

Feb. 26, 1946.

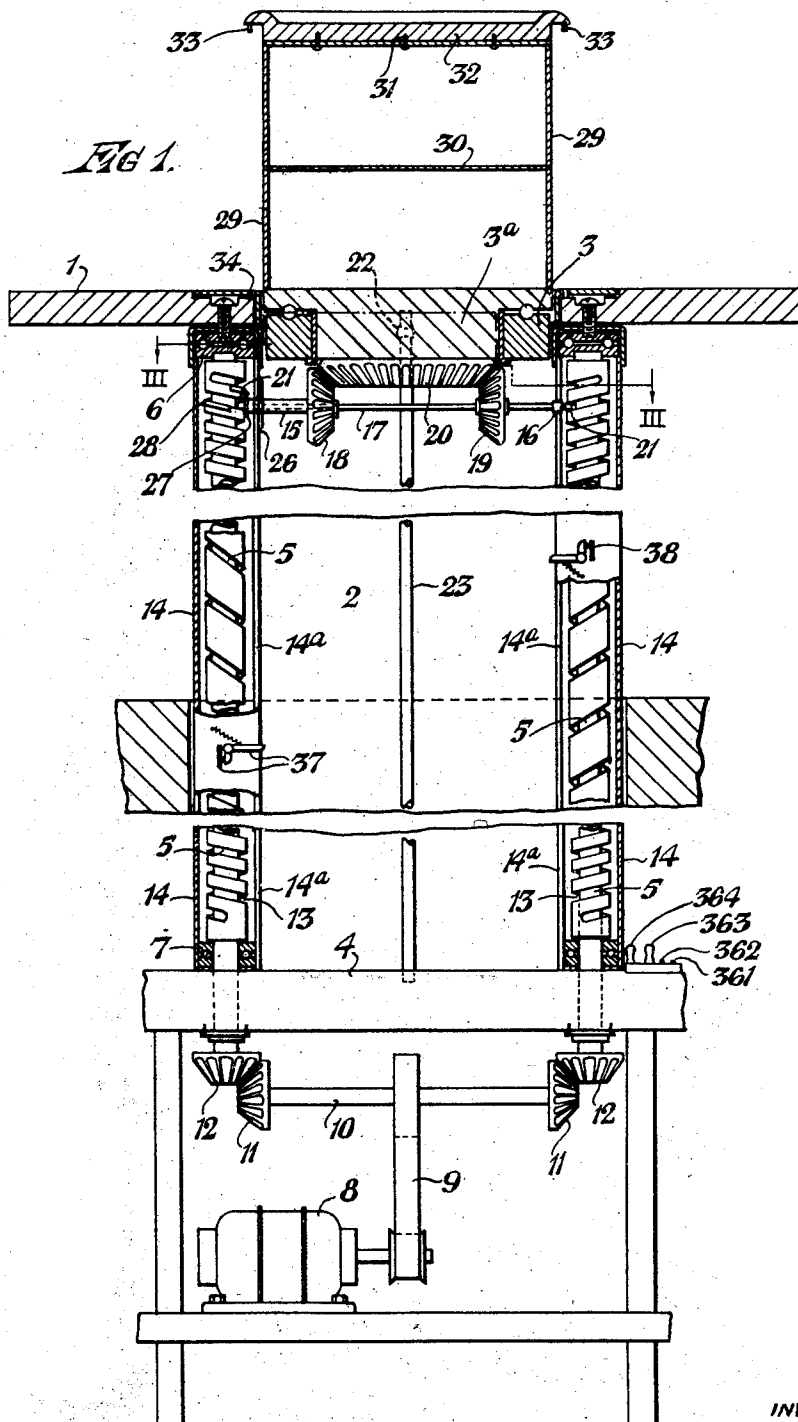
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2,395,735

LIFT

Filed July 26, 1944

2 Sheets-Sheet 1



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Fig. 3.

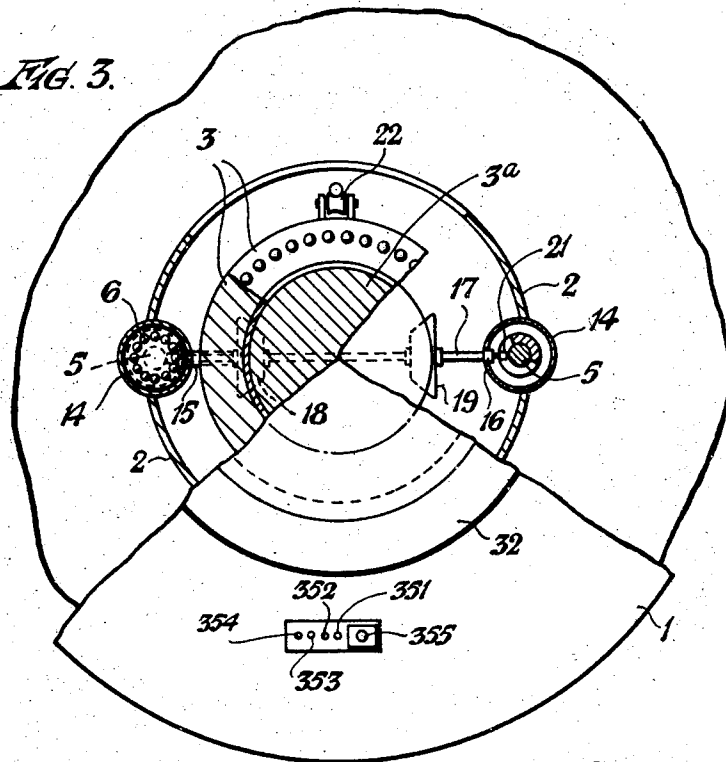


Fig. 4

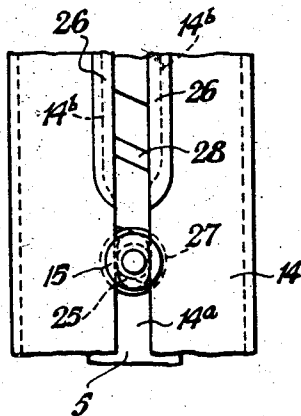


Fig. 5

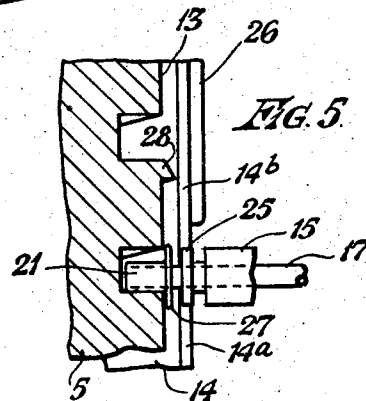
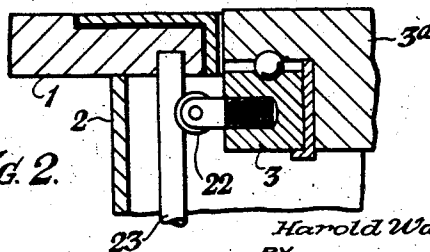


Fig. 2.



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UNITED STATES PATENT OFFICE

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LIFT

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3 Claims. (Cl. 186—1)

This invention is designed to provide improved lift arrangements, more especially improved apparatus of the kind combining a table or like on a pedestal with a lift so that the lift passes through a shaft beneath the table top and can deliver or be loaded more or less at or a little above table top level.

In the improved arrangement the lift is operated by engagement of a lug, nut, part nut, or the like at two or more points at or outside the edge of its platform or the like with a revolving thread.

The device is described here in relation to its use as a dining-table. It can however be used as a serving-table, a serving counter, a work-bench, a library lift-table, an apparatus for conveying materials to working points on different floors of a building and the like, the word table being used in a wide sense to include a bench, counter or the like.

In a typical form, the mechanism includes two or more parallel helical threaded columns each extending upwards from a point approximately level with the lift bottom when the lift is in position for loading for its upward journey to the point at which it comes to rest for unloading, the top of each column being approximately at table level. Each driven column is rotated axially at uniform speed by means of manual or mechanical driving impetus of an orthodox type. Each driven column is provided with a separate slide or channel member extending the length of the worm and parallel to it, this channel being interposed in a fixed position between the driven column and the proposed path of the lift platform (this word being used to include any equivalent or suitable main part of the lift structure). An axle or cross-piece or other projecting member or lug from the lift platform is provided in relation to each driven column and this slides in the intervening channel and engages with the thread. The lug thus moves along a path fixed by the channel and parallel to the axis of the column. Thus, two driven columns at opposite sides of the lift platform, could each rotate in a tube of C-section, the aperture in each tube providing the channel in which a member projecting from the lift platform would slide. The thread angle can vary, so that the rate of rise per revolution can alter, permitting, for example, the lift to start or finish its travel at a lower rate of rise per revolution than during the remainder of its travel.

Other parts of the invention are embodied in typical apparatus now to be described by way

of example and illustrated by the accompanying drawings. The parts of the invention for which a monopoly is desired are those delimited by the claims.

In the drawings:

Fig. 1 is a central sectional elevation.

Fig. 2 is a fragmentary view to a larger scale in a plane at right angles to that of Fig. 1.

Fig. 3 is a part-sectional plan view on line III—III and

Figs. 4 and 5 show to a larger scale mechanism for rotating the platform from a driven column.

As illustrated, a table has its top 1 carried by a hollow pedestal 2, forming the lift shaft at the top of the course of a lift platform 3. Extending beneath the table to the base 4 in a lower floor of the building are columns 5 mounted for rotation in ball bearings 6, 7. Beneath the base 4 is a driving motor 8 arranged to drive the columns 5 through belt 9, cross shaft 10 and bevel gears 11, 12. Each of the columns 5 is formed with a helical thread 13 and is enclosed by a tubular housing 14. The columns take the main weight of the lift structure from the lower floor, as well as serving to raise and lower the lift. The housings 14 are slotted at 14a, the slots serving as channels for sleeves 15, 16 through which passes the supporting shaft 17 on which are free to revolve bevels 18, 19 which engage the bevel 20 attached to the bottom of a rotary part 3a of platform 3 and so support the platform 3. On the shaft 17 are mounted the members 21 which engage the threads 13 of the columns 5. The platform is further guided and steadied by concave rollers 22 running on vertical guide rods 23. It will be apparent that by starting, stopping and reversing the motor 8 the lift platform can be raised, stopped and lowered and that it will rise or fall relatively slowly in the vicinity of the top and bottom stations, owing to the variation in the pitch of the threads 13.

Provision is made for rotating the lift if desired when the platform 3 is at about the level of the table top 1, by power derived from a vertical column. This is accomplished by providing gearing which will come into action when the platform has reached its normal upper stopping level. As illustrated, with particular reference to Figs. 4 and 5, the sleeve 15 is arranged to drive the bevel 18 (Figs. 1 and 3). On the sleeve 15 is formed a portion 25 of flattened section which will engage in the slot 14a and ensure that the bevels 18, 19, 20 are normally locked. When the predetermined level is reached the slot 14a is enlarged as at 14b and the sleeve 15 can rotate,

supplementary guides 25 engaging a circular part of the sleeve 15 to maintain the vertical guiding action. A gear 27 (shown as a friction wheel, though toothed gearing can be used if desired) mounted on sleeve 15 then engages a supplementary track or lip 28 on the column 5, so that further rotation of the columns with a minimum of lift will drive the gears 18, 20, 19 and rotate the rotary part 2a of the lift platform 3 through a desired angle—say up to 360°.

A suitable structure mounted on the rotary part 3a of the platform 3 includes upright members 29 and possibly one or more shelves 30. At the top of this structure spring-buffer members 31 are arranged to engage and lift the panel 32 as the structure rises through the table top, keeping the panel centrally located. When the lift is lowered the panel 32 covers the open top of the shaft and projections 33 engage in an annular recess 34 to ensure its location before the members 31 disengage.

The control of the lift is by conventional push button, signal lamp and relay methods, combined with lift-operated switches. Four control buttons 351, 352, 353 and 354 and a signal lamp 355 are shown at table level and two buttons 361 and 362 and a signal lamp 363 on the lower floor, in addition to switch 37 by which contact is automatically made on the downward passage of the platform at a predetermined level and switch 38 by which it is made on the upward passage. The proposed method of operation is so to arrange the conventional circuit wiring that the server below no longer has any control over the lift once a mechanical actuator near its top has reached and actuated switch 38, whereupon the control of the motor is restricted to the four buttons 351 to 354. The buttons 361 and 362 become effective again when switch 37 is actuated on the downward passage of the platform. A normal series of operations of the lift would be as follows:

1. Person at table presses button 351 and brings lift up until switch 38 is actuated, whereupon the lift stops and signal lamp 355 is illuminated.

2. Button 352 brings the platform to table level where it stops and lamp 355 goes out.

3. Order list having been placed on the platform, button 354 is pressed and the lift returns to the bottom floor, where it automatically stops, signal lamp 363 having been lighted by switch 37 on the way down and switched off by arrival of the lift at the bottom.

While clearing or filling the lift on the lower floor, the attendant can cut out all motor circuits

by a separate switch, which simultaneously diverts calls from the table level to illuminate lamp 364 as a signal that the lift is wanted. Button 353 rotates the rotary part of the lift, so long as it is depressed, up to say 360°, when it is automatically stopped. Buttons 361 and 362 will move the lift up and down respectively between the bottom and the predetermined level where bottom control ceases.

The device can be designed to serve more than one floor. Any number of floors can be served, by continuing the columns and enclosure up from the table aperture on lower floors to that on the top floor, where the table surface can be unencumbered, as when only one floor is to be served. An enclosing shaft could be carried up over the tables on lower floors, with apertures at the various table top levels and covering panels or doors, so arranged that a signal would be given and the covering panel would become free to be opened on arrival of the lift at a station and stopping of the drive: restarting could be subject to the closing of the panel as in known automatic lift arrangements.

I claim:

1. In an apparatus of the character described, the combination of upright rotary lift screws arranged in spaced relation, a horizontal shaft having its opposite ends disposed in the grooves of said screws respectively, fixed guides cooperating with said screws to cause said shaft to move up and down in response to the rotation of said screws, a lift platform having guided up and down and rotary movement, a sleeve loosely surrounding said shaft, bevel gears fast on said sleeve and shaft respectively, a third bevel gear meshing with said first gears and fixed to the underside of said lift platform, said platform being movable up and down with said shaft through the intervention of said gears which serve as a support for the platform, and coacting means on said sleeve and one of said screws to cause the platform to rotate in response to the rotation of said screw when said platform reaches a predetermined level.

2. In an apparatus as set forth in claim 1, wherein said platform is rotated when it approximately reaches the limit of its upward movement.

3. In an apparatus as set forth in claim 1, wherein said coacting means consists of a friction wheel fixed on said sleeve and a traction lip on the screw which acts on said wheel as the screw rotates.

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