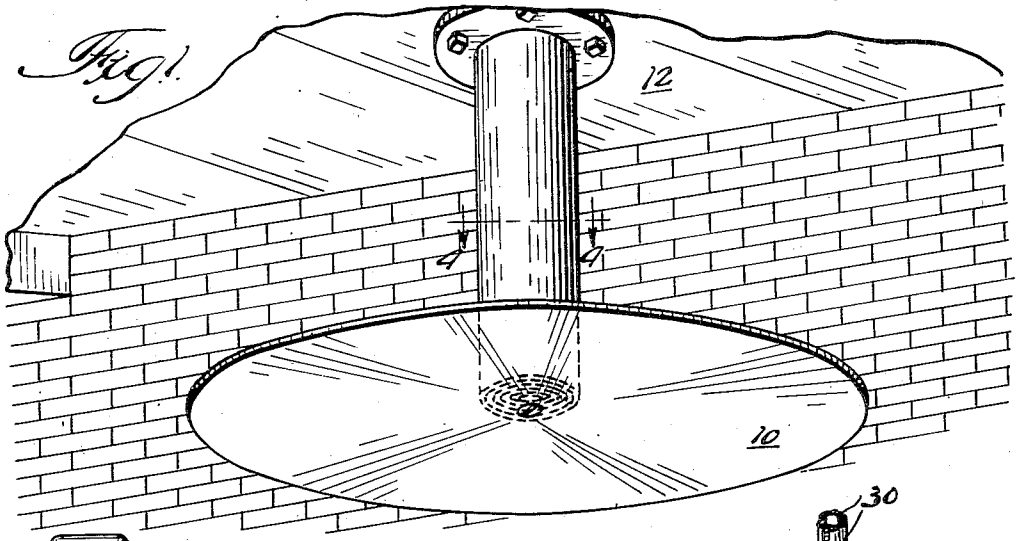
March 18, 1958 R. G. GALLOWAY 2,827,350

ADJUSTABLE PLATFORM STRUCTURE

Filed Aug. 10, 1956

Fig. 1.



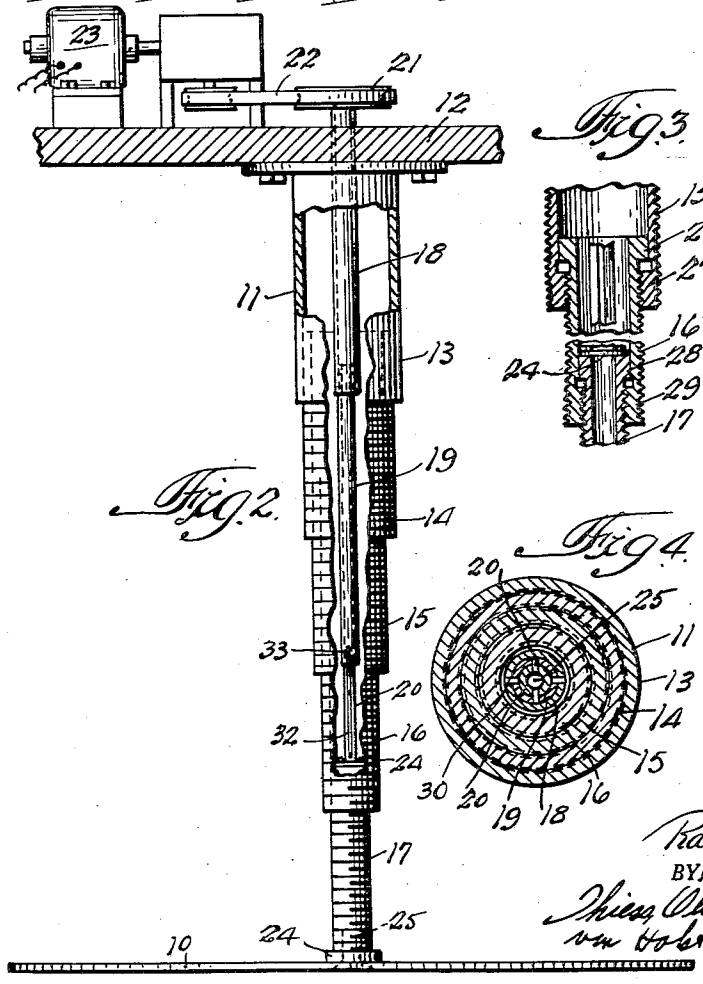


Fig. 2.

Fig. 3.

Fig. 4.

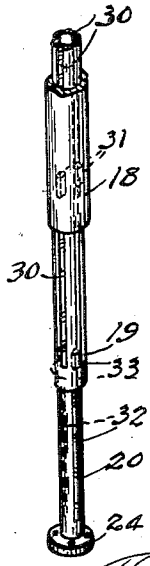


Fig. 5.

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ADJUSTABLE PLATFORM STRUCTURE

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9 Claims. (Cl. 311—17)

This invention relates to platforms and more particularly to platforms having an adjustable means of support.

The platform structure may be described in connection with a table, the base of which may be attached to a ceiling or overhead structure, but it is to be understood that it may also be applied to any type of supporting platform structure or the like which is attached to and/or used in conjunction with a floor, a wall, or any other supporting base.

Tables of the usual construction present many problems where space is at a premium. Generally, where a particular space is to be used in connection with activities or for purposes other than those which require the use of tables, the tables must be collapsibly constructed or otherwise made portable. Such an arrangement is very inconvenient particularly where the space is continually being used for activities which only intermittently require tables. The setting up and taking down of these tables is not only very inconvenient; it is very time-consuming and requires the expenditure of much manpower. Up to the present time the only practical alternative has been to provide separate spaces for those activities which require and those which do not require tables.

The improved structure utilizes a practical mechanical means whereby such tables may be quickly, smoothly and conveniently set in place or disposed of. The mechanism for the adjustment of such tables is very simple, both in operation and in installation, and requires very little operating space. The construction is such that the table is adapted for use in business offices, homes, schools, restaurants, civic auditoriums, or any such place where a mechanically positionable and disposable table would be desired. The most practical embodiment of the invention appears to be a table suspended from a ceiling and adjustably movable toward or away from that ceiling.

It is therefore one particular object of my invention to provide a platform which may be easily adjusted to the proper height.

It is another object of my invention to provide a platform which may be suspended from a ceiling and adjustably positioned in such a manner with respect to that ceiling so that the platform when not in use may be raised to a position closely adjacent to such ceiling and thereby provide additional floor space.

It is still another object of my invention to provide a platform which is adapted to be adjusted to proper height, raised or lowered out of the way, and may be easily installed in those buildings already constructed, as well as those buildings under construction.

It is a further object of my invention to provide a platform which may be smoothly and mechanically raised or lowered in order to provide a saving of space either above or below the platform.

It is also an object of my invention to provide a disappearing platform which may be raised through a recess or hole in a ceiling, lowered through a recess or hole in the floor, or horizontally disposed of through a slot in the wall, depending upon to which base structure the platform is attached.

It is another object of my invention to provide a platform which may be disposed of through either a wall, floor, or ceiling with a minimum of operating room required within that base structure.

It is still a further object of my invention to provide a ceiling suspended platform structure which may be adjusted to the desired height and which is entirely free of legs or other underlying support.

Other objects may be seen and a fuller understanding of the invention may be had by referring to the following description and claims taken in conjunction with the accompanying drawings.

In accordance with one embodiment of this invention, a platform is provided in combination with a relatively fixed base and an adjustable supporting means which operatively connects the platform to the base. The adjustable supporting means is controlled by a power actuated means and is used to effect movement of the platform toward or away from the base. The adjustable supporting means comprises a plurality of interconnected supporting sections which are adapted to extendably and retractably move relative to one another. This movement of the supporting sections is dependent upon the power actuated means. One of the supporting sections is mounted on the base structure and a second such section is connected to and carries the platform. If the base is connected to or integral with a ceiling, the extension and retraction of the interconnected supporting sections result in a corresponding lowering and raising of the platform. By ceiling is meant any overhead means of suspension.

The supporting sections are cylindrically constructed and threadably interconnected and are adapted to threadably telescope when they are rotated relative to one another. The relative rotation is by means of a plurality of telescopically connected drive sections which are coaxially mounted within the supporting cylinders. One of the drive sections is mounted to one of supporting cylinders and another is operatively connected for rotation to the power actuated means. Thus rotation of the drive sections causes rotation and telescoping of the supporting cylinders.

For a more complete understanding of this invention, reference will now be made to the accompanying drawings in which:

Figure 1 shows one embodiment of the invention in which the platform is suspended in its telescoped or retracted position from a ceiling or overhead structure;

Fig. 2 is a sectional fragmentary view of the ceiling-suspended table in its extended position and showing novel mechanism for extending and retracting the table with respect to the ceiling;

Fig. 3 is a partial fragmentary enlarged view of two of the supporting cylinders showing the internal and external thread engagement as well as the flange arrangement for preventing the separation of these cylinders when the cylinders are in their extended positions;

Fig. 4 is a sectional view of the supporting cylinders and the drive cylinders taken substantially on line 4—4 of Fig. 1; and

Fig. 5 is an enlarged fragmentary view of the drive cylinder assembly showing the means for preventing these cylinders from rotating individually with respect to each other while permitting their rotation as an assembly unit.

Referring now to the drawing, 10 generally designates a platform such as a table which is suspended from a ceiling 12 by means of the supporting cylinder assembly 11.

The supporting cylinder assembly may be bolted to the ceiling as illustrated or fastened thereto in any number of obvious and well known ways. The platform may be in the form of a table, seat or other similar support

and may be adjustably connected to a wall, floor or other stable supporting base structure. The adjustable means of support may be described in one embodiment as a telescoping cylinder assembly, but it is to be understood that it may consist of a plurality of any type of supporting sections.

The supporting cylinder assembly is shown in Fig. 2 and consists of cylindrical sections 13, 14, 15, 16 and 17 which are shown in their extended position. The table may be bolted to the innermost cylinder 17 by means of a bolt or rivet 25. The outermost cylinder 13 may be connected to a ceiling 12 or other base. In one particular embodiment of the invention shown in Fig. 2, each of the supporting cylinders with the exception of the base-attached cylinder 13 are provided with external threads, and each of the supporting cylinders, with the exception of the table-attached cylinder 17 are hollow and provided therein with correspondingly threaded inwardly extending annular flanges 27 and 29. The internal threads of the inwardly extending flange of cylinder 13 are adapted to engage the external threads of cylinder 14, the internal threads of 14 to engage the external threads of 15 and, as shown in Fig. 3, the internal threads of cylinder 15 disposed on inwardly extending flange 27 are adapted to engage the external threads of cylinded 16, and the internal threads of cylinder 16 disposed on flange 29 engage the external threads of cylinder 17. This arrangement permits each cylinder to be telescoped or nested within the cylinder above it by simply rotating one cylinder with respect to the other. When the cylinders are fully telescoped within each other, the platform is in its most retracted position.

When in their extended position the supporting cylinders are prevented from further rotation with respect to one another and thus from separation. A detailed construction of the means for accomplishing this result is shown in Fig. 3. Disposed at the upper end of cylinders 16 and 17, respectively, are outwardly extending annular flanges 26 and 28. These flanges may slidably engage the internal faces of the hollow cylinder bores of cylinders 15 and 16 and provide radial stabilization for the assembly. These flanges are also adapted to engage inwardly extending annular flanges 27 and 29 when the respective cylinders to which flanges 26 and 28 are connected are in their most extended position.

One means for imparting a relative rotative movement between the ceiling or base structure and the supporting cylinders to make the cylinders threadably extend or retract is shown in Fig. 2. This means may comprise a drive cylinder assembly which is turned by a belt drive. The drive cylinder assembly is shown in Fig. 2 and consists of three telescopically connected cylindrical sections 18, 19 and 20. Section 20 is attached to and adapted to axially rotate supporting cylinder 17. The other end of the drive cylinder assembly section 18 extends through and may be journaled for axial rotation in the ceiling or base structure. A drive belt engaging wheel 21 may be connected to the end of section 18 which extends through the ceiling or base structure. Wheel 21 is adapted to engage a drive belt 22 which is driven by a motor 23.

A detailed view of the interconnected drive sections is presented in Fig. 5. In that particular embodiment the drive sections 18, 19, and 20 are cylindrical in shape and of hollow bore. Cylinder 20 is adapted to fit within the hollow bore of cylinder 19, and, in like fashion, cylinder 19 will fit within the bore of cylinder 18, permitting nesting or telescoping of both cylinders 19 and 20 within cylinder 18.

The interconnected drive sections are adapted to operate as a unit in axial rotation. In other words, the sections are prevented from axial rotation relative to one another. Thus, rotation imparted to section 18 will correspondingly rotate section 20. One means for accomplishing this result is shown in Fig. 5. In this embodiment sections 19 and 20 are provided with grooves 30 and 32, respectively, which may be disposed approximately 180° from each other and may extend substantially the entire length of their respective sections. Adapted to ride in these grooves and correspondingly disposed on the interior bores of cylinders 18 and 19 are projections 31 and 33. Thus, diametrically opposed projections 31 and 33 are adapted to ride within diametrically opposed grooves 30 and 32, respectively, permitting the cylinder sections to freely telescope but preventing any relative rotation among the cylinders.

The platform may be prevented from spinning relative to the ceiling when the height adjustment is being made. The preferred means for accomplishing this is by two structural alterations. First cylinder 17 is so connected to the platform that it may rotate without rotating the platform. This is done by providing a journaled bearing in cylinder 17 in which screw or rivet 25 is rotatably journaled. A second structural alteration is the addition of a telescoping cover consisting of a plurality of hollow telescopically interconnected cylinders attached at one end to the ceiling or base structure 12 and at the other end to the platform 10 and adapted to fit over and coaxially align with the supporting cylinder assembly. The individual sections of this cover assembly could be prevented from relative rotation in much the same manner as the individual sections of the drive assembly are prevented from relative rotation, previously described. This construction would allow raising or lowering of the platform but prevent unwanted rotation thereof. The cover also would be an excellent means for preventing grease from contacting the table linen or the like, for preventing articles from being caught in the threads of the telescoping supporting cylinders and for providing a pleasant finished appearance to the structure.

It may be readily seen that there are many possible variations of my invention. The drive sections could be rotated by a hand crank through a series of belts and direction-changing gears or by making it an extension of the rotating armature of a motor. The motor could be actuated by limit switches or other equally well known actuating devices. However, in its preferred embodiment the driving means is of the frictional type, comprising either a belt drive, as shown, or a friction wheel drive. A friction means for rotating the drive assembly is desired in order to prevent jamming of the cylinders in either their extended or retracted positions.

A square or other noncylindrical configuration may be provided for the telescoping drive sections in place of the projection and groove arrangement, thereby permitting the cylinders to telescope individually and rotate as a unit but preventing the cylinders from rotating individually. The supporting cylinder assembly may consist of any number of sections, which is also true of the drive cylinder assembly. The base connected cylinder may be recessed in the base in order to permit the platform to be brought flush with or in through the ceiling. An elongate table could be provided with two or more supporting cylinder assemblies simultaneously operable.

The platform as mentioned may constitute a table, a seat, or other supporting means of any configuration. If it is desired to attach the table to a wall with the supporting cylinders extending outward therefrom, the plane of the table would, of course, be horizontal and substantially parallel to the axis of the supporting cylinder assembly. Such an arrangement would permit the table to move laterally in and out of a recess or slot in the wall.

In operation, when the platform is desired to be extended from the supporting base, the motor 23 is energized to turn the belt 22 and wheel 21. This causes the drive cylinder assembly to rotate the innermost cylinder 17. When this cylinder has been fully extended, the bottom of the outwardly extending annular flange 28 attached thereto engages the top of the inwardly extending annular flange 29 attached to cylinder 16 and prevents further relative rotation between cylinders 16 and

17. Continued turning of the drive cylinder assembly causes cylinder **16** to turn and extend until its outwardly extending annular flange **26** abuts against the inwardly extending annular flange **27** of cylinder **15**, whereupon further turning causes cylinder **15** to turn and extend. The assembly is further rotated until all of the supporting cylinders have been thus extended or until the desired height has been reached, at which point the motor is de-energized. In order to retract the table the motor is energized to run in the opposite direction, thereby causing the supporting cylinders to threadedly telescope within each other. Instead of a motor which may be energized to run alternately in two directions, a gear assembly may be provided for changing the direction of rotation. It is also very possible that the supporting sections could be operated hydraulically. With such an arrangement a hydraulic ram would replace the motor and drive cylinder assembly and the internal and external threads of the supporting cylinders could be eliminated.

It will be apparent from the foregoing that a platform structure has been provided which may be quickly, smoothly and mechanically moved into proper position or disposed of in order to provide additional space. The described structure can be easily installed in any type of building and requires very little operating room. It can be used very effectively in places where the presence of legs or other underlying supports would be annoying. Other advantages, uses and novel functions are plainly evident to those skilled in the art.

Although I have described my invention with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

I claim as my invention:

1. The combination of a relatively fixed base, a platform, adjustable supporting means operatively connected to said platform and base to effect movement of said platform toward or away from said base, power actuated means operatively connected to said adjustable supporting means to effect controlled adjustment thereof; said adjustable supporting means including at least three threadably interconnected supporting cylinder sections adapted to screw in and out of each other in telescoping fashion, one of said supporting sections being mountable on said base and a second supporting section being connected to said platform, said power actuated means including means for imparting a relative rotative movement between the base and a predetermined number of telescoping cylinders in such a manner as to cause said supporting cylinders to telescope.

2. The structure of claim 1 and including means for preventing rotation of the platform with respect to the base during telescoping of said cylinders.

3. The structure of claim 2 wherein the power actuated means includes a friction means for engaging and imparting rotation to the drive sections.

4. The combination of a relatively fixed base, a platform, adjustable supporting means operatively connected to said platform and base to effect movement of said platform toward or away from said base, power actuated means operatively connected to said adjustable supporting means to effect controlled adjustment thereof; said adjustable supporting means including a plurality of threadably interconnected supporting cylinder sections adapted to move relative to one another in telescoping fashion, one of said supporting cylinder sections being mounted on said base and a second supporting cylinder section being connected to said platform, a plurality of interconnected drive sections extendably and retractably movable relative to one another and mounted coaxially within said supporting cylinder sections, one of said drive sections being drivingly connected to one of said supporting cylinders, another drive section being rotatably connected to the power actuated means, said power actuated means including means for imparting a rotative movement to the drive sections.

5. The combination of a relatively fixed base, a platform, adjustable supporting means operatively connected to said platform and base to effect movement of said platform toward or away from said base, power actuated means operatively connected to said adjustable supporting means to effect controlled adjustment thereof; said adjustable supporting means including a plurality of threadably interconnected supporting cylinder sections movable in telescoping fashion, one of said supporting cylinder sections being mounted on said base and a second supporting cylinder section being connected to said platform, a plurality of telescopically connected drive cylinders mounted coaxially within said supporting cylinders and capable of telescoping axially while operating as a unit in rotation, one of said drive sections being mounted to one of said supporting cylinders, another drive section being operatively connected for rotation to the power actuated means, said power actuated means including friction means for imparting a rotative movement to the drive sections.

6. The combination of a relatively fixed base, a platform, adjustable supporting means operatively connected to said platform and base to effect movement of said platform toward or away from said base, power actuated means operatively connected to said adjustable supporting means to effect controlled adjustment thereof; said adjustable supporting means including at least three threadably interconnected supporting cylinder sections adapted to screw in and out of each other in telescoping fashion, one of said supporting sections being mountable on said base and a second supporting section being connected to said platform, said power actuated means including means for sequentially imparting rotative movement to each of the cylinders disposed between said base mounted cylinder and said platform whereby each of said thus disposed cylinders are selectively extended from and retracted into said base connected cylinder.

7. The combination of a relatively fixed base, a platform, adjustable supporting means operatively connected to said platform and base to effect movement of said platform toward or away from said base, power actuated means operatively connected to said adjustable supporting means to effect controlled adjustment thereof; said adjustable supporting means including a plurality of threadably interconnected supporting cylinder sections movable in telescoping fashion, one of said supporting cylinder sections being mounted on said base and a second supporting cylinder section being connected to said platform, a plurality of telescopically connected drive cylinders mounted coaxially within said supporting cylinders and capable of telescoping axially while operating as a unit in rotation, one of said drive sections being mounted to one of said supporting cylinders, another drive section being operatively connected for rotation to the power actuated means, means carried by said supporting cylinder for preventing separation of said cylinders when the latter are in extended position.

8. The combination of a relatively fixed base, a platform, adjustable supporting means operatively connected to said platform and base to effect movement of said platform toward or away from said base, power actuated means operatively connected to said adjustable supporting means to effect controlled adjustment thereof; said adjustable supporting means including a plurality of threadably interconnected supporting cylinder sections movable in telescoping fashion, one of said supporting cylinder sections being mounted on said base and a second supporting cylinder section being connected to said platform, a plurality of telescopically connected drive cylinders mounted coaxially within said supporting cylinders and

capable of telescoping axially while operating as a unit in rotation, one of said drive sections being mounted to one of said supporting cylinders, another drive section being operatively connected for rotation to the power actuated means, said power actuated means being effective to impart rotative movement through said drive cylinders to the platform connected supporting cylinder, and means for sequentially transmitting this movement to each of the supporting cylinders intermediate said base connected and said platform connected cylinders, whereby said intermediate cylinders are selectively extended from and retracted into said base connected cylinder.

9. The structure of claim 8 wherein the supporting cylinder to which said one of said drive cylinders is connected is the platform connected cylinder.

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