



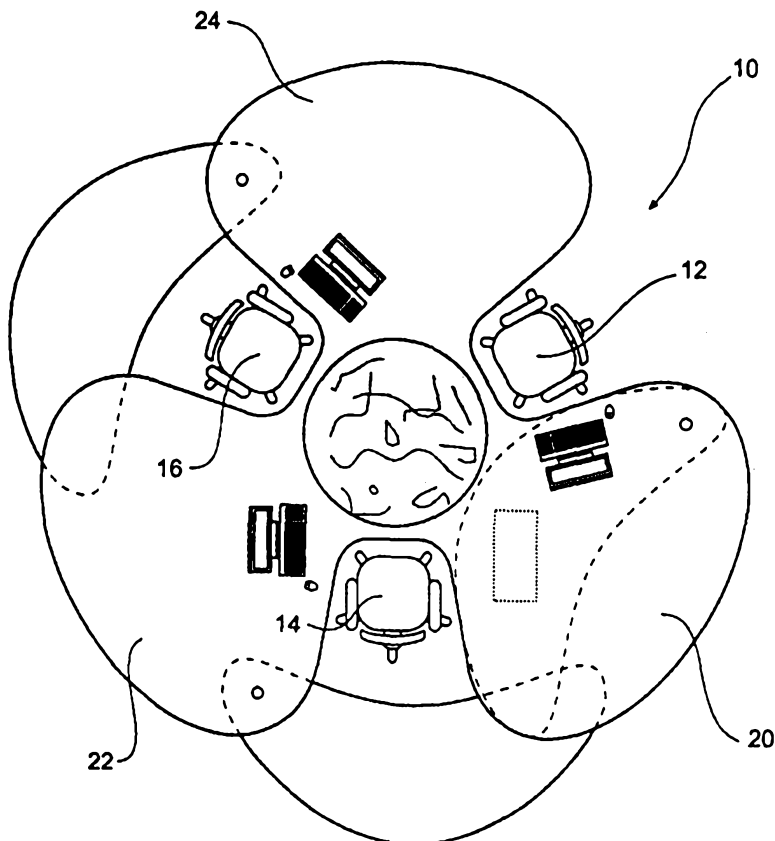
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<p>(21) International Application Number: PCT/AU99/00948 (22) International Filing Date: 3 November 1999 (03.11.99) (30) Priority Data: PP 6905 3 November 1998 (03.11.98) AU (71) Applicant (for all designated States except US): THE COMMONWEALTH OF AUSTRALIA [AU/AU]; Anzac Park, Canberra, ACT 2600 (AU). (72) Inventor; and (75) Inventor/Applicant (for US only): ANDERSON, Mark, Stephen [AU/AU]; Anzac Park, Canberra, ACT 2600 (AU). (74) Agent: MADDERNS; Level 1, 64 Hindmarsh Square, Adelaide, S.A. 5000 (AU).</p>	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>	

(54) Title: CONTROL CENTRE CONSOLE ARRANGEMENT

(57) Abstract

A multi-user collaboration and work station console (10) is described having at least three operator locating devices (12, 14 and 16) and a central common work surface over which each operator can see each other operator. There are additional work surfaces (20, 22 and 24) located between each of the operator locating devices and said operator locating devices are capable of being orientated towards said common work surface as well as towards at least one of said two additional work surfaces. The central common work surface is set below the eye level of the operators so that the central common work surface which has an information display means can simultaneously display information in the direction of each of said plurality of operator locating devices. The additional work surfaces are adaptable to support one or more visual display devices and a segment of the additional work surface is adapted to support, at variable heights, one or more computer input devices.



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CONTROL CENTRE CONSOLE ARRANGEMENT

This invention relates to a multi-user collaboration and work station console and in particular to a configuration of users, user operable equipment and a common collaborative work surface.

BACKGROUND

Emergency control centres, police communication radio dispatch centres, military command and control centres and telephone call centres typically provide a plurality of operator consoles (one console per operator) and one or more supervisor consoles. The chain of command within these centres typically determines the layout of the room where it is not uncommon for the supervisor to be located so that all of the operators for whom they are responsible can establish eye and sometimes verbal contact with them. Each operator will also have console equipment within easy view and reach such as computer keyboards, computer and video screens, switches and buttons, but these will be facing away from the supervisor and towards the operator.

This common arrangement establishes a mechanism for easy collaboration between the supervisor and operator but requires operators to turn sideways or rearwards to collaborate with other operators. Information (computer data, video, maps, etc) which may need to be concurrently shared between operators, is commonly projected onto the nearest wall or drop down screen adjacent the supervisor, but sometimes can be too far away to be easily referred to by the operators and may also interrupt the visual and verbal contact between operators and their supervisor or other operators.

Not surprisingly, it is not uncommon for operators to leave their chair and stand to be seen by someone they wish to formally or informally communicate in such an ordered arrangement. They may even, within the constraints of their headset

cord length, walk to another operators area or lean over consoles to effect physical, verbal and non-verbal contact.

Human interaction is often quicker and more effective than that which can be provided by computer input tools (email, computer generated messages, icon flashing and audio prompting) and as such is still an underestimated and often ignored component of control room work flow.

Clearly of course, computer assisted communications can be logged, audited and tracked for many useful purposes. However, in urgent circumstances, even a non-verbal human interaction can convey the necessary urgency and elicit a more appropriate response than that which may be provided by computer assisted communications.

In addition to the above, the ease of reference to common information is made more effective by common collaborative space which is not available in the structured arrangement described previously.

The above described problems are common to current multi-user configurations and alternative arrangements are required so that collaboration between operators can be improved.

BRIEF DESCRIPTION OF THE INVENTION

In a broad aspect of the invention a multi-user collaboration and work station console comprises, at least three operator locating devices for positioning operators; a central common work surface over which each operator can see each other operator; at least one additional work surface located between each of at least three operator locating devices; wherein said operator locating device can orientate a said operator towards said common work surface as well as towards at least one of two additional work surfaces.

In a further aspect of the invention said central common work surface is set below the eye level of the operators.

In a yet further aspect of the invention said central common work surface has an information display means adapted for simultaneously displaying information in the direction of each of said plurality of operator locating devices.

In a further aspect of the invention said at least one additional work surface is adapted to support one or more visual display devices.

In a yet further aspect of the invention said at least one additional work surface or a segment of said at least one additional work surface is adapted to support, at variable heights, one or more computer input devices.

In a yet further aspect of the invention said operator locating device is a chair.

Specific embodiments of the invention will now be described in some further detail with reference to and as illustrated in the accompanying figures. These embodiments are illustrative and are not meant to be restrictive of the scope of the invention. Suggestions and descriptions of other embodiments may be included, but they may not be illustrated in the accompanying figures or alternatively features of the invention may be shown in the Figures but not described in the specification.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 depicts a plan view of a multi-user collaboration and work station console;

Fig. 2 depicts a side view of one users work space in a console according to Fig. 1; and

Fig. 3 depicts a side view of a preferred arrangement of a large flat monitor screen and computer input devices for an operator.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

Fig. 1 depicts a three operator collaboration and work station console 10, comprising in this embodiment three operator locating devices (eg swivel chairs) 12, 14 and 16; a central common work surface 18 located intermediate each of the operator locating devices; and three additional individual/shared work surfaces 20, 22 and 24 located between the three operator locating devices.

In this embodiment each of the three additional work surfaces 20, 22 and 24 extend radially outwards from the central common work surface 18 and are sized sufficiently large to support various equipment such as one or more monitors; computer input devices (keyboard/mouse); instrument controls; etc.

Since verbal and non-verbal communications are an integral and important part of collaborative multi-operator consoles, the central common work surface may in one embodiment be small enough to ensure that operators can talk across the work surface without needing amplification. This distance is also likely to be sufficient for the operators to hand paperwork across the work surface.

However, the use of headsets (earphones and microphone) by operators may obviate the need for a particular physical separation distance and may also negate the possibility of audio interference from the remainder of the room while the headsets are being used.

The central common work surface can also conveniently provide a surface upon which plans, maps and articles of common concern and interest can be displayed.

An alternative may include the use of the work surface as a projection surface onto which maps etc are projected.

Image projection apparatus may be arranged to project directly onto the central work surface from above or behind the common work surface. In the case of projection from behind, the projection equipment can be located a) beneath the central work surface or b) beneath one of the individual work surfaces.

In the latter case if optical projection techniques are used lenses, mirrors etc can be arranged below one or both of the additional and central work surfaces.

It is possible for the optical projection apparatus to be located below floor level under either of the work surfaces. In some instances the entire work station console can be raised above the floor level including the surface upon which the operators locating devices are placed. This would allow a variety of apparatus to be located for use in the console.

In any event appropriate shrouding of the path of the optical projection may be required while ensuring that operator comfort is maintained by way in one example of providing comfortable leg room under the various work surfaces.

If optical image projection techniques are used the common work surface should be a material which has the ability to refract and if necessary reflect over a wide viewing angle so that operators can readily detect detail from a variety of positions they may occupy while using the console.

A further alternative may include the work surface itself being a screen (eg flat l.c.d. or plasma type display) and the source of the information may be an operator's computer, other computers, video outputs, etc.

Since the subject matter of the information may be more easily viewed if orientated in a particular way with respect to each of the operators, the viewing area of the central common work surface 18 may be partitioned such that multiple versions of the information may be observable by a respective operator.

Hard copy of the information may also be available from printers which provide their output at a location accessible to the operators if required.

About the periphery of the common work surface 18, there may be a further partitioned work surface upon which can be located computer and monitor interface devices such as pointers, keyboards, track balls, touch pads and other controls which may be used to interact with the computer equipment, peripherals and the one or more displays on the work surfaces or may be linked to other apparatus which may be located on, in or under the various surfaces.

Equipment located below the various work surfaces can be repositioned by using slides and other mechanical and electromechanical arrangements to allow them to move from a concealed to a visible and accessible position and then be returned once no longer needed. This type of equipment can also be arranged to slide along fixed or variable position rails and thus be positioned along, under or above different parts of the various work surfaces.

A variety of display devices and apparatus may be located on, in or above the additional work surfaces 20, 22 and 24 adjacent the operator chairs and orientated, arranged or adjustable to suit the particular operator. However, it may be advantageous to allow the operator to swivel and thus allow either operator adjacent a work surface to observe and use the apparatus located on an adjacent additional work surface.

Alternatively, most mechanical arrangements which would be used to provide the above features can be replicated electromechanically, so that for example, a

double-sided flat screen located on an intermediate work surface could be used from either side by a respective operator merely by providing an appropriate command issued by the operator verbally or manually via a control device.

All of the operator interface devices such as for example pointers, keyboards, track balls, touch pads and other controls may be wireless (eg radio frequency, infrared, etc).

Fig 1 also depicts, in phantom, a further work surface which is moveable to the position shown when and if required by the operator once they have moved to the operator locating device. This work surface may for example slide out from immediately under one or more of the adjacent individual work surfaces, it may also be raised from under the floor or be folded from along the side of the console, or it may be retrieved from storage and attached to the existing work surface.

The movement of the further work surface can be done using mechanical or electromechanical means and in the latter arrangement operated by the touch of a button or command from a control device.

The further work surface can be arranged to interconnect to the other work surfaces as well as the various moveable devices and tracks described above and later in the specification.

Once the further work surface is in place adjacent the operator it will prohibit the egress of the operator from their position but can be removed when required.

There can also be further additional work surfaces added to the additional work surfaces 20, 22 and 24. These surfaces may be on a higher level than those depicted or may be extendable from the existing arrangement in the form of slide out surfaces 30 (as depicted in Fig 2) which can expose additional operator interface equipment or connections for such equipment. Such additional surfaces can be

arranged to be made available if additional personnel are required to interact with the apparatus at this level and there exists further need to have operators interact with the displays and other equipment associated with the console.

Not shown but possible is the arrangement of one or more consoles in close proximity to one another and appropriate interconnection of displays and equipment to allow for collaboration between operators at multiple of the consoles arranged in a cluster.

The close proximity may mean that the consoles are unconnected but in another embodiment they may be physically interconnected so that one or more work surfaces become common to one or more operators.

Referring to Fig. 2, an example of the above arrangement is shown, whereby a monitor screen 26 (flat type) is located on a work surface 22, the front and side of a monitor screen 26' can be observed on work surface 24, and behind the operator chair 14 monitor screen 26'' is depicted as being located on work surface 20. One or more of the monitor screens are preferably provided the ability to be moveable in three-dimensional space which in one embodiment may be by providing a monitor arm.

A pointing device 28 is shown lying upon the upper surface of additional work surface 22 and a partly obscured lowered and height adjustable portion of the work surface 30 is visible below the pointing device 28. The adjustable work surface is merely an option and not an essential aspect of the arrangement but offers adjustability of the surface upon which an input device such as a keyboard can be located. Adjustability of the work surface may also be a part of the larger additional work surface and may be of assistance when for example screens can be adjusted upwards, downwards, tilted or rotated as required by the operator. The additional work surface could also be adjustable so that it can be moved sideways along a predetermined path so that the apparatus located upon the work surface can be

positioned more conveniently for the operator who has a need to reorientate themselves for one reason or another.

The relatively large volume beneath the work surfaces can be used to house various equipment such as computers (32) or control electronics for the projection equipment; console switching equipment; audio, video and digital data switching and amplification equipment; etc. Further, as mentioned previously, the whole console could be raised above normal floor level, thus creating a further useable volume.

To facilitate the interconnection of the various devices and apparatus used by the operators, the console may incorporate conduits for specific cable runs, closable apertures for selected access to those conduits as well as access to equipment located below the various work surfaces.

Clearly, it is of assistance if the operator locating devices are capable of being rolled or slid, swivelled and height adjusted. This may be achieved manually with operation of a respective control on the locating device (eg chair) but may also be automated and electronically controlled and provided with memorised positional preferences that can be selected by the operator or linked/ associated with the "log-in" procedure of the computer terminal at the operators location (Pre-programmed equipment positioning is thus possible actuated by the operator as well as being adjustable manually and memorised by the arrangement). The equipment located above and on the work surfaces may also be moved below the surface or quickly detachable and replaced with other devices. For example a 21 inch flat panel monitor may be replaced with a holographic projection device or a more conventional 17 inch VDU type monitor.

Although not depicted, users may require more than one monitor. Monitors in addition to that depicted may be arranged on the work surface in one or more of the following configurations a) back-to-back and thus facing adjacent operator positions

(touching or not touching); b) side-by-side facing a single operator position (touching or not touching); c) stacked vertically one on top of the other (directly in contact or supported by a suitable framework); or d) moveable in 3 dimensions either manually or electromechanically under the control of a computer. This could, in one embodiment, comprise a monitor arm which provides 3 dimensional locating ability. Other configurations and variants will be readily apparent when the large work surface intermediate to the adjacent operators is also being used.

Fig. 3 depicts a yet further arrangement of monitor and work surface. A very large VDU type monitor 44 is shown recessed into the work surface 22 and a keyboard 40 and computer pointing device 41 are locatable on a portion of the work surface between the monitor 44 and the operator position 50. The tilt of the monitor 44 can be adjusted by positioning its base in a recess which may have grooves appropriately located to support edges of the base to achieve variability of the tilt angle of the screen with respect to the operator.

It will be appreciated by those skilled in the art, that the invention is not restricted in its use to the particular application described and neither is the present invention restricted in its preferred embodiment with regard to the particular elements and/or features described or depicted herein. It will be appreciated that various modifications can be made without departing from the principles of the invention, therefore, the invention should be understood to include all such modifications within its scope.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A multi-user collaboration and work station console comprising,
at least three operator locating devices for positioning operators;
a central common work surface over which each operator can see each other operator having an information display means adapted for simultaneously displaying information in the direction of each of said operators;
at least one additional work surface located between each of at least three operator locating devices;
wherein said operator locating device can orientate a said operator towards said common work surface as well as towards at least one of two additional work surfaces.
2. A multi-user collaboration and work station console according to claim 1 wherein said central common work surface is set below the eye level of said operators.
3. A multi-user collaboration and work station console according to claim 1 wherein said at least one additional work surface is adapted to support one or more visual display devices.
4. A multi-user collaboration and work station console according to claim 1 wherein said at least one additional work surface or a segment of said at least one additional work surface is adapted to support, at variable heights, one or more computer input devices.
5. A multi-user collaboration and work station console according to claim 1 wherein said at least one additional work surface or a segment of said at least one additional work surface is adapted to support, at variable heights, one or more display devices.

6. A multi-user collaboration and work station console according to claim 1 wherein said operator locating device is a chair.
7. A multi-user collaboration and work station console according to claims 5 or 6 wherein one or more of said central or additional work surfaces has a volume below for enclosing control equipment associated with one or more of said visual display apparatus or computer input devices.
8. A multi-user collaboration and work station console according to claim 1 wherein said information display means is a back lighted screen and a rear projector apparatus.
9. A multi-user collaboration and work station console according to claim 1 wherein said information display means is an electronic display screen having a viewing angle sufficient for said screen to be viewed by a user from said operator locating device.
10. A multi-user collaboration and work station console according to claims 8 or 9 wherein said display means is partitioned and able to display the same or different information in each partition.
11. A multi-user collaboration and work station console according to claim 1 wherein about the periphery of said common work surface there are further work surfaces arranged to support computer and monitor interface devices for use by the occupier of said operator positioning device.
12. A multi-user collaboration and work station console according to claim 11 wherein said further work surfaces are adapted to slide out of and about said additional work surfaces.
13. A multi-user collaboration and work station console according to any

preceding claim wherein control equipment for said computer and monitor devices is located under said common and additional work surfaces.

14. A multi-user collaboration and work station console according to claim 4 wherein said computer input devices communicate with wireless means to one or more computers.

15. A multi-user collaboration and work station console according to any preceding claim wherein any of said relocatable surfaces, computer and monitor interface devices or operator locating devices are electromechanically controlled and relocatable using said control equipment.

16. A multi-user collaboration and work station console according to any preceding claim wherein further additional work surfaces are locatable between said at least two additional work surfaces such that egress from said console by a said operator is restricted.

17. A multi-user collaboration and work station console according to claim 15 wherein said control computer memorises at least one location of a said surface, computer and monitor interface device or operator locating device and can relocate said device to said memorised location.

18. A multi-user collaboration and work station console according to claim 15 wherein said relocatable surfaces, computer and monitor interface devices are relocatable along predetermined paths.

19. A multi-user collaboration and work station console substantially as hereinbefore described with reference to and as illustrated in the figures on the accompanying drawings.

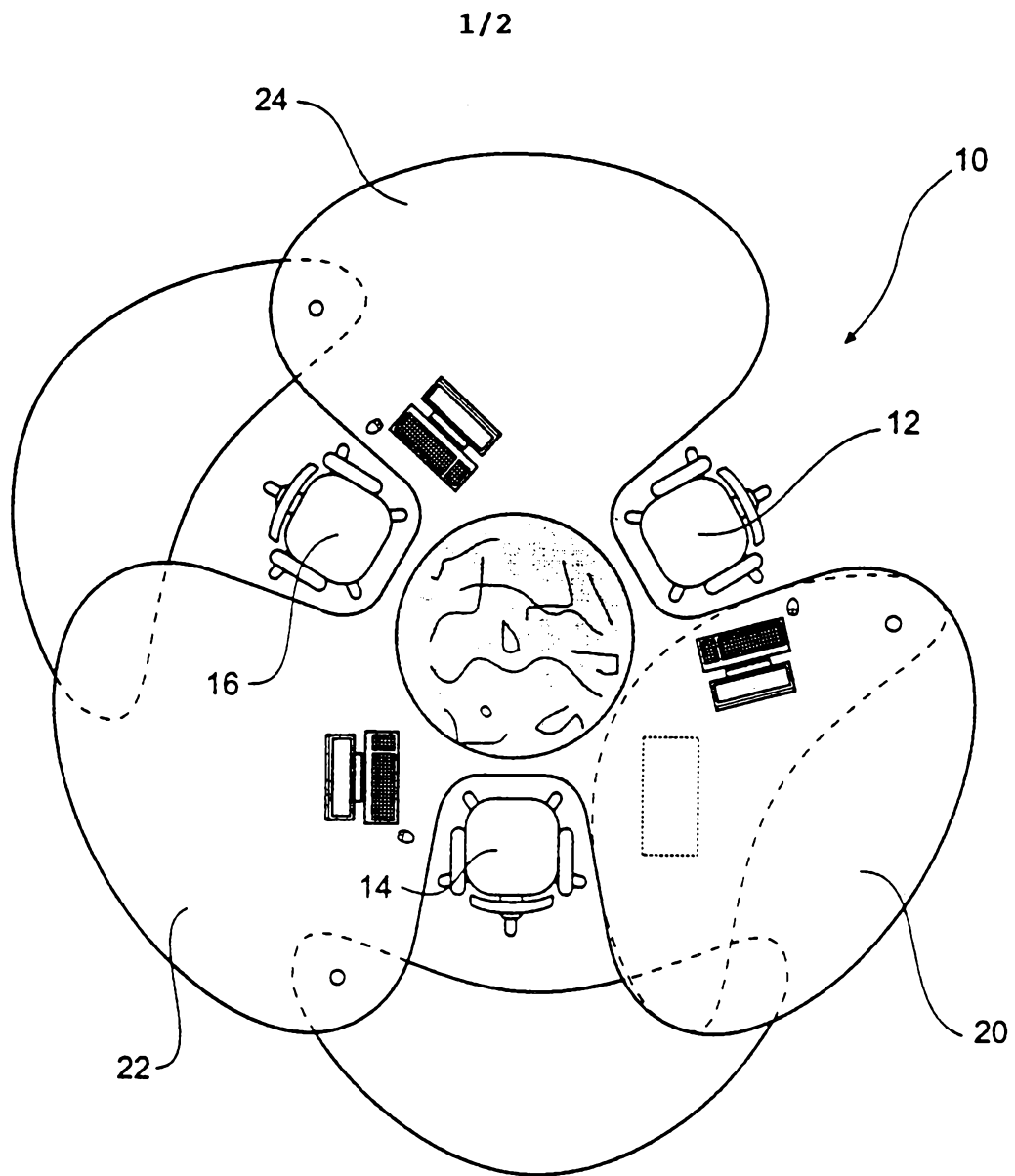


FIG 1

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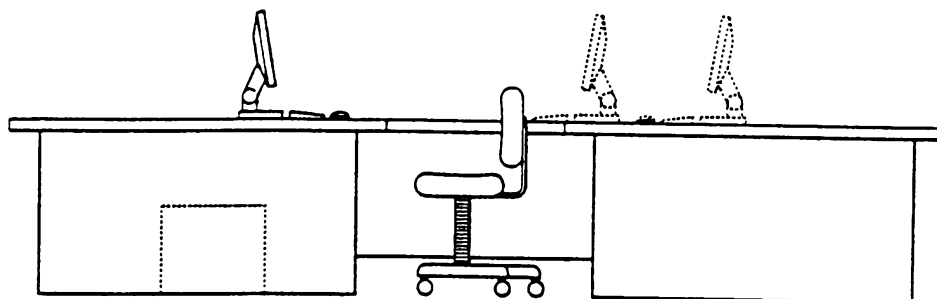


FIG 2

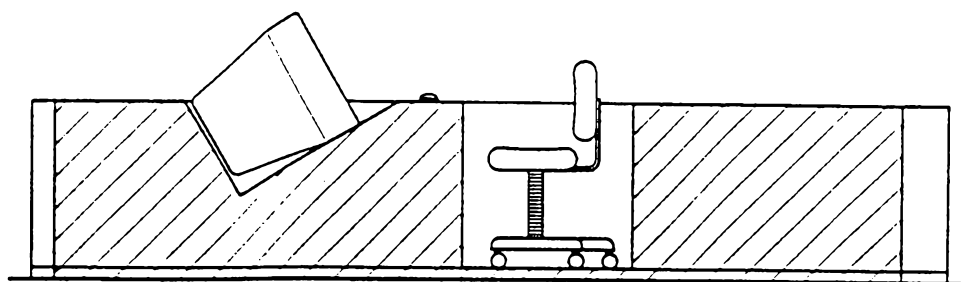


FIG 3