April 20, 1965 D. H. HALE 3,179,369

POWER-OPERATED UTILITY STOOL

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FIG. 1.

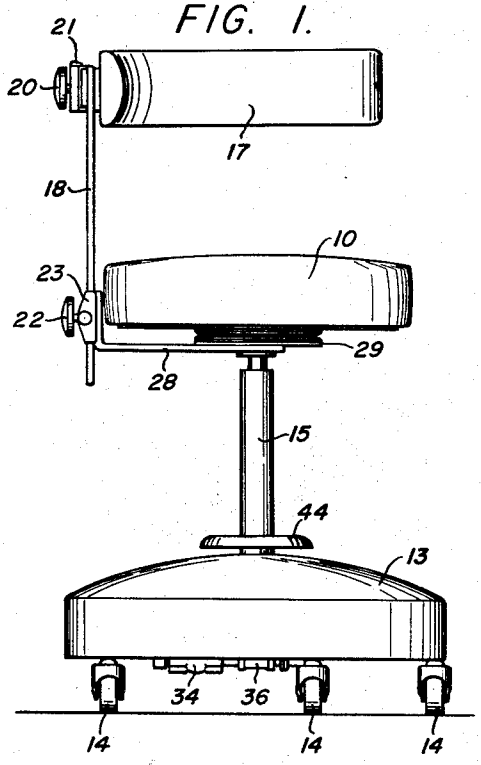


FIG. 2.

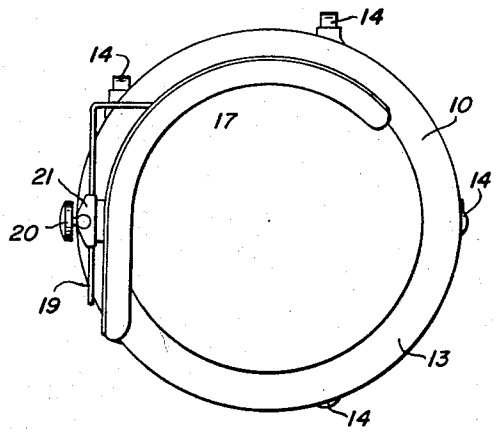


FIG. 3.

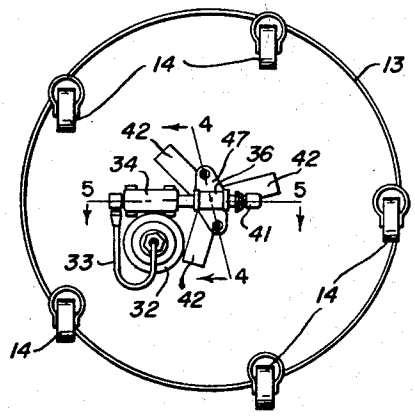
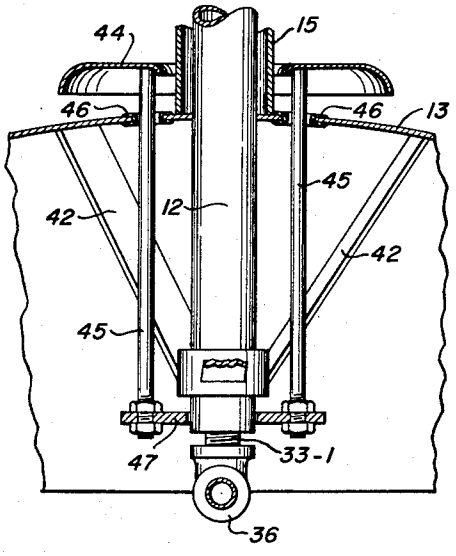


FIG. 4.



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FIG. 5.

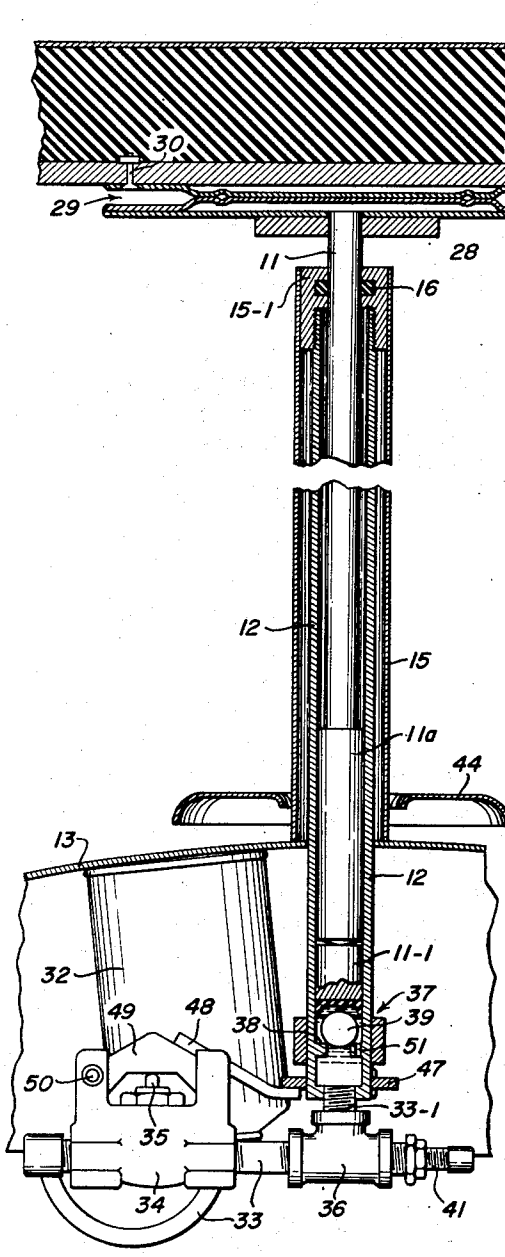
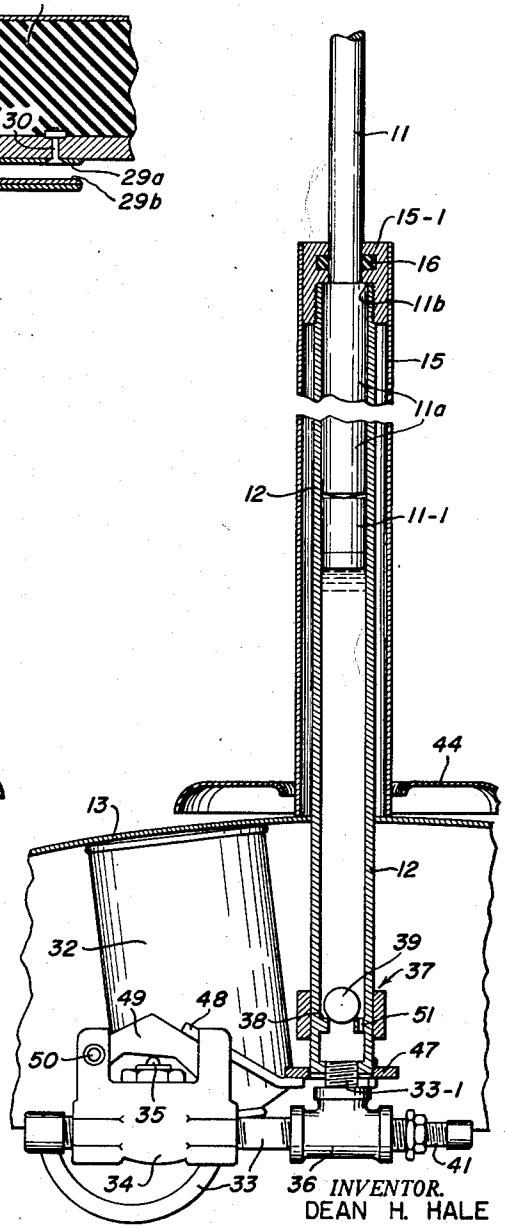


FIG. 6.



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POWER-OPERATED UTILITY STOOL

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3 Claims. (Cl. 248—404)

This invention relates to power-operated utility stools and is especially but not exclusively concerned with the type of utility stool which forms the subject of my copending application for patent Serial Number 144,980, filed October 13, 1961, now Patent No. 3,145,053, entitled "Utility Stool" and of copending application Serial Number 144,862, filed October 13, 1961, now Patent No. 3,147,946, by Elbert O. Thompson and me jointly, entitled "Stool for Dentists."

The stools of these applications for patent include self-contained power units controlled by foot pedals extending outwardly from and below the periphery of platform bases. It has been found that such foot pedals are not only difficult to locate by occupants of the stools groping for it with a foot while giving major attention to work in progress, but also can be inadvertently stepped on at inconvenient times during the progress of such work, thereby posing a danger to orderly conduct of the work.

The present invention avoids both these difficulties and enables an occupant of the stool to have positive, convenient control of seat raising and lowering at all times, without undue groping with the feet and without danger of inadvertent actuation.

A feature of the invention is the provision of a ring or partial ring closely surrounding the center post of the stool immediately above the platform base as a part of a treadle for actuating the power control.

A specific embodiment representing what is presently regarded as the best mode of carrying out the inventive concepts in connection with the stools of the aforementioned patent applications is illustrated in the accompanying drawings. From the detailed description of such embodiment adaptations to other stool constructions will be obvious.

In the drawings:

FIG. 1 represents a front elevation of the stool with its seat in a lowered position;

FIG. 2, a top plan;

FIG. 3, a bottom plan;

FIG. 4, a fragmentary vertical section taken on the line 4—4 of FIG. 3 and drawn to a considerably larger scale;

FIG. 5, a similar section taken on the line 5—5 of FIG. 3; and

FIG. 6, a view corresponding to that of FIG. 5 but showing the foot-operated ring depressed and the seat of the stool thereby raised to an elevated position.

Referring to the drawings:

The stool of FIGS. 1 and 2 is constructed in substantially the same manner as those of the patent applications above noted. Thus, a circular seat **10** is supported in stool fashion at the upper end of a post **11**, which depends centrally from the seat into a receiving tube **12**. Post **11** and tube **12** together form part of an extendible and retractable hydraulic assembly mounted in a base **13**, tube **12** being fixed therein as by welding.

Base **13** is platform-like and hollow, being maneuverably supported by castors **14**. There must be at least three castors for stability, as is quite apparent, but there are preferably five, so that, regardless of floor unevenness, there will always be at least a three-point support for the stool with consequent stability at all times during use. The platform character of this base, coupled with the fact that its diameter significantly exceeds that of the seat **10**, enables a person seated on such seat to comfortably and

effectively rest his or her feet off the floor when found desirable.

For added strength and to facilitate lubrication, a sleeve **15** is secured to the upper end of tube **12** and extends down to the base **13** as a tube housing, where it is secured as by welding. A ring of oil-impregnated felt **16** wipes oil onto the surface of post **11** as it rises and descends relative thereto.

In order to provide support for the trunk of the body of the occupant, for example a dentist or dental assistant, when working from a seated position and leaning outwardly from the seat **10**, an abdominal rest **17** is provided in upwardly spaced relationship with the seat. It is supported in what is essentially cantilever fashion from a post **18**, which is preferably a broad and rigid bar or strip of some such material as steel or aluminum rising above the seat near the circumference thereof.

Body rest **17** is of broad strip formation in the sense that it is wide but relatively elongate, so as to provide comfortable and effective support for the body at or near the waist. It and seat **10** are preferably cushioned with foam rubber or the like and upholstered with a washable plastic sheet material.

While in some instances it may be desirable to construct the stool with the body rest permanently fixed to its supporting post, in the illustrated construction rest **17** is adjusably positioned relative to post **18** so as to accommodate thin as well as stout persons. In any event, the rest is largely curved in conformity with the seat and is positioned so that its width extends vertically and so that its length extends horizontally in cantilever fashion from one side of the post.

To enable a person to easily move into and out of position on the seat with respect to the body rest, such body rest preferably has its opposite end portions deviating outwardly from the aforespecified curvature, the end portion **17***a* nearest the supportingg post **18** advantageously being rectilinear or approximately so. Best results are had when the circularly curved intermediate portion of the rest subtends an angle of about 90°.

For the purpose of adjustment, rest **17** is provided with a bracket arm **19**, which extends from near the middle of such rest backwardly and outwardly along the back of one end portion of the rest, see particularly FIG. 2, and is firmly secured to post **18** by suitable releasable fastening means, such as the hand-operated clamping screw **20** threaded into slideway **21**. In turn, post **18** is firmly but adjustably secured to the rest of the stool structure by means of a second clamping screw **22** threaded into slideway **23**.

Slideway **23** is secured, as by welding, to the outer and upwardly turned end of a mounting bar **28**, so that its throughway is disposed vertically for slidably receiving post **18**, while slideway **21** is similarly secured to the upper end of post **18** with its throughway disposed horizontally for slidably receiving bracket arm **19**.

Mounting bar **28** is secured, as by welding, to the upper end of post **11**, and, in order to provide for independent swiveling movement of seat **10** and body rest **17** relative to each other, an anti-friction bearing **29**, FIG. 5, has its upper race plate **29***a* secured to the seat, as by bolts **30**, and its lower race plate **29***b* secured to mounting bar **28** and post **11**, as by welding.

The self-contained power mechanism for raising seat **10** and, coincidentally, body rest **17** is housed within hollow base **13**. It is of hydraulic type and utilizes captive air under pressure to force a non-compressible hydraulic fluid, such as oil, into the lower end of tube **12**.

A reservoir **32** for the pressure air and hydraulic fluid communicates with the lower end of tube or cylinder **12** by means of a conduit **33**, in which is interposed a normally closed valve **34** of standard type having a spring-loaded

plunger **35** for controlling flow of the pressurized hydraulic fluid to and from tube **12**. As such, valve **34** constitutes means for controlling operation of the power means represented by pressurized reservoir **32**.

Conduit **33** is directly connected to a **T** fitting **36**, which has its lateral connected by a nipple **33–1** to a check valve arrangement **37** formed at the lower end of tube **12** and containing a seat **38** for a ball check **39**. An air-injection fitting **41** is connected to the other end of **T 36** and is equipped with a standard air-injection valve (not shown) similar to those used for pneumatic tires, whereby compressed air can be introduced from an ordinary air hose for initially charging reservoir **32** to a pressure of from about 60 to 80 p.s.i. and for repressurizing if and when necessary.

Inasmuch as tube **12** and check valve body **37** depend deeply into base **13**, braces **42**, extending and secured to the underside of base **13**, are provided for strength and stability.

Seat-supporting post or piston **11** fits tube **12** snugly along a lower end portion **11***a*, but is of reduced diameter above to provide a shoulder **11***b* which serves as an abutment stop when it reaches cap **15–1** of sleeve **15** in the upward adjustment of seat height.

Post **11** is preferably made with its lowest portion as a separate part **11–1**, to which is attached a cup seal **43**. In this way, seat **10** and its post **11** are free to be moved upwardly independently of seal **43** and there is no possibility of damaging such seal by forced raising of the seat, apart from power actuation, as would be the case were the post not made up of separate parts. Such parts are preferably abruptly tapered where they meet, as shown at **11–2**, to provide a relief area.

In accordance with the present invention there are provided means for actuating the control means, which include a foot-operated portion at least partially surrounding the seat-supporting post structure previously described, closely adjacent thereto and immediately above the upper surface of the base.

As illustrated, it is preferred that such foot-operated portion be a ring **44** encircling the post structure and that such actuating means include a lever operable on plunger **35** of valve **34**, so that foot power applied anywhere along the extent of ring **44**—far inwardly of the top of platform base **13**—will easily push such plunger inwardly of the valve to open same and cause seat **10** to be raised by extension of its supporting post structure.

The lever shown is very satisfactory, operating smoothly and positively to accomplish its purpose. It comprises a pair of rods **45** depending slidably through suitable openings provided in the top of base **13**, the defining edges of such openings being preferably lined with rubber grommets **46** to eliminate metal-to-metal contact in the sliding movement of such rods.

A bearing ring **47** is slidably mounted on the lower end of tube **12** so as to be slidable upwardly and downwardly of the lower end of the post structure. The lower ends of rods **45** are connected to ring **47** at diametrically opposite portions thereof, and a lever arm **48**, FIGS. 5 and 6, projects therefrom toward valve **34** intermediate the two rod connections.

Lever arm **48** is secured to another lever arm **49**, provided as part of valve **34** and pivoted at its far end so that ring **44**, rods **45**, ring **47**, and lever arms **48** and **49** become a single lever of the second class fulcrumed at the pivotal connection **50** of lever arm **49** with the body of valve **34**.

The height of stool seat **10** is adjusted by pressing foot-ring **44**. It is not intended in this illustrated embodiment that there be a lifting of a person seated on the stool, but, rather, that there be a powered lifting of the stool seat **10** alone, since this is all that is necessary from a practical standpoint. Thus, when the dentist or other person using

the stool desires to alter his working position upwardly, he need merely step on the foot-ring while raising his body. The stool seat will closely follow until pressure on the foot-ring is released, whereupon a sitting position can be resumed without ever having taken eyes or hands from the work in progress. It is apparent that opening of valve **34** permits the entrapped compressed air in reservoir **32** to expand and force hydraulic fluid from such reservoir into tube **12**.

Ball check **39** is preferably of steel or other heavy material, so as to seat when post **11** and its auxiliary part **11–1** are raised as in FIG. 6. Thus, when it is desired to lower the height of stool seat **10** and foot-ring **44** is pressed for that purpose, the hydraulic fluid is trapped against rapid escape from tube **12** and there is no sudden descent of the seat. Instead, a bleeder passage **51** provides for gradual return of fluid to reservoir **32** and, therewith, a gradual lowering of such seat.

It should be realized that, because the reservoir is pressurized, it will be necessary for the user to rest his or her weight on the stool seat while the foot-ring is pressed in order to lower such seat from any given height.

Such foot-ring **44** is easily located by either foot of the user of the stool, without groping. Yet, it is out of the way of the area of the platform base normally used as a foot rest. Thus, there is little danger of inadvertent pressing of the ring as work progresses from the stool as a work center.

Whereas there is here illustrated and described a certain preferred construction which I presently regard as the best mode of carrying out my invention, it should be understood that various changes may be made without departing from the inventive concepts particularly pointed out and claimed herebelow.

I claim:

1. A utility stool, comprising a platform base; a seat; extendible and retractable post structure rising from said base centrally thereof and supporting the seat; power means for extending said post to raise the seat; means carried by and located within the base for controlling operation of the power means; and actuating means including a foot-operated ring portion encircling said post structure closely adjacent thereto and immediately above the surface of the base, and a depending member extending downwardly from the foot-operated portion thereof into operative relationship with the means in the base for controlling operation of the power means.

2. The stool of claim 1, wherein the power means include a hydraulic system, the control means is a plunger-operated valve, and the actuating means include a lever operable on said plunger, power being applied through the foot-operated portion thereof.

3. The stool of claim 2, wherein the foot-operated portion of the actuating means is a ring encircling the post structure, and the lever comprises a pair of rods depending slidably through the top of the base from diametrically opposite portions of said ring, a bearing ring slidable along the lower end of the post structure and having diametrically opposite portions connected to said rods, respectively, and a work arm projecting from the bearing ring.

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