

## Ironing board having an extendable and retractable base

This invention relates to an ironing board comprising a base having a variable length, and a body. The invention also relates to a system comprising an ironing board and an iron and/or garment steamer.

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Commonly known ironing boards are equipped with X-legs, the legs are joined at the centre to form a pivot for height adjustment of the board. This conventional cross-legged design requires a user to place the ironing board horizontally and almost at floor level, before opening it and raising the ironing board to the required height. Setting up or storing an ironing board may take considerable space.

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The X-leg concept further is a way to maintain stability during ironing.

However, this principle can only withstand a limited force at either end before it starts to tilt. It is very important that an ironing board has a certain extent of stability while ironing is carried out. When subjected to forces that are exerted at any points or either end of the board, it should not tilt or topple over. In that case the hot iron could fall off the board, thus likely causing injuries to the user. Safety in this aspect is important.

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It is an object of the invention to provide an ironing board that can be easily stored and that can be converted into a stable position for ironing in a simple manner.

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This object is achieved by an ironing board in which the body has several positions with respect to the base and the ironing board also comprises a column extending between the body and the base and an adjustment mechanism arranged for changing the length of the base depending on the position of the body relative to the base.

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The base is shorter in case the work surface is positioned vertically and the base is longer in case the work surface is positioned horizontal corresponding to an ironing mode. The longer base provides a larger surface area for the ironing board to rest on. In this way the weight of the board and a possible additional force on the body during use are distributed over a larger area. As a result, the ironing board is more stable when the body is

positioned substantially horizontal. If the ironing board is stored, the body will usually be in a substantially vertical position. When the body of the ironing board according to the invention is in a vertical position the base has a reduced length. This shorter length is easier to store because it requires less space.

5                   The adjustment mechanism may be a mechanical, electromechanical, hydraulic, pneumatic or magnetic means to transfer the rotary movement of the body to a movement of the moveable portion of the base.

                  The ironing board according to the invention is provided with a column that is located between the body and the base.

10                  A rod may be mounted on the body at the side of the column, i.e. the bottom of the body during use, across its width near the middle of the body. The body can be tilted along the direction of the rod. In an embodiment, the rod may be linked to a vertical shallow round or rectangular shaft by means of a few universal joints such as crown wheels. This vertical shaft may be fixed to a lever. The lever may be slideable in a slit in the base in such a way that the length of the base is extended or shortened depending on the position of the lever. Such an embodiment is described in claim 2.

                  The ensemble works together as follows. The ironing board is first in its vertical position. As the body is being tilted towards the horizontal position, the rod begins to turn. This brings about a rotational movement of the crown wheel connected to the rod. This crown wheel as a result rotates the crown wheel connected to the vertical shaft or rotation axle. Thus the rotation axle is being rotated. This rotation of the rotation axle moves the lever in the slit and consequently the base slides out and thus causes the base to extend. With this extension, the base of the ironing board is longer. This extension provides a much wider base for the system when the body is horizontal, thus achieving a stable unit as a whole.

25                  The reverse happens when the body is placed in a vertical position e.g. when the user wants to store the board; the base is being retracted and needs less space than during ironing. In this way the board can easily be stored.

                  A practical embodiment of the ironing board is characterized as defined in claim 3. In order to further improve the stability it may be favorable to divide the second part into two or more sub-parts. Such a sub-part may be linked to the adjustment mechanism or may be mutually linked by mechanical means known per se.

30                  The base moves along the floor, which provides an easy stable movement. The base can be equipped with sliding means. A benefit of equipping the base with sliding means is that there is less friction and thus it is easier for the user to handle. Furthermore, the floor is

not damaged as a result of the sliding means. Another benefit of the sliding means is that the user can tilt the ironing board towards the sliding means and easily pull the board over the floor. In this way the user does not have to lift the ironing board when moving it around. Examples of such sliding means are wheels or gliders.

5                   For convenience, the base of the ironing board may comprise wheels and the column or the board may comprise a handle so the ironing board can easily be pulled over the floor and the user does not have to lift the board when moving it around. The wheels may comprise blocking means to secure the position of the ironing board which are known by the skilled person.

10                   In another embodiment of the ironing board according to the invention the board has a chamber to accommodate appliances such as an iron, a steam iron and/or a garment steamer. This could be a cabinet with a drawer on or in the column in which the user can store for instance an iron when not in use.

                  Means to operate such appliances might also be provided. These means are for  
15 instance a water tank for providing water, a boiler, for generating steam (from the water from the water tank) and supplying steam to an inlet of the iron and a power supply for supplying power. In this way the ironing board and the iron form and cooperate as a system. Alternatively, the steam may be supplied to an inlet of the garment steamer, if present. In this way the ironing board and the garment steamer form and cooperate as a system.

20                   Special care is usually taken in placing an article to be ironed in a flat manner on the work surface of the body. Doubled or folded fabric of the article could – if not taken care of - lead to a self-induced fold or artificial wrinkles in the article after ironing. This is an unwanted effect. In an embodiment of the ironing board according to the invention the ironing board is equipped with means to blow or suck air through a permeable work surface.  
25 The body may be made of permeable material or solid material provided with holes and a permeable cover, for instance made of a textile. The blowing of air through the permeable work surface helps to place the article in a flat manner. The air provides a certain cushion on which the article can be placed in a flat or stretched manner. After the article is placed, the direction of the fan might be changed to suction (for instance by pushing a control button on  
30 the iron). Now the fabric of the article, after being placed in a flat manner on the air cushion, is sucked in a flattened manner to the work surface and now ready for ironing, thus reducing the risk of unwanted self-induced folds.

                  In another embodiment the ironing board may also be provided with means to heat up the work surface. In this way the fabric of the article is warmed from the work

surface side, for instance by the use of a hot electric spiral located in the body. Alternatively a flexible heating element may be attached, e.g. sewn into the cover.

In case the ironing board according to the invention board is equipped with a fan and/or a heater, a power supply is needed to supply power to these functions.

5           A concept of an ironing board with a body having several positions with respect to the base is described in FR 2695145. This document hardly provides technical information about positioning of the body.

          Several embodiments of the ironing board according to the invention are defined in claims 2 to 9. The invention further relates to a system comprising an ironing  
10   board according to the invention and an iron for cooperation with the ironing board. Embodiments of the system according to the invention are described in the claims 11 and 12.

          The invention will now be described by way of example with reference to the  
15   accompanying drawings. In principle all aspects can be combined. In the figures the same numbers are being used for the same or equivalent features, in which:

          Figure 1 schematically depicts a first embodiment of an ironing board according to the invention with the body in a substantially vertical position,

          Figure 2 schematically shows the ironing board of figure 1 with the body in a  
20   substantially horizontal position,

          Figure 3 schematically shows an adjustment mechanism for the ironing board according to the invention with the body in a substantially vertical position,

          Figure 4 schematically shows the adjustment mechanism for the ironing board of figure 3 with the body in a substantially horizontal position,

25           Figure 5 schematically shows an embodiment of a detail of the adjustment mechanism,

          Figure 6a schematically depicts a second embodiment of the ironing board according to the invention,

          Figure 6b schematically depicts the embodiment of figure 6a with the body in  
30   a substantially vertical position,

          Figure 6c schematically depicts the embodiment of figure 6a in a folded position,

          Figure 7 schematically shows a tilting means for the ironing board according to the invention,

Figure 8 schematically shows a detail of the tilting means of figure 7 in perspective,

Figure 9 schematically shows a side view of a detail of figure 8,

Figure 10 schematically shows a detail of the tilting means of figure 7 in perspective in another position,

Figure 11a schematically shows a side view of a detail of figure 10 in a first position,

Figure 11b schematically shows a side view of a detail of figure 10 with the protrusion in a second position,

Figure 12 schematically shows a detail of a third embodiment of an ironing board according to the invention,

Figure 13 schematically shows an air guiding means for the ironing board according to the invention,

Figure 14 schematically shows an embodiment of the ironing board according to the invention in a pressing mode,

Figure 15a schematically depicts a first embodiment of a torso-shaped body according to the invention,

Figure 15b schematically depicts a second embodiment of a torso-shaped body according to the invention,

Figure 16 schematically shows an embodiment of the height adjustment means of an ironing board according to the invention,

Figure 17 schematically shows an alternative embodiment of the height adjustment means of an ironing board according to the invention,

Figure 18 schematically shows an embodiment of a weight compensation means as part of an embodiment of a height adjustment means for an ironing board according to the invention,

Figure 19 schematically shows an enlarged detail of the height adjustment means of figure 18 and

Figure 20 schematically shows another enlarged detail of the height adjustment means of figure 18.

The figures are now described in detail and reference is made to the numbers in the figures. In figure 1 an embodiment of an ironing board 2 having a body 5, a base 1 and

a column 7 is depicted. The body 5 is in a substantially vertical position and the base 1 has a length L1. In figure 2 the body 5 is in a substantially horizontal position and the base 1 has a length L2, which is larger than L1. Figures 1 and 2 together illustrate the relation between the position of the body 5 with a work surface 6 and the length of the base 1. The length of the base 1 is the distance between the contact points (4a and 4b) with the floor during use. The base 1 comprises a first base part 1a and a second base part 1b. The first base part 1a is attached to the column 7 and the second base part is slidable along the first base part 1a.

In figure 3 an adjustment mechanism 9 is shown with the body 5 in a substantially vertical position. The body 5 (not shown in figure 3) is connected to a rod 10 that enables the body to be tilted along a tilting axis T-T. As the body 5 is tilted along tilting axis T-T towards the horizontal position (as shown in figure 4), the rod 10 begins to turn. This brings about a rotational movement of a crown wheel 15 connected to the rod 10. This crown wheel as a result rotates a further crown wheel 13 connected to the vertical shaft 11 serving as a rotation axis. Thus the vertical shaft 11 is rotated counter clockwise. This rotation of the shaft 11 moves a base lever 17 in a slit 19 and consequently the base 1 slides out as illustrated by arrow A. The base is preferably equipped with sliding means, e.g. wheels 21. The result of this movement is shown in figure 4.

Figure 5 schematically shows an example of the shaft 11 comprising a first telescopic part 12 and a second telescopic part 14, which are not rotatable relative to each other because they have a non-circular cross-section. Such a shaft may be used in an embodiment of the invention where the retractable / elongateable base feature is combined with height adjustment. A shaft comprising telescopic parts allows the distance between body and base to be varied.

In figure 6a the second embodiment of the ironing board 2 according to the invention is depicted comprising a base 1 and a body 5 with a work surface 6, the body having a first longitudinal axis I-I. The ironing board further has a column 7, having a second longitudinal axis II-II. The tilting axis T-T extends substantially perpendicularly to both the first axis and the second axis. Figures 6a and 6b illustrate two positions that can be obtained by tilting the board with the body having a stretched-like state.

In figures 7 to 11b details of the tilting means are depicted.

In figure 7 is shown that the body 5 (shown in part) of the ironing board is rotatably connected to an axle 63. The axle 63 in this example is an embodiment of the tilting axis T-T (as shown in figure 6a). The embodiment comprises a first button 61, connected to the axle 63. The axle 63 is connected to a triangle 71 via a first connector 64. The triangle 71

is connected to a clamp protrusion 73, which is arranged for cooperation with a pivot plate 75. The pivot plate 75 has a first slot 74 and a second slot 76 (as shown in figure 8).

The tilting is now described with reference to the figures. The starting point of the description is the body in a substantial horizontal position as depicted in figure 6a. If the user pushes the first button 61 in the direction of the body, the axle 63 rotates as illustrated by arrow C in figure 7. Hence, the triangle 71, coupled to the axle 63 via the first connector 64, is pushed in the direction of arrow D (see also fig 8 and 9). As a result the clamp protrusion 73 is released from the first slot 74 located in the plate pivot 75. If the user, simultaneously with pushing the first button 61, exerts a force in the direction of an arrow E (see figure 6), the body 5 rotates and the clamp protrusion 73 slides along the plate pivot 75 to the next available slot, in this case the second slot 76 (see figures 10 and 11a). If the user releases the first button 61, the clamp protrusion 73 fits in the second slot 76 (see figure 11b). Because the body 5 is connected to the axle 63 the result is that the body 5 is tilted along the rotation axle 63 to a substantially vertical position; in this case about 81 degrees relative to the horizontal plane. This is illustrated in figure 6b.

In the second embodiment the body 5 (see figure 6b) has a first part 91 having a first work surface 92 and a second part 93 having a second work surface 94, the first and second parts being connected by a hinge 103 serving as folding means. The first part 91 may be provided with a support element 101 for supporting the second part (see figure 6a). A first part of the hinge 102 is secured to the first part of the body 91 and a second part of the hinge 104 is secured to the second part 93 of the body (see figure 13).

The folding of the body of the ironing board will now be explained. The starting point of the description is the body in a substantial vertical position as depicted in figure 6b.

If the user pushes the first button (61) in the direction of the body, the clamp protrusion 73 is released from the second slot 76 in the plate pivot 75 (see figure 11a). If the user, simultaneously with pushing the first button 61, exerts a force in the direction of the arrow E on the second part 93 of the body, this second part is folded towards the first part. The first work surface 92 and the second work surface 94 now face towards each other. This is illustrated in figure 6c. In this mode the ironing board according to the invention can be stored easily and in a compact manner.

In order to prevent the second part 93 of the body from slamming down on the first part 91 and to accompany the folding process, a resilient element 81 is provided for. In figure 12 an embodiment of the resilient element 81 is shown. In this embodiment the

resilient element comprises a strap 83 fixed to a spring 85. One end of the strap 86 is connected to the second part 93 of the body and the other end of the strap is connected to the spring 85. The spring is secured to the first bottom part of the column 84. The first bottom part 84 is part of a moveable frame 33 of the column 7 (shown in figure 16 and explained later).

The shifting of the position of the body 5 in the second embodiment from substantially horizontal (stretched state like in fig 6a) to substantially vertical (stretched state like in fig 6b) might result in unwanted folding of the body. In order for the tilting of the body to prevail over premature folding, the resilient element 81 (see figure 12) is selected and constructed in such a way that the resilient force is stronger than the force needed to tilt the body, thus keeping the parts together while tilting the body 5. In figure 12 it can be seen that the course of the resilient element 81 leads through the column (not shown), through the first part of the body 91 and ends in the second part of the body 93. The strap is secured to the second part 93 at the location indicated by number 86 (figure 12). Depending on the weight of the body a skilled person can select the force of the resilient element. This could be the force of the spring 85. The strap and the spring may be substituted by for instance an elastic band (not shown). In that case the force of the elastic band can be selected by the skilled person. A guiding means 80 guides the course of the resilient element. An example of the guiding means is a roller known per se.

To keep the first part 91 of the body and the second part 93 of the body in a stretched state during tilting, alternatively a fixation means (not shown) might be provided.

This fixation means may be a hinge or spring-loaded hinge, known per se, which has two stable positions e.g. open position and closed position.

Alternatively, the fixation means may comprise a protrusion secured to the first part of the body close to the first part of the hinge (102, see figure 13) cooperating with a receiving means secured to the second part of the body close to the second part of the hinge 104 (fig 13). The cooperation is done in a way known per se, so the first and second part of the body are fixated in their stretched state. The protrusion could be a hook and the receiving means a socket, these are known per se. In such an embodiment the user would have to release the hook from the socket before the body can be folded. In practice it would function as locking/unlocking means between the parts of the body.

In figure 14 an embodiment of the board according to the invention in a pressing mode is depicted. This embodiment comprises a hook 111 fixed to the first part 91 of the body and a body protrusion 113 secured to the second part 93 of the body. This could

also be the other way around. The body protrusion 113 serves as a receiving element. The skilled person can select alternative known hook-shaped elements and known receiving elements and fix them to the first part 91 and second part 93 of the body respectively in such a way that the elements can cooperate. A touch button 135 serves as a control unit for an electrical unit (not shown). The electrical unit is arranged for activating a fan 133.

A way to press an article using an ironing board according to the invention will now be described. The body in a horizontal position (ironing mode) (fig 6a) is taken as starting point. An article 151 is placed on the first work surface 92 of the first part 91 of the body. The second part 93 of the body is folded towards the first work surface 92. The first part 91 of the body will remain latched on the pivot plate 75 (in the horizontal position). In this way the first 92 and second work surface 94 are facing each other and at least a portion of the article 151 is located in between. Now the parts 91, 93 are clamped together. This is done by moving the hook 111 around the body protrusion 113. If the touch button 135 is pushed, the fan 133 is activated resulting in an air stream flowing through the second work surface 94 of the second part of the body and through (part of) the article 151. A board heater (if present, not shown) may be activated to provide heat during the pressing operation.

In an embodiment according to the invention the control unit for activating the fan 133 comprises a remote control 137.

In figure 14 it is furthermore shown that an embodiment of the ironing board according to the invention may be provided with a chamber 121 or e.g. a drawer for accommodating appliances, for instance an iron 123 and if present, a garment steamer. In this way the board has means for storing the iron and/or garment steamer.

In an embodiment of an ironing board according to the invention the ironing board is arranged for housing at least one of a water tank 125 or a boiler 127 or a power supply (figure 14). The boiler is provided with a hose, which is connectable to an iron having an inlet (not shown). The water tank 125 is arranged for providing water to the boiler in a manner known per se. In this way steam can be generated and supplied to the iron. The iron can thus function as a steam iron. The iron can thus cooperate with the ironing board.

Figure 15a schematically depicts a first embodiment of a torso-shaped body according to the invention, where the work surface has a contour 141, which corresponds to the contour of a longitudinal section of a torso.

Figure 15b schematically depicts a second variant of a torso-shaped body according to the invention having a contour 143.

The torso-shape may be symmetrical relative to an axis III-III.

In an embodiment of the ironing board according to the invention, the board has a refreshing mode. In this mode the user can refresh articles by hanging them over the body 5, the body being in a substantially vertical position (see figure 6b).

The article can be for instance a jacket, a blazer, a blouse or a shirt. The article may be buttoned and thus closed at the what is usually called front side of the article. In this way the shoulder parts hang over the shoulder (for example: 142 in figure 15a, or alternatively 144 in figure 15b) of the body 5. A non-button article like a dress or a sweater may be hung over the body in such a way that the shoulder straps or shoulder parts rest on the shoulders of the body. In both descriptions the body is dressed with the article. Alternatively, the article may hang on a hanger and the hanger is connected to the body. The user activates the electrical unit to start the fan 133. The fan 133 produces an air stream. The activation is done using the control unit 135. The control unit may for instance be located at any place at the back of the body so that the user can easily reach it. Alternatively, the control unit comprises a remote control 137. The fan activation can also be done from a garment steamer (if present). In this case, garment refreshing is accelerated with the use of steam from the garment steamer, and assisted with air (which could be warmed with a heater) from the board.

In an embodiment according to the invention the air flows through a permeable work surface. In case the body has multiple parts, the air is guided via air guiding means for guiding air, mobilised during use by the fan 131, from one part of the body to another part of the body and vice versa.

The air guiding means comprises a first wall portion of the first part of the body 107 (figure 13), which first wall portion is located near the folding means 103 and a second wall portion of the second part of the body 109, which second wall portion is located near the folding means and which first and second wall portions are provided with corresponding openings 105.

In an alternative embodiment the body is equipped with vents 131 (figure 14), the vents 131 are opened and the air stream is mainly blown out of the vents located at opposite sides of the body. Now an air stream flows towards the sleeves and the upper part of the article. In this way the armpit region, known as a sweat area, is especially refreshed.

In an embodiment of the ironing board 2 according to the invention depicted in figure 16, the ironing board comprises a height adjustment means to adjust the distance of the body 5 relative to the base 1. In figure 16 a schematic embodiment of the height adjustment means is depicted showing the column 7 equipped with a stationary frame 31 secured to the

base 1 and a moveable frame 33 secured to the body 5. The stationary frame 31 has a guiding means 35 for guiding the movable frame 33. In figure 17 an alternative embodiment of the height adjustment means is shown. In this embodiment the ironing board comprises a second movable frame 34. The second movable frame 34 moves relative to the stationary frame 31 and the movable frame 33 moves relative to the second movable frame 34.

The height adjustment means is shown in more detail in figures 18, 19 and 20.

In these figures is depicted that a second button 39 is connected to a shaft 40. The shaft 40 is connected to a strip lift 41 via a second connector 42 (figure 19). A lever lift 43 (figure 20) is secured to the strip lift 41 and cooperates with an index plate 45.

To adjust the height the user pushes the second button 39 towards the body. In this way the shaft 40 is rotated in the direction of the arrow F (see figure 19). As a result, the strip lift 41, connected to the shaft 40 via the second connector 42, is moved down. As a result the lever lift 43 is released (unlocked) from the index plate 45 (or alternatively a gear train) (see figure 20). The user may now (while pushing the second button 39) pull the body up or push it down because the movable frame 33 can move freely using the guiding means 35 on the stationary frame 31. To lock the body in a desired height the user releases the second button 39 and the lever lift 43, serving as stop means, slides in the nearest opening in the index plate 45.

In order to facilitate the height adjustment so that the user does not have to apply a force to lift the weight of the body and the frame connected to it, an ironing board according to the invention is preferably equipped with means of exerting a repelling force on the body. Such a force is a force on the body directed away from the base. This force may be provided by electrical, magnetic, hydraulic, pneumatic or mechanical means.

In an embodiment according to the invention the weight of the body 5 is compensated during height adjustment by a constant-force spring 37 (see figure 18). The constant-force spring 37 is at one end 38 fixed, by means of common fixing means, such as a screw or a mounting bridge, to the stationary frame 31 (visualised in figure 16) and the other end connected to the movable frame 33 (visualised in figure 16). The bottom 84 (shown in figure 16) of the movable frame 33 sits on the fastening means 30 of the constant force spring 37. Because the body 5 (visualised in figure 16) is secured to the movable frame 33, the weight of both the body 5 and the movable frame 33 is compensated by the constant force spring.

## CLAIMS:

1. An ironing board (2) comprising a base (1), having a variable length, and a body (5), characterized in that the body has several positions with respect to the base and the ironing board further comprises a column (7) extending between the body and the base, and an adjustment mechanism (9) being arranged for changing the length of the base depending on the position of the body relative to the base.

2. An ironing board as claimed in claim 1, characterized in that the adjustment mechanism comprises a rotation shaft (11) parallel to the column and having a first end and a second end, a first crown wheel (15) secured to the first end and meshing with a second crown wheel (13) connected to the body and a lever (17) having a first lever end secured to the rotation shaft end and a second lever end, and guiding element (19) located in the base arranged for cooperation with the second lever.

3. An ironing board as claimed in claim 1 or claim 2, characterized in that the base comprises a first base part and a second base part, which first base part is connected to the column and which second base part is movable along the first base part.

4. An ironing board as claimed in claim 3, characterized in that the second base part comprises a sliding means to facilitate sliding over a floor surface.

5. An ironing board as claimed in any one of the preceding claims, characterized in that the rotation axis is arranged for elongation or shortening by a height adjustment means.

6. An ironing board as claimed in claim 5, characterized in that the height adjustment means comprises a first telescopic part and a second telescopic part arranged for cooperation with the first telescopic part.

7. An ironing board as claimed in claim 6, characterized in that the first and second telescopic parts are non-rotatably coupled to each other to prevent substantial rotation of the first and second parts relative to each other.

5 8. An ironing board as claimed in any one of the preceding claims, characterized in that the body is arranged to be tilted around a tilting axis to put the body in a desired position.

9. An ironing board according to any one of the preceding claims, characterized  
10 in that the board is equipped with at least one of the following devices: a heater, a fan for blowing or sucking air through the work surface of the body and a boiler for providing steam.

10. A system comprising an ironing board according to any one of the preceding claims and an iron and/or garment steamer for cooperation with the ironing board.

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11. A system according to claim 10, characterized in that the board has means for storing the iron and/or garment steamer.

12. A system according to claim 10 or 11 in combination with claim 9,  
20 characterized in that the boiler is being arranged for providing steam to the iron and/or garment steamer.