Aug. 29, 1967 J. J. RYAN 3,338,650

DENTAL INSTRUMENT CABINET

Filed April 7, 1966 3 Sheets-Sheet 1

Fig. 1.

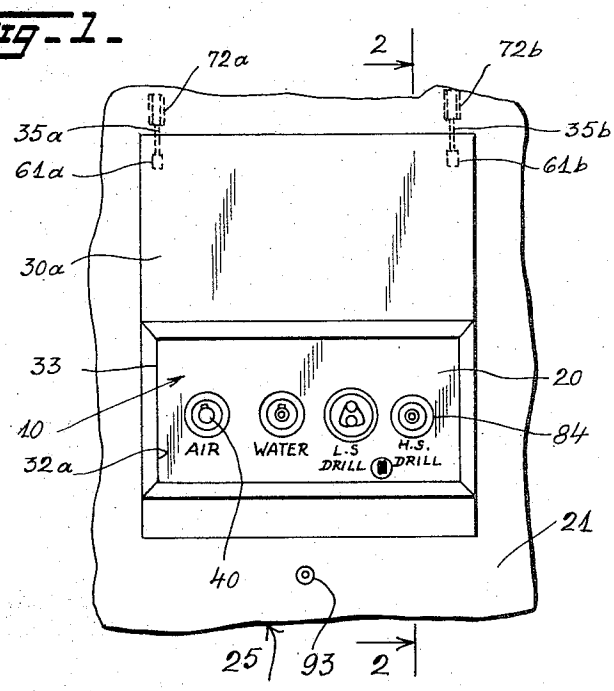
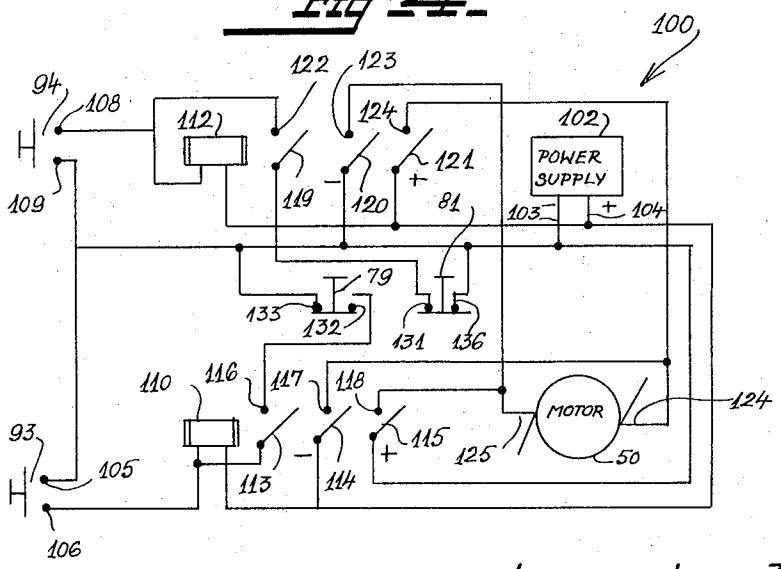


Fig. 4.



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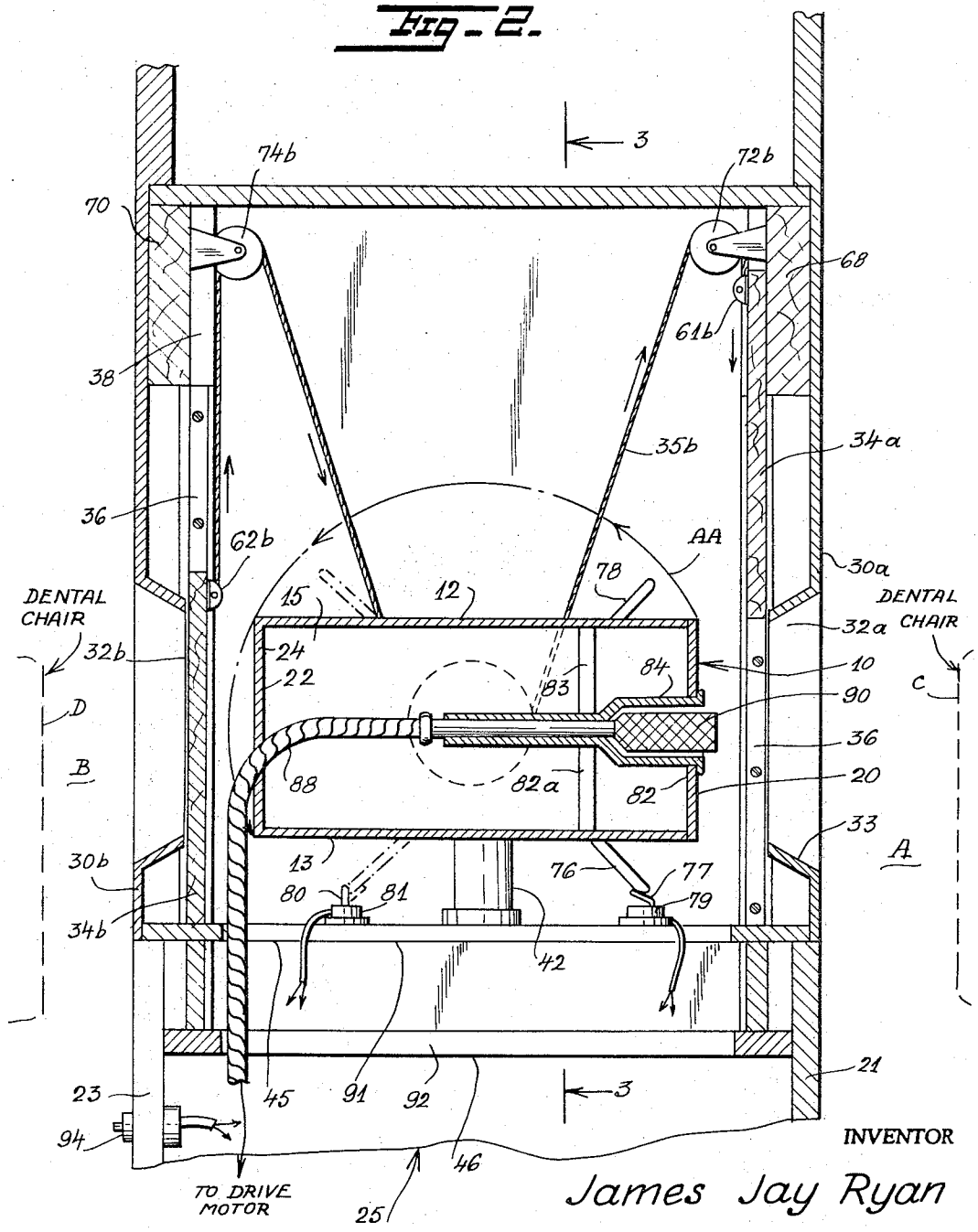
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Fig. 2.



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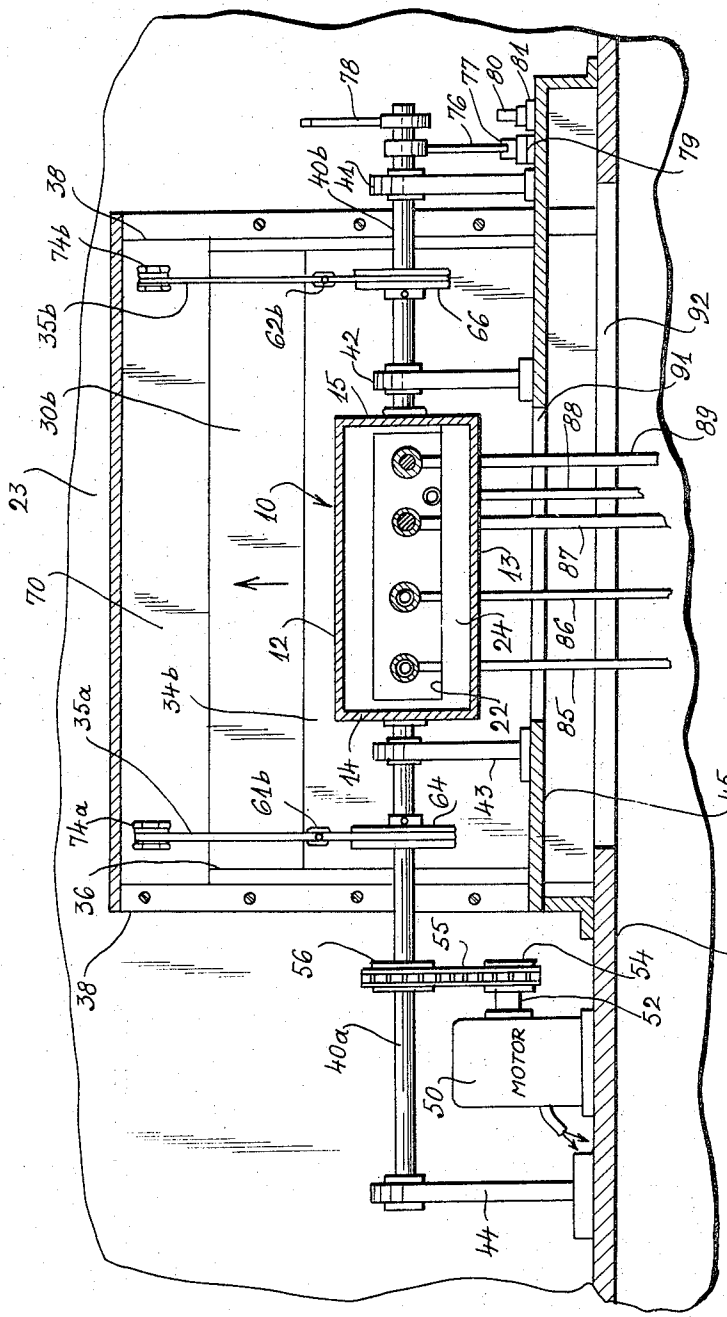
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Fig - 3 -



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DENTAL INSTRUMENT CABINET

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This invention concerns an improved cabinet for dental instruments.

According to the invention, there is provided a cabinet which can be installed in a hollow wall between two dental chairs. The wall has two rectangular aligned openings at opposite sides. The cabinet is pivotally mounted between opposite sides of the wall. The cabinet has a panel which can be exposed at either one of the openings in the wall. The panel has a number of openings in which are various conduits for supplying compressed air, water, and electric power, as well as a flexible cable for driving a drill. The several conduits and cable can be drawn out of the openings in the panel for use at either of the dental chairs. The conduits terminate in heads fitted with suitable control valves, chucks for drill bits, receptacle, etc. A motor-driven mechanism is provided for automatically pivoting the cabinet between either of two operative exposed positions. Vertically movable doors are slidably mounted at the openings in the walls. These doors are driven by the drive mechanism of the openings in the walls. These doors are driven by the drive mechanism of the cabinet in opposite directions so that when one door is raised to open one wall opening the other door is lowered to close the other wall opening. The operation of the doors is synchronized with pivoting of the cabinet, so that the doors automatically respectively open and close when the cabinet is pivoted to either operative position. By the arrangement described, two dental operating positions can be supplied with power-driven instrumentalities and utilities from a single wall installation. This effects a considerable saving in cost of a dental equipment installation, as compared with the cost of two complete independent installations. Furthermore, a substantial saving in dental office space is realized. At the same time, all the essential powered equipment and utilities are located close at hand for use by dentist or dentists at both dental operating positions.

It is therefore, a principal object of the invention to provide an assembly of dental equipment, comprising a pivotal cabinet having a panel carrying flexible conduits and cables for dental instruments, the cabinet being pivotal between two positions, for exposing the panel at each position.

Another object is to provide an assembly as described, in which the cabinet is mounted between two sides of a wall having openings in which the panel is exposed in turn, with two doors movably mounted at the wall openings, respectively, for closing one wall opening while opening the other one.

Still another object is to provide an assembly as last described, with an automatically operated motor-driven mechanism for pivoting the cabinet between two operating positions and for simultaneously raising one of the doors to clear one wall opening while lowering the other door to close the other wall opening.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIGURE 1 is a front elevational view of an assembly embodying the invention.

FIG. 2 is a vertical sectional view on an enlarged scale taken on line 2—2 of FIG. 1.

FIG. 3 is another vertical sectional view taken on line 3—3 of FIG. 2, and FIG. 4 is a diagram of an electric circuit employed in the assembly.

Referring first to FIGS. 1–3, the assembly comprises a generally rectangular cabinet **10** having two horizontal walls **12**, **13**, joined at their ends by two vertical end walls **14**, **15**. The cabinet has a rectangular vertical panel **20** joined to coplanar front edges of walls **12–15**. The cabinet has a rectangular rear opening **22** formed in rear vertical **24** joined to coplanar rear edges of walls **12–15**. The cabinet is mounted between opposite side facings **21**, **23** of a hollow wall **25** separating two dental operating positions A and B where dental chairs C, D are indicated by dotted lines. The chairs may be located about two feet from wall **25** or at some other short convenient distance. Frames **30***a*, **30***b*, mounted in the respective side facings of the wall **25**, define aligned rectangular openings **32***a*, **32***b* respectively. These openings may have beveled edges **33**. Located inwardly of the frames **30***a*, **30***b* are two vertically disposed and vertically movable rectangular doors **34***a*, **34***b* respectively arranged to close the openings **32***a*, **32***b*. The doors are suspended on flexible cables **35***a*, **35***b* so that when one door is raised, the other door is lowered and vice versa. The doors are guided in vertical channels **36** located at opposite vertical edges of the doors. The channels **36** are secured to posts **38** which are in turn secured to inner sides of the wall facings **21** and **23**.

Two axially aligned shafts **40***a*, **40***b* are secured to the end walls **14**, **15** of the cabinet. These shafts are rotatably journaled in spaced bearing brackets **41**, **42** and **43**, **44**. Bearing brackets **41**, **42** and **43** are supported by a framework **45** mounted above a horizontal table or platform **46** inside wall **25**. Bracket **44** is supported on platform **46**. A reversible motor **50** is mounted on platform **46**. This motor has a shaft **52** carrying a drive sprocket **54**. Entrained on the sprocket is a drive chain or belt **55** engaged on another sprocket **56** carried by and secured to shaft **40***a*. It will be apparent that when the motor shaft, which may be provided with a speed reducing mechanism, is driven in one direction or another the cabinet **10** will pivot in one direction or another. The cabinet will pivot one half turn counterclockwise from the position shown in FIG. 2 as indicated by arrows AA. This will expose panel **20** at frame opening **32***b*. If the cabinet is then pivoted one half turn clockwise, the panel **20** will be returned to opening **32***a* where it is shown located in FIG. 2.

At the upper inside corners of door **34***a* are brackets **61***a*, **62***a*. At the upper inside corners of door **34***b* are brackets **61***b*, **62***b*. On shafts **40***a*, **40***b* are two pulleys **64**, **66**. Cable **35***a* is secured at opposite ends to brackets **61***a*, **62***b*. Mounted on vertical wall boards **68**, **70** at the inner sides of the two wall facings **23**, **24** are idler pulleys **72***a*, **72***b* and **74***a*, **74***b*, respectively. Cable **35***a* passes upwardly from bracket **61***a* around pulley **72***a*, then down under pulley **64** up over pulley **74***a*, and down to bracket **61***b*. Cable **35***b* similarly passes upwardly from bracket **61***b* over pulley **72***b*, then down under pulley **66**, up over pulley **62***b* and finally down to bracket **62***b*. By the arrangement described, the weight of door **34***a* balances the weight of door **34***b*. The cables support both doors between the channels **36**. When the cabinet **10** is pivoted, either door **34***a* or **34***b* will rise to open the opening where panel **20** is to be located while the other door descends to close the wall opening from which panel **20** is withdrawn. The same drive mechanism which pivots the cabinet **10** also drives to doors **34***a*, **34***b* to open and close them.

Shaft **40***b* carries two fixed arms **76**, **78** spaced apart axially of the shaft and also spaced apart about 90° angularly. They are arranged so that in one position of the cabinet as shown in FIG. 2, arm **76** will contact and move operating arm **77** of a switch **79** mounted on framework **45**. In an opposite position of the cabinet, arm **78** will contact and move operating arm **80** of another switch **81** mounted on the framework.

Panel **20** has a plurality of openings **82**. Tubular fittings **84** are supported in panel openings **82** and in openings **82***a* of partition **83**. Conduits **85–89** are movably inserted in each of the fittings. These conduits terminate in operating heads **90** including valves, chucks or other suitable instrumentalities. The conduits are all flexible and slack. They can slide axially through the fittings. They pass through opening **22** in rear wall **24** and down through openings **91**, **92** formed in framework **45** and platform **46**. They terminate at drive motors, air and water pumps, electrical outlets, or other power and utility sources (not shown) located inside of wall **25**. An operating switch button **93**, **94** is provided on each of the wall facings **21** and **23** for actuating the electric circuit **100** of the assembly. The electric circuit **100** is shown in FIG. 4 to which reference is now made.

In circuit **100** is shown a suitable power supply **102** having two terminals **103**, **104**. The circuit further includes normally open pushbutton switches **93**, **94** each having two contacts **105**, **106** and **107**, **108**. Contacts **105**, **107** are connected to power supply terminal **103**. The circuit includes two relays **110**, **112**. Relay **110** has three poles **113**, **114**, **115** normally open with respect to contacts **116**, **117**, **118**. Relay **112** has three poles **19**, **20**, **21** normally open with respect to contacts **122**, **123**, **124**. Switches **81** and **79** are pushbutton type microswitches having normally closed contacts **130**, **131**, and **132**, **133**.

Relay contact **116** is connected to contact **132** of switch **79**. Relay contacts **117** and **118** are connected to motor terminals **124**, **125** respectively. Relay pole **113** and switch contact **106** are connected to one end of the coil of relay **110**. The other end of the relay coil is connected to power supply terminal **104**. Relay poles **114** and **115** are connected to power supply terminals **103**, **104** respectively. Switch contact **133** is connected to power supply terminal **103**.

One end of the coil of relay **112** is connected to relay contact **122** and to contact **108** of switch **94**. The other end of the relay coil is connected to power supply terminal **104**. Relay pole **119** is connected to switch contact **131**. Switch contact **130** is connected to power supply terminal **103**. Relay poles **119** and **120** are connected to power supply terminals **103**, **104**. Relay contacts **123** and **124** are connected to motor terminals **125** and **124** respectively. It will be noted that the motor is de-energized as shown in FIG. 4 because the relays are de-energized and the switches **93**, **94** are open.

Now in operation of the assembly, taking it from the position of FIGS. 1–3, suppose it is desired to operate the dental instrumentalities at dental operating position B. Switch **79** is open because it is being held by arm **76**. Suppose switch **94** is now closed momentarily. The relay **112** will become energized and will remain energized through pole **119** closed with contact **122**, even though switch **94** is now released and opens. The motor **50** will be energized and will turn the cabinet counterclockwise as viewed in FIG. 2 for one half of a cycle or 180°. Switch **79** closes when the cabinet starts to return. Switch **81** is closed by arm **78** when the cabinet completes one half cycle and is precisely positioned at wall opening **32***b*. Then the arm **78** opens switch **81** which opens the power supply circuit of the relay **112**. This relay becomes de-energized and the power supply circuit of the motor **50** is opened. As the cabinet pivots, door **34***b* rises to clear opening **32***b* while door **34***a* descends to close

opening **32***a*. Arm **78** bearing on switch **81** helps hold the cabinet **10** level with panel **20** vertical. When it is desired to reverse the positon of the cabinet, pushbutton **93** will be pushed momentarily at dental operating position A. The power supply circuit of the motor will be reversed through contacts of relay **110** and the cabinet will pivot clockwise until arm **76** opens switch **79**. At the same time door **34***b* will descend while door **34***a* rises to the position shown in FIG. 2. The switches **79** and **81** serve as limit switches as well as stop members in cooperation with angularly disposed arms **76**, **78**.

By the arrangement described, there is provided an automatic, means for selectively utilizing a plurality of dental instruments at either of two operating positions. When the instruments are exposed at one operating position, the other position is closed by a door to conceal the back of the cabinet carrying the instruments. When the cabinet is in either of its operating positions, the flexible conduits and cables are bent no more than 90° as they pass through the opening **22** in the rear wall **24** of the cabinet. This moderate bend enables moving cables such as motor-driven flexible shafts to be fully operative. The flexible conduits which carry air, water and electric power easily bend when the cabinet **10** is pivoted from one position to another. In each direction of movement of the cabinet no flexible conduit is bent more than 180° so that no kinks can develop and the conduits cannot become tangled around the cabinet.

Any desired number of conduits and types can be provided at the panel **20**, the number shown in the drawings being only exemplary. In each case the conduits will be sufficiently long and slack so that they can be easily pulled out of the cabinet and just as easily retracted.

While I have illustrated and described the preferred embodiments of my invention it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

What is claimed is:

1. An instrument assembly for use at either one of two spaced instrument operating positions, comprising a rectangular panel, opposing wall members joined to edges of said panel to define a generally rectangular cabinet, said panel having spaced openings therein, generally cylindrical fittings secured in said openings and extending perpendicular from said panel inwardly of said cabinet, a plurality of flexible conduits having operating heads at one end respectively disposed in said fittings, said conduits being movable axially through the fittings for extension out of the cabinet said conduits extending rearwardly through and out of cabinet in a direction opposite from the panel, and shaft means joined to opposite end wall members of the cabinet parallel to said panel for pivoting the cabinet on a horizontal axis in either of two opposite directions to expose the panel in either of two spaced vertical positions, said conduits being bent angularly not more than 90° at points where they extend rearwardly out of the cabinet.

2. An instrument assembly as recited in claim **1**, further comprising means supporting said shaft means for pivoting on said horizontal axis, and a drive motor operatively connected to said shaft means for driving the same.

3. An instrument assembly as recited in claim **2**, further comprising a pair of spaced, stationary limit switches, a pair of angularly spaced arms carried by said shaft means and arranged for contacting the limit switches respectively at either of two limits of pivoting of the cabinet spaced 180° apart, said switches being connected in circuit with said motor for stopping the motor when the cabinet is at either one of its two limits of movement.

4. An instrument assembly as recited in claim **2**, further comprising pulleys carried by said shaft means, flex-

ible cables entrained on said pulleys, and a pair of vertically movable doors spaced apart and disposed at the two instrument operating positions respectively, said cables being joined at opposite ends to the doors so that one door rises when the other door descends and vice versa, while the cabinet is pivoted in each of said two opposite directions.

5. An instrument assembly as recited in claim 1, further comprising a hollow vertical wall separating said two instrument operating positions, said vertical wall having two spaced vertical facings formed with aligned rectangular openings, means pivotally supporting said cabinet inside said wall with said shaft means disposed in an axially horizontal position, so that the panel is exposed in each of the openings in the wall facings in turn at each of said two vertical positions of the panel.

6. An instrument assembly as recited in claim 5, further comprising a drive motor operatively connected to said shaft means for driving the same, a pair of spaced, stationary limit switches, a pair of angularly spaced arms carried by said shaft means and arranged for contacting the limit switches respectively at either of two limits of movement of the cabinet spaced 180° apart, said switches being connected in circuit with said motor for stopping the motor when the cabinet is at either one of its two limits of movement.

7. An instrument assembly as recited in claim 5, further comprising first pulleys carried by said shaft means, second pulleys mounted inside said wall facings, flexible cables entrained on said first and second pulleys, and a pair of vertically disposed vertically movable doors located at the wall facings respectively for closing the openings therein alternately, said cables being joined at opposite ends to the doors so that one door rises when the other door descends and vice versa while the cabinet is pivoted in each of said two directions.

8. An instrument assembly as recited in claim 7, further comprising a drive motor operatively connected to said shaft means for driving the same, a pair of stationary spaced limit switches, a pair of angularly spaced arms carried by said shaft means and arranged for contacting the limit switches respectively at either of two limits of movement of the cabinet spaced 180° apart, said switches being connected in circuit with said motor for stopping the motor when the cabinet is at either one of its two limits of movement.

9. An instrument assembly as recited in claim 7, further comprising a drive motor operatively connected to said shaft means for driving the same, limit switches disposed for actuation alternately at either of two limits of movement of the cabinet spaced 180° apart, said switches being connected in circuit with said motor for stopping the motor when the cabinet is at either one of its two limits of movement.

10. An instrument assembly as recited in claim 9, further comprising manually operable other switches, a power supply, and circuit means interconnecting the limit switches, motor, power supply and other switches, so that the motor starts to turn the cabinet in any one of said directions when one of the other switches is operated and the motor turns the cabinet in the opposite direction when the other one of the other switches is operated.

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