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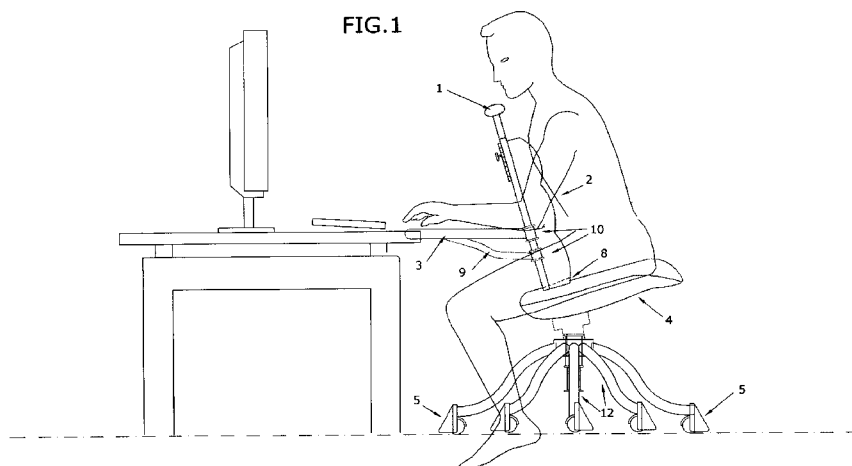
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(54) Title: CHAIR WITH BACK/CHEST SUPPORT



(57) Abstract: Orthopedic office chair with innovation for the discharge of the spine, using an ergonomic adjustable backrest that provides a chest support. The chair can be used in the usual way or in the opposite direction that is supporting the front of the torso on its back, which increases the contact surface decreased body at the same time the pressure on the spine. All this is supported by certain mechanical arrangements (amended back, arm rests swivel...), making the chair can redistribute the forces that insist on the spine thus preventing back pain.



CHAIR WITH BACK/CHEST SUPPORT

TECHNICAL FIELD:

The field of the technique is that of ergonomic chairs, designed to make the job to the PC less stressful by the physical point of view because the sitting position, is the most deleterious with regard to the distribution of body weight.

STATE OF THE ART:

At the current state of the art do not exist chairs that allow unload the weight of the body with this innovation while continuing to perform a type of sedentary work such as to the computer. Some chairs on the market have been adapted for that purpose, but only partially (see models stokke) because it is not allowed to support the front of the chest and abdomen strength of the invention.

In other chairs, in which is present the thoracic support, are engaged on static positions of complete relaxation such as for massage sessions or insertion catheter via lumbar and in any case do not take into account the forehead support as a means for a more equitable redistribution of forces that insist on the hinge lumbo-sacral ergo there is no reference no benefit inherent in lumbar problems, which this invention proposes to do, being designed so as to be more versatile in the workplace ie download his back while continuing the own business, without having to take breaks to relieve any pain states.

DESCRIPTION:

In Italy, the Article. 173 of Legislative Decree 81/08., Defines the use of the VDT worker who uses equipment provided with VDT in a systematic and regular for at least 20 hours per week provided

for by discounting the breaks. 175 of Legislative Decree no. 81/08 (ie break of fifteen minutes every two hours of continuing to

VDT)

Risks related to posture and visual fatigue and mental

_ Symptoms:

_ Annoyances neck, back, shoulders and hands, pain in head, Anxiety, Insomnia, Depression,

Causes:

_ Working positions not suitable because of the inadequacy of the elements of

furniture that does not allow a correct posture

_ Stay over in front of a display screen even if they have

a suitable location and ergonomic

_ Workload: too high or too low, monotonous and repetitive, no

liability or responsibility over

___ Remedies:

_ Maintain a good posture in front of the display screen

_ Avoid excessive stay in front of the display screen

_ Make workstations with the principles of ergonomics

_ Ergonomic and environmental conditions

_ The Leg. 81/08 and subsequent amendments and interpretations, which sets out the requirements

minimum for screen equipment, and in particular for the

seat work, the work, the keyboard and screen

_ Health Surveillance

_ The operator display screen must undergo health surveillance

_ E 'should be subject to medical examination workers, before being assigned to the activity of videoterminal, to highlight any structural malformations.

From this we can deduce that the work environment (for office work with VDTs), should always be comfortable and easy, so as to ensure the mental health but also physical, the worker, who will benefit from these simple technical solutions, increasing their productivity.

In this regard myself suffering from disorders of the spine, it is impossible to remain many hours sitting without much pain in the back, I thought I'd come up with a chair designed for all those people who suffer from continuous states of inflammation borne by the spine or less due to serious pathologies nature of postural.

It is also indicated as a preventative tool states painful, especially for sedentary individuals accustomed to a strenuous office work.

The chair is designed to reduce the forces that insist on the hinge of the lumbosacral spine.

In this regard, the backrest is changed so as to make physiologically versatile is resting than in the usual sternum-abdominal (Figure 9).

The innovation is based on the fact that stationed while sitting, position of support backbone, can lead to an excessive overload of the spine, in particular at the lumbar level.

The basic principle obeys the laws of physics:

the pressure (P) is equal to the ratio between a force (F) exerted and the surface (S) on which distributes $P = F / A$

In this case, F is the force due to the mass weight of the bust multiplied by the acceleration of gravity and A is no more than the area of the cross section of the 1st sacral vertebra which corresponds to a few square centimeters. On which rest precisely the weight of the trunk and limbs of the skull.

Increasing the form of A, ie the support surface of the bust, since F remains constant, we will have a net decrease in the module P that insists on the line section of the spine, bringing relief and a considerable reduction of stress to the skeleton. To increase the module "A" must be set aside carriers of the forces that insist on the individual vertebrae, and then join together, forcing the hinge L5-S1 (5th lumbar-sacral 1).

In this connection is changed the architecture of the chair, and in particular of the backrest, to provide for the creation of a support surface used annulment of the weight force exerted from the skull and rib cage through a simple technical innovation, namely a backrest that can be used both in a classical and providing the user with a support-abdominal sternum. The problem of classic chairs is the only way to support your back, to lessen the pressure on the vertebrae above, this does not solve the problem completely but above all you must get away from the desk and unable to continue working on the keyboard pc. The reason being the sitting position is detrimental to your back is to be found in the series of evolutionary events for which the ancient apes went from a life closely quadrumanous and arboreal biped to a life devoted to hunting and migration and in the end the exclusive use of the hands for making tools, thanks to the development of a higher intellect. The chair, in case of treatment and / or prevention of pain states, is designed so that it can be turned and used to continue to work in a state of deep relief and comfort, leaning on the backrest the ventral part of the bust, namely from the lower abdomen at the beginning of the sternum and, since equipped with a backrest with adjustable inclination, provide a bearing surface with which cancel

the forces insistent on the column, loading it on the wheelchair itself. The goal is to provide a structure type cyclist, that is able to support that person, sitting, strenuous efforts for hundreds of kilometers in about 5-6 hours, without suffering from back pain. So, essentially, the backrest (modified in its position, height and consistency) will provide the user a means to download more than the 90% of the pressure at which it is usually subjected the hinge lumbo-sacral, bringing benefits of character psycho and physical, without removing the user from the office work for which it is engaged.

In this regard, the design of the chair requires changes to the anatomical fact that totally changes the distribution of the forces that insist on the frame of the chair itself.

In the first place the backrest is moved more towards the center line of the chair as close as possible to the cylinder carrier that connects the seat to the legs. The rear part of the seat is enlarged to give ergonomically space in the legs, the backrest is also less enveloping, reclining and with a mushroom shape so as to leave space for supporting the thighs of the user (Figure 6), the supports arms detached from the seat and fitted with a mechanical structure able to rotate them by 180 degrees (figure 2), is also mounted on the top of the backrest supports a chin extensible so as to cover the needs for users of different heights.

The cylinder carrier is constructed with a piston compressed air, combined with 5 feet constructed so as to form a slight curve downwards (figure 8) for shock loads better since the chair, to be convenient, needs to be higher compared to the usual standard.

At the end of each foot is added to a rubber structure, thick and located in the proximity of each wheel and used for the block quote for any tipping (Figures 4-8).

The seat is wider and is joined to the piston of the supporting frame via a metallic structure trilobe, positioned immediately below (figure 5), which collects the vectors of the forces that insist on the seat and redistributes them, thanks to the different length of its 3 parts, so as to be aligned on the

supporting structure, in order to decrease strongly the form of the mechanical moment $L = F \times r$ given by the support of the abdomen on the backrest that leans forward to support the torso of the user. F corresponds to the weight of the bust and r is no more than the distance between the pelvic support and the point at which falls the projection of the head height of the seat.

DESCRIPTION OF FIGURES

Figure n ° 1: This figure shows the total redesign of the chair, in so far as, the position of the backrest is definitely moved and the seat tilted, so that, the user can expand the support surface by: the abdominal press, the rib cage, the lower jaw, in a person of average height can amount to about 900 cm² instead of circa 10-20 cmq data from the largest lumbar vertebra.

Figure n ° 2 (a / c): view from above of the chair, positioned so as to highlight the location of the armrests innovative swivel.

Figure n ° 2 (b): top view of the chair in the usual position.

Figure n ° 2 (d): view from below, which highlights the superposition of the supporting structures with the backrest, important technical measure to avoid an incorrect distribution of the loads when the chairs is used in place innovative; particular from below which shows the ' unusual difference in length between legs and radius of the seat. In addition, the presence of anti-slip rubbers above each wheel.

Figure n ° 2 (e): frontal view of the chair which highlights the mushroom shape of the backrest.

Figure n ° 2 (f): view from below the seat, detail of the trefoil metal used to collect all the force vectors weight and channel them directly to the central cylinder.

Figure n ° 3: the usual position at the desk, here it is possible to note the tilt of the seat base (about 10 °) that allows, once taken the unloading position, the user not to slide backward in order to provide comfortable support of lasting comfort.

Figure 4: vision from the usual sitting. The chair can be used exactly like a standard office chair, but having the peculiarity of being exploited for its innovation when it is needed, in this figure shows the increased surface area of the seat and the apparent concentration of ' insertion of the back, two fundamental measures will allow the user to one session comfortable and safe during the innovative use.

Figure 5: view from the chair with innovative, showing the enlarged contact surface for the user, to cater to the needs of nature and of postural comfort during sedentary work in a sitting position.

METHODS OF IMPLEMENTATION

With regard to the realization of the chair should take account of unusual position for which will be used. In the production phase is necessary to take into consideration the total reorganization of the supporting structure, for the fact that the loads to be withstood acquire a greater lever arm, able to confer a significant instability.

The first key point to address is the location of the backrest which will be placed more towards the center of the sitting height of about 6-7 cm 43-48 cm. The insertion of the backrest has a funnel shape, front perspective, to make room for legs when using the position of sternal support, width 10-15 cm. The upper part is rounded and slightly modified to allow the user to be free with his back and move his arms wide and 28-32 cm, the support on the back, it must be perfectly flat, in order to obtain greater versatility ' support and connected at the rear by a vertical elongated structure that puts in communication with the cylinder anatomical backrest carrier, by adjusting the inclination of the first and the second discharging the load of the upper parts of the body so as to increase the efficiency of the chair avoiding sensations of loss of balance.

The support arms are slightly reclined of about 5° - 10° , in anatomical contact exclusively with the backrest and fitted with a mechanism so that it can turn by 180° and enjoy a comfortable support during unloading, supporting limbs canceling its weight-force vector length 40-44 cm (Figure 9). At

the top of the backrest is mounted chin supports extensible 0-15 cm that will provide the total discharge of the skull. The supports chin is wide and about 10 cm long and 5 cm well-padded, of semi-elliptical shape, so as to provide a comfortable

The seat is also constructed so as to allow the user to comfortably accommodate the legs during sitting exhaust. To this end, immediately behind the backrest, the perimeter of the seat is made of concave curves, or the concavity is towards the center of the chair.

The structure is very important to cushion the load and make the session as highly stable, facing a wider range of structural stress on the support abdominal dates. Should be constructed of metal with a cylindrical piston with compressed air, height cm 40-50 cm, connected with a ring internally provided with teeth which can control the variability of the height and that it can connect the central cylinder at the foot of the chair.

The cylinder carrier is slightly set back (figure 5) for the presence of a three-lobed structure, mounted under the seat also of metal, so that, with the different length of its 3 lobes, placed in perfect alignment cylinder and backrest carrier, to decrease as much as possible the mechanical moment given by the distance of the projection of the skull at the level of the seat.

The feet have a structure curves upward to the ground length of 36-38 cm, are provided with wheels and rubber overlying very thick, approximately 0.5 cm from the ground and arranged for the 180° of the outer part (Figure 4 - 8), so as to provide a support for the safety in case of unbalance. The angles between the feet have exactly the same distance that is $360/5 = 72^\circ$.

The material of the structural elements should be made of metal (three-lobed structure, cylinder carrier, feet and wheels) or alternatively carbon fiber, the padding of the seat and backrest can be of any material (synthetic or leather), the important and that are thicker than 3-5 cm above the backrest, by the use massive that the rearrangement of the latter will give.

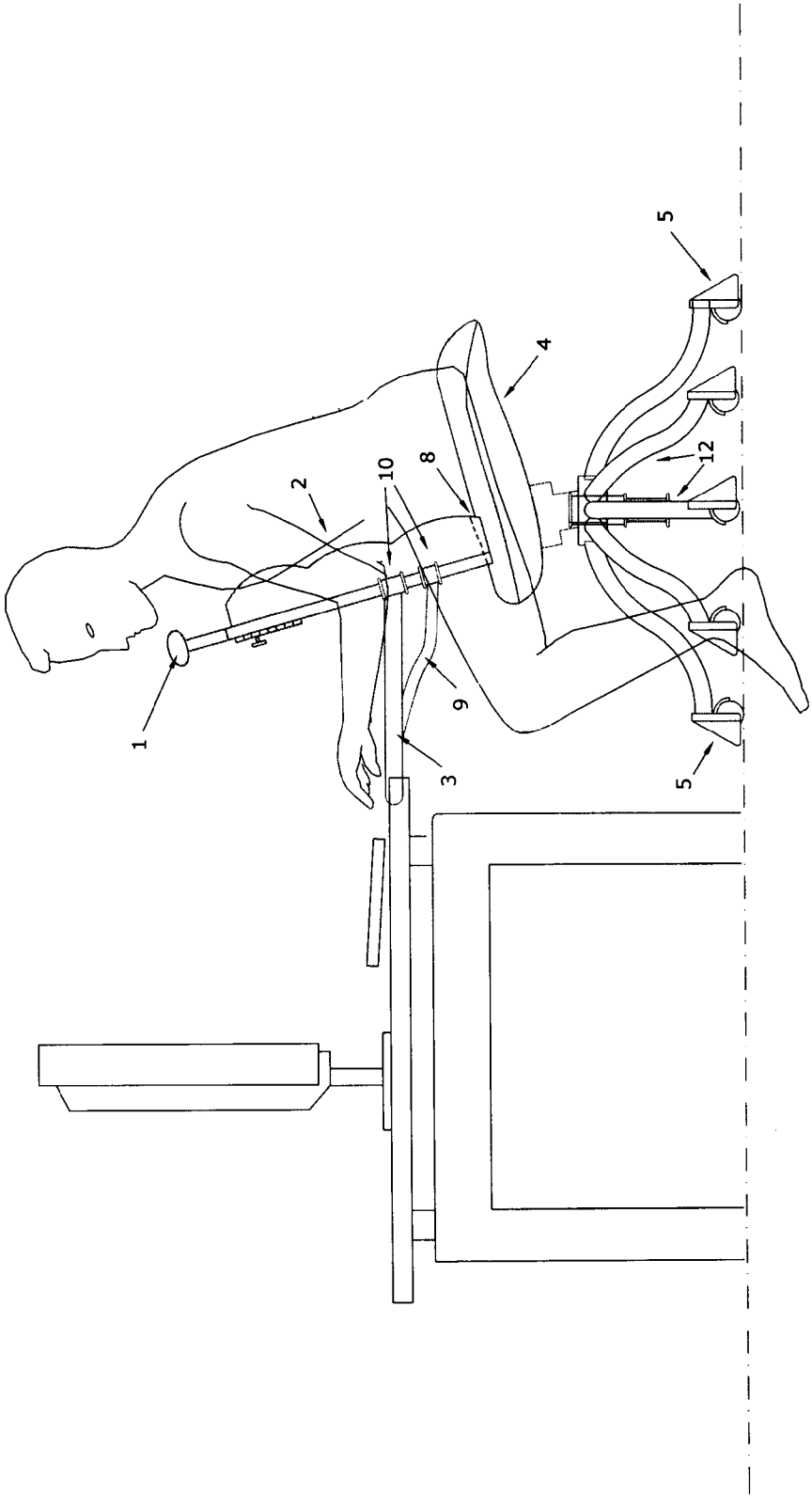
Claims

- 1) orthopedic chair for office use diversified by having a backrest modified to be usable in the chest support (2), characterized in that the insertion in the seat is depository (8), on the same line about the mast (8) , he was given a mushroom shape (Figure 2e), having the widened part of support for the shoulders compared to the usual office chairs, with a top with curved corners (Figure 2e) and having made the final part near the 'insertion in the seat curved towards the inside on both sides (11), bringing the total width of the backrest, in the lower part of insertion on the seat, proportional to the distance between the insertion of the femurs of the human skeleton; chair characterized by the fact to possess more than one, of the swivel arms (3) with a rotational mechanism (10), a chin-extendable supports (1) on top of the backrest, a seat more ergonomic and adapted for use with the above-mentioned (8.4), the rubber anti tipping on top of each wheel (5) and support feet longer (12) of the chairs usual, with curved structure.
- 2) Orthopedic chair for office use according to claim 1 characterized by the fact of having swivel arms (3) equipped with a rotation mechanism mounted to the sides of the backrest (10) able to rotate them to 180 ° degrees to support the seat according to the criteria innovation previously mentioned; slightly inclined by about 5 ° -10 ° (3) to be positioned at the sides of the user parallel to the ground being innovative seat (Figure 1), mounted with a support from below with which joins (9), equipped with a curved line with insertion to about 2/3 of the length of the armrest and provided with a rotation mechanism similar to that of the previously mentioned arm (10).
- 3)) orthopedic chair for office use according to claim 1 characterized by the fact of having a chin extensible supports mounted on the top of the backrest (1), of a semi-elliptical, with padding 10-15 cm wide massive, the mechanism of which carrier is mounted on the back of

the backrest (1), extensible to about 15 cm, equipped with a supporting structure rigid and adjustable, and of cylindrical shape

- 4) 4) orthopedic chair for office use according to claim 1 characterized by the fact of having rubber anti-tip (5) positioned immediately above the wheels (Figure 2d, 2e), at the end of the feet of the chair, hard rubber and circular in shape, very thick (about 1.5-2 cm), approximately 0.5 cm from the ground and arranged for the 180 ° of the outer part of the wheel (figure 2d), so as to cover, with a radial symmetry, the whole area support of the seat of the user (figure 1).
- 5) 5) orthopedic chair for office use according to claim 1 characterized by having the following changes in load of the seat: the rear perimeter of the seat is made of the concave curves (7), or the concavity is towards the center of the chair (Figure 2a, 2b, 2c), the curved lines are positioned between the center of the seat and the respective side corners (7), the seat is characterized by an initial inclination of about 5-10 ° (4) and has a greater surface support (50x50 cm², approximately) (8) with respect to office chairs common (figure 2b); the seat is characterized in that it be larger, more enveloping and more ergonomic especially with regard to the innovative seat (figures 1.5), characterized by a three-lobed structure below (6), formed by two lobes front and a rear mounted to the same angle (6), can be considered the fact that the 2 anterior lobes can be mounted at an angle slightly more open at the center but the posterior lobe must necessarily be mounted so that its horizontal projection, on the line of the seat itself is perpendicular with the backrest (figure 2d).

FIG.1



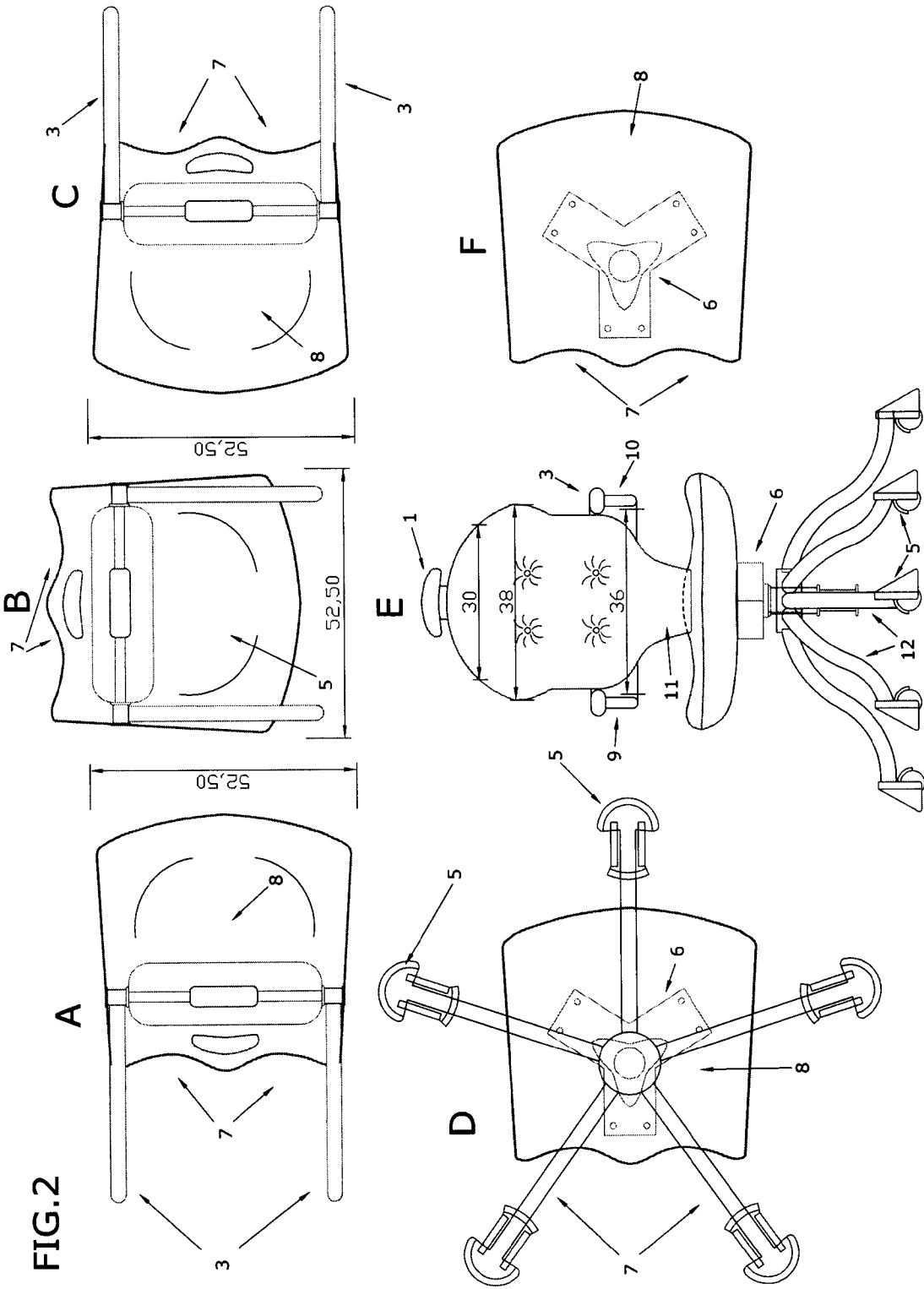


FIG.3

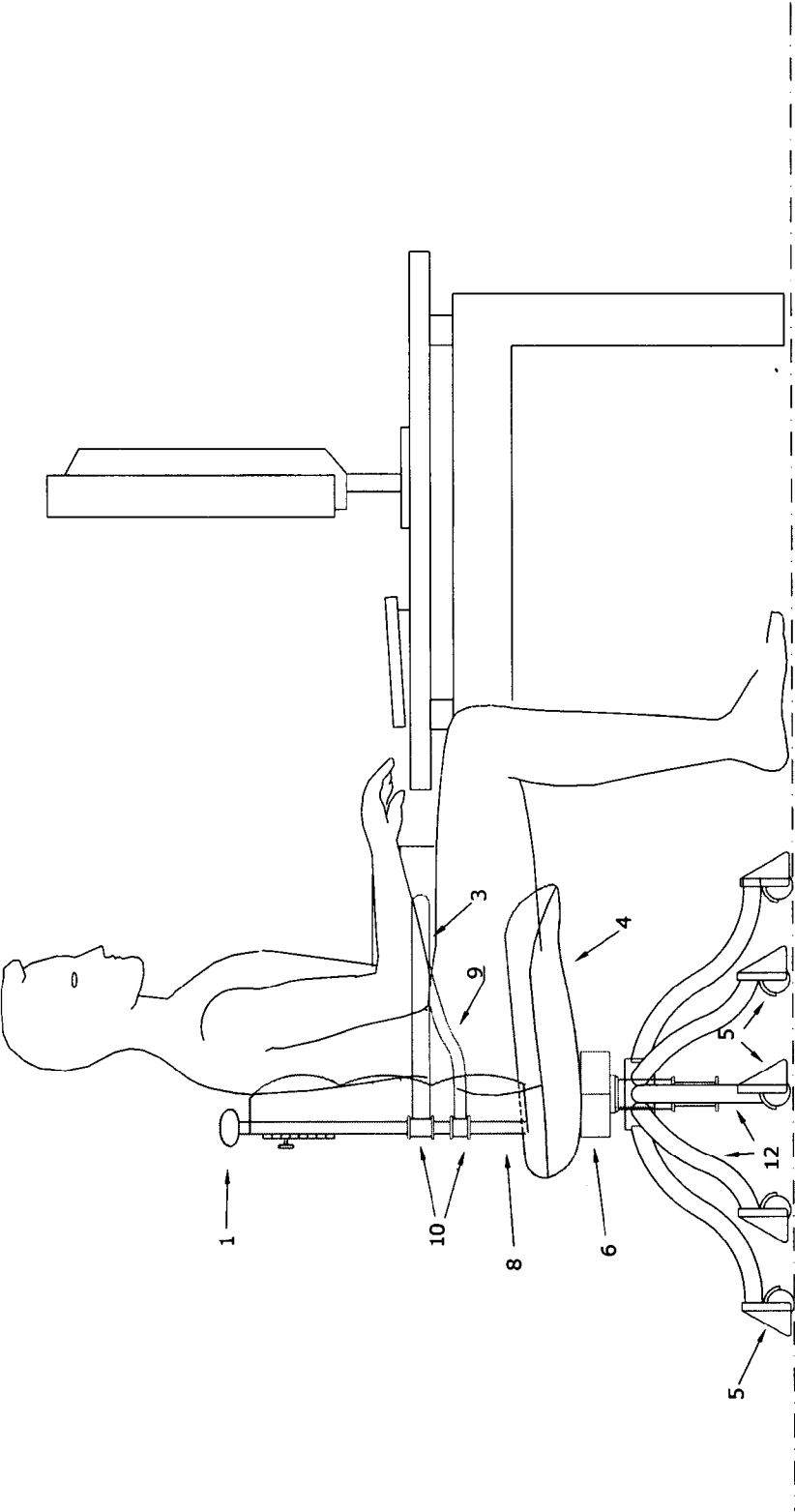


FIG.4

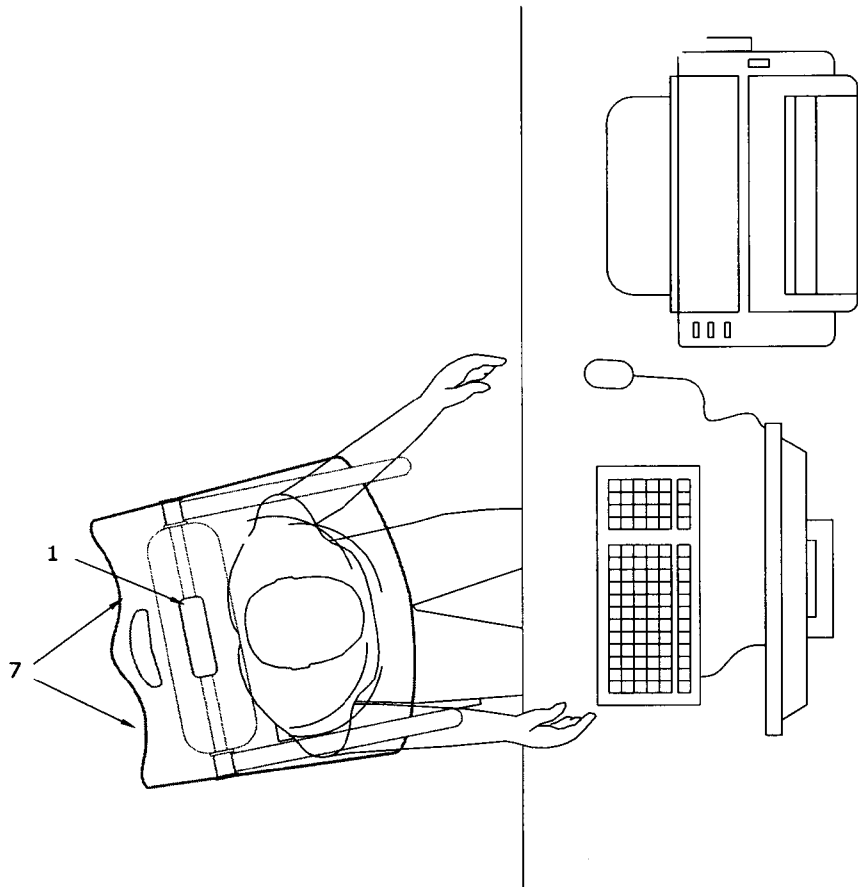
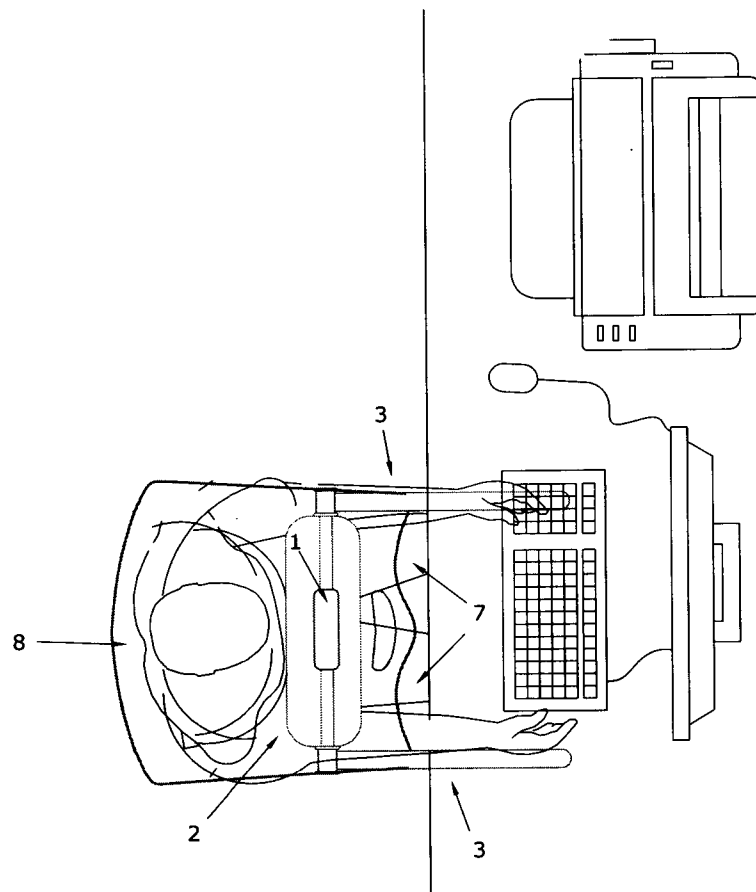


FIG.5



INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2013/000015

A. CLASSIFICATION OF SUBJECT MATTER

INV. A47C1/03 A47C9/00 A47C7/00 A47C7/38
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47C A61G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2008 062015 A (ITOKI CORP) 21 March 2008 (2008-03-21) figures	1
A	----- GB 276 561 A (JAUREGUI) 1 September 1927 (1927-09-01) figures	1
A	----- DE 200 02 799 U1 (DEISIG) 5 July 2001 (2001-07-05) figures	1
A	----- EP 0 163 437 A1 (OPSVIK) 4 December 1985 (1985-12-04) figures	1



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See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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