



US 20200229588A1

(19) **United States**(12) **Patent Application Publication**
CHEN et al.(10) **Pub. No.: US 2020/0229588 A1**(43) **Pub. Date: Jul. 23, 2020**(54) **ELECTRIC LIFTING DESK WITH
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(CN)**(21) Appl. No.: **16/388,889**(22) Filed: **Apr. 19, 2019**(30) **Foreign Application Priority Data**

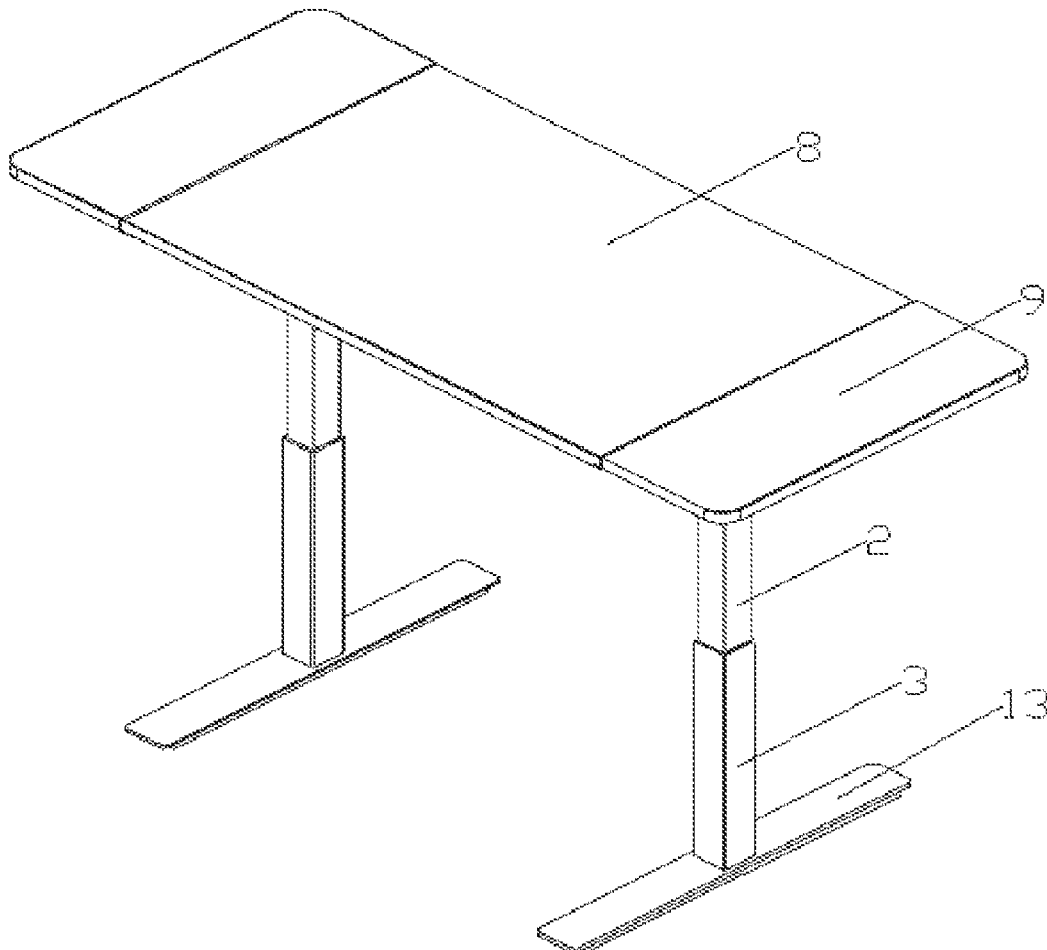
Jan. 18, 2019 (CN) 201910047825.1

Publication Classification(51) **Int. Cl.**
A47B 9/04 (2006.01)
A47B 9/20 (2006.01)
A47B 1/04 (2006.01)(52) **U.S. Cl.**CPC **A47B 9/04** (2013.01); **A47B 9/20**
(2013.01); **A47B 1/04** (2013.01); **A47B**
2200/0061 (2013.01); **A47B 2200/004**
(2013.01); **A47B 2200/0054** (2013.01); **A47B**
2200/0057 (2013.01); **A47B 2200/0001**
(2013.01)

(57)

ABSTRACT

A three-segment electric lifting desk includes a desktop and supporting legs. The supporting legs are connected to the bottom of the desktop. A main beam is provided at a bottom of the desktop, and two ends of the main beam are respectively connected to one supporting leg. The supporting leg is formed by connecting three tubes of different diameters, and the three tubes are a first tube, a second tube and a third tube, respectively. The three tubes are sequentially nested and connected to each other, and an interconnected cavity is formed inside the tubes. An electric pushing rod is provided in the cavity. The three-segment electric lifting desk has the characteristics of simple structure, stable lifting process, freely space retracting and expanding, stable driving of lifting and lowering, etc.



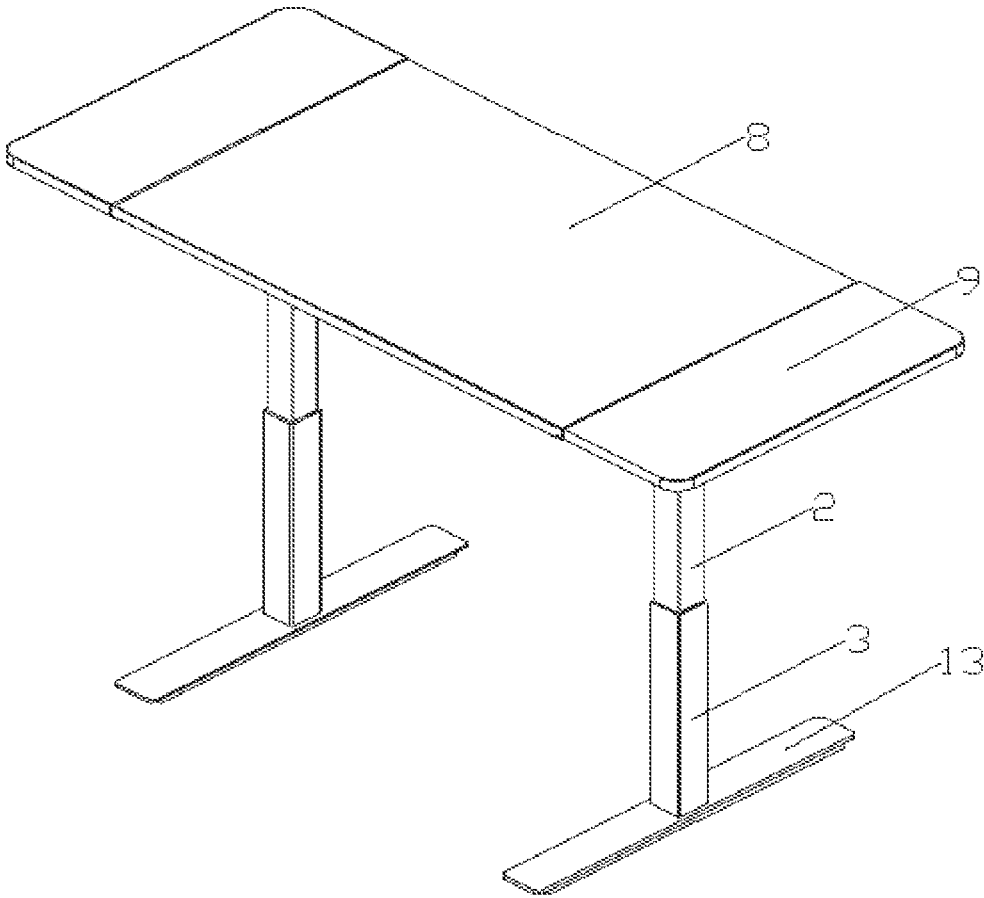


Fig. 1

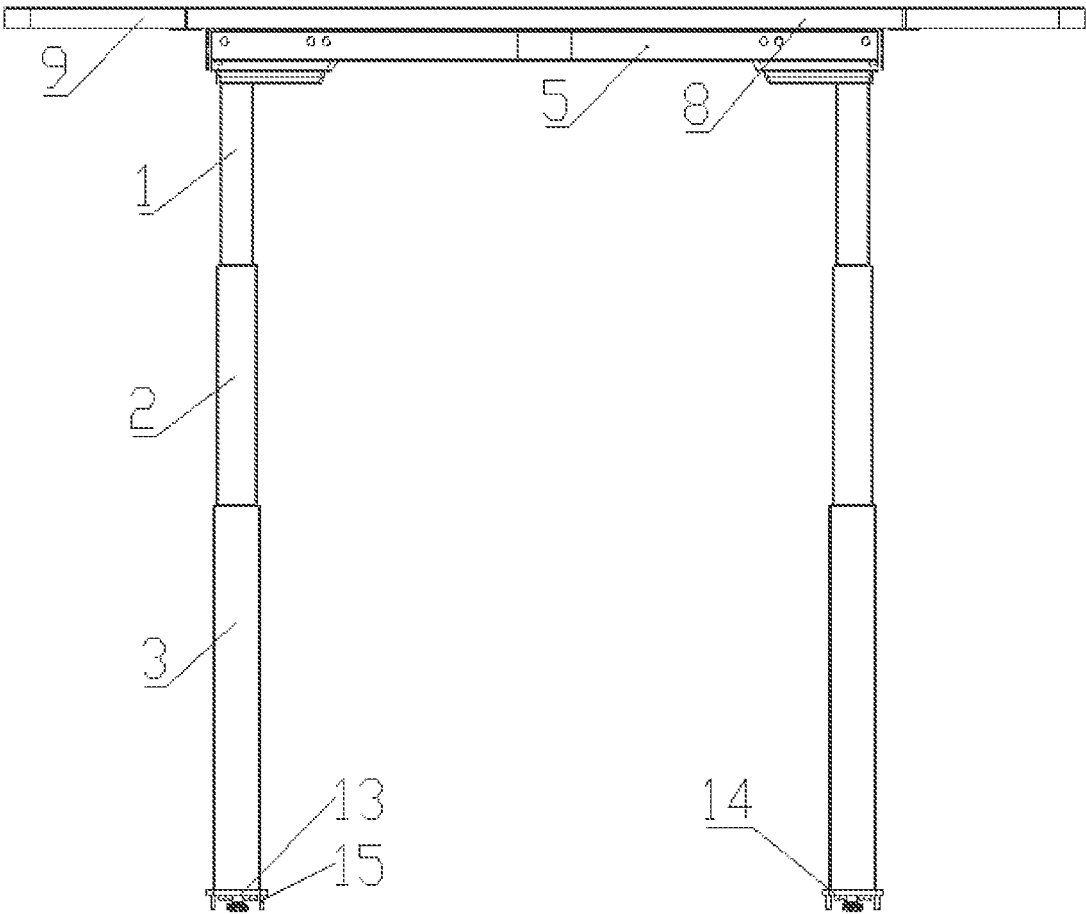


Fig. 2

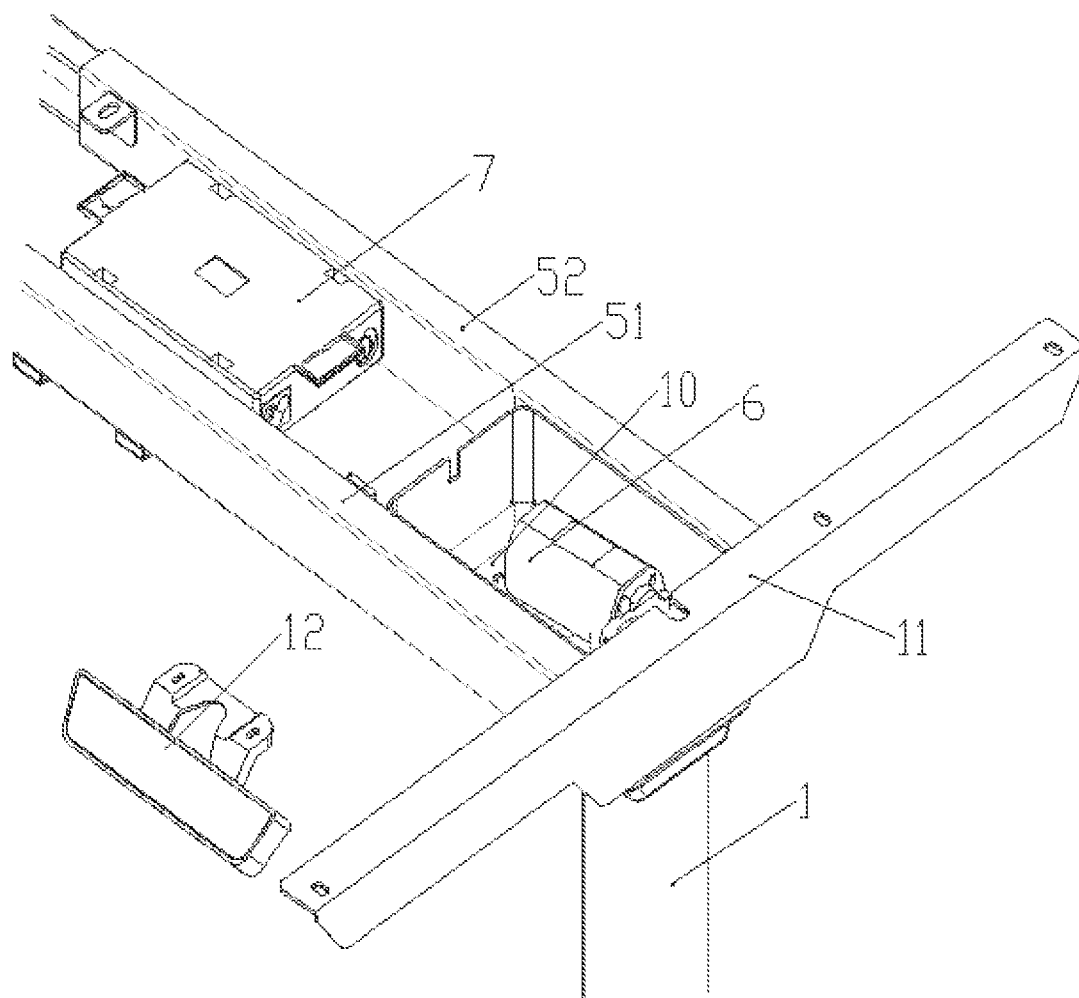


Fig. 3

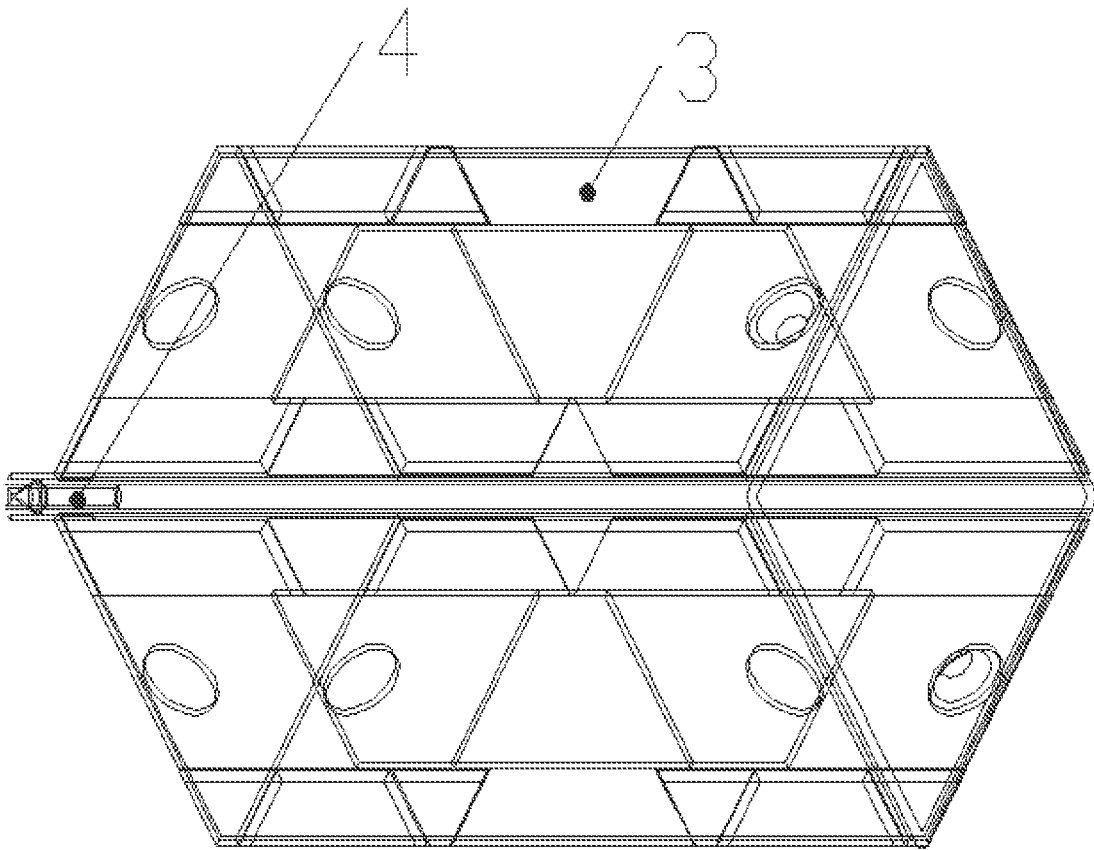


Fig. 4

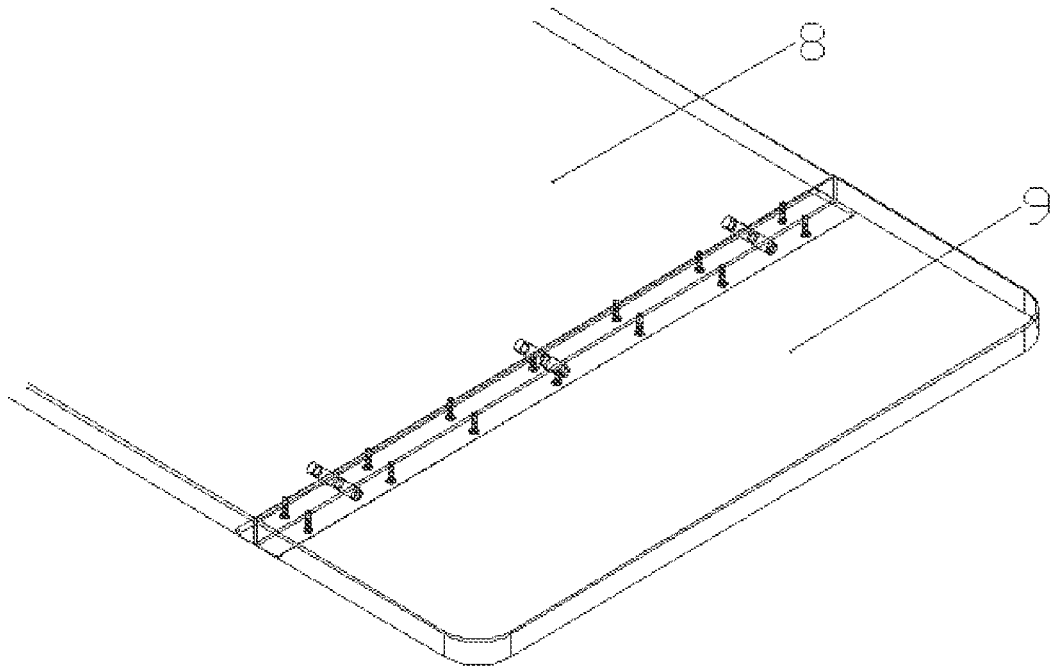


Fig.5

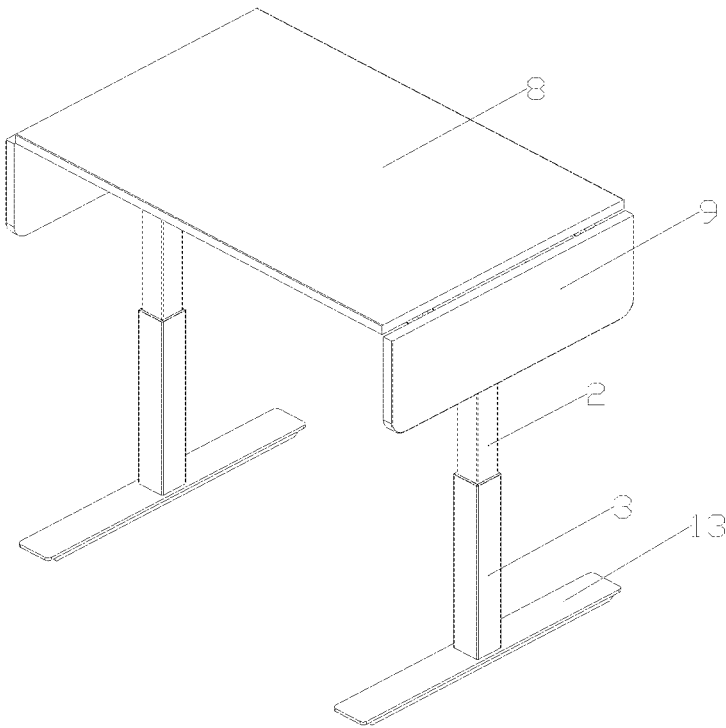


Fig. 6

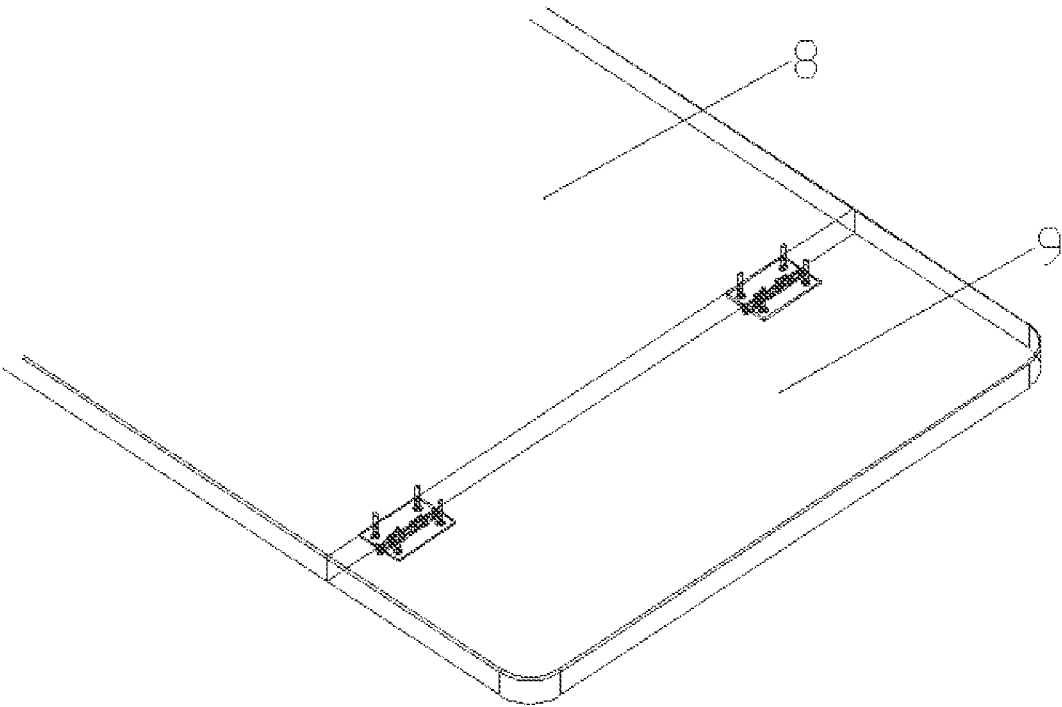


Fig. 7

ELECTRIC LIFTING DESK WITH THREE-SECTION LEGS

CROSS REFERENCE TO THE RELATED APPLICATIONS

[0001] This application is based upon and claims priority to Chinese Patent Application No. 201910047825.1, filed on Jan. 18, 2019, the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates to office supplies, in particular to an electric lifting desk with three-section legs.

BACKGROUND

[0003] Researchers has conducted an investigation on the history of the development of furniture in the world and found that sitting down is conducive to reducing fatigue in daily activities after human beings start to walk upright, therefore seats were invented. The sitting-work mode is maintained accordingly. However, as sitting-work time is continuously increased, people gradually realize that a long-time sitting is not conducive to the improvement of work efficiency. People began to try a sit-stand work mode, and gradually the standing desk appeared. Standing-work by using the lifting desk is becoming a popular healthy working mode.

[0004] The automatic lifting desk is generally powered by electricity. The height of the lifting desk is adjusted by controlling a mechanical device using a motor, or by controlling a gas pressure rod or a hydraulic rod using a compressor. The automatic lifting desk has the advantages of low power consumption, and having stable and beautiful appearance, and large height adjustable range. For this kind of automatic lifting desk, a form of single column or double column is available, and a height adjustable mode of remote control or manual control is available. The disadvantage of the automatic lifting desk is that the cost is relatively high. The height adjustment thereof mainly relies on the electric lifting system, and the quality of the lifting system determines the service life accordingly.

[0005] The non-automatic lifting desk is a simplification of the automatic lifting desk. For the non-automatic lifting desk, the electric motor or the compressor is eliminated, and the mechanical device, the hydraulic rod and the gas pressure rod by manpower are adjusted manually. The advantage of the non-automatic lifting desk is the cost is relatively low, and the disadvantages thereof are as follows. When adjusting the height, a few efforts are needed, requiring operating some buttons by hand to achieve the purpose of lifting. Moreover, the height capable of being lifted is limited, the workmanship is ordinary; the shape is single, and it is easy to knock down.

SUMMARY

[0006] Mainly aiming at the technical problems existing in the prior art, such as complicated structure, unstable lifting process, non-freely space retracting and expanding, unstable driving of lifting and lowering, etc., the present invention provides an electric lifting desk with three-section legs that has a simple structure, stable lifting process, freely space retracting and expanding, and stable driving of lifting and lowering.

[0007] In order to achieve the above objective, the technical solution of the present invention is as follows.

[0008] An electric lifting desk with three-section legs includes a desktop and supporting legs. The supporting legs are connected to the bottom of the desktop. A main beam is provided at the bottom of the desktop, and two ends of the main beam are respectively connected to a supporting leg. The supporting leg is formed by connecting three tubes of different diameters, consisting of the three tubes are a first tube, a second tube and a third tube, respectively. The three tubes are sequentially nested and connected to each other to form an interconnected cavity. An electric pushing rod is provided in the cavity. The supporting legs can be made of aluminum alloy or high-strength plastic, so as to reduce an overall weight of the lifting desk. The third tube at a bottom has the largest tube diameter, while the first tube at a most top has the smallest tube diameter. A cross section of each of the three tubes may be designed to have a circular shape, a rectangular shape, or even an elliptical shape, etc. A predetermined space of the interconnected cavity is provided for accommodating the electric pushing rod. The second tube nested in the third tube is capable of stretching out or retracting driven by the retractable electric pushing rod, and the first tube nested in the second tube is also capable of stretching out or retracting driven by the retractable electric pushing rod.

[0009] The main beam includes two cross rods: a left cross rod and a right cross rod, respectively. A supporting mechanism is provided between the left cross rod and the right cross rod, a pair of motors are provided on the supporting mechanism, and each of the motors is connected to the electric pushing rod. The main beam is configured for connecting the two supporting legs and storing a power system and a control system of the lifting desk. The structure of the main beam may be a simple double-cross-rod supporting mechanism, a supporting plate structure, etc.

[0010] A controller is provided between the motors, and the controller is connected to the motors on both sides. The motors act as power sources of the electric pushing rods in the supporting legs. The controller balances the power outputs of the motors on both sides, so that the output powers of the motors on both sides are equal to each other, and lifting speeds of the electric pushing rods in the supporting feed on both sides are equal to each other, ensuring the stable operation during a lifting process.

[0011] Preferably, the desktop is divided into two areas: a fixing area and folding areas, respectively. The folding areas are located on both sides of the fixing area. The desktop is designed to have a folding mechanism, saving storage and using space, and more suitable during use.

[0012] Preferably, the fixing area is connected to the folding area by a hinge. A simple mechanical hinge is applied, facilitating the folding, modification and maintenance.

[0013] Preferably, the fixing area is fixedly connected to the folding area by a pin roll. Alternatively, a state of the fixing area and the folding area is fixed temporarily, and a common mechanical pin roll is used, facilitating assembly and disassembly, and modification.

[0014] Preferably, a motor fixing plate is provided between the left cross rod and the right cross rod. The motor connected to the electric pushing rod may be suspended or enclosed on the main beam by setting the motor fixing plate, reducing dust accumulation and prolonging service life.

[0015] Preferably, a side plate is provided on the main beam, and a plurality of screw holes are provided in the side plate. The side plate can be connected to desktops with various shapes. The screw holes provided on the side plate make the desktop capable of being fixedly connected to the side plate by the nuts on the side surface of the desktop. Alternatively, a welding position may further be provided on the side plate for welding and fixing the desktop. The side plate plays a role of supporting the desktop and the main beam, does not change a main structure of the main beam, and can be applied to connections to different desktops.

[0016] Preferably, a remote control button is hung at the bottom of the desktop, and the remote control button is connected to the controller. The remote control button may be provided by suspension or external connection, and the controller is controlled by the remote control button to allow the lift desk to be manually controlled.

[0017] Preferably, the supporting legs are connected to a bottom plate. The bottom plate increases a contact area between the supporting legs and a ground to increase a balance of the lift desk.

[0018] Preferably, the bottom plate is mounted with an adjusting foot. The adjusting foot may be adjusted in height to make the bottom plate adapt to an uneven surface and enhance a stability of the lifting desk.

[0019] Preferably, reinforcing strips are provided on the bottom surface of the bottom plate. The reinforcing strips are arranged at intervals to snap-fit the bottom plate to a special ground to adapt to certain bumpy spaces, such as trains, airplanes, ships, etc.

[0020] In summary, the present invention has the characteristics of simple structure, stable of lifting process, freely space retracting and expanding, stable driving of lifting and lowering, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. 1 is a diagram of a first overall structure of an embodiment of the present invention;

[0022] FIG. 2 is a front view showing a structure of an embodiment of the present invention;

[0023] FIG. 3 is a cross-sectional view showing a partial structure of a main beam of an embodiment of the present invention;

[0024] FIG. 4 is a schematic diagram showing an internal structure of a third tube of an embodiment of the present invention;

[0025] FIG. 5 is a schematic diagram of a first structure of a desktop of an embodiment of the present invention;

[0026] FIG. 6 is a schematic diagram showing a second overall structure of an embodiment of the present invention; and

[0027] FIG. 7 is a schematic diagram of a second structure of a desktop of an embodiment of the present invention.

[0028] The reference designators are described below: 1—first tube, 2—second tube, 3—third tube, 4—electric pushing rod, 5—main beam, 6—motor, 7—controller, 8—fixing area, 9—folding area, 10—motor fixing plate, 11—side plate, 12—remote control button, 13—bottom plate, 14—adjusting foot, 15—reinforcing strip, 51—left cross rod, and 52—right cross rod.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0029] In order to further understand the present invention, the preferred implementation modes of the present invention are described with reference to the embodiments below. However, it should be understood that these descriptions are only for further illustration of the features and advantages of the present invention, rather than limitations to the claims of the present invention.

[0030] The present embodiment provides an electric lifting desk with three-section legs, embodiment 1 as shown in FIGS. 2-4 and 6-7, including a desktop and a pair of supporting legs. The table top is divided into a fixing area 8 and folding areas 9. Two hinges are mounted in the gaps between the fixing area 8 and each of the folding areas 9, and the structure of the hinge is similar to that of a door hinge.

[0031] A main beam 5 is provided at the bottom of the desktop. The main beam 5 includes a left cross rod 51 and a right cross rod 52. The left cross rod 51 and the right cross rod 52 may be made of angle steel, and provided in a same horizontal position. Two motor fixing plates 10 are provided between the left cross rod 51 and the right cross rod 52, and the two fixing plates 10 are respectively provided with a motor 6. A controller 7 is provided between the two motor fixing plates 10. The controller 7 is connected to the motors 6 on both sides, and the controller 7 is externally connected to a remote control button 12. The remote control button 12 is hung at the bottom of the main beam 5. Two side plates 11 are mounted on both sides of the main beam 5, and the side plates 11 are used to fixedly connect the fixing area 8 of the desktop.

[0032] A single supporting leg is divided into three sections, namely, the first tube 1, the second tube 2 and the third tube 3, respectively. Wherein, the third tube 3 has the largest tube diameter, the first tube 1 has the smallest tube diameter. The first tube 1 is nested in the second tube 2, and the second tube 2 is nested in the third tube 3. The third tube 3 is connected to the bottom plate 13, and the first tube 1 is connected to the main beam 5. The three tubes respectively have a rectangular cross section.

[0033] An interconnected cavity is formed inside the first tube 1, the second tube 2 and the third tube 3. An electric pushing rod 4 is provided in the cavity, and the electric pushing rod 4 can move telescopically from bottom to top. The electric pushing rod 4 is provided with three nodes which are respectively connected to the first pipe 1, the second pipe 2 and the third pipe 3. The electric end of the electric pushing rod 4 is connected to the motor 6.

[0034] The bottom of the third tube 3 is connected to a strip-shaped bottom plate 13. The bottom surface of the bottom plate 13 is in a rectangular shape, and provided with a plurality of reinforcing strips 15 to form a concave-convex interval structure. An adjusting foot 14 is provided in the concave part, and the adjusting foot 14 can rotate horizontally. The adjusting foot 14 has a similar structure to a refrigerator foot.

[0035] During an operation, the motors 6 are activated by the remote control button 12, and the controller 7 starts to work simultaneously with the two motors 6. The controller 7 provides the same power output control signal for the two motors 6. The electric pushing rod 4 is lifted upward from the inside of the third tube 3 by the power supplied by the motor 6. In the first stage of lifting, the node provided on the electric pushing rod 4 drives the second tube 2 to be drawn

out from the third tube 3. In the second stage of lifting, the node disposed on the electric pushing rod 4 drives the first tube 1 to be drawn out from the second tube 2. Thereby, all the lifting work is completed.

[0036] When the folding areas 9 of the desktop are bent downward, the hinges provided between the fixing area 8 and each of the folding areas 9 work to transform the space of the fixing area 8 with the folding areas 9, and the area of the desktop is changed from the area having the fixing area 8 and the folding areas 9 to the area having only the fixing area 8.

[0037] In embodiment 2 as shown in FIGS. 1-5, the desktop is divided into a fixing area 8 and folding areas 9. Two pieces of angle steel are installed in the gaps between the fixing area 8 and each of the folding areas 9. One side of the angle steel is filled in the gap between the fixing area 8 and the folding area 9, the other side of the angle steel protrudes on the surface where the fixing area 8 and the folding area 9 are located, and two pin holes are provided thereon to insert the fixing pin.

[0038] The other structure is the same as that in embodiment 1.

[0039] During an operation, the fixing area 8 and the folding area 9 of the desktop cannot be reversed due to the influence of the structure of the fixing pin, and the area of the desktop includes the entire area composed of the fixing area 8 and the folding area 9.

[0040] The description of the above embodiments is only intended to help understand the methods and core ideas of the present invention. It should be pointed out that for ordinary technicians in the art, without departing from the principles of the present invention, the present invention can further be improved and modified in a number of ways, and these improvements and modifications fall within the scope of the claims of the present invention.

What is claimed is:

1. An electric lifting desk with three-section legs, comprising: a desktop and at least two supporting legs, wherein the supporting legs are connected to a bottom of the desktop, a main beam is provided at the bottom of the desktop, a first end of the main beam is connected to a first supporting leg of the at least two supporting legs, and a second end of the main beam is connected to a second supporting leg of the at least two supporting legs; each of the at least two supporting legs is formed by connecting three tubes of different diameters, and the three tubes include a first tube, a second tube and a third tube, respectively; the three tubes are sequentially nested and connected to each other, and an interconnected cavity is formed inside the three tubes; an electric pushing rod is provided in the interconnected cavity;

the main beam comprises two cross rods: a left cross rod and a right cross rod, respectively; a supporting mechanism is provided between the left cross rod and the right cross rod, a pair of motors are provided on the supporting mechanism, and each motor is connected to the electric pushing rod;

a controller is provided between the motors, and the controller is connected to the motors on both sides.

2. The electric lifting desk with the three-section legs of claim 1, wherein, the desktop is divided into a fixing area and folding areas, and the folding areas are located on both sides of the fixing area.

3. The electric lifting desk with the three-section legs of claim 2, wherein, the fixing area is connected to each folding area by a hinge.

4. The electric lifting desk with the three-section legs of claim 2, wherein, the fixing area is fixedly connected to each folding area by a pin roll.

5. The electric lifting desk with the three-section legs of claim 1, wherein, a motor fixing plate is provided between the left cross rod and the right cross rod.

6. The electric lifting desk with the three-section legs of claim 1, wherein, a side plate is provided on the main beam, and a plurality of screw holes are provided on the side plate.

7. The electric lifting desk with the three-section legs of claim 1, wherein, a remote control button is hung at the bottom of the desktop, and the remote control button is connected to the controller.

8. The electric lifting desk with the three-section legs of claim 1, wherein, the at least two supporting legs are connected to a bottom plate.

9. The electric lifting desk with the three-section legs of claim 8, wherein, the bottom plate is mounted with an adjusting foot.

10. The electric lifting desk with the three-section legs of claim 8, wherein, reinforcing strips are provided on a bottom surface of the bottom plate.

11. The electric lifting desk with the three-section legs of claim 2, wherein, a motor fixing plate is provided between the left cross rod and the right cross rod.

12. The electric lifting desk with the three-section legs of claim 3, wherein, a motor fixing plate is provided between the left cross rod and the right cross rod.

13. The electric lifting desk with the three-section legs of claim 4, wherein, a motor fixing plate is provided between the left cross rod and the right cross rod.

14. The electric lifting desk with the three-section legs of claim 2, wherein, a side plate is provided on the main beam, and a plurality of screw holes are provided on the side plate.

15. The electric lifting desk with the three-section legs of claim 3, wherein, a side plate is provided on the main beam, and a plurality of screw holes are provided on the side plate.

16. The electric lifting desk with the three-section legs of claim 4, wherein, a side plate is provided on the main beam, and a plurality of screw holes are provided on the side plate.

17. The electric lifting desk with the three-section legs of claim 2, wherein, a remote control button is hung at the bottom of the desktop, and the remote control button is connected to the controller.

18. The electric lifting desk with the three-section legs of claim 3, wherein, a remote control button is hung at the bottom of the desktop, and the remote control button is connected to the controller.

19. The electric lifting desk with the three-section legs of claim 4, wherein, a remote control button is hung at the bottom of the desktop, and the remote control button is connected to the controller.

20. The electric lifting desk with the three-section legs of claim 2, wherein, the at least two supporting legs are connected to a bottom plate.

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