

[54] **COMBINATION DESK AND CHAIR**

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312/235

[51] Int. Cl.. **A47b 77/08, A47b 53/00, A47b 83/00**

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297/170; 248/404-405,
422; 108/147

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[57] **ABSTRACT**

A desk top is rigidly secured to a vertically movable column constituting a hydraulic or pneumatic cylinder for a piston rising from the floor or depending from the ceiling. The piston is tubular and accommodates wiring and/or fluid pipes supplying electric or other equipment on the desk. A chair facing the desk top has a frame fastened to the piston or the cylinder. Receptacles, such as a waste basket and a file cabinet, are slidably received in rails on the underside of the desk top and are normally raised off the floor to facilitate sweeping, these receptacles being provided with casters for easy transportation to another location upon being lowered onto the floor and withdrawn from their rails.

12 Claims, 8 Drawing Figures

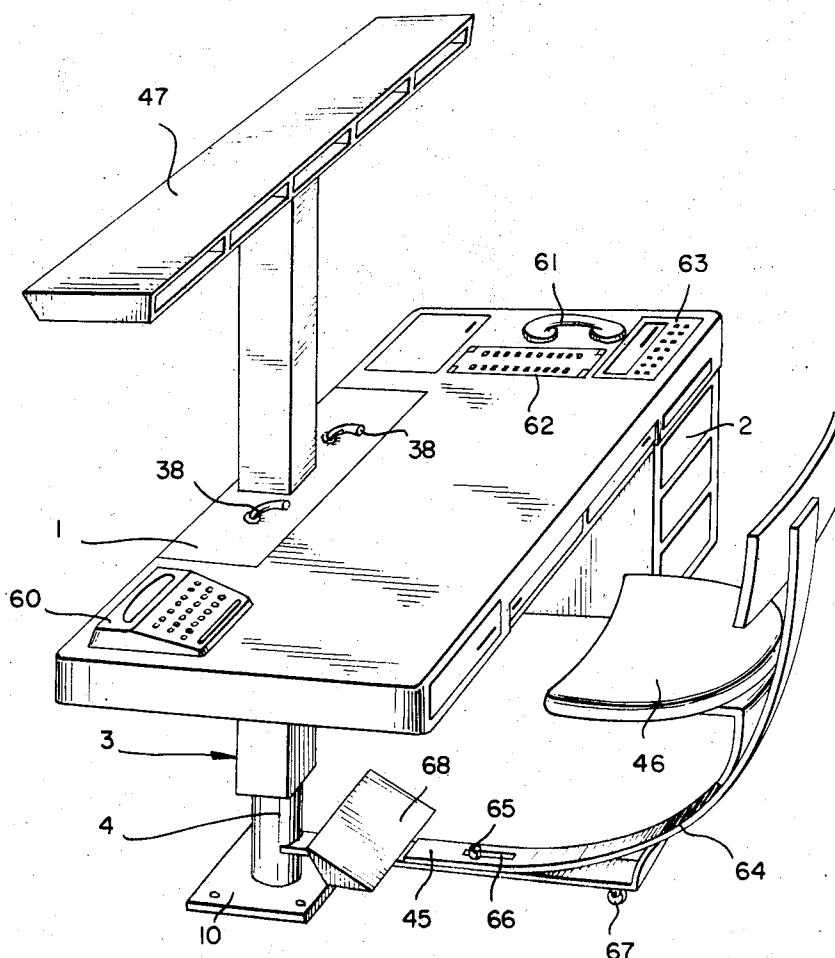
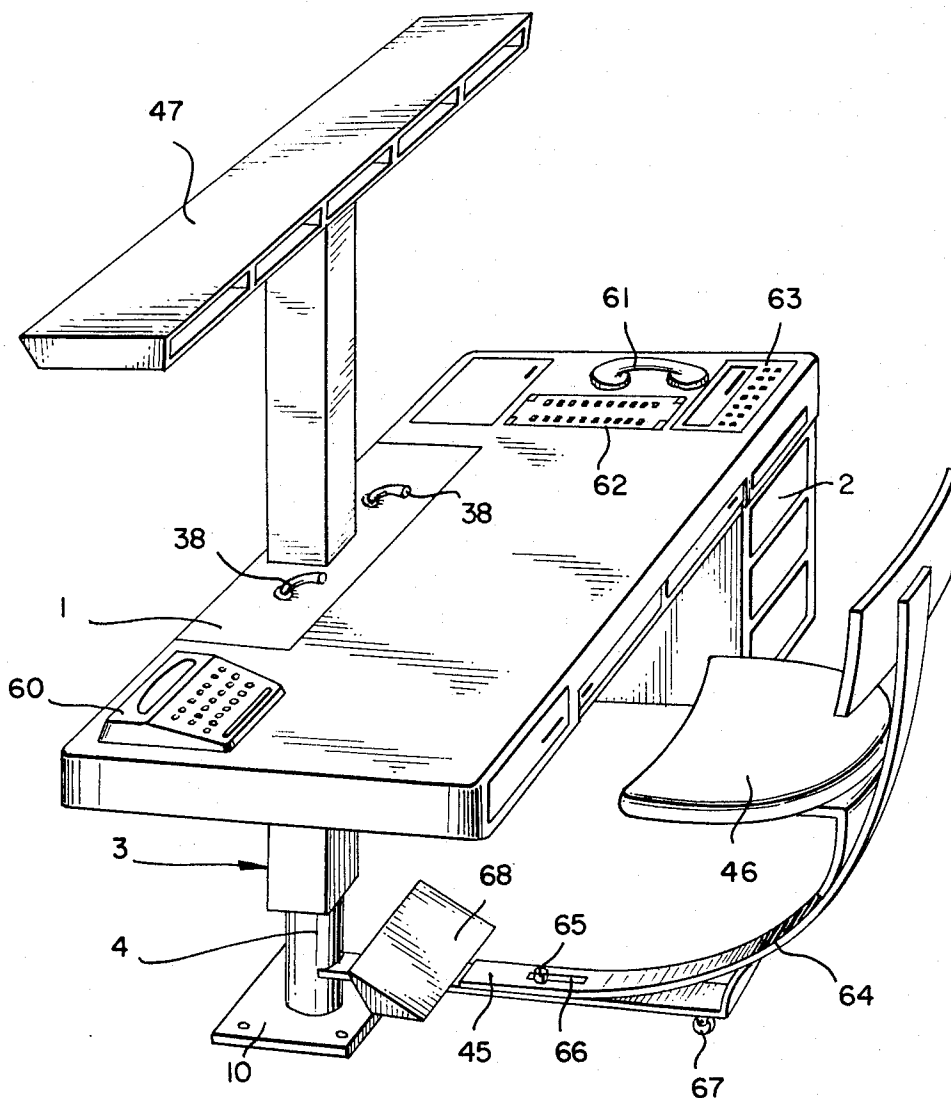
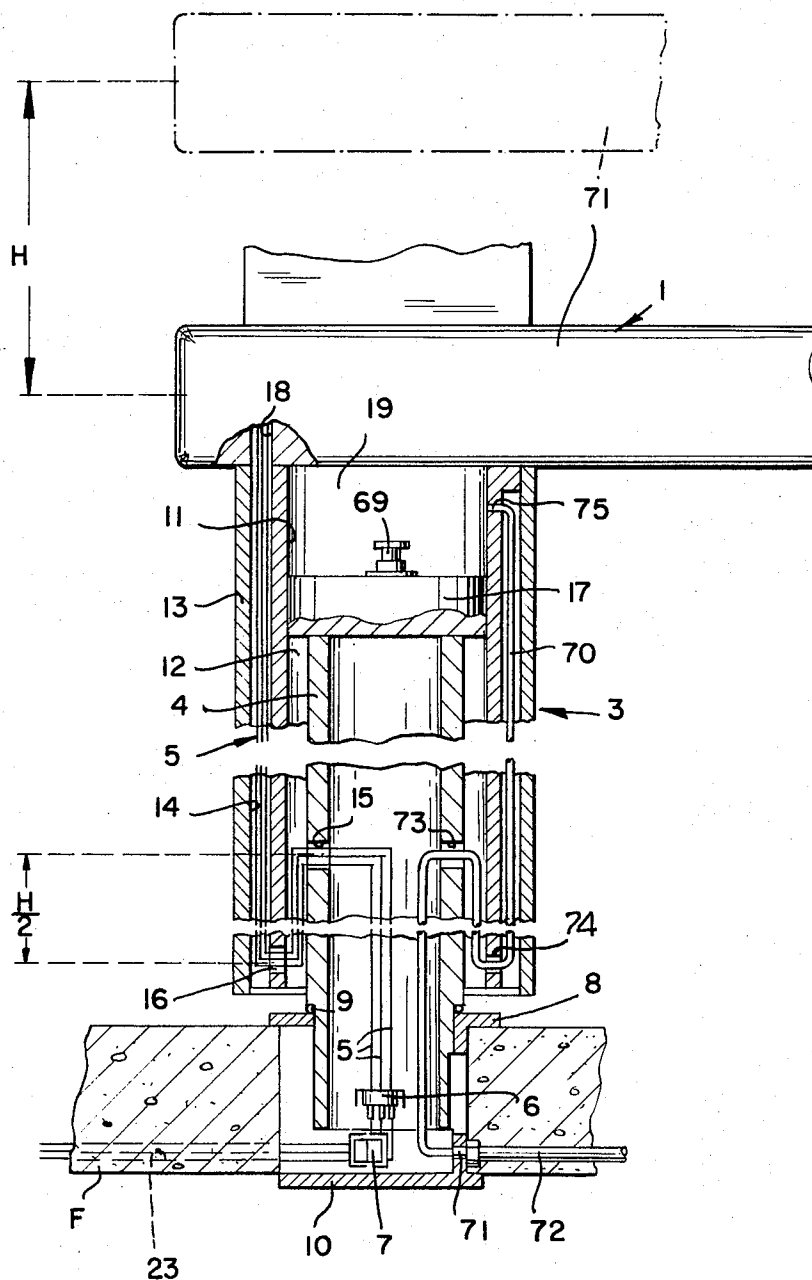


FIG. 1



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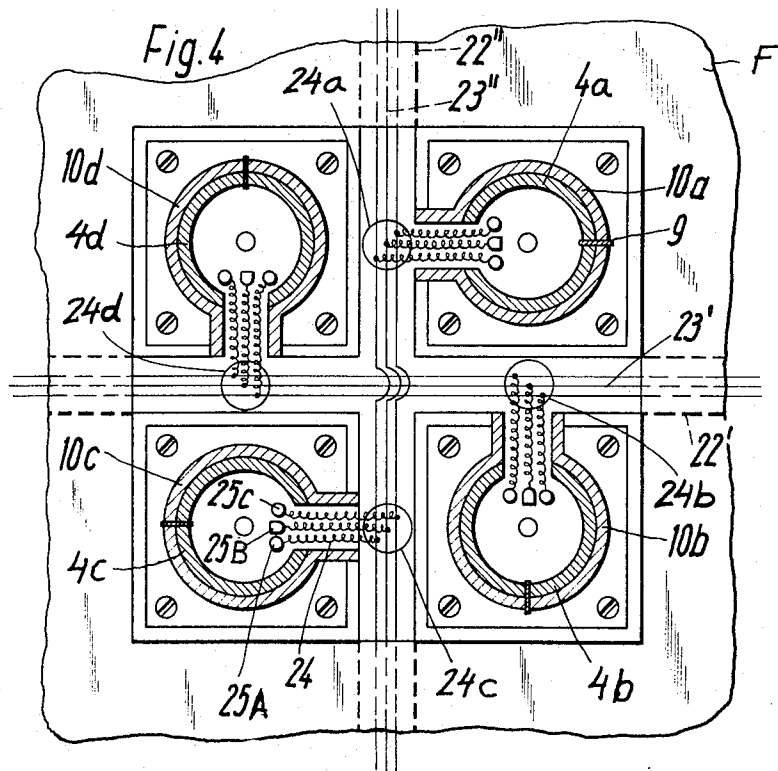
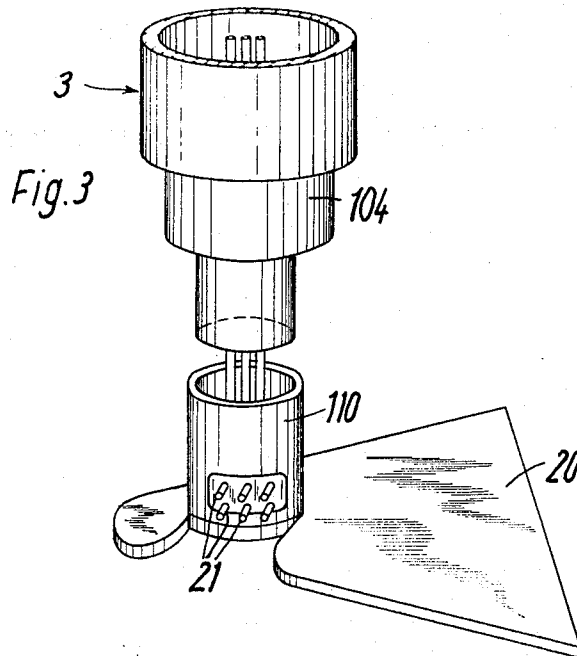
FIG. 2



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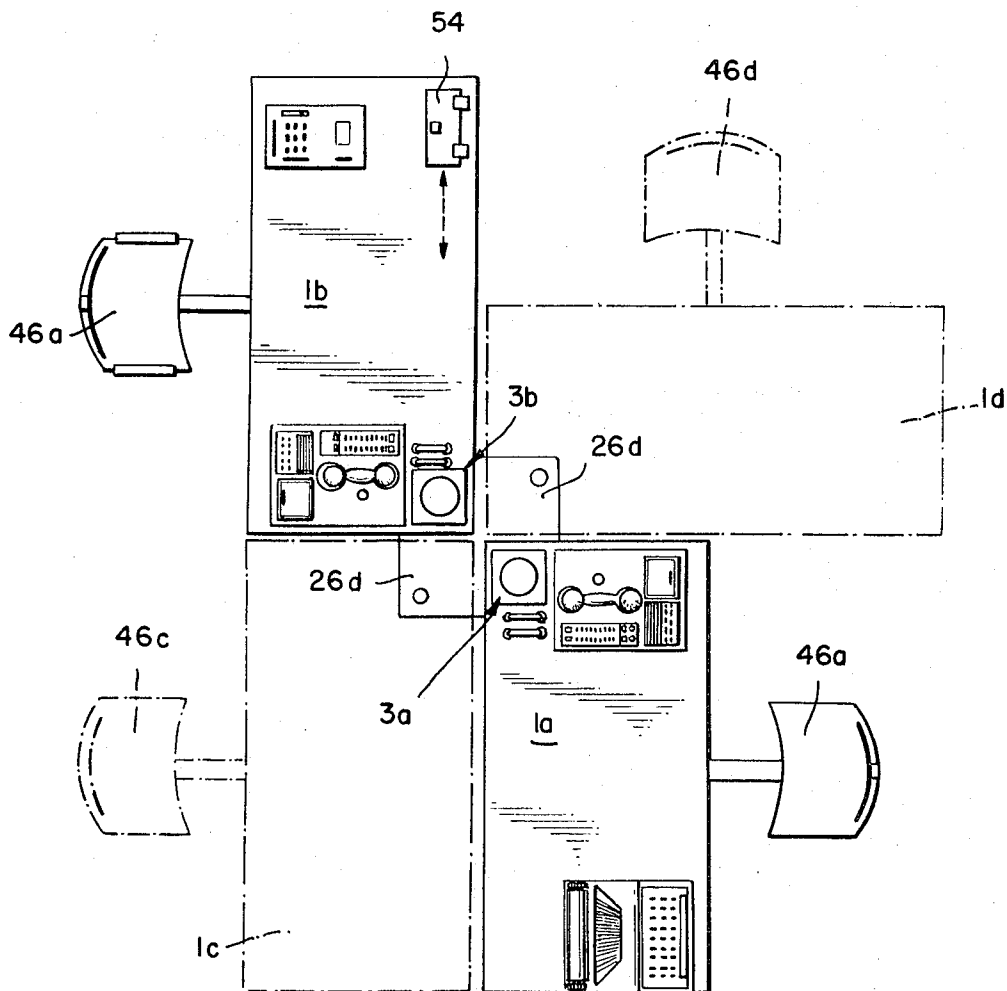
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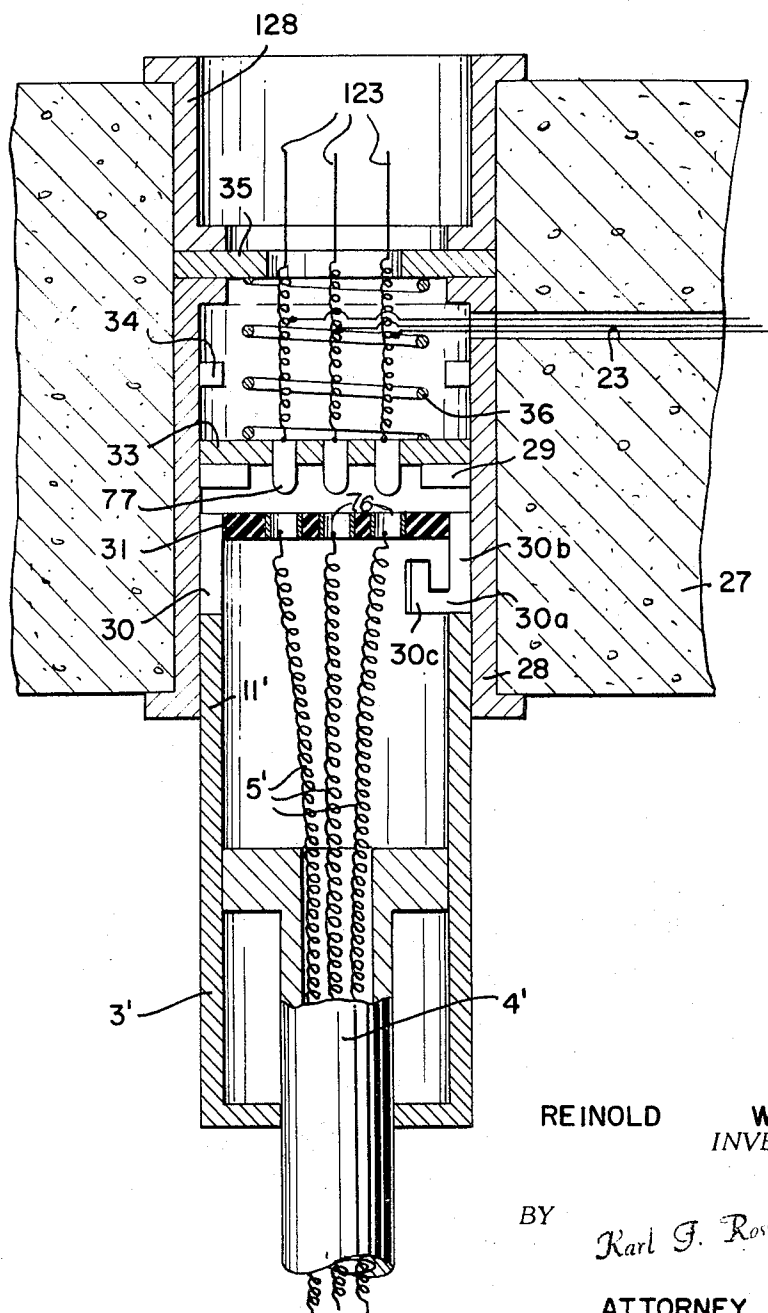
FIG. 5



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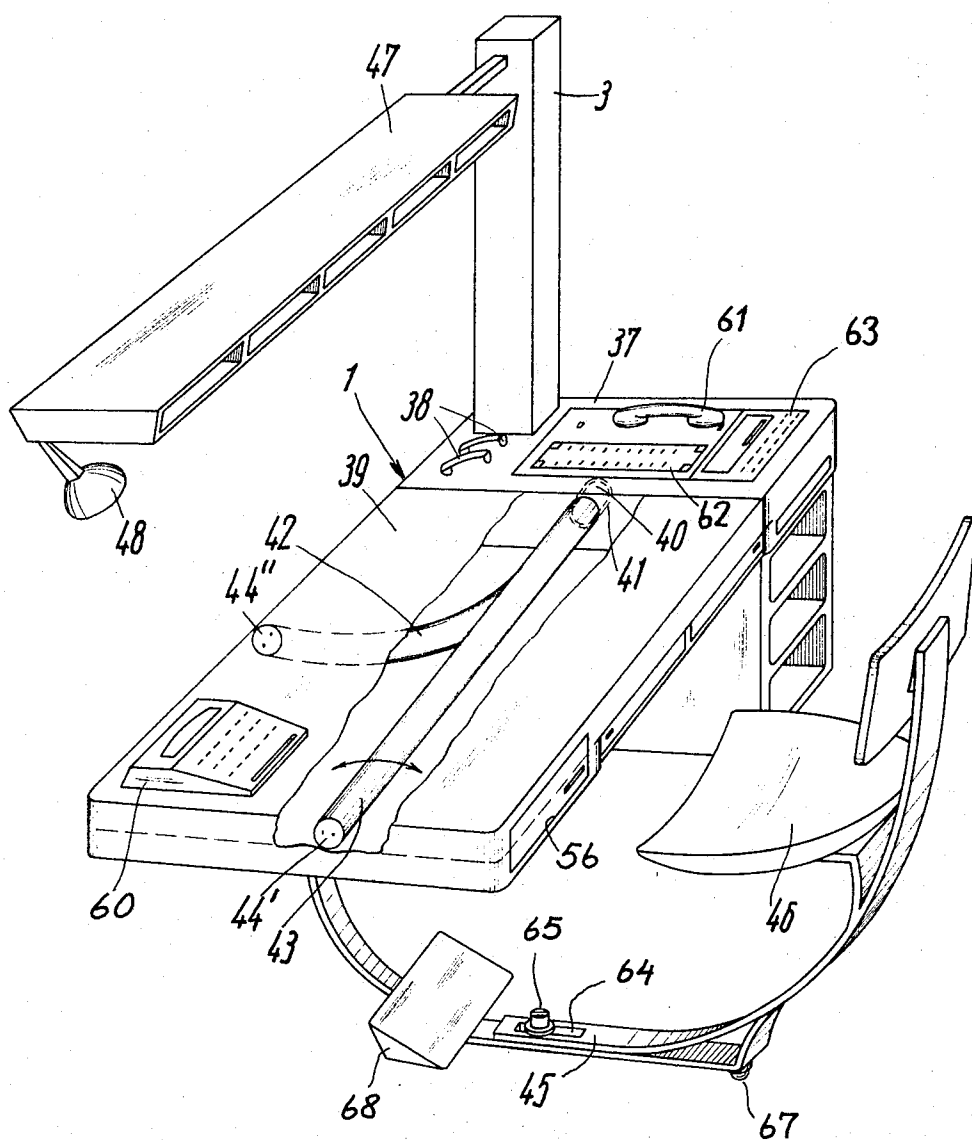
FIG. 6



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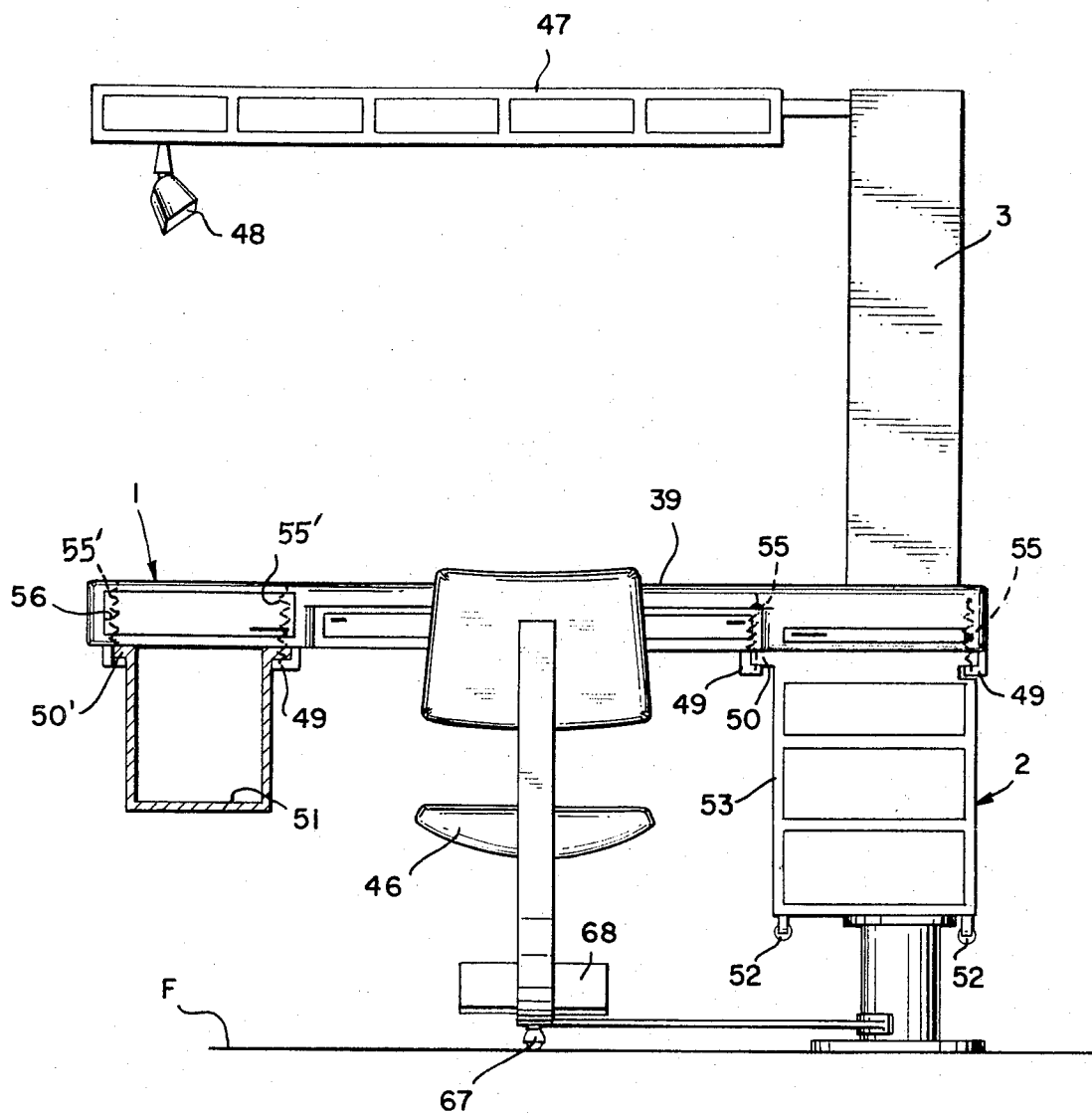
Fig. 7



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FIG. 8



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COMBINATION DESK AND CHAIR

My present invention relates to a piece of office furniture, more particularly to a desk which may be combined with an associated chair into a structural unit.

As is well known, desks are made in a variety of shapes for different purposes, such as secretarial or executive, and frequently must be able to accommodate ancillary appliances such as typewriters, telephones, lamps, teleprinters, calculators and other equipment requiring electrical or fluid connections to external sources. These connections, as well as the table legs normally used to support the desk top, occupy considerable space and interfere with floor sweeping and similar activities while also impeding the mobility of the user's legs. Moreover, conventional desks are difficult to adjust to the body size of the persons to be seated thereat or to adapt to different purposes, e.g. for use as a relatively low support for a typewriter or as a relatively high tabletop for manual writing.

It is, therefore, the general object of my present invention to provide an improved piece of furniture obviating the afore-stated disadvantages.

More specifically, my invention aims at providing a desk construction designed to provide nearly or completely unobstructed leg room for the user and to dispense with unsightly encumbrances such as electrical or other supply line extending from the desk top to the floor.

A further object is to provide convenient means in such a unit for raising and lowering a desk top to adjust its level to the requirements of the user, to facilitate sweeping or searching for lost articles, and to clear a pathway for the moving of bulky equipment.

Still another object, allied with the preceding one, is to provide means on such a desk top for enabling the removable attachment of one or more receptacles to the underside thereof, thereby allowing the independent transportation of such receptacles (e.g. wastebaskets, sets of drawers or storage cabinets) to other destinations.

I attain the foregoing objects, in conformity with the present invention, by the provision of a unique support for a vertically movable desk top, this support consisting essentially of an upright, extensible post including a pair of telescoped members (i.e. a cylinder and a piston) which are relatively displaceable by pneumatic or hydraulic pressure. The piston is hollow and forms a guide tube for one or more supply lines (e.g. electrical conductors) for the operation of ancillary equipment on the desk top, these supply lines being therefore provided with suitable terminals at the desk top to which the appliances may be connected. Conduits, such as those used for the control of the pneumatic or hydraulic fluid utilized in the desk-elevating system, may also pass through the piston.

With one of the two telescoped member fixedly secured to the desk top, the other member is made rigid with a surrounding building structure defining the room occupied by the desk, as by being temporarily or permanently fastened to either the floor or the ceiling of that room. In the latter instance, i.e. with the desk top suspended from above, the desk will be completely clear of the floor if its depending receptacles are detached or if the desk top is raised high enough to lift these receptacles off the floor surface.

If the location of the desk is to be substantially fixed, a pre-existing structural pipe may be used as the piston by providing such pipe with a flange to serve as the piston head and encasing same in a mobile cylinder rigid with the desk top. Usually, however, it will be more convenient to fit either the cylinder or the piston into a socket provided for this purpose on the floor or on the ceiling, advantageously at a location where the necessary utility mains such as power or telephone outlets are readily accessible. Thus, the high-voltage or communication cables might be disposed in channels within the floor or ceiling structure and provided with junction boxes within the sockets to which the internal supply lines from the post may be connected automatically upon a fitting of the tubular piston (or possibly the cylinder) into its socket. Suitable retaining means, such as a bayonet coupling, may serve to hold the fixed post member securely in its socket while maintaining the electrical connection therebetween.

In an office building with desks located on adjoining upper and lower floors, the socket may traverse the intervening ceiling layer so as to accommodate both a suspended post on the lower floor and a rising post on the upper floor; in this case, evidently, the feeder lines for supplying electric as well as hydraulic or pneumatic power to all the desks of a multistory office building need be provided only on alternate floors.

In cases where the laying of utility lines in the floor or ceiling of a room is not practical, the supply conductors or conduits may enter the post laterally and may be hidden from view by carpeting, rugs or the like. In either case it will be advantageous, pursuant to another feature of my invention, to guide these supply lines inside the hollow piston to an intermediate point thereof and to let the lines emerge from the piston at that point with enough slack to allow movement of an edge of the surrounding cylinder past the point of emergence in opposite directions, the cylinder being spaced in the region of its edge from the piston to form a clearance which accommodates part of the flexible wiring and/or tubing constituting the internal supply lines. The remainder of this wiring or tubing is preferably received in a channel formed between the outer cylinder wall and an external sheath spacedly surrounding same; this channel may communicate with the interior of the cylinder through a hole near the cylinder edge traversed by the wiring or tubing for positively entraining same and preventing entanglement. The point of emergence of the supply lines from the interior of the piston should be located at or near the center of the structure of the movable cylinder as measured by the limiting positions of the aforementioned hole, thereby allowing the greatest possible stroke for a given length of wiring or tubing. Naturally, the supply lines (especially in the case of telephone wires or the like) may also be of the conventional coiled type whose effective length varies with the relative position of the piston and the cylinder, thereby obviating the need for a partial guidance of such wiring outside the cylinder. It will also be understood that, if necessary, sliding contacts may be provided on the movable member of the post to facilitate a connection of the desk-supported electric equipment to an external circuit.

If the two telescoped members are relatively rotatable, or if the desk top is rotatably secured to its supporting member, the position of the desk may be altered even with a permanently installed post. A chair

for the user of the desk may be supported on the same post, with or without angular orientability but preferably with longitudinal adjustability of its mounting frame to allow for different levels and/or distances of the seat with reference to the desk top.

The above and other features of my invention will be described hereinafter with reference to the accompanying drawing in which:

FIG. 1 is a perspective view of a desk-and-chair combination embodying my invention;

FIG. 2 is an enlarged sectional elevation of the lower part of a post included in the unit of FIG. 1;

FIG. 3 is a perspective view of a modified base for the post of FIG. 1;

FIG. 4 is a top view of an array of sockets for a set of desk units according to the invention;

FIG. 5 is a diagrammatic top view, on a smaller scale, of a set of desks mounted on the sockets of FIG. 5;

FIG. 6 is a sectional elevation of a ceiling-mounted socket for a suspended desk generally similar to that of FIG. 1;

FIG. 7 is a perspective view similar to FIG. 1, illustrating a modification; and

FIG. 8 is an elevational view of the unit of FIG. 7.

In FIG. 1 I have shown a unitary piece of furniture comprising a desk top 1 cantilevered on a post or column 3 rising from the floor of the room. A set of drawers 2 is detachably secured, in a manner more fully described hereinafter with reference to FIGS. 7 and 8, to the underside of desk top 1 and may or may not touch the floor, depending on the elevation of the desk top. This elevation may be varied, hydraulically or pneumatically, by means of a pair of switch handles 38 controlling the admission of high-pressure fluid to the interior of post 3 whose internal construction will be described hereinafter with reference to FIG. 2. Desk top 1 also provides space for a typewriter 60, a telephone 61 and various panels 62, 63 with pushbuttons, e.g. for data-processing or inter-office communication; the electrical supply lines for these devices extend entirely within the post from the floor to the level of desk top 1. A lighting fixture 47, whose energizing circuit also lies with the post 3, is mounted at the top thereof.

The lower part of post 3 is designed as a hollow piston 4 on which the upper part, hereinafter referred to as a cylinder, is telescopically slidable. An arm 45, extending laterally from piston 4, is part of a frame supporting a seat 46, this frame also including a strong leaf spring 64 which is adjustably mounted on the arm 45 with the aid of several screws 65 and slots 66 (only one shown) whereby the level of the seat 46 may be altered. The free end of arm 45 rests on a floor-contacting spherical caster 67. Arm 45 also carries a foot rest 68 for the person occupying the chair 46.

FIG. 2 shows details of the post 3 whose piston 4 is seated by a shoulder 8 on a socket 10 sunk into the floor F. Wires 5 extending within the piston 4 serve for the energization of the aforescribed electrical appliances and terminate at the foot of the piston in a multiple plug 6 co-operating with a mating multiple jack 7 which serves as the terminus of external supply leads 23 disposed within the floor. Piston 4 has a head 17 in fluidtight contact with the inner wall surface of a hydraulic or pneumatic cylinder 11 which defines an annular clearance 12 with the tubular piston rod. A hole 16 in the cylinder wall, near the free lower edge thereof, connects the clearance 12 with an annular

channel 14 formed between the outer cylinder surface and a surrounding tubular sheath 13 rigid with cylinder 11 and with the desk top 1. A spring-loaded bumper 69 within the working chamber 19 of cylinder 11 intercepts the descending desk top 1 upon a failure of pressure within that chamber.

By the admission and removal of high-pressure fluid into and from chamber 19, with the aid of conventional valves (not shown) electrically controlled by the handles 38 of FIG. 1, the desk top 1 can be displaced between a lower limiting position (full lines) and an upper limiting position (dot-dash lines) separated by a distance H which represents the stroke of the movable cylinder 11. An opening 15 in the wall of piston 4 is located at the midpoint of the stroke executed by the hole 16, i.e. a distance H/2 above the illustrated bottom position of that hole, and is traversed by the internal wiring 5 which rises from plug 6 within the piston and then passes in clearance 12 between apertures 15 and 16, thereafter extending within the outer channel 14 to a bore 18 of the desk top 1.

As also illustrated in FIG. 2, a similar path may be followed by the working fluid entering and leaving the chamber 19 via a flexible tube 70 which communicates through a coupling 71 with a pipe 72 also located within the floor F. Tube 70 leaves the interior of the piston 4 through an opening 73 at the level of opening 15, then passes outwardly through a hole 74 in the wall of cylinder 11 near the lower edge thereof, and finally opens into chamber 19 at a port 75.

FIG. 3 shows a modified piston fitting into a base 110 which is provided with a foot 20 and with lateral contact pins 21 for extending the circuits of wires 5 to their external power-supply and/or communication network by corresponding female connectors not shown. Naturally, the base 110 could be given any desired shape including, for example, several feet extending in different directions. Base 110 may be screwed or otherwise fastened to the floor at any convenient location.

FIG. 4 illustrates an array of four juxtaposed sockets 10a, 10b, 10c, 10d, each similar to the socket 10 of FIG. 2, combined into a single unit sunk into the floor. Two sets of bus bars 23', 23'' are disposed in a pair of intersecting floor channels 22', 22'', branches of these bus bars extending from junction boxes 24a, 24b, 24c, 24d to respective jacks 125, 125a, 325c in each socket. The connection between these jacks and the wiring inside each piston 4a - 4d of respective desk-supporting posts is completed by plugs similar to the one shown at 6 (FIG. 2) upon a positioning of each piston, with the aid of its key 9, in the associated socket. Naturally, not all the available sockets need be utilized for the mounting of posts.

FIG. 5 illustrates a possible positioning of two diagonally adjoining desks 1a, 1b, together with chairs 46a, 46b, on posts 3a, 3b rising from the corresponding sockets of FIG. 4. Two other desks 1c and 1d and chairs 46c, 46d, whose positions have been shown in dot-dash lines may be mounted on the remaining sockets which in their absence are covered by plates 26c and 26d.

In FIG. 6 I have shown a modified socket 28 lodged in a ceiling 27 for the support of a depending post 3' with a fixed cylinder 11' and a mobile piston 4' secured to a desk top not shown. Extensible wires 5' within post 3' terminate at sleeves 76 within a dielectric end plate 31 of the cylinder, these sleeves confronting a set of mating pins 77 at the ends of respective supply leads 23

extending within the ceiling. Pins 77 project downwardly from an axially shiftable but non-rotatable base plate 33 which is under downward pressure from a coil spring 36 bearing upon a top plate 35; stops 29 on the inner wall of socket 28 limit the descent of plate 33 and also serve as bayonet lugs coacting with slots 30 in the upper part of cylinder 11'. Each slot 30 has an arcuate midportion 30a with an open-ended vertical branch 30b and a blind vertical branch 30c, the lugs 29 entering the branches 30b of the associated slots upon an upward thrusting of cylinder 11' into the socket 28 in a position in which the pins 77 are disaligned from the sleeves 76 so that the plate 31 is lifted against the force of spring 36 and to the extent permitted by fixed abutments 34 within the socket. Next, the cylinder 11' is rotated so that the lugs 29 move within the branches 30a of their slots until they reach the branches 30c thereof, at which point the pins 77 find themselves in alignment with sleeves 76 so that spring 36 is free to press the plate 33 downwardly for completing the electrical connection between conductors 5' and 23. The post 3' is then allowed to descend under its own weight so that the lugs 29 become firmly lodged in the slot branches 30c without breaking the electrical connection.

As further shown in FIG. 6, socket 28 may have an upward extension 128 accommodating leads 123 which branch off the wires 23 and pass upwardly through apertures in plate 35 to a set of connectors (not shown). Thus, socket extension 128 may receive a rising column at the next-higher floor, e.g. in the manner described for socket 10 and post 3 with reference to FIG. 2.

FIGS. 7 and 8 show a unit similar to that of FIG. 1, except that the cantilevered desk top 1 is mounted on post 3 at a corner rather than at the center of its rear edge. The part of the desk top designated 37 is a plate fixed to the movable cylinder portion of the post whereas another part 39, representing a worktable, is tiltably mounted (e.g. for drafting purposes) on the plate 37 by means of a trunnion 40 received in a horizontal bore 41 of that portion. Table 39 is internally channeled at 42, 43 to accommodate respective transmission lines which extend from the wires 5 in bore 18 (cf. FIG. 2) to outlets 44', 44'' in line with the swing axis of the table and at the rear edge thereof, respectively. By passing through the hollow pivot represented by trunnion 40, these wires are protected from excessive wear upon a tilting of table 39.

Trunnion 40 may be designed as the male part of a separable coupling enabling the tabletop 39 with its internal wiring to be removed from the rigid desk portion 37, e.g. for replacement by another tabletop of different appearance and/or configuration.

FIG. 7 and 8 also show a lamp 48 forming part of the lighting fixture 47 which in this case is cantilevered to the top of post 3 so as to overhang the tiltable working surface 39.

FIG. 8 further shows the removable mounting of the set of drawers 2 on the underside of desk top 1, its frame 53 being provided for this purpose with lateral flanges 50 slidably engaged by a pair of rails 49 which are vertically movable and are urged against these flanges by springs 55. Casters 52 (similar to ball 67) at the bottom of frame 53 form a rolling undercarriage on which the set of drawers 2 may be bodily transported to another location after the desk top 1 has been lowered sufficiently to let these casters come to rest on the

floor F. Thus, the user of the desk may easily transfer all his files to a different desk in the case of relocation, or possibly to a conference room for temporary use there, without having to carry each drawer individually or to empty its contents.

In similar manner, a wastebasket 51 suspended from the tabletop 39 by means of flanges 50' and rails 49' loaded by springs 55' can be removed from the desk 1 and emptied before being returned to its normal position. A chute 56 gives access to the wastebasket 51 while a flap 54 (FIG. 5) may be provided in desk plate 37 above an access opening for the top drawer of set 2.

It will thus be seen that I have provided a highly versatile piece of furniture which can be adapted to a variety of purposes and which, upon removal of the receptacles 2 and 51, reduces to a simple shelf that could even be raised high enough to allow unhindered traffic through the room. The associated chair, of course, could be made demountable from post 3 if necessary. Suitable means (not shown) may be provided in the unit of FIGS. 7 and 8 to clamp or arrest the tiltable top 39 in different positions.

I claim:

1. A piece of office furniture comprising a desk top and a support therefor, said support consisting essentially of an upright extensible post including a cylinder member and a piston member slidable in said cylinder member under fluid pressure, one of said members being rigid with said desk top, the other of said members being fixedly secured to a surrounding building structure, said piston member being hollow and internally provided with at least one supply line having terminal means at said desk top for connecting to office equipment to be supplied thereby; said desk top being cantilevered to said post by a marginal portion engaging said one of said members and including a swingable worktable provided with hollow pivot means hingedly securing same to said marginal portion, at least part of said terminal means being carried on said worktable and connected to said supply line by conductor means axially traversing said hollow pivot means.

2. A piece of furniture as defined in claim 1 wherein said piston member is rigid with the floor of a room defined by said building structure.

3. A piece of furniture as defined in claim 1 wherein said structure is provided with utility mains, said supply line being coupled to said mains through a pair of mating connectors at an end of said piston member.

4. A piece of furniture as defined in claim 1, further comprising an adjustable frame extending from said post beneath said desk top and a seat on said frame confronting said desk top on a side remote from said marginal portion.

5. A piece of furniture as defined in claim 1 wherein said desk top is provided on its underside with rail means and with depending receptacle means detachably secured thereto by said rail means.

6. A piece of furniture as defined in claim 5 wherein said receptacle means is provided with an undercarriage enabling transportation thereof along a floor.

7. A piece of furniture as defined in claim 5 wherein said desk top is provided with at least one access opening overlying said receptacle means.

8. A piece of office furniture comprising a desk top and a support therefor, said support consisting essentially of an upright extensible post including a cylinder

member and a piston member slidable in said cylinder member under fluid pressure, one of said members being rigid with said desk top, the other of said members being fixedly secured to a surrounding building structure provided with utility mains, said piston member being hollow and internally provided with at least one supply line joining said mains at an end of said piston member and having terminal means at said desk top for connection to office equipment to be supplied thereby; said supply line including a flexible element emerging from the interior of said piston member at an intermediate point and continuing thence outside said piston and cylinder members with enough slack to allow movement of an edge of said cylinder member past said intermediate point in opposite directions, said cylinder member being spaced from said piston member in the region of said edge with formation of a clearance accommodating part of said element.

9. A piece of furniture as defined in claim 8 wherein said cylinder member is provided with an external sheath spacedly surrounding same and forming therewith a channel for a portion of said element.

10. A piece of furniture as defined in claim 5 wherein said cylinder member is provided near said edge with a hole traversed by said element between said channel and said clearance.

11. A piece of office furniture comprising a desk top and a support therefor, said support consisting essentially of an upright extensible post including a cylinder member and a piston member slidable in said cylinder member under fluid pressure, one of said members being rigid with said desk top, the other of said members being provided with an open-ended socket fixedly secured to a surrounding building structure and being further provided with retaining means for immobilizing

same in said socket, said piston member being hollow and internally provided with at least one supply line having terminal means at said desk top for connection to office equipment to be supplied thereby; said supply line including at least one electrical conductor and coupling means comprising an axially movable base plate in said socket resiliently biased toward the open end of said socket receiving said other of said members, the latter having an end plate with a termination for said conductor, said base plate carrying a complementary formation engageable with said termination in a fully inserted position of said other of said members and tied to utility mains in said structure.

12. A piece of office furniture comprising a desk top and a support therefor, said support consisting essentially of an upright extensible post including a cylinder member and a hollow piston member slidable in said cylinder member under fluid pressure, one of said members being rigid with said desk top, the other of said members being provided at an end portion thereof with a socket fixedly secured to a surrounding building structure and being further provided with retaining means for immobilizing said end portion in said socket; electrical conductor means within said post passing partly through said piston member and partly through said cylinder member in a generally vertical direction, said conductor means having a first termination at said desk top for connection to office equipment to be supplied thereby and having a second termination at said end portion; and connector means in said socket matingly engaging said second termination upon insertion of said end portion into said socket, said connector means being conductively joined to utility means in said structure.

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