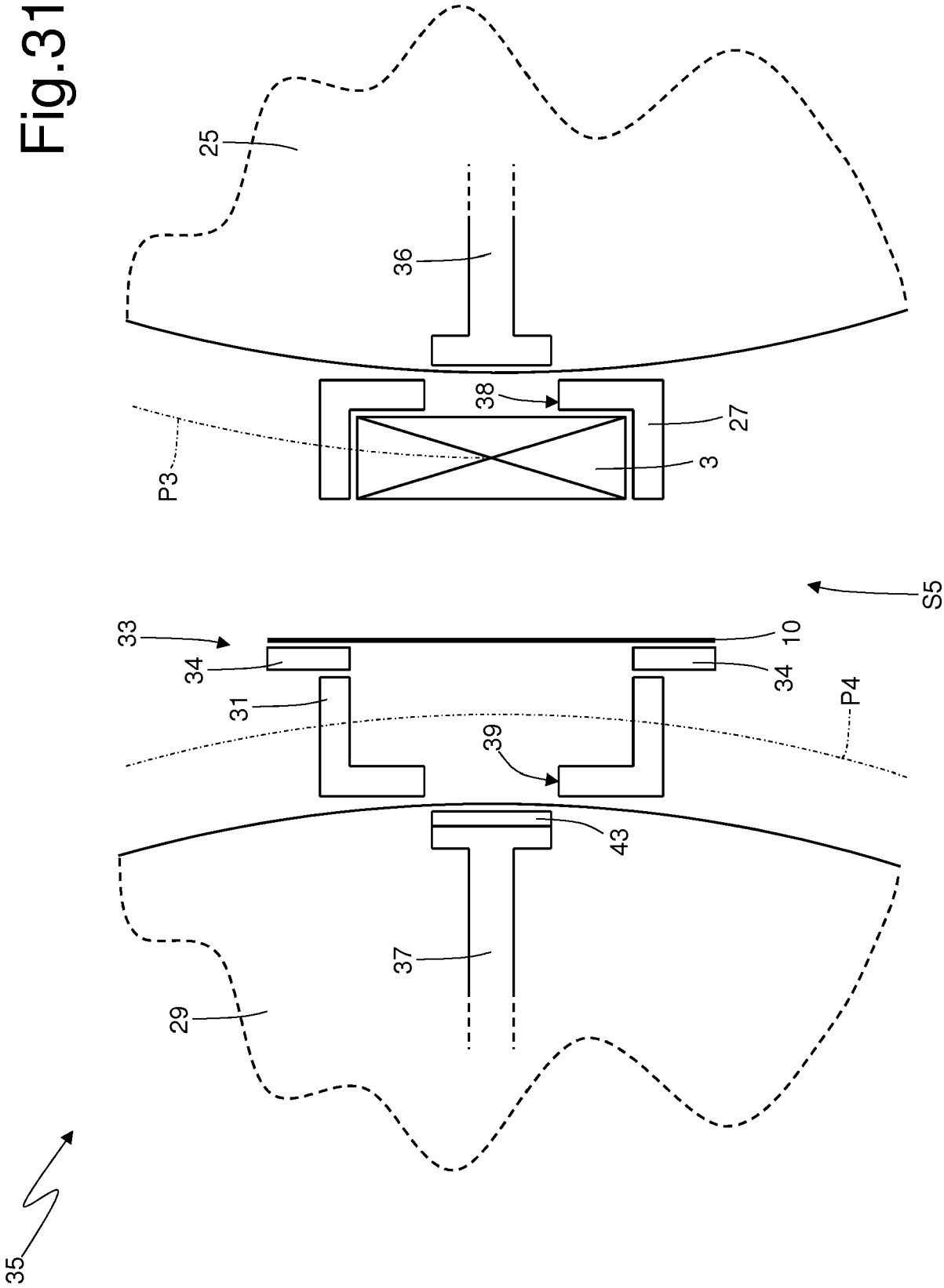


Fig.32

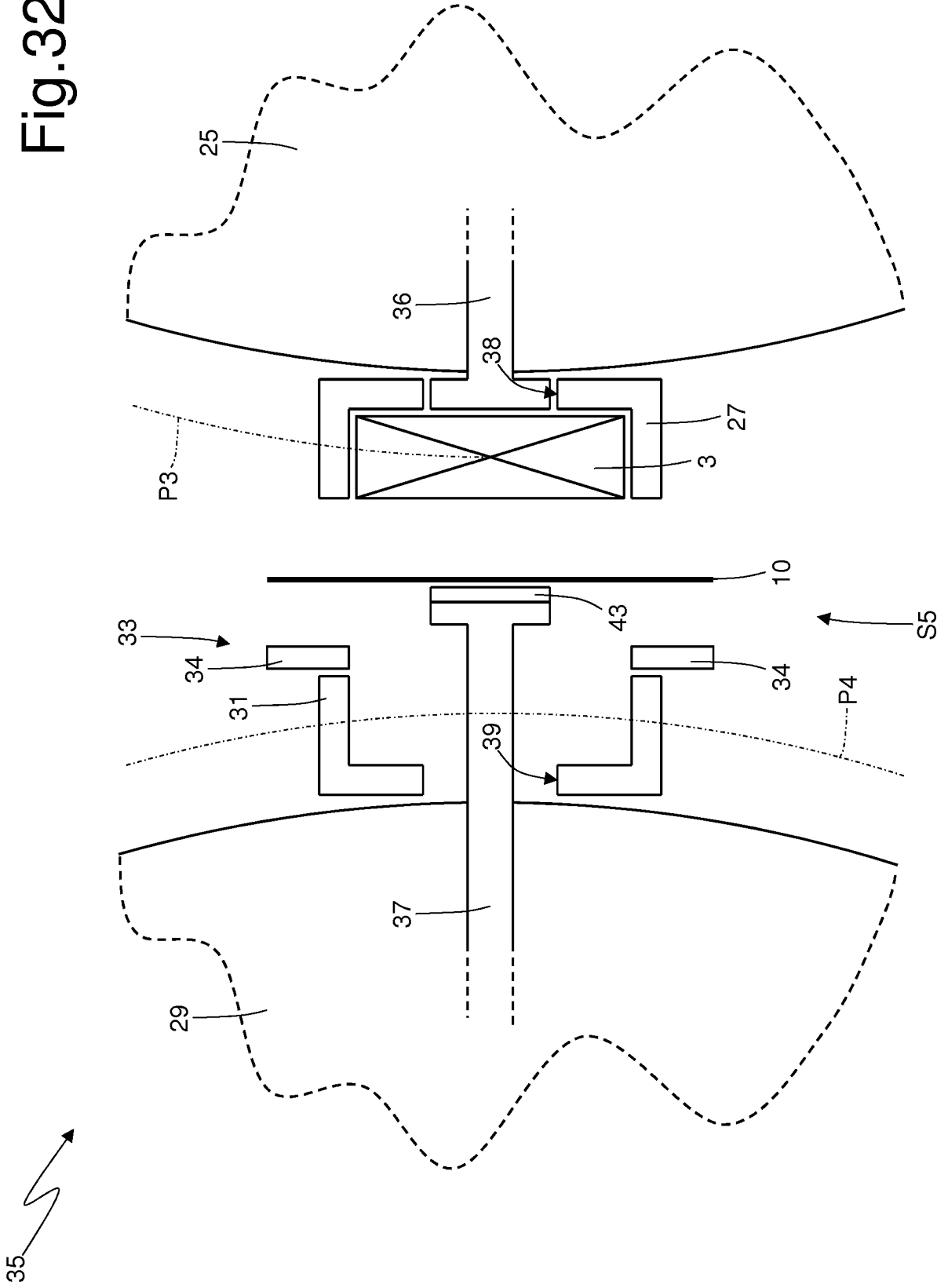


Fig. 33

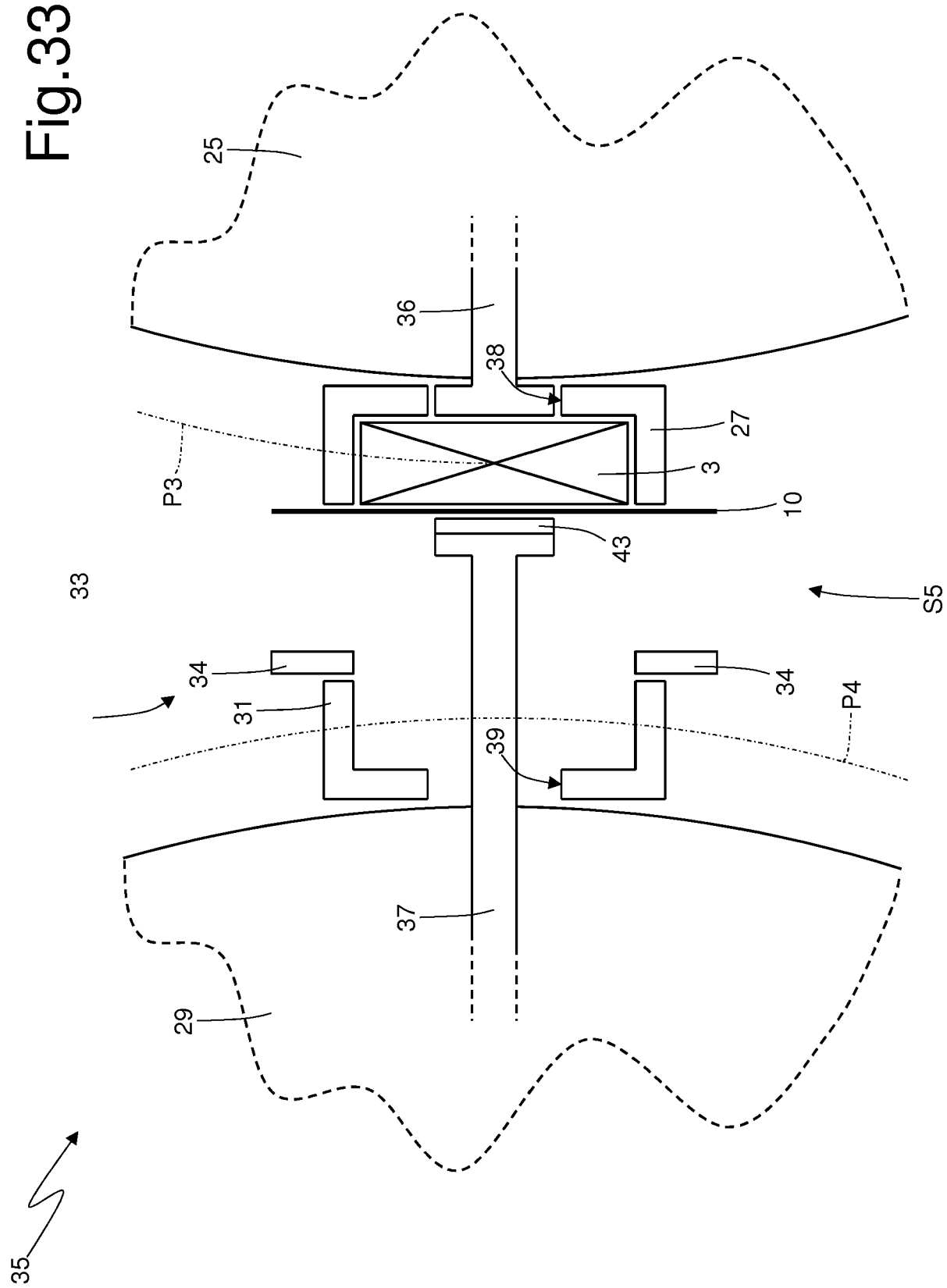


Fig.34

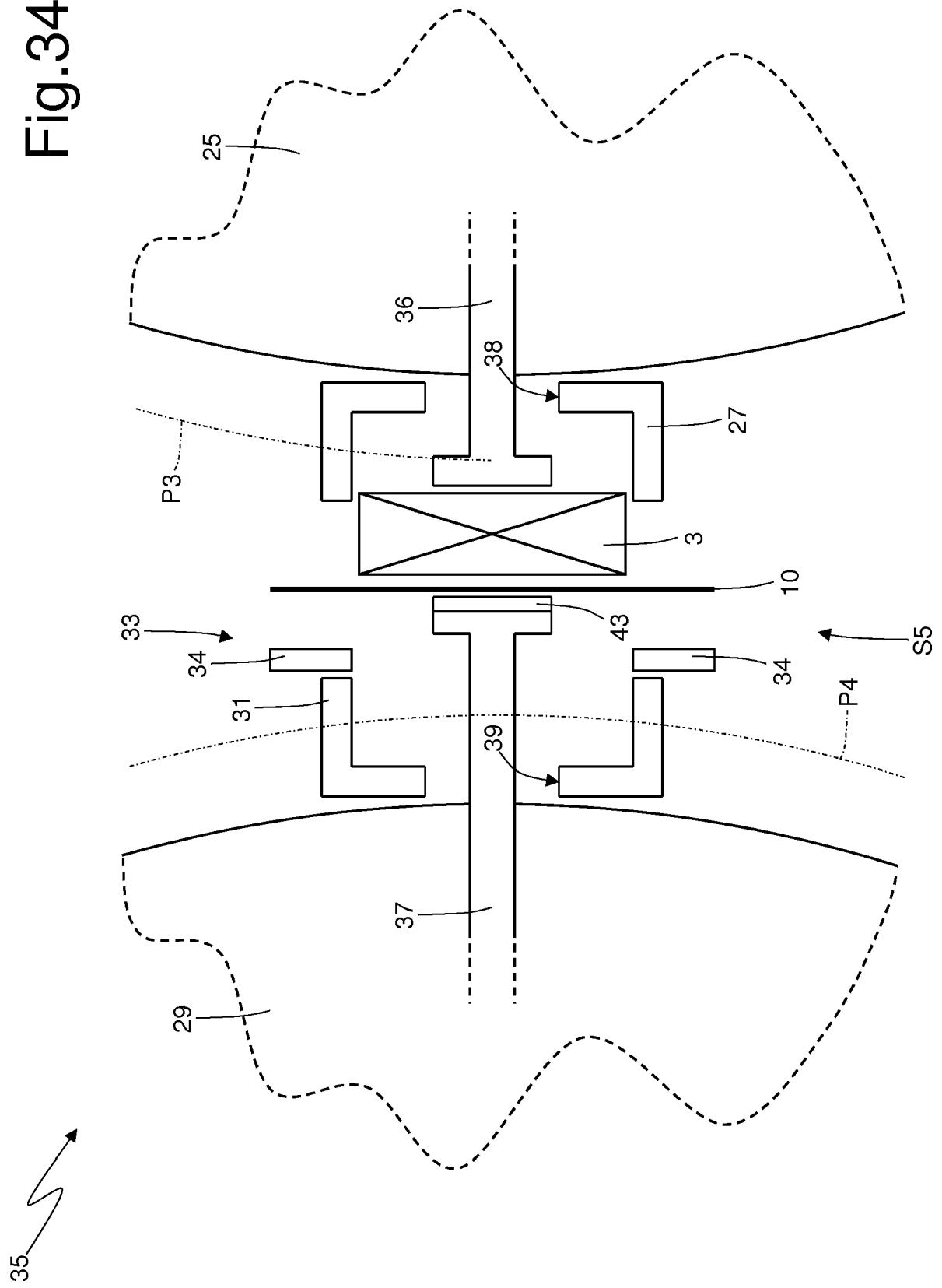
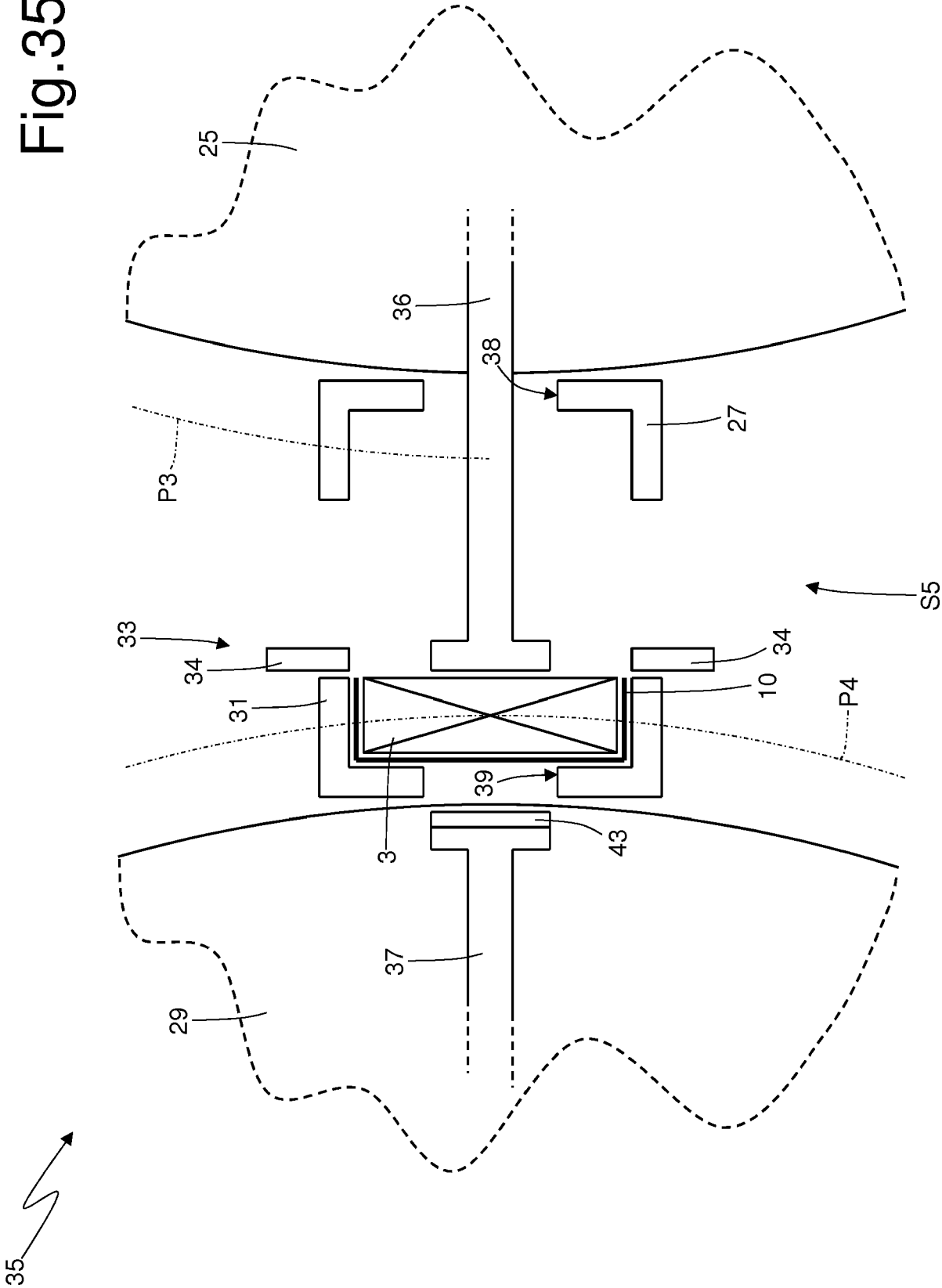


Fig.35





EUROPEAN SEARCH REPORT

 Application Number
 EP 17 16 2187

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 0 792 805 A1 (SASIB SPA [IT]) 3 September 1997 (1997-09-03)	1-6, 9-11, 13-15	INV. B65B41/06 B65B41/08 B65B35/40 B65B19/20 B65B19/22
A	* figure 1 *	7,8,12	
Y	US 5 775 063 A (IKAI KENJI [JP] ET AL) 7 July 1998 (1998-07-07)	1-6, 9-11, 13-15	ADD. B65B19/02
A	* figures 2, 4, 5, 9-13 * * column 2, lines 56-63 * * column 7, line 62 - column 8, line 2 * * column 10, lines 23-45 * * column 12, lines 27-58 * * page 21, lines 23-62 *	7,8,12	
Y	US 4 646 508 A (FÖCKE HEINZ [DE]) 3 March 1987 (1987-03-03)	1-6, 9-11, 13-15	
A	* figure 2 *	7,8,12	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 June 2017	Examiner Schmitt, Michel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 16 2187

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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19-06-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0792805 A1	03-09-1997	EP 0792805 A1	03-09-1997
		IT SV960009 A1	01-09-1997
US 5775063 A	07-07-1998	DE 69600243 D1	20-05-1998
		DE 69600243 T2	03-09-1998
		EP 0771731 A1	07-05-1997
		JP 2936458 B2	23-08-1999
		JP H09124003 A	13-05-1997
		US 5775063 A	07-07-1998
US 4646508 A	03-03-1987	BR 8504393 A	08-07-1986
		CA 1305654 C	28-07-1992
		DE 3433428 A1	20-03-1986
		EP 0174591 A2	19-03-1986
		JP H0662142 B2	17-08-1994
		JP S6169517 A	10-04-1986
		US 4646508 A	03-03-1987

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0792805 A1 [0008]
- US 4646508 A [0009]