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(54) **CHAIR ARM WITH STOWABLE TABLE AND MOUSE PAD**

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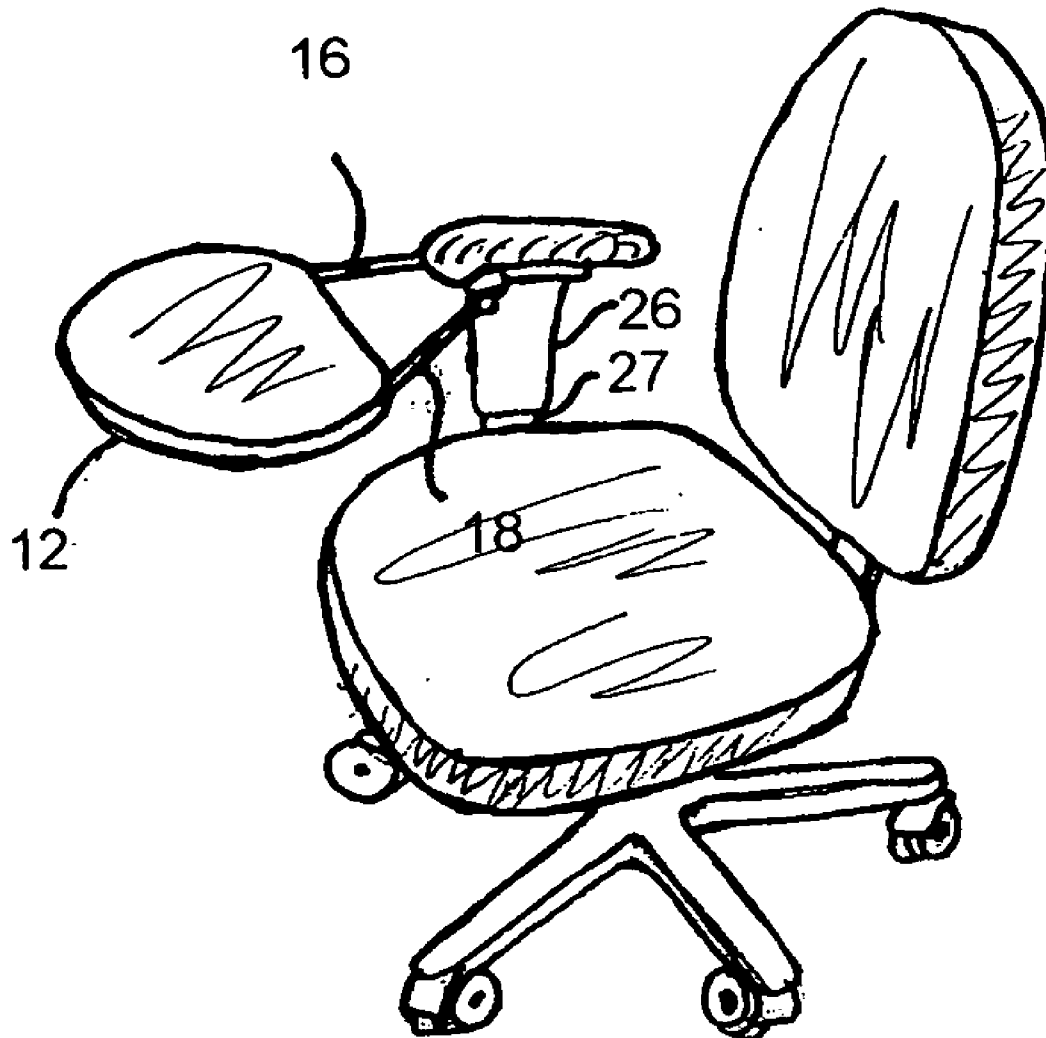
(57) **ABSTRACT**

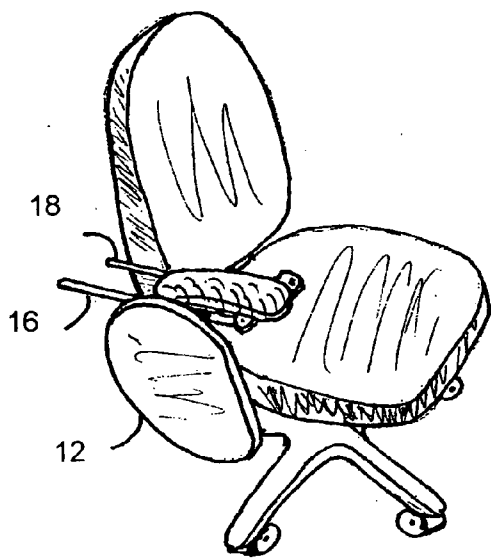
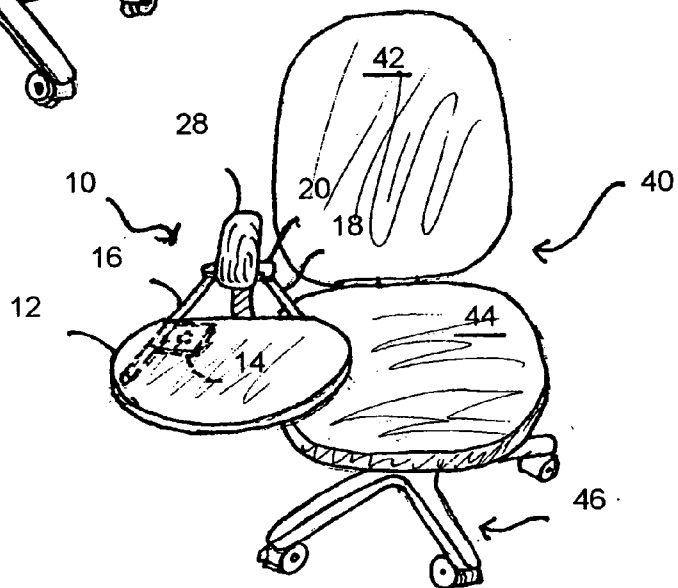
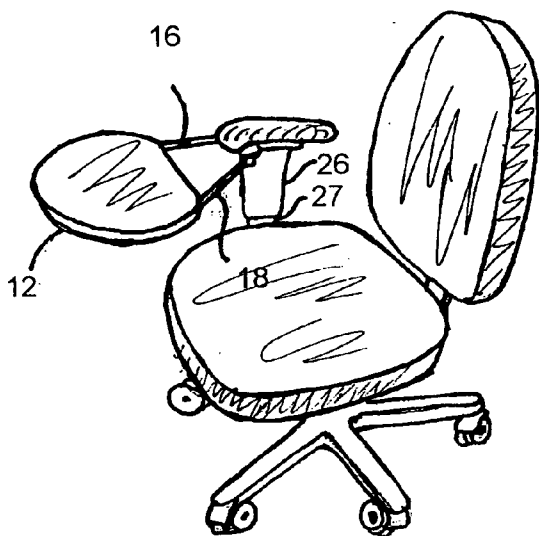
An attachment apparatus assembly that is multi positional and attaches to a computer or desk chair is shown. The assembly attaches to a chair by use of an existing chair arm or by using a separate attachment member. The device provides support for the forearm and wrist while operating a computer mouse by allowing the user to rest their forearm on a chair arm that has a stowable work surface on its top surface. The work surface is vertically adjustable and can go from a myriad of horizontal work positions in front of or to the side of the user, and folds down into a stowed away position to the chairs side when not in use. The work surface may be utilized to operate a keyboard from by positioning the work surface over the users lap. In one embodiment the armrest is also horizontally positional.

(21) Appl. No.: **11/193,767**
(22) Filed: **Jul. 28, 2005**

Related U.S. Application Data

(60) Provisional application No. 60/591,657, filed on Jul. 28, 2004.





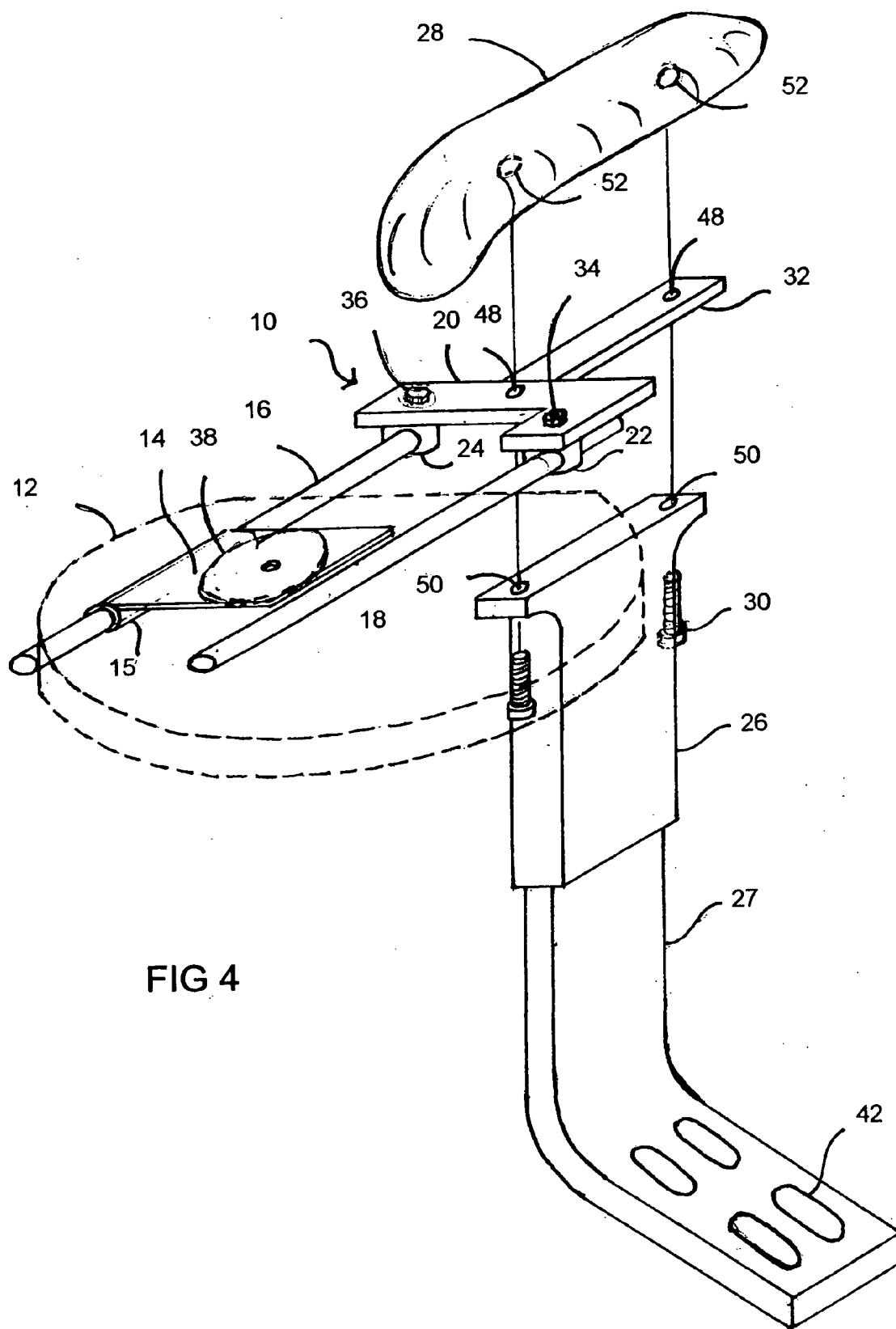


FIG 4

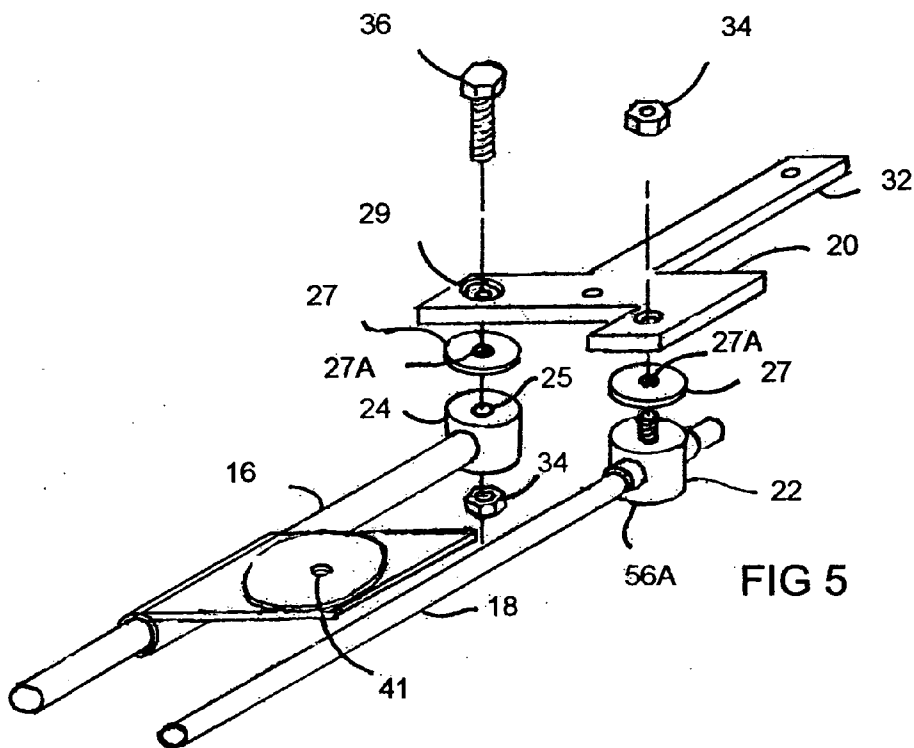


FIG 5

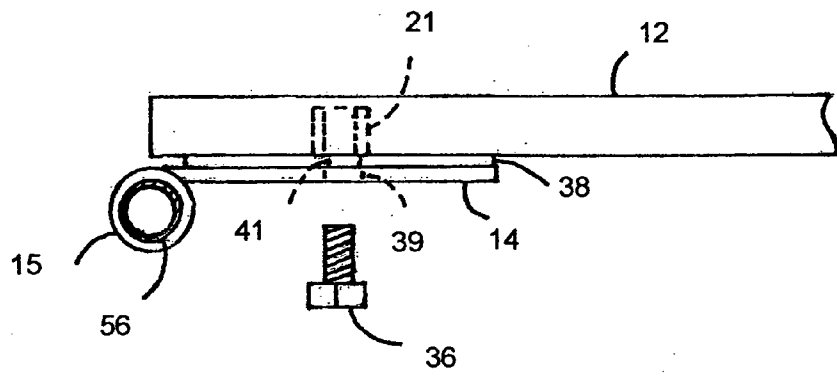


FIG 6

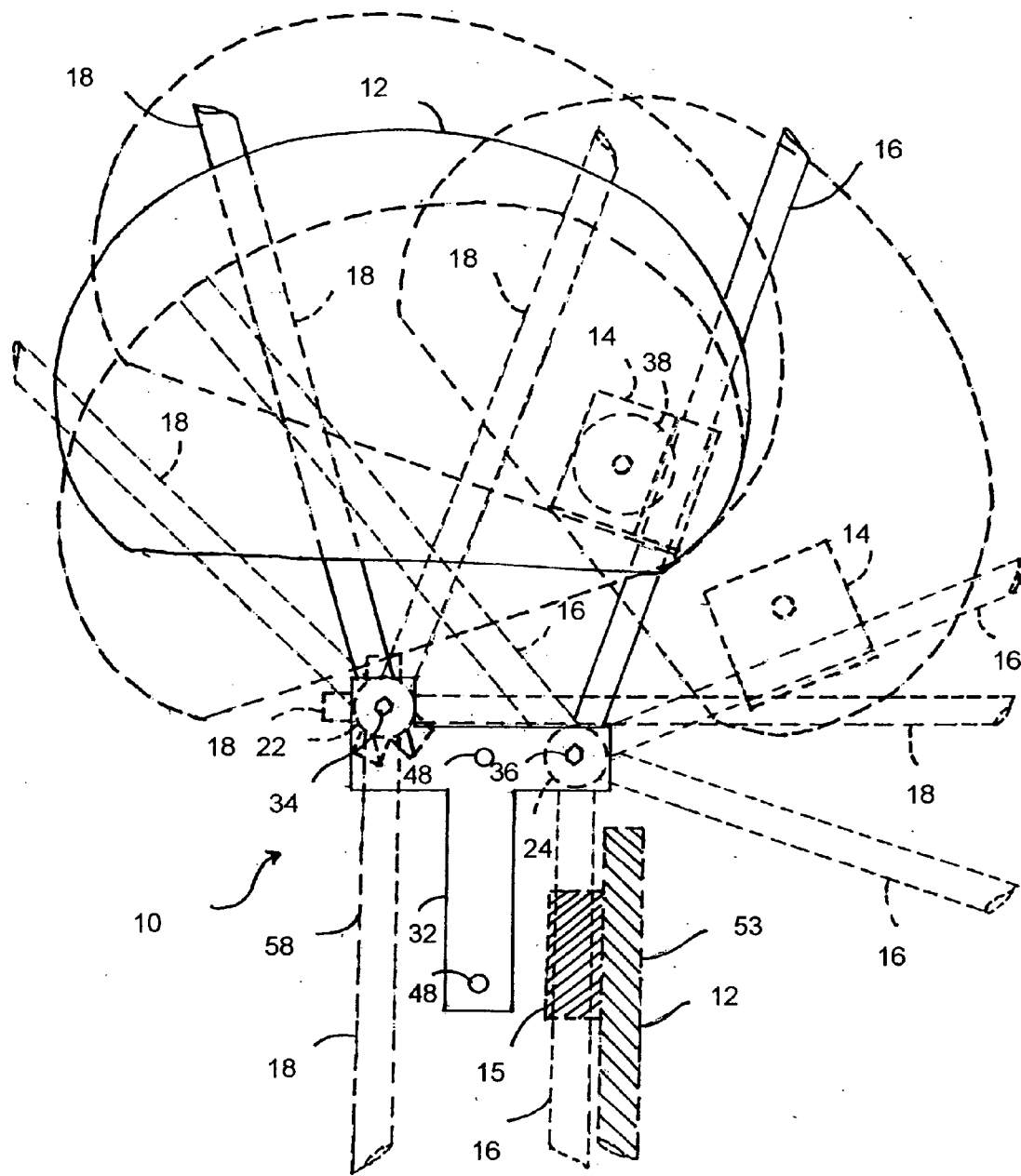
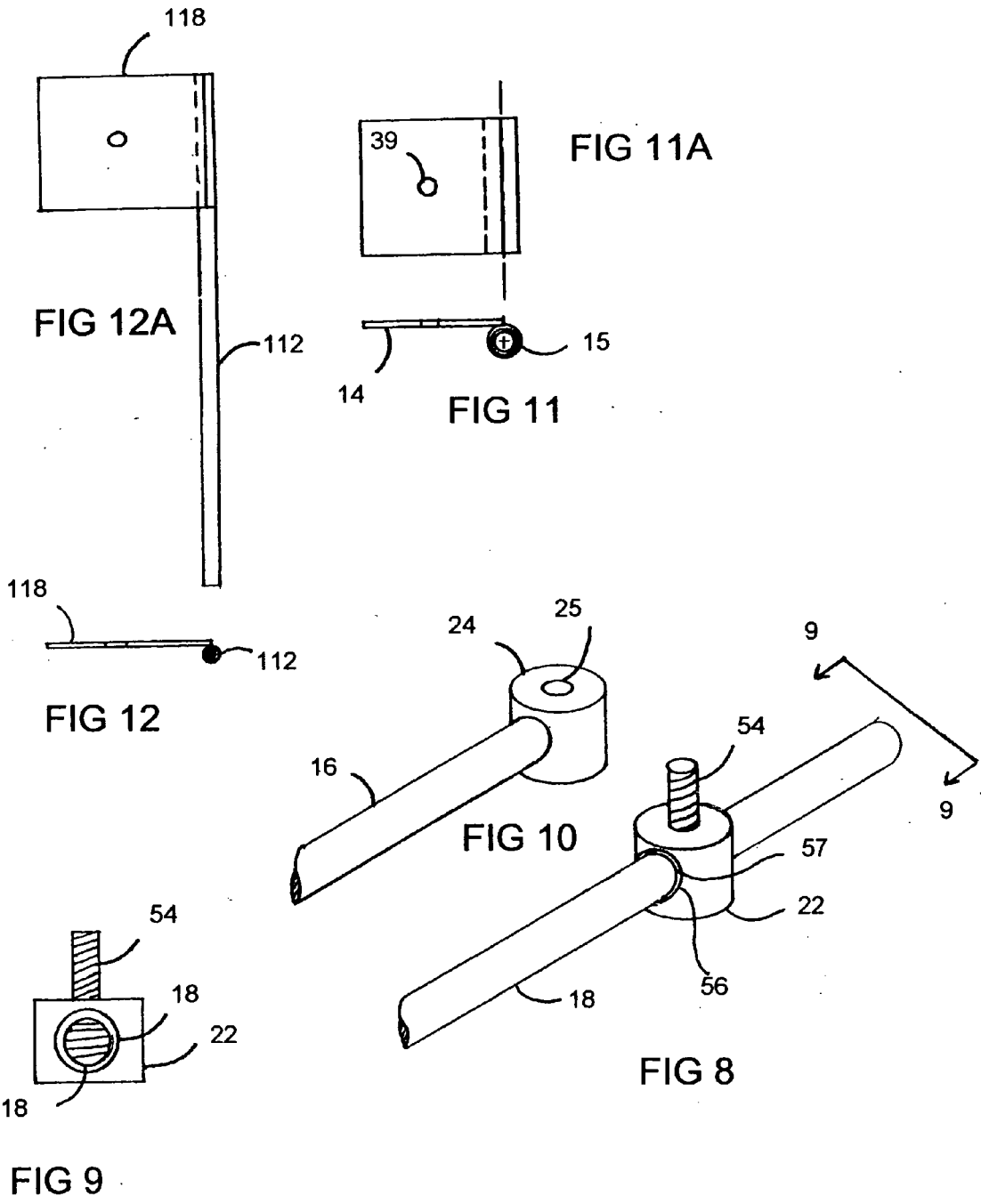


FIG 7



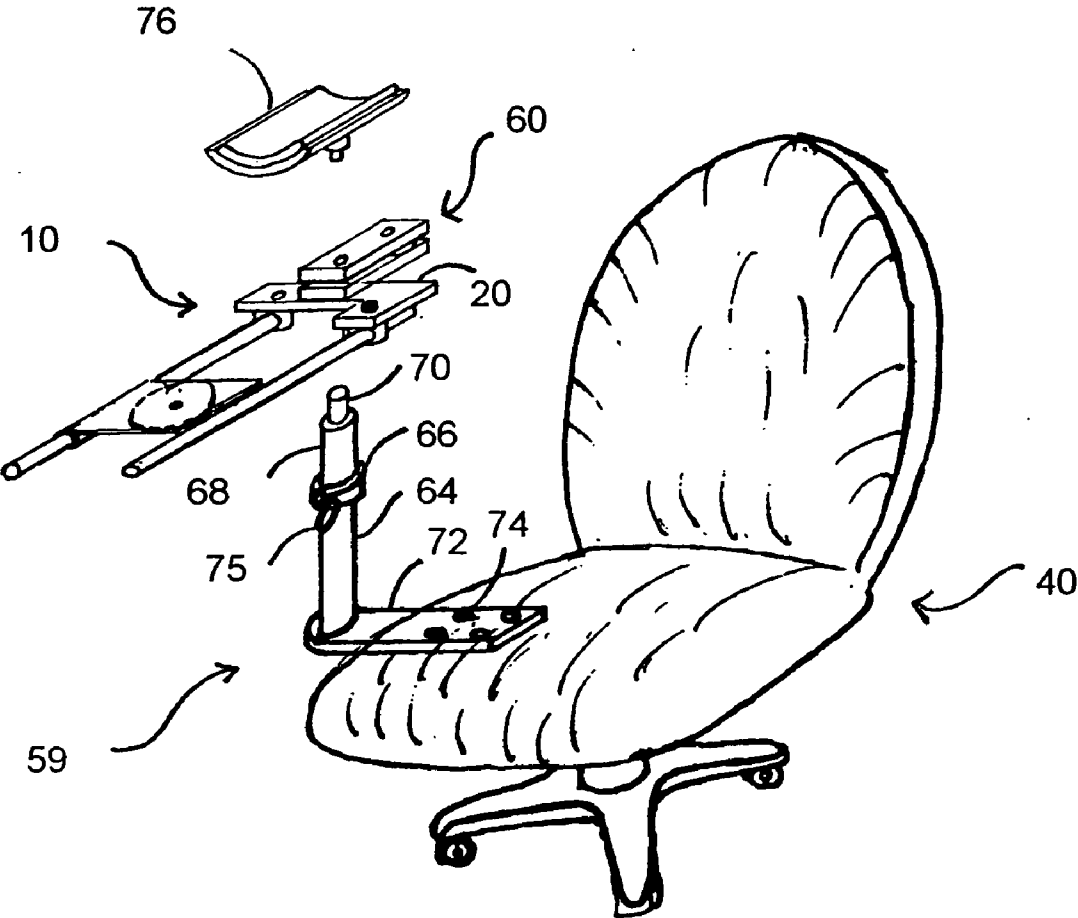


FIG 13

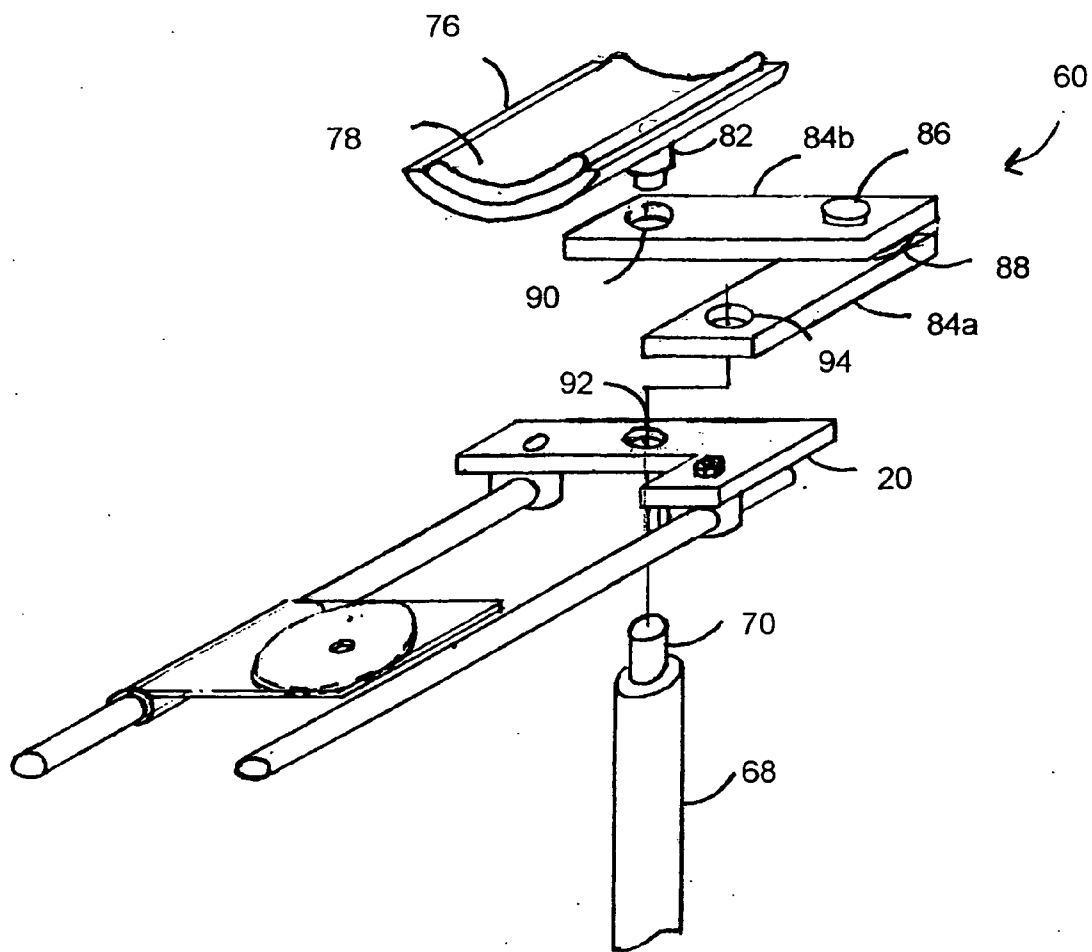


FIG 14

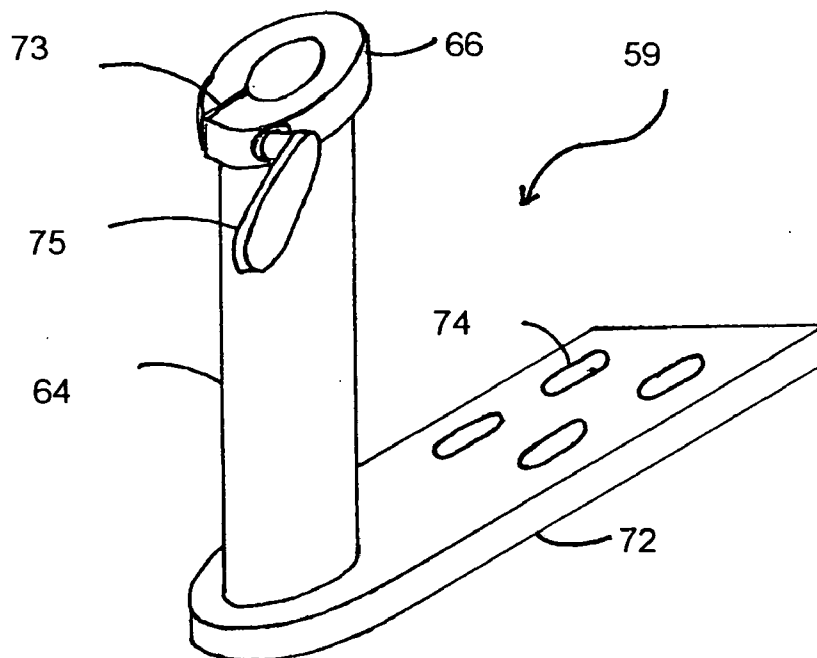


FIG 16

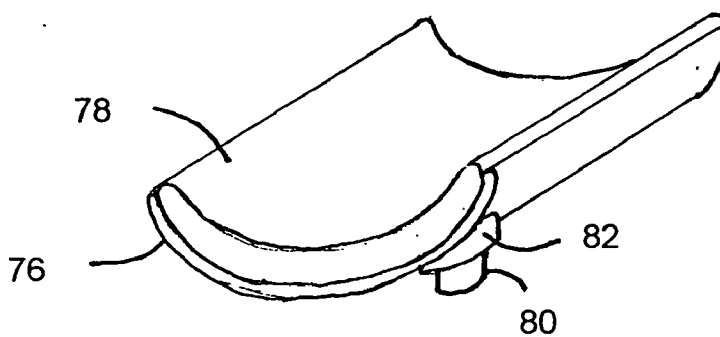


FIG 15

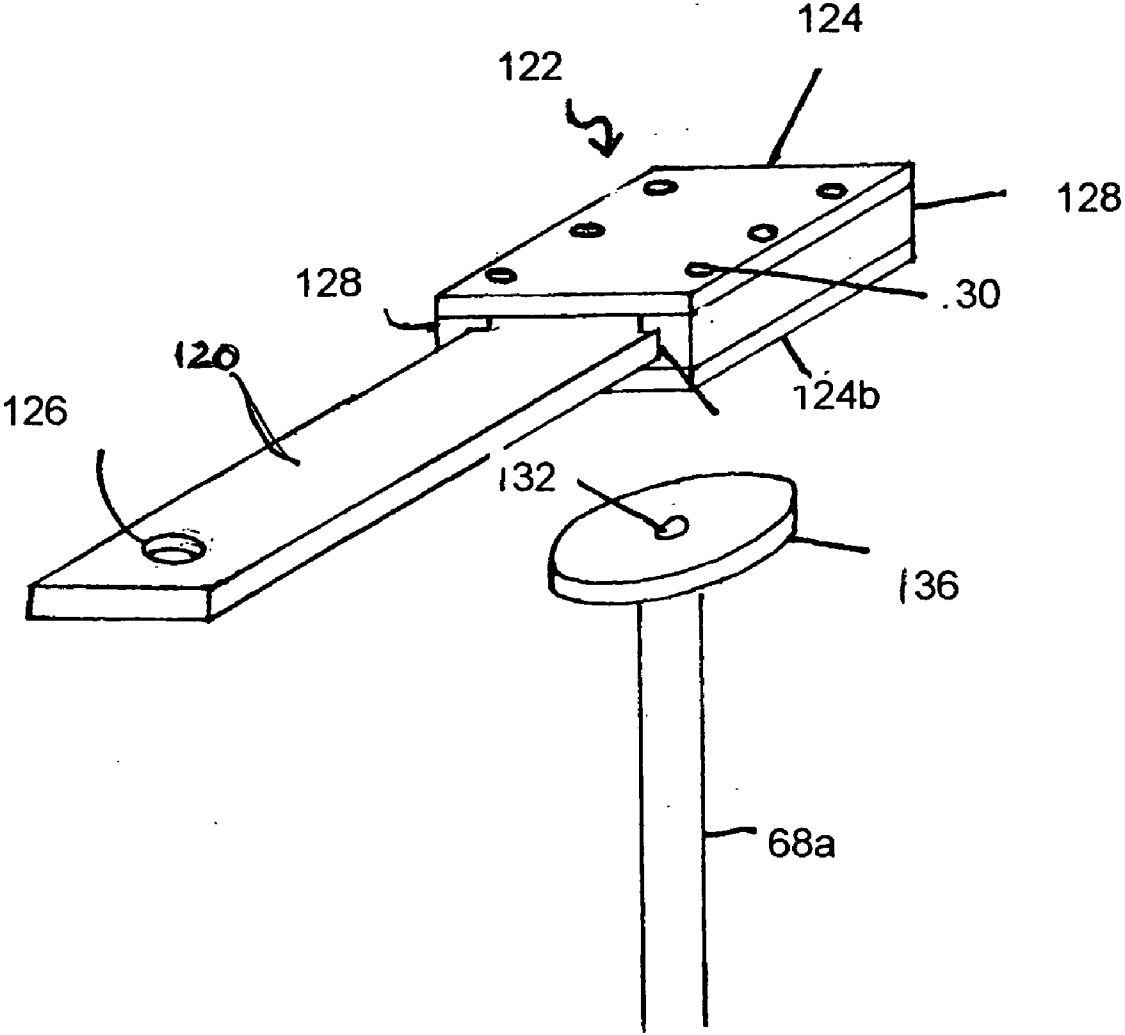


FIG 17a

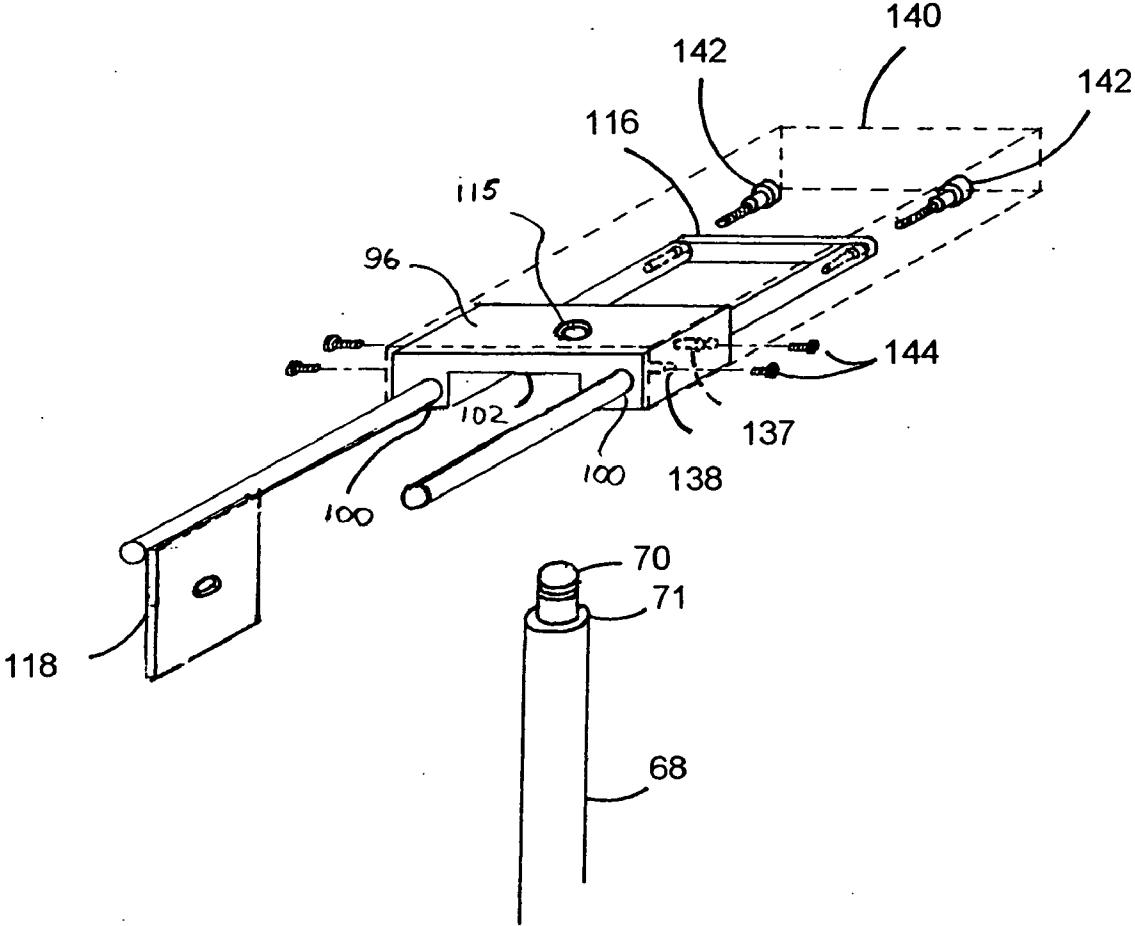


FIG 18

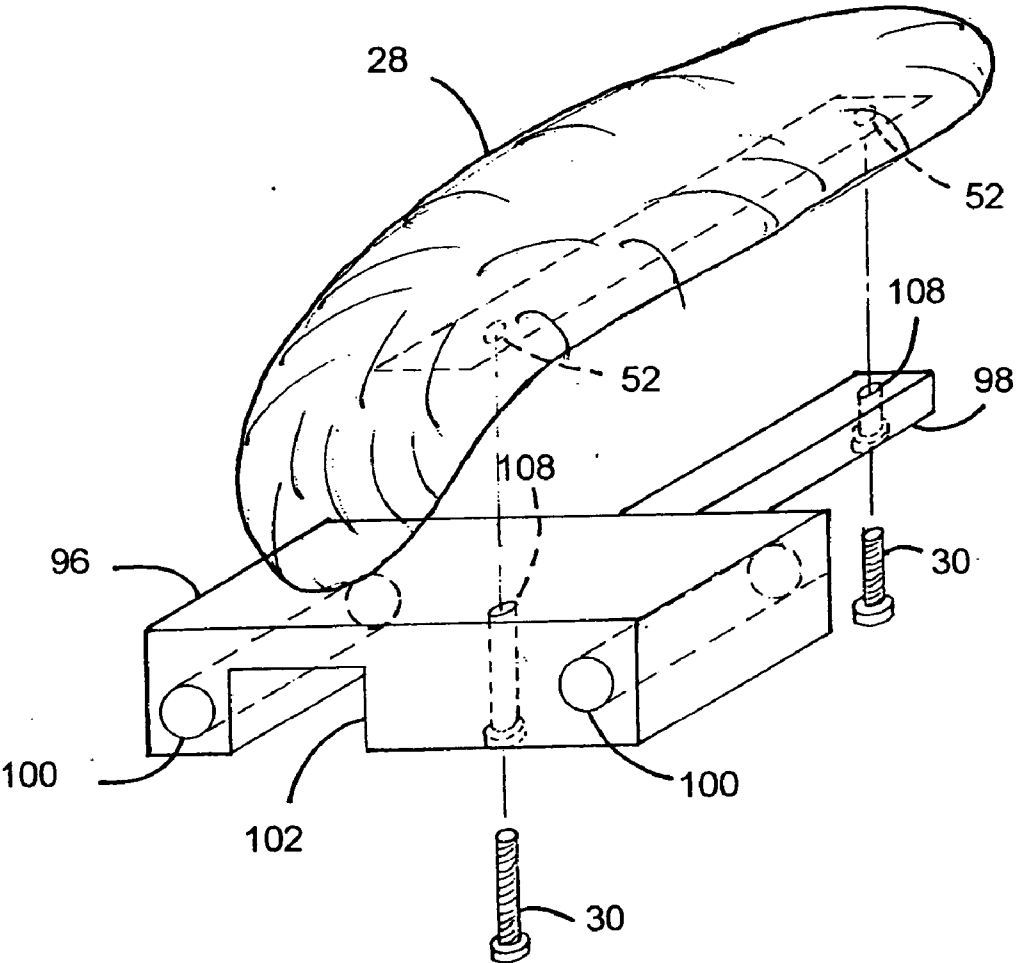


FIG 19

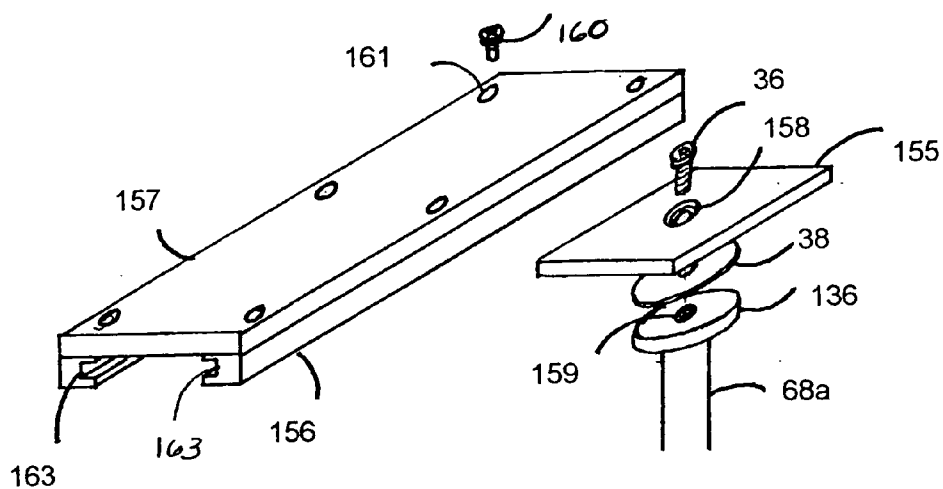


FIG 21

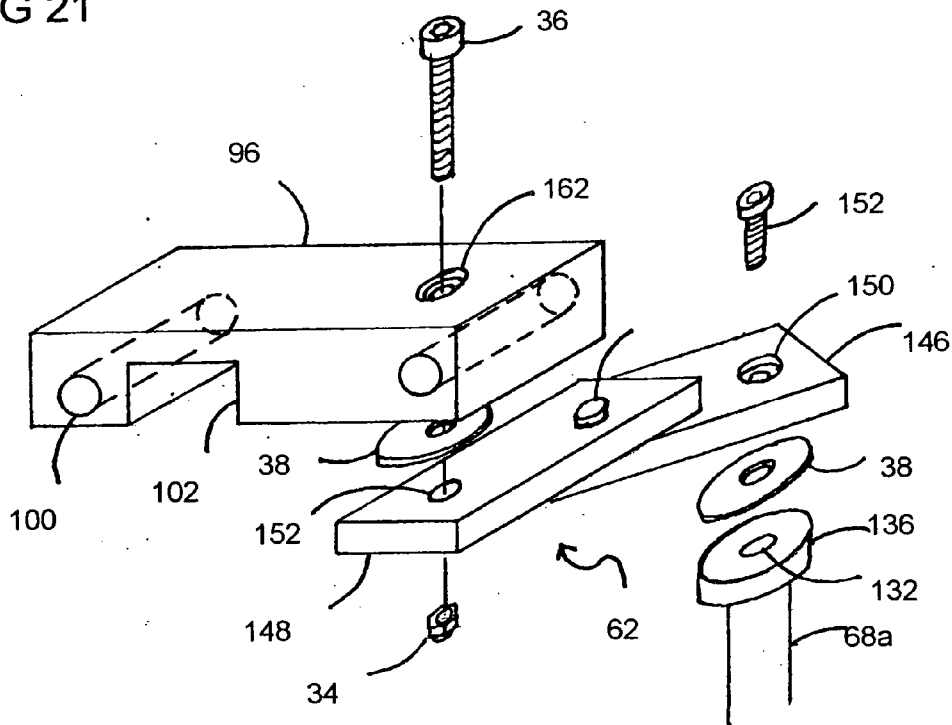


FIG 20

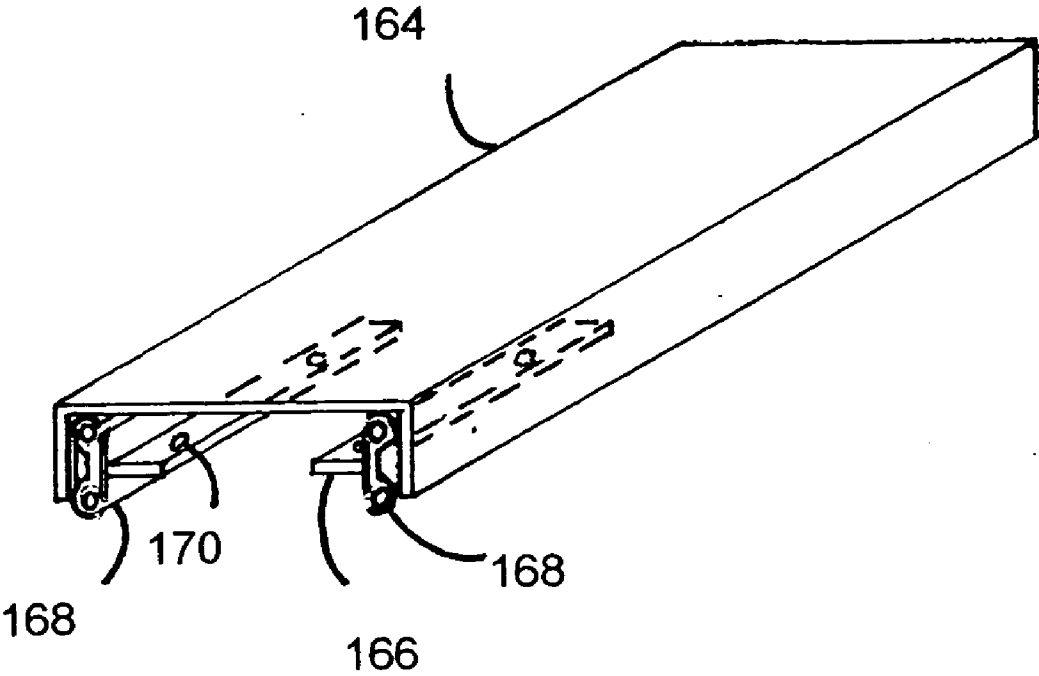


FIG 22

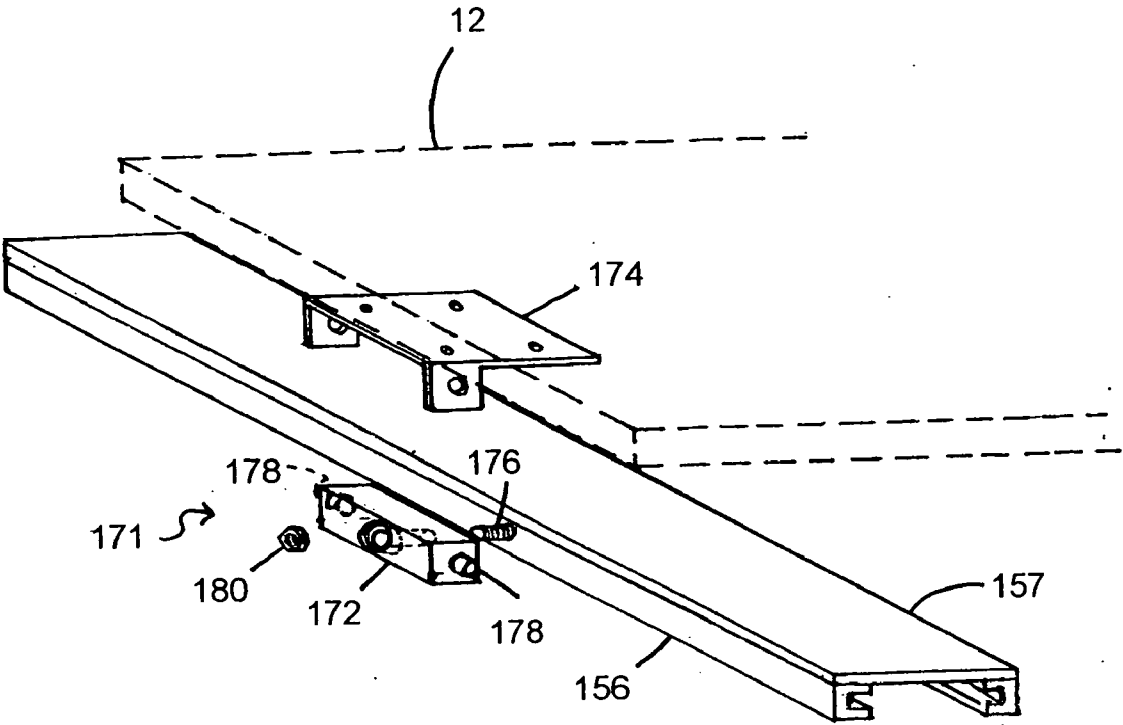


FIG 23

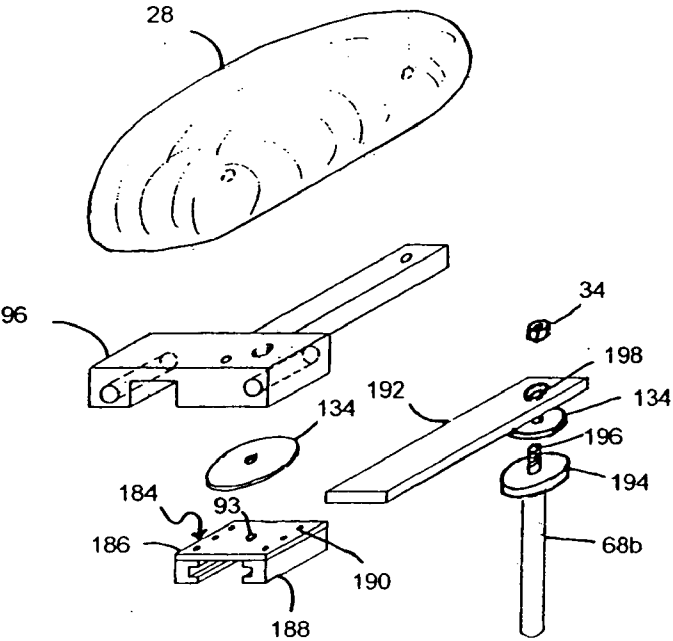


FIG 24

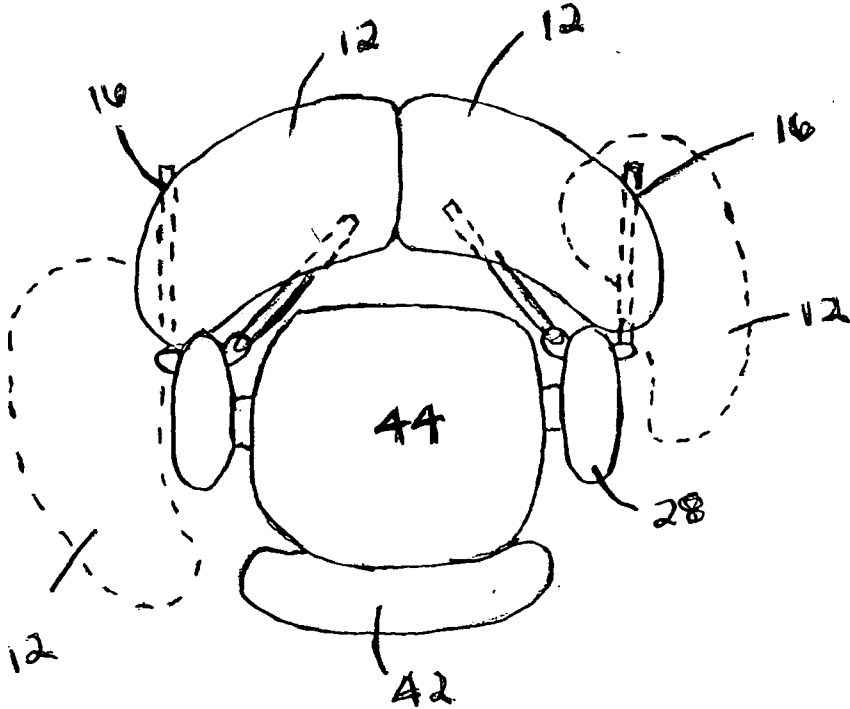


FIG 25

CHAIR ARM WITH STOWABLE TABLE AND MOUSE PAD

[0001] This application claims priority from Provisional Application Ser. No. 60/591,657 filed Jul. 28, 2004.

FIELD OF THE INVENTION

[0002] This invention relates to a chair and table combination, in particular a chair arm having a stowable table with an integrated mouse pad. The chair arm is positional relative to the person sitting in the chair thereby allowing the user to position the table in the most ergonomic and comfortable position for operating a keyboard and/or a computer mouse positioned on the table. Furthermore, the chair arm has an armrest allowing the user to rest their arm on the rest while using the computer mouse.

BACKGROUND OF THE INVENTION

[0003] Ergonomics as it relates to computer use is a field in need of innovation. Concerns involving the lack of proper positioning of a persons body while operating a computer keyboard and mouse are growing rapidly. Of particular concern are a person's back and arm position while operating a computer. The operation of a computer primarily involves inputting data through use of a keyboard and the use of a computer mouse for moving a curser and clicking the mouse.

[0004] Typically, these operations are performed in a seated position for long periods of time. Accordingly, these operations are the cause of a great number of stress related injuries. Repetitive motion injuries such as carpel tunnel syndrome and tendonitis are injuries that are common but avoidable with proper ergonomic posture during use of the keyboard and mouse.

[0005] Ergonomic devices have been developed to address these issues. For example, chairs have become high tech with the ability to be positioned to suit the user's needs and comfort level. Also, articulating arms that attach to desktops have been designed to provide support for a users arm while using a keyboard or mouse. Furthermore, mouse pads with a fold out arm that attach to a desktop and a chair desk having a stowable table with a mouse pad have been designed. In particular, these designs address the important and growing issue of relieving the strain put on the users back and arms and wrists. These devices concentrate mainly on supporting the users' arms and wrists while operating a keyboard and mouse. The users' arms and wrists are traditionally positioned on the desk in front of a computer monitor with the mouse pad being to the right of the keyboard. The problem is that there is no easy way to make using the keyboard and mouse comfortable and safe when they are located in a position that forces the user to stretch and bend the arms in positions that cause strain.

[0006] An example of one device addressing the problem of using a computer mouse is shown in U.S. Pat. No. 6,347,771, issued to Lauzon et, Feb. 19, 2002 and entitled "Portable arm and mouse support for use with personal computers". The device has a jointed arm with a mouse pad on one end and the other end is attached to a desktop. This design presents a problem with stability. In particular, the device is not able to withstand the weight a person will inadvertently put on the arm while positioning him or

herself. The device is also cumbersome in that it does not stow away and must be attached and detached when not in use.

[0007] Another such device, U.S. Pat. No. 5,490,710, issued to Dearing et al, Feb. 13, 1996 and entitled "Swing Arm Chair" shows a chair having a stow able table mounted onto a chair arm with an integrated mouse pad. The problem with this design is that it lacks the necessary adjustments to position the table up, down or rotationally so that the table may be usable while using a computer keyboard in conjunction with the mouse. Also, there is no support under the table to provide for any weight that one might put on the table. The mouse pad is in a fixed position and will likely incur strain and fatigue on the wrist because of the inability to position it where it is most comfortable. Finally, another problem is that this chair desk arm is not mountable on the standard office chair.

[0008] In addition, U.S. Pat. No. 6,264,150 issued to Touzani, Oct. 5, 2004, and entitled "Ergonomic bi-level workstation" shows a chair desk with incorporated mouse pad. Many similar problems exist with this device as with that of U.S. Pat. No. 5,490,710 to Benden, et al., Aug. 12, 2003 and entitled "Support apparatus for a chair" in that the table is not positional vertically or horizontally. The mouse pad is in a fixed position to the user's right side thereby forcing the user's arm into a single position that may overtime become uncomfortable.

[0009] Moreover, U.S. Pat. No. 6,311,939 issued to Christensen, Nov. 6, 2001 and entitled "Integrated mouse pad and wrist and arm support" shows a chair arm with an integrated mouse pad that is positional to a limited extent. A problem exists in this design in that the table or mouse pad is not stowable thereby causing a problem of being cumbersome when not in use. Although the arm is positional it has no linear tracking thereby limiting the mouse pad position to a fixed radius from the pivot points.

[0010] Next, U.S. Pat. No. 6,352,303 issued to Hope, Mar. 5, 2002 and entitled "Arm rest mouse pad" shows a mouse pad with almost no means of positioning and no means of stowing it away. This chair mouse pad must be attached and detached when not in use. With the need for maneuverability of an office chair, leaving an extended mouse pad attached to a chair arm would create problems of mobility in the often cluttered and confined environment of computer workstations.

[0011] Finally, U.S. Pat. No. 6,203,109 issued to Bergsten, et al., Mar. 20, 2001 and entitled "Ergonomic arm support" shows multi positional arm supports that are attachable to an office chair. Although this design provides good positioning of the arm supports in relation to the users body and keyboard, it does not provide for a stow able table with integrated mouse pad thereby being limited in its use as only supporting a person's arms. The design does provide for a mouse pad attachment in place of the armrest. This design creates a problem in that the mouse pad would not be hinged or stowable, and would not have the armrest to provide support for the arm while using the mouse.

[0012] In today's workforce and confined environments compactness and speed are essential. In order for a chair arm or desk combination having an integrated mouse pad to be useful it should be quickly accessible, provide ergonomic

positioning and have the ability to be quickly stowed away. If the device is cumbersome, unappealing, and too complicated it will not be used. The present invention provides a solution to these needs and other problems, and offers other advantages over the prior art.

SUMMARY OF THE INVENTION

[0013] In accordance with one embodiment of the invention, a stowable work surface and attachment apparatus are used with an existing chair. The attachment apparatus comprise a vertically adjustable post having a first end that is configured and arranged to be attached to a chair, and a second end that is configured and arranged to rotatably support a mounting plate or bracket. The mounting plate, in turn, is operatively and movably connected to one or more arms that are configured and arranged to support the work surface. And the work surface comprises a computer peripheral interface surface and an armrest.

[0014] In another embodiment, a stowable work surface and a portion of the attachment apparatus are used with an existing chair armrest. In this embodiment, only the mounting plate of the attachment apparatus is used.

[0015] In another embodiment, there are two stowable work surfaces that are movably connected to both sides of a chair. In this embodiment, which may be used with chairs having armrests or chairs without armrests, the work surfaces are configured and arranged so that they may create a substantially continuous work space in front of the chair.

[0016] Still another object of the present invention is to provide a work space that can be separated and stowed along side of a chair when not in use.

[0017] Still another object of the present invention is to provide a work surface that can be removably attached to the frame of an existing wheeled chair thereby converting the chair into a mobile work station.

[0018] Still another object of the present invention is to provide a chair having a stowable work surface capable of supporting a laptop, and movable into a stowed position when not in use.

[0019] Additional advantages and features of the invention will be set forth in part in the description which follows, and in part, will become apparent to those skilled in the art upon examination of the following or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIG. 1 is a front perspective view of the present attachment apparatus assembly with showing the stowable work surface in an extended horizontal position.

[0021] FIG. 2 is a side perspective view of the present attachment apparatus assembly in an extended horizontal position directly in front of a chair.

[0022] FIG. 3 is a side perspective view of the present attachment apparatus assembly with the stowable work surface in a stowed away position to the side of the chair.

[0023] FIG. 4 is an exploded perspective view of the present attachment apparatus assembly.

[0024] FIG. 5 is an exploded perspective view of the attachment apparatus assembly of FIG. 4 showing greater detail of the swing arm mechanism.

[0025] FIG. 6 is a detailed side view of the bracket.

[0026] FIG. 7 is a top view of the attachment apparatus assembly of FIG. 4 showing various positions of the stowable work surface.

[0027] FIG. 8 is a partial perspective view of the second arm positioned in the second block.

[0028] FIG. 9 is an end view of the second block shown from the direction of arrows in FIG. 8.

[0029] FIG. 10 is a partial perspective view of the first arm with the first block attached to its end.

[0030] FIG. 11 is a side view of the bracket.

[0031] FIG. 11a is a top view of the bracket with linear tube shown in hidden lines.

[0032] FIG. 12 is a side view of the first arm in an alternate embodiment of attachment apparatus assembly.

[0033] FIG. 12a is a top view of FIG. 12.

[0034] FIG. 13 is an exploded perspective view of an alternate embodiment of attachment apparatus assembly FIG. 4 and shows an articulating armrest and a mounting assembly having an adjustable post arm.

[0035] FIG. 14 is a detailed exploded perspective view of the articulating armrest assembly of FIG. 13.

[0036] FIG. 15 is a perspective view of the alternate embodiment of the arm rest in FIG. 13.

[0037] FIG. 16 is a perspective view of the alternate embodiment of the mounting assembly shown in FIG. 13.

[0038] FIG. 17 is an exploded perspective view of an alternate embodiment of present attachment apparatus assembly and shows a glide block assembly and pivot block having linear sliding members.

[0039] FIG. 17a is a detailed perspective view of the alternate embodiment of the glide block assembly of FIG. 17.

[0040] FIG. 18 is a detailed perspective view an alternate embodiment of the pivot block shown in FIG. 17 that is attachable to a post arm.

[0041] FIG. 19 is an exploded perspective view of an alternate embodiment of the pivot block shown in FIG. 17 and is attachable directly to an existing chair arm via arm rest mounting bolts.

[0042] FIG. 20 is an exploded view of an alternate embodiment of a means of positioning the present attachment apparatus assembly of FIG. 17 and shows an articulating arm assembly with the pivot block attached.

[0043] FIG. 21 is an exploded view of another alternate embodiment of positioning the attachment apparatus assembly of FIG. 17 showing an extension arm attached to a swivel mechanism on a post arm.

[0044] FIG. 22 is a perspective view of an alternate embodiment of the extension arm of FIG. 21 and shows an extension arm having ball bearing track members instead of nylon linear glides.

[0045] FIG. 23 is an exploded perspective view of an alternate embodiment of the present attachment apparatus assembly showing the extension arm in FIG. 21 having a rotating hinge assembly with stowable work surface attached to it.

[0046] FIG. 24 is an exploded perspective view of another embodiment of the present attachment apparatus assembly.

[0047] FIG. 25 is another embodiment in which each side of a chair is provided with an attachment apparatus and work surface which, when combined form a work space.

DETAILED DESCRIPTION

[0048] As shown in FIGS. 1, 2, and 3 the present attachment apparatus assembly is designated in general by the numeral 10, and includes as its principal components a stowable work surface 12 connected to a mounting plate 20 by means of a first arm 16 and a bracket 14. The bracket 14 engages the first arm 16, by means of a linear tube 15 and sleeve bushing 56 and provide a means for the stowable work surface 12 to be swing able and slid able, relative to the mounting plate 20. The mounting plate 20 is connectable to a chair 40 via an adjustable armrest bracket 26 and an arm support 27. A second arm 18 is connected to the mounting plate 20 and supports the stowable work surface 12 in a horizontal position. A standard armrest 28 is mounted on top of the mounting plate 20 thereby sandwiching the mounting plate 20 between the standard armrest 28 and the adjustable armrest bracket 26.

[0049] FIGS. 1, 2, and 3 show various positions of the stowable mouse pad 12 from the stowed away position shown in FIG. 3 to an extended horizontal position directly in front of the chair arm as shown in FIGS. 1 and 2. FIG. 2 shows the stowable work surface 12 extended and positioned over a user's lap. It will be understood by those skilled in the art that the stowable work surface 12 may be positioned in a myriad of positions.

[0050] FIGS. 4 and 5 show with greater detail exploded views of the present invention showing a stowable work surface 12 in an extended horizontal position. The stowable work surface 12 in phantom as it may appear is connected to a mounting plate 20 by means of a steel rod or first arm 16 and a bracket 14. The bracket 14 as shown in FIGS. 6, 11, and 11a is mounted to the underside of the stowable work surface 12 and comprises a generally plain body and a linear tube 15 having a sleeve bushing 56 that slidably engages the first arm 16 and allows the stowable work surface 12 to rotate relative to the mounting plate 20. The stowable work surface 12 may rotate about a bolt 36 that passes through apertures 39 and 41 of the bracket 14 and thrust washer 38, respectively. Preferably, the bolt 36 is threaded into a threaded insert 21 located in the underside of the stowable work surface 12, thereby securing the stowable work surface 12 to the bracket 14. The thrust washer 38 is positioned between the underside of the stowable work surface 12 and the bracket 14 thereby allowing the stowable work surface 12 to frictionally engage the bracket 14 and to pivot via the bolt 36 and thrust washer 38. The first arm 16 is mounted to and frictionally engages the mounting plate 20 via a first block 24, which is attached to the end of the first arm 16 and which frictionally engages the underside of the mounting plate 20. See, for example, FIG. 5. It will be understood by those skilled in the art that the first block 24 is generally disc

shaped having a through hole or aperture 25 and two opposing flat sides one of which provides a bearing surface on which the first block 24 rotates. The first block 24 has an aperture 25 extending through the center axis of the first block 24. A thrust washer 27 may be positioned between the first block 24 and the mounting plate 20. The first block 24 is attached to and frictionally engages the mounting plate 20 via a bolt 36 which passes through apertures 29, 27a, and 25 of the mounting plate 20, thrust washer 27, and first block 24 respectively, and which is engaged by a nut 34. It will be understood by those skilled in the art that by tightening or loosening the nut 34, the resistance at which the swing arm pivots may be increased or decreased. An additional thrust washer 27 may be placed on the opposing flat side of the first block 24 to ensure a fluid pivoting motion. As shown the mounting plate 20 has a T-shape with the horizontal portion having a leg extending thereabove from the left side of the Tee, which allows a second arm 18 to be offset from the first arm 16, and which allows the second arm 18 to be perpendicular to or cross over in front of a standard arm rest 28. The lower portion of mounted plate extension 32 provides support that allows the mounting plate 20 to be secured to an arm rest bracket 26 via the mounting plate bolt holes 48 and arm rest mounting bolts 30.

[0051] A second arm 18 provides support for a work surface while in a horizontal position and comprises a second arm 18 which is engaged by a second block 22. The second block 22 is shown in greater detail in FIGS. 8 and 9. The second block 22 is generally disc shaped having two opposing flat sides. On one flat side a threaded pin or stem 54 extends from the center of the flat portion of the disc, and provides a means for securing the second block 22 to the mounting plate 20. The second block 22 has through hole or aperture 57 extending through the disc, perpendicular to its center axis. A sleeve bushing 56 comprised of nylon or other low friction material such as polytetrafluoroethylene may be fixed in the hole 57 thereby forming a pillow block through which the second arm 18 may move, allowing the second arm 18 to move into an extended or retracted position. FIG. 3 shows the second arm 18 and the first arm 16 in a retracted position. The second block 22 frictionally engages the bottom of the mounting plate 20. A thrust washer 38 is may be between the flat bearing surface of the second block 22 and the bottom of the mounting plate 20. The threaded stud 54 passes through apertures 27a and 29 of the thrust washer 27 and mounting plate 20 respectively, and is engaged by a nut 34. By tightening or loosening the nut 34 the resistance at which the second arm 18 pivots may be increased or decreased respectively. An additional thrust washer may be placed on the top side of the mounting plate 20 to ensure a fluid pivoting motion if desired. As shown in FIG. 4, the mounting plate 20 is positioned between an arm rest 28 and an adjustable arm rest bracket 26 by two mounting bolts 30, which pass through apertures 50, 48 of the adjustable armrest bracket 26, mounting plate 20 and mounting plate extension 32, respectively. The armrest mounting bolts 30 are threaded into T-nuts 52 located on the underside of the standard armrest 28. An arm support 27 doubles as a connecting means by which the adjustable armrest bracket 26 and stowable mouse pad 10 are attached to an office chair 40 of the type having a back 42, a seat 44, and a support structure 46. The arm support 27 typically has four slots at its end, providing a means for bolting the arm support to the bottom of the chair seat 44. It should be noted

that the second block 22 need not be limited in use with the second arm 18 only, and may also be used in place of the first block 24 thereby allowing a swingable and slideable first arm 16 as well as a swingable and slidable second arm 18.

[0052] FIG. 7 shows various positions in phantom of the stowable work surface 12 with corresponding positions of the first arm 16 and second arm 18. The stowable work surface 12 is shown in four different horizontal positions swinging from left to right and ending with the stowable work surface 12 in a vertical or stowed away position 53. The second arm 18 is shown in a retracted or stowed away position 58. From the stowed away position 53 the table may be lifted or swung into a horizontal position, and the second arm 18 extended to provide support for the stowable work surface 12. The stowable work surface 12 may then be swung into any one of a multitude of positions including but not limited to the four positions shown. It will be appreciated by those skilled in the art that the stowable work surface 12 may also rotate or pivot independently relative to bracket 14 about bolt 36 as described in FIG. 6, thus allowing even greater positioning capacity.

[0053] FIGS. 13 and 16 shows an alternate embodiment of the present invention having an attachment apparatus 59 that allows the stowable work surface 12 to be connected to a chair 40 that does not have existing arms. Here, a positional arm rest assembly 60 comprises an articulating arm 84a, 84b and a rotatable arm rest 76. A post assembly includes as its principle components a post 68 which connects the stowable work surface 12 to a chair 40. The arm housing 64 may be provided with a clamp 66 with which to secure the post 68 relative to the housing 64. The bottom of the housing 64 terminates with a bracket 72 which is provided with mounting slots. The post arm 68 is connected to the mounting plate 20 and provides the means to pivot as well as adjust the height of the stowable work surface 12 by engaging the post clamp 66 and a sleeve bearing located inside the arm housing 64 near the bottom. The post clamp 66 has an inside diameter slightly larger than the outside diameter of the post arm 68 thereby allowing it to slide inside the inside diameter of the post clamp 66. The clamp 66 is of a typical design used on shafts for positioning and holding them in place. Clamp 66 includes a vertical slot 73 with an intersecting bolt hole and a lever with a threaded bolt extending through the hole thereby allowing the post clamp 66 to constrict around the arm 68 by turning the lever and decreasing the diameter of the clamp 66 inside diameter.

[0054] FIG. 14 shows in greater detail the articulating arm 60 in FIG. 13. The articulating arm 84a, 84b allows armrest 76 to rotate and thereby increase positioning capability. The articulating arm comprises a lower arm 84a and an upper arm 84b joined together at one end by a pivot pin 86 which allows the two arms to act as a hinge having a common pivot pin. A thrust washer 88 is positioned between the lower 84a and upper 84b arms with the pivot pin 86 extending through the thrust washer 88.

[0055] The upper arm 84b has a through hole or aperture 90 opposite the end of the pivot pin 86. The aperture 90 is used as a bushing through which a downwardly depending stem 80 of the arm rest 76 is inserted, allowing the arm rest 76 to be seated and to pivot about the center axis of the aperture 90 at the end of the top arm 84b. A bushing may be inserted into the through hole or aperture 90 to allow

smoother rotation, if desired. The lower arm 84a has a hole 94 opposite the end of the pivot pin 86 through which the upwardly extending stem 70 of the post projects. As shown, the stem 70 projects through a hole 92 in the center of the mounting plate 20 and extends out the top of the mounting plate 20 and through hole 94 located at the end of the lower arm 84a opposite the pivot pin. A thrust washer (not shown) may be positioned between the top of the mounting plate 20 and the bottom of the lower arm 84a. A retainer ring, circlip, or similar fastening may be used on the end of the stem 70 to hold the articulating arm 84a, 84b onto the stem 70.

[0056] FIG. 15 shows a rotatable armrest 76 having a cupped shape that is configured to receive the forearm of a user. The arm rest 76 may be provided with a padded portion 78 made of a resilient material such as foam or sponge rubber which overlays the rigid body of the arm of the armrest 76. A trunnion 82 is located on the convex or bottom surface of the armrest 76. The trunnion 82 has a downwardly depending stem 80 inserted into the through hole or aperture 90 located at the end of the upper arm 84b of the articulating arm 84a, 84b.

[0057] FIGS. 17 and 17a show yet another alternate embodiment of the present invention referred to in general by the numeral 104. In exploded view the main components of the alternate embodiment, are a stowable work surface 12 that is slidably connected to a block 96 by means of a first arm 112. The first arm 112 has a work surface attached to its end by means of a bracket 118; the opposing end slidably engages the pivot block. The block 96 is connected to the end of an extension arm 120. The extension arm 120 is slidably connected to a block 122. The glide block 122 is mounted to a post 68a by a swivel base 136 located on the upper end of the post 68a. The post 68a is attached to the chair by means of a post arm assembly 59 as previously described. In greater detail the stowable work surface 12a is shown in an extended vertical folded down position ready to slide back to its stowed away position through a channel 102. Shown in phantom in FIG. 17, work surface 12a is in an extended horizontal position. The stowable work surface 12 may pivot about the vertical and horizontal and is extendable by two linear slide mechanisms the block 96 and the block 122. The stowable work surface 12 pivots and slides by means of a first arm 112.

[0058] The first arm 112 is connected to a second arm 114 by bar 116. The first arm 112 and second arm 114 each have a threaded hole at their respective end for receiving threaded fasteners. The first arm 112 and second arm 114 are connected together after inserting the arms through parallel apertures 100 in the block 96. The fastening elements 142 includes a shoulder that prevents over-tightening and allows the first arm 112 to rotate, thereby allowing both arms 112 and 114 to slide in unison and maintain the ability of the first arm 112 to also rotate with the shoulder of the fastening element 142 acting as a shaft and the arm hole acting as a bearing. The block 96 is of a rectangular shape having two parallel holes 100, one located on each end of the block and extending therethrough. Each hole 100 may include a plastic bushing that slidably engages the first arms 112 and 114. The block 96 also has an opening or channel 102 in the bottom portion of the block and located between the two parallel holes 100 of the block 96, and closest to the first arm 112. The channel 102 extends through the block from one side to the other and is generally parallel to the holes 100. The

channel 102 provides an opening in the block 96 so the work surface may be moved into a retracted and stowed position. The block 96 has a through hole 110 extending through the block from top to bottom. The block 76 is mounted to the end of the extension arm 120 by extending a bolt through the throughhole 110 through a nylon washer, and through the block mounting hole located at the end of the extension arm 120. A nut 34 is screwed onto the end of the bolt thereby frictionally engaging the pivot block 96 with the extension arm 120 with a nylon thrust washer between them. The nut is tightened to increase or decrease the resistance at which the block 96 rotates.

[0059] An arm rest mounting hole 111 is located near the center of the block 96 allowing the stem 80 of the armrest 75 to be inserted in the hole and the trunnion 82 to be seated upon the block thereby allowing the arm rest to pivot. The extension arm 120 comprises a longitudinal flat bar having a top surface and a bottom surface with two ends opposite each other and two sides opposite each other. A block mounting hole 126 is located on one end the opposite end is inserted into a block 122. The block 122 comprises a top plate 124 and a bottom plate 124b. The two plates are generally parallel to each other and retain channel elements 128 therebetween. The channel elements 128 are generally rectangular in shape and have a U shaped channel 134 extending the length of the glide. The channel elements 128 may be made of nylon, polytetrafluoroethylene, or other material that is used for making a bushing. The U shaped channel 134 has 3 sides a top a bottom and a side. The top and bottom sides are at a distance from each other approximately equal to the thickness of the extension arm 120. The glides are positioned between the glide plates 124 and 124b opposite each other one on each side of the plates so that the U shaped channels 134 are facing each other. The channels 134 create a slot into which the end of the extension arm 120 opposite the pivot block mounting hole 115 is inserted. The extension arm 120 slides back and forth inside the channel elements 128 relative to the block 122. The channel elements 128 are fastened to the glide block plates 124 and 124b by bolts that extend through apertures 130 in the top plate 124. The bolts extend through corresponding holes in the channel elements 128 and extend into threaded apertures in the bottom glide plate 124b (not shown). The block 122 can rotate 360 degrees and is seated on a swivel base 136. The swivel base 136 is a round disc shaped member having a threaded hole 132 located at its center. The swivel base 136 is located on the top end of a post 68a. The block 122 is mounted onto the swivel base by a conventional threaded bolt extending through a pivot bolt hole located at the center of the bottom plate 124b and through a thrust washer and threaded into the threaded hole 132 in the swivel base 136.

[0060] FIG. 18 shows an alternate embodiment of the present invention having a pivot block 96 as described in FIG. 17 mounted directly to a post 68. The block is mounted onto the post 68 at throughhole 115 located in the center of the block 96. The stem 70 of the post arm 68 extends through the hole 115 and extends through the top of the block 96. The bottom of the block 96 is seated on a seat or shoulder 71 of post 68. A shroud 140 may be attached to the pivot block by means of screws 144 inserted through apertures 138 in the shroud 140 and screwed into threaded holes 137 in the pivot block. An arm rest may be attached to the top of the shroud 140. An armrest may also be attached to the pivot block as shown in FIG. 17.

[0061] FIG. 19 shows another alternate embodiment of the present invention showing the block 96 having an extension 98 extending therefrom. The extension 98 allows the block 96 to be mounted to an adjustable bracket 26 as shown in FIG. 4. Arm rest mounting bolts 30 extend through the bracket bolt holes 50 (see FIG. 4) and through apertures 108 in the pivot block and extension 98, and into threaded apertures 52 the underside of the arm rest 28.

[0062] FIG. 20 shows an alternate embodiment of the present invention having an articulating arm 62 interposed between the block 96 and post 68a. As will be understood, the articulating arm increases the range of motion by which the stowable work surface 12 may be moved. The articulating arm 62 comprises a lower arm 146 and an upper arm 148 joined together by a bolt 154 which allows the two arms to act as a hinge and swivel via the pivot pin 154. The articulating arm is of a common design and has been shown earlier in FIG. 14. The lower arm 146 has a hole 150 opposite the its hinged end. The bolt 152 extends through the hole and threads into the threaded hole 132 in the swivel base 136. A thrust washer 38 may be positioned between the swivel base 136 and the lower arm 146. The upper arm 148 has a throughhole or aperture 152 located on its end opposite its hinged end. A bolt 36 extends through a hole 162 in block 96, through the thrust washer 38 and through the through-hole or aperture 152 at the end of the arm 148 and is secured via a nut 34. The nut is tightened to allow the block to pivot freely with some resistance.

[0063] FIG. 21 shows an alternate embodiment of the present invention having an extension arm 157 with channel elements 156 extending the length of the extension arm 157 and secured to the underside of the arm by fastening elements 160 that extend through apertures 161 in the extension arm 157 and screwed into the channel elements 156. The channel elements 156 are a longer version of channel elements 128 in FIG. 17a. The extension arm 157 is configured so that the U shaped channels 163 slide along the edges of a rectangular plate 155. The plate 155 is rotatably mounted onto the swivel base 136 by bolt 36 which extends through a hole 158 located in the center of the plate 155 through a thrust washer 38, and into threaded hole 159 located in the center of the swivel base 136.

[0064] FIG. 22 shows an alternate embodiment of an extension arm 164 that is shaped like a channel having a top and two sides and an interior cavity. Two ball bearing glides 168 are secured to the interior walls of the channel and have mounting flanges 166 that extend towards the interior cavity 166. The mounting flanges 166 have holes 170 that allow the extension arm 164 to be attached to plate having corresponding holes similar to plate 155 shown in FIG. 21 but with corresponding attachment holes (not shown).

[0065] FIG. 23 shows an alternate embodiment having an extension arm 157 as shown in FIG. 21 with a rotating hinge assembly 171 attached to it. The hinge assembly is a known device used for stowing a desktop to the side of a chair used in classrooms and auditoriums. The mechanics will be briefly described here. A block 172 is mounted to the arm 157 by bolt 176 that extends through a hole 182 located in the center of the block and nut 180 is threaded onto the bolt. The block 172 rotates about the bolt 176. The block 172 has two hinge pins 178 located at each end of the block which allows a hinge bracket 174 to be mounted and swivel

perpendicular to the axis on which the block 172 swivels. The stowable work surface 12 is attached to the hinge bracket thereby allowing the stowable work surface 12 to be flipped up and rotated 180 degrees down and slid back via the extension arm 157.

[0066] FIG. 24 shows another alternate embodiment of the present invention having an extension arm 192 that does not slide. A block 184 having a block 96 thereto it allows the stowable work surface 12 to slide and rotate. An extension arm 192 is fastened to the swivel base 194 through an aperture 198 on one end of the extension arm 192. The swivel base has a threaded stud 196 that extends upwardly from the center of the swivel base and extends through the hole 198 on the extension arm and where it is secured by a nut 34. A thrust washer 134 may be placed between the swivel base 194 and the extension arm 192 to provide a smooth wear resistant surface on which the extension arm 192 may swivel. The block 184 is built in the same fashion as the extension arm shown in FIG. 21, but shorter in length. The block 184 comprises a plate 186 having two channel elements 188 secured to the underside thereof by conventional fastening elements that are received mounting holes 150. A thrust washer 134 may be positioned between the block 184 and the block 96 to provide easy and smooth rotation of the pivot block 96. A standard armrest 28 may be mounted to the pivot block 96.

[0067] FIGS. 25 and 25a shows a stowable work surface 12 with a partial oval shape having one flat edge. The stowable work surface 12 has a recess 200 cut into the top that is slightly deeper than the thickness of a mouse pad. A mouse pad 202 is placed in the recess allowing a ridge 204

around the perimeter of the work surface to extend beyond the height of the mouse pad thereby allowing the ridge to prevent a mouse from falling off the stowable work surface 12. The stowable work surface 12 has a threaded insert 21 threaded into the bottom of the work surface and provides the means for bolting the work surface to the bracket 14 or bracket 118.

[0068] It is to be understood that even though numerous characteristics and advantages of various embodiments of the present invention have been set forth in the foregoing description, together with details of the structure and function of various embodiments of the invention, this disclosure is illustrative only, and changes may be made in detail, especially in matters of structure and arrangement of parts within the principles of the present invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A storable table system comprising a chair arm, a storable table and an integrated mouse pad, the storable table system being configured to move the storable table between an operating position and a stored position.
2. A work surface adapted to be attached to a wheeled chair, the work surface operatively connected to the wheeled chair by an attachment apparatus.
3. A work surface in combination with an attachment apparatus, the combination useable with a chair that does not have arms.

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