G. E. ANDERSON.

ADJUSTABLE SUPPORT FOR FURNITURE.

APPLICATION FILED MAR. 31, 1909.

957,176.

Patented May 10, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

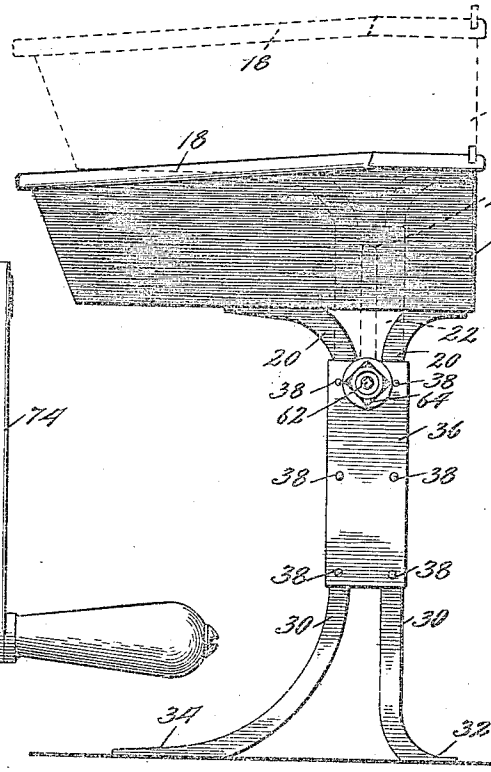


Fig. 3.

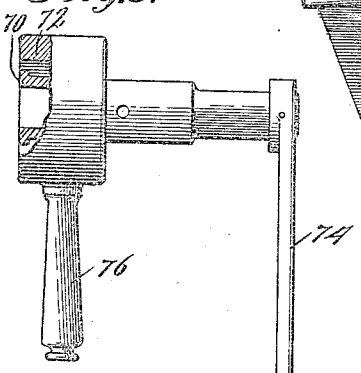
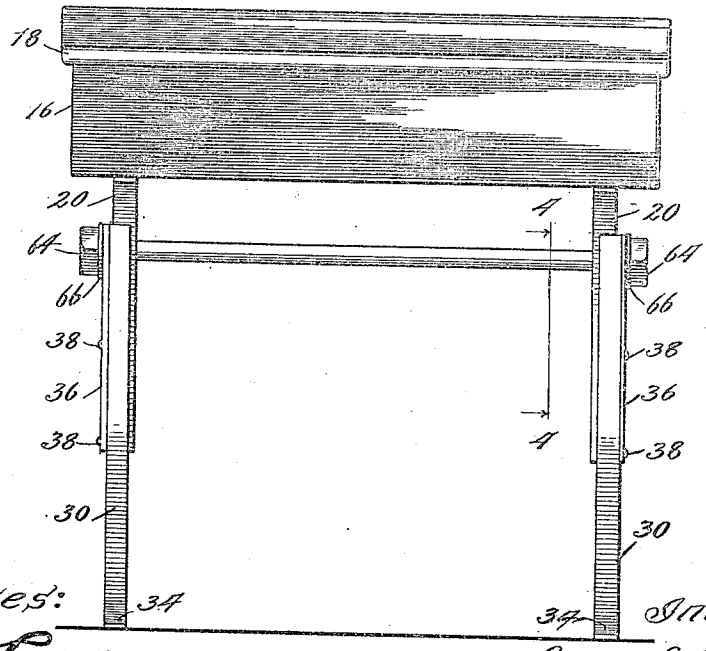


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 4.

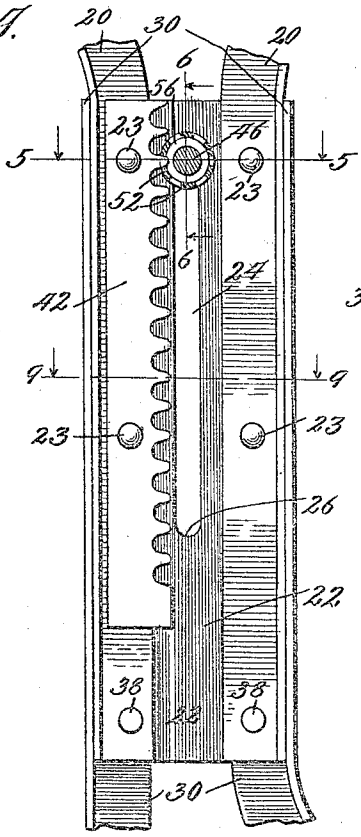


Fig. 5.

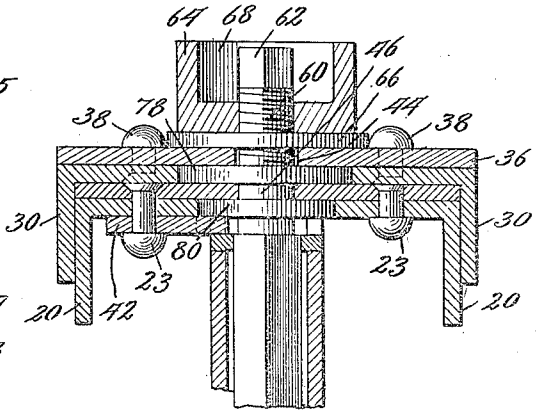


Fig. 6.

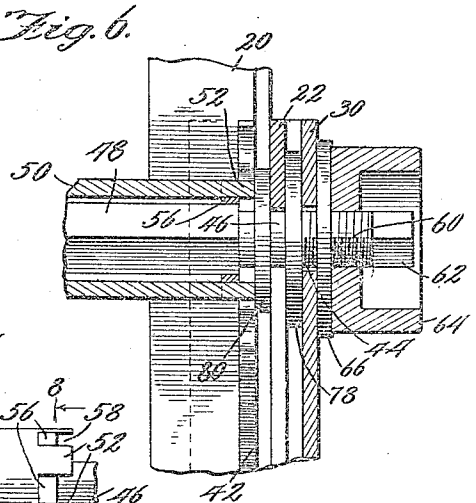


Fig. 8.

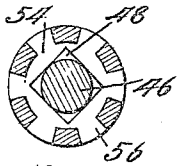
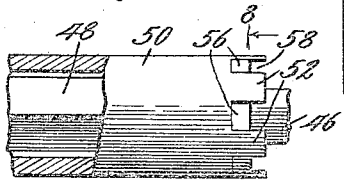


Fig. 7.



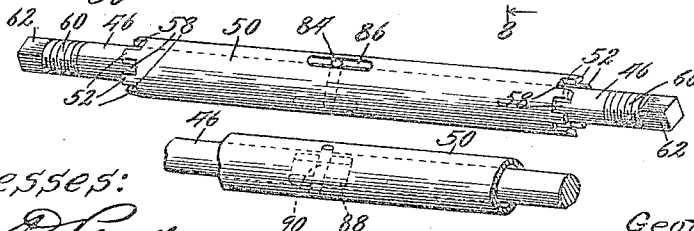


Fig. 7a.

Fig. 7b.

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3 SHEETS—SHEET 3.

Fig. 9.

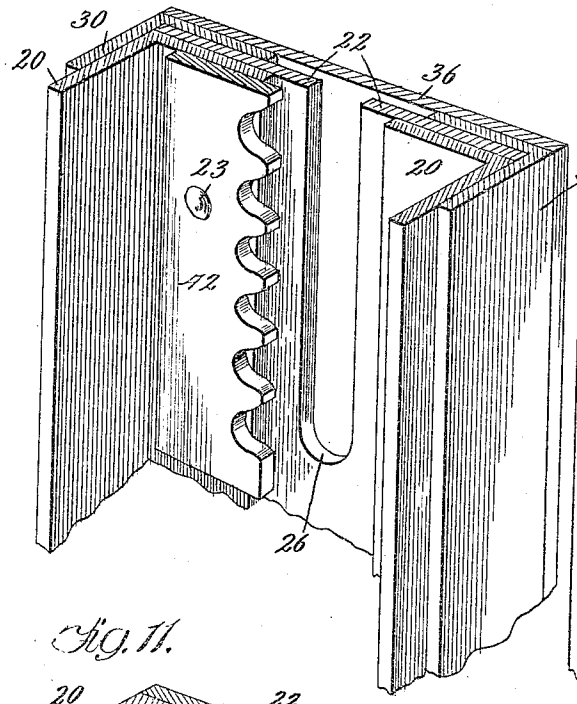


Fig. 10.

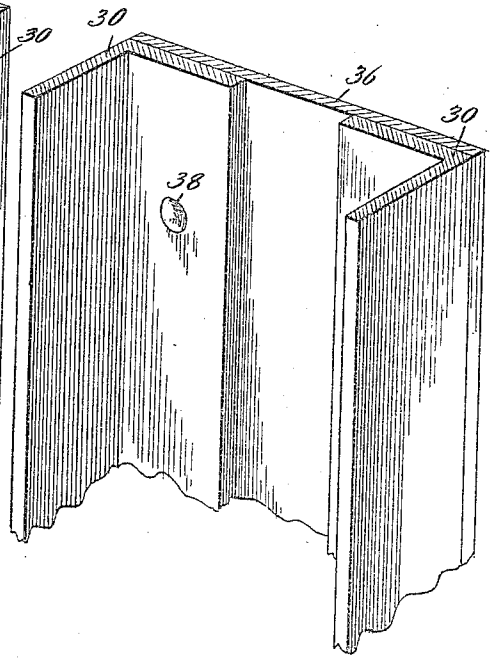


Fig. 11.

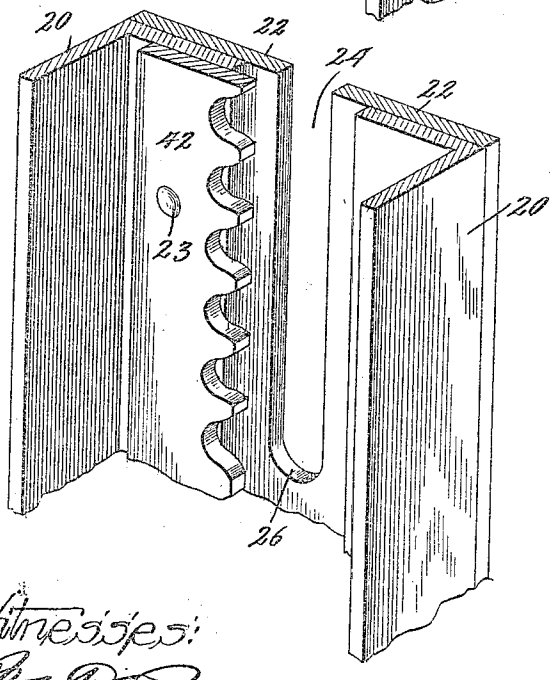
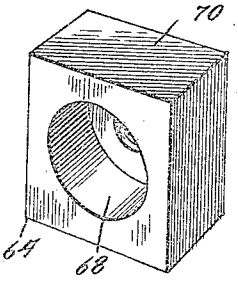


Fig. 12.



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UNITED STATES PATENT OFFICE.

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ADJUSTABLE SUPPORT FOR FURNITURE.

957,176. Specification of Letters Patent. Patented May 10, 1910.

Application filed March 31, 1909. Serial No. 486,974.

To all whom it may concern:

Be it known that I, GEORGE E. ANDERSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Adjustable Supports for Furniture, of which the following is a specification.

This invention is a mechanism for adjusting the legs, standards or supports of furniture and is manifestly capable of use upon all sorts of articles of this class. For convenience it is shown as applied to a school desk where its use is especially desirable.

The object of the invention is to provide a simple device by means of which the height of a school desk or other article of furniture may be easily, quickly and efficiently varied by mechanism not readily liable to get out of order.

The invention consists in novel mechanism for carrying out the foregoing objects, particularly in details of construction which will be fully apparent as the specification proceeds.

Figure 1 is an end view of an ordinary school room desk whose supporting legs or standards are equipped with the device of this invention; Fig. 2 is a front view of the desk of Fig. 1; Fig. 3 illustrates a special form of compound wrench especially applicable to this device, which wrench is more fully described and claimed in my application filed herewith for combination wrench, Serial No. 486,973; Fig. 4 is a detail view of one of the supports of the desk taken from the line 4—4 of Fig. 2; Fig. 5 is a sectional detail view on line 5—5, Fig. 4. Fig. 6 is a corresponding vertical view on the line 6—6, Fig. 4; Fig. 7 is a detail view of the driving shaft and an inclosing tube or pipe, in the ends of which are formed gears or pinions; Figs. 7[a] and 7[b] are modifications of Fig. 7; Fig. 8 is a sectional detail view on the line 8—8, Fig. 7; Fig. 9 is a perspective detail view taken with its top upon approximately the line 9—9, Fig. 4; Figs. 10 and 11 are the parts of Fig. 9 separated; and Fig. 12 is a perspective detail view of a locking nut.

Again referring to the drawings, numeral 16 represents an ordinary school desk having the ordinary top 18. Rigidly secured to the bottom of this desk 16, in parallel vertical planes, are two brackets, as here constructed composed of two angle irons 20 and a connecting flat plate 22 rigidly secured thereto by any suitable means such as the rivets 23. In each flat plate 22 and between adjacent flanges of the angle irons 20 is an elongated slot 24 having the closed ends 26, as shown. These parts just described may be cast in one piece if desired. Each of these depending brackets just described and clearly illustrated in Fig. 11 slidably engages a stationary floor standard, whose essential parts are clearly illustrated in Fig. 10. Each standard is made from two vertically extending angle irons 30 provided respectively with feet 32 and 34, by which they may be secured to the floor by any suitable means, the upper ends of the angle irons 30 being secured to a flat plate 36 by rivets 38 or any other suitable means. These parts just described may be cast in one piece if desired. The sliding fit of each depending bracket in its adjacent floor standard is such that when the desk 16 is raised or lowered, the bracket members attached thereto slide easily in the corresponding floor standards just described.

Rigidly secured by any suitable means, as for instance the rivets 23 entering the brackets and upon the same side of each of the slots 24 is a toothed rack 42.

Journaled in suitable bearings 44 formed in the upper portion of each of the plates 36 is a shaft 46 having the non-circular, in the particular instance here shown square, cross-section 48 for substantially all of the distance between the brackets. This non-circular portion 48 is made larger than the circular portion 46. Inclosing this non-circular portion 48 of the shaft is a hollow tube 50 having rigid teeth 52 cut upon its opposite ends of such a size, shape and location that they mesh with the rack teeth 42 upon the standards at opposite ends of the desk. This tube 50 is non-rotatively secured upon the square portions 48 of the shaft by means of the disks 54, best seen in Fig. 8, which are themselves in non-rotative but in sliding engagement with the portion 48 of the shaft 46 and are provided with teeth 56 which, as seen in Fig. 7, enter the spaces or notches 58 between the gear teeth 52 on the ends of the tube 50. Each outer end of the shaft 46 extending outside of the bearings 44 carries screw threads 60 terminating at the extreme outer ends in non circular portions 62 adapted to be engaged by a wrench. Nuts 64

are provided, engaging threads 60 and bearing against washers 66. The outer portions of these nuts 64 have in them hollow recesses 68 in which a driving wrench 70 may enter to take hold of the non-circular portions 62 of the shaft 64. The outer portions 70 of these nuts are made non-circular in form so that they may be engaged by the locking portion 72 of the wrench shown in Fig. 3. The device of this invention may, manifestly, be manipulated by two separate wrenches, but for convenience a compound wrench is provided comprising the portion 70 to engage the shaft operated by the handle 74 and the portion 72 journaled upon the portion 70 of the wrench and adapted to be operated by the handle 76, as more fully shown, described and claimed in my accompanying application, Serial No. 486,973. It should be noted that the racks 42 are longer than the slots 24 and that therefore the closed ends 26 of the slots 24 serve as stops for limiting the upward and downward movement of the pinions on the racks. For convenience the shaft is provided with suitable washers 78, 80 and 66 as shown. These washers, particularly the middle one 80, are unnecessary and may be wholly omitted without affecting the invention in any way.

In the operation of the device the parts are first assembled by hand, as shown in the drawings. The operator applies preferably the compound wrench shown, and by rotating the handle 76 loosens up the nut 64, which is in engagement with it, and then by manipulating the handle 74 in the proper direction rotates the shaft 46, thereby causing the gear teeth 52 to rotate, and as the gears 52 are carried by the shaft upon fixed bearings, it manifestly follows that the racks 42 with the attached brackets and desk are elevated or lowered, as the case may be, depending upon the direction of rotation of the shaft. When the desk has reached the proper height, the operator, by any suitable mechanism, tightens the nut 64 and the desk is firmly locked in position until it is desired to adjust it to a different height, when the operation is repeated.

Attention is called to the fact that the operator is able to hold the desk in any position of adjustment, by means of the wrench which engages the end of the shaft, while he tightens or loosens the locking nut. In other words he is not obliged to take hold of the desk or any part attached thereto with his hands in order to retain it in position while turning the locking nut.

Attention is particularly called to the fact that by making the tube 50 of proper length the gears are always maintained in mesh with the racks and that by making the shaft slidable lengthwise inside the tube 50 and by making the non-circular portion 48 of the shaft of a shorter length than the distance between the washers 80 the shaft has sufficient endwise play so that it is only necessary to loosen the locking nut at one end of the desk in order to be able to rotate the shaft and elevate or lower the desk. That is to say the locking effect takes place by the locking nuts 64 engaging the floor standards and clamping them and their adjacent brackets against the ends of the tube 20 *i. e.* in the particular case here shown the ends of teeth 52. In other words the tube 50 and the washers 80 used, in the particular case here illustrated, together serve as a compression member against the ends of which the tightening of either nut 64 locks the brackets and floor standards as described.

Fig. 7[a] shows a modified construction in which the non-circular portion 48 of the shaft 46 is omitted and a pin 84 rigid in the shaft slides back and forth in an elongated slot 86 in the tube.

Fig. 7[b] is a device similar to that of Fig. 7[a] in which pin 88 is rigid in the tube and slides in a slot 90 in the shaft. In both of these cases then the shaft is slidable lengthwise of the tube but the tube, and consequently the gears thereon, rotates with the shaft.

Attention is called to the fact that by journaling the shaft in the floor standards the operator can rotate it more conveniently than he could were the mountings of the brackets and racks reversed *i. e.* the racks on the standards and the shaft in the movable bracket—an entirely possible construction.

What I claim as new, and desire to secure by Letters Patent, is:

1. In mechanism of the class described, the combination of a pair of floor standard members, a bracket member carrying an article of furniture slidably engaging each of said standard members, a shaft journaled in one of said sets of members and slidable in an elongated slot in the other set of members, a rack on each of the last mentioned set of members, a compression member between the supporting members at opposite ends of the shaft, positively connected to the shaft by mechanism permitting longitudinal movement of the shaft, a pinion carried by said compression member in engagement with each of said racks and mechanism adapted to lock the outer ends of the shaft in such a way as to compress the supporting members adjacent to each end of the compression member together against said compression member for the purposes set forth.

2. In mechanism of the class described, the combination of a pair of floor standard members, a bracket member carrying an article of furniture slidably engaging each of said standard members, a shaft journaled in one

of said sets of members and slidable in an elongated slot in the other set of members, a rack on each of the last mentioned set of members, a compression member between the supporting members at opposite ends of the shaft inclosing said shaft, positively connected to the shaft by mechanism permitting longitudinal movement of the shaft, a pinion carried by said compression member in engagement with each of said racks and mechanism adapted to lock the outer ends of the shaft in such a way as to compress the supporting members adjacent to each end of the compression member together against said compression member for the purposes set forth.

3. In mechanism of the class described, the combination of a pair of floor standard members, a bracket member carrying an article of furniture slidably engaging each standard member, a shaft rotatably journaled and longitudinally movable in the floor standard members and passing through slots in the bracket members, a rack on each of said bracket members, a compression member between the supporting members at opposite ends of the shaft, positively connected to the shaft by mechanism permitting longitudinal movement of the shaft, a pinion carried by said compression member in engagement with each of said racks and mechanism adapted to lock the outer ends of the shaft in such a way as to compress the supporting members adjacent to each end of the compression member together against said compression member for the purposes set forth.

4. In mechanism of the class described, the combination of a pair of floor standard members, a bracket member carrying an article of furniture slidably engaging each standard member, a shaft rotatably journaled and longitudinally movable in the floor standard members and passing through slots in the bracket members, a rack on each of said bracket members, a compression member between the supporting members at opposite ends of the shaft inclosing said shaft, positively connected to the shaft by mechanism permitting longitudinal movement of the shaft, a pinion carried by said compression member in engagement with each of said racks and mechanism adapted to lock the outer ends of the shaft in such a way as to compress the supporting members adjacent to each end of the compression member together against said compression member for the purposes set forth.

5. In mechanism of the class described, the combination of a pair of floor standard members, a bracket carrying an article of furniture slidably engaging each standard member, a shaft journaled in the floor standard members and sliding in an elongated slot in the bracket members, a tube inclosing said shaft between the supporting members at opposite ends of the shaft, a rack rigidly secured to each of the last mentioned supporting members, a pinion formed by cutting the teeth thereof in the circumference of the tube upon the shaft meshing with each rack, and means at the ends of the shaft engaging the adjacent supporting members for locking the adjacent supporting members against the ends of the tube and mechanism independent from the locking means for rotating the shaft.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

GEORGE E. ANDERSON.

Witnesses:
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C. J. CHRISTOFFEL.