May 20, 1947. E. L. MONNOT 2,420,901

INSTRUMENT HOLDER CONSTRUCTION FOR DENTAL UNITS AND THE LIKE

Filed Nov. 4, 1943 3 Sheets-Sheet 1

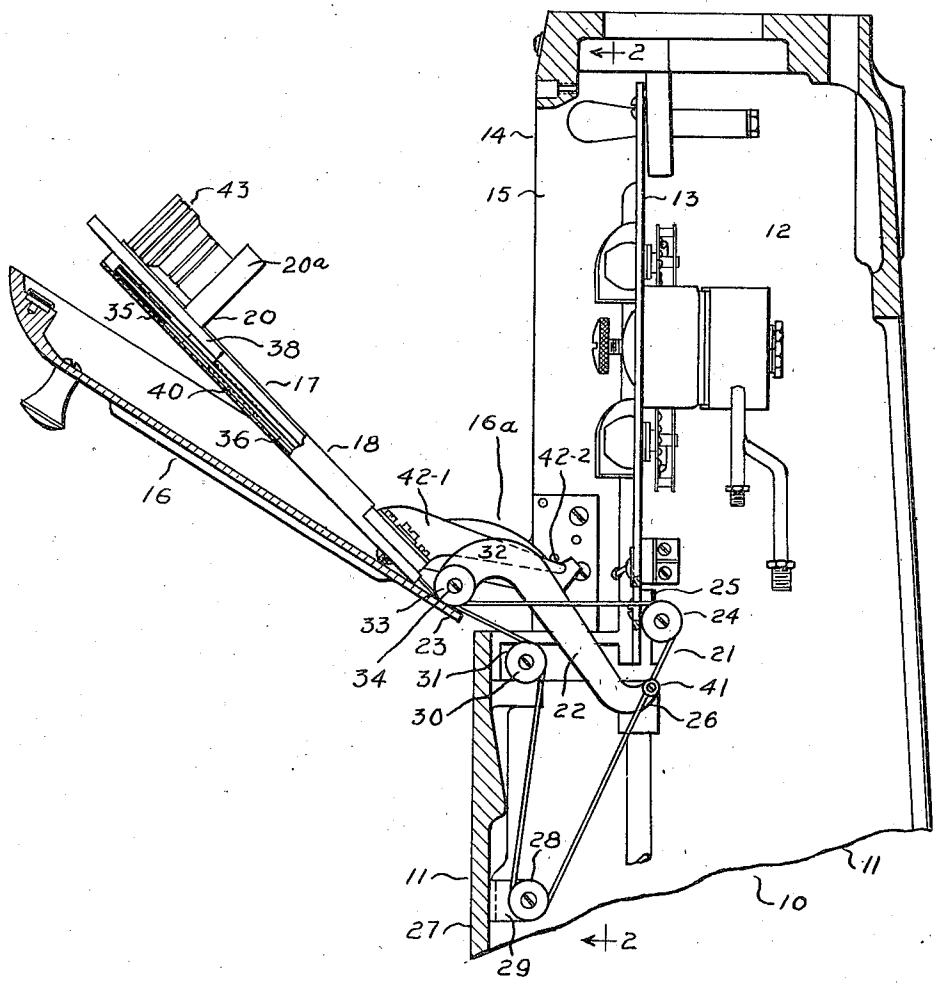


Fig. 1

Inventor

Edward L. Monnot

By Frease and Bishop

Attorneys

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INSTRUMENT HOLDER CONSTRUCTION FOR DENTAL UNITS AND THE LIKE

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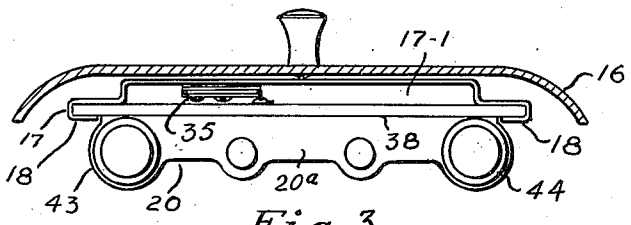


Fig. 3

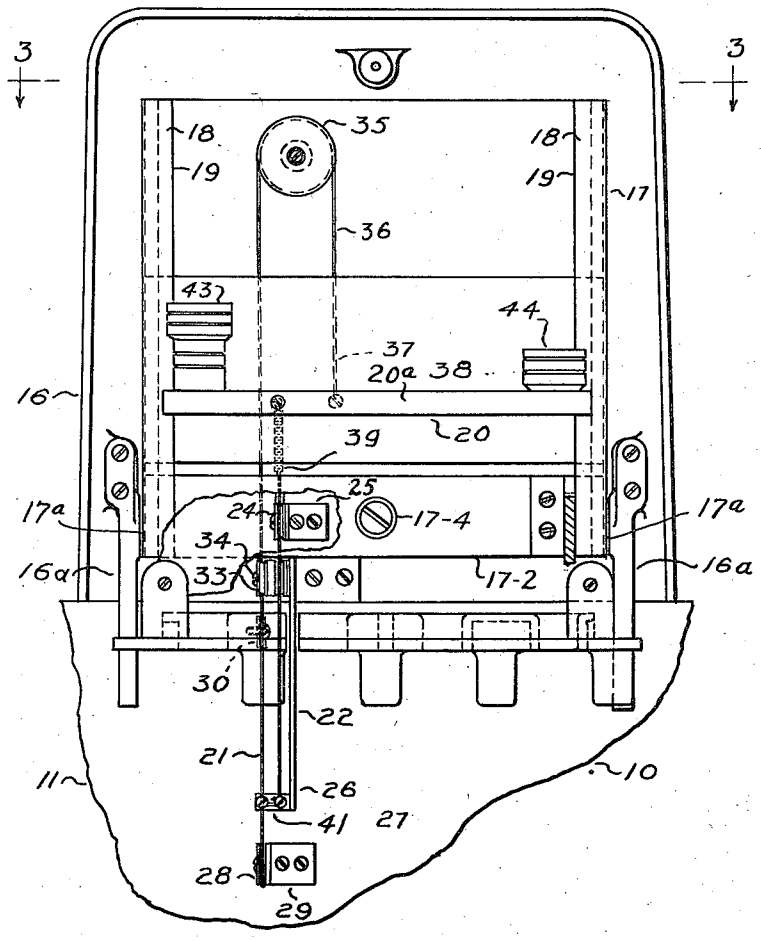


Fig. 2

Inventor

Edward L. Monnot

By Frease and Bishop

Attorneys

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INSTRUMENT HOLDER CONSTRUCTION FOR DENTAL UNITS AND THE LIKE

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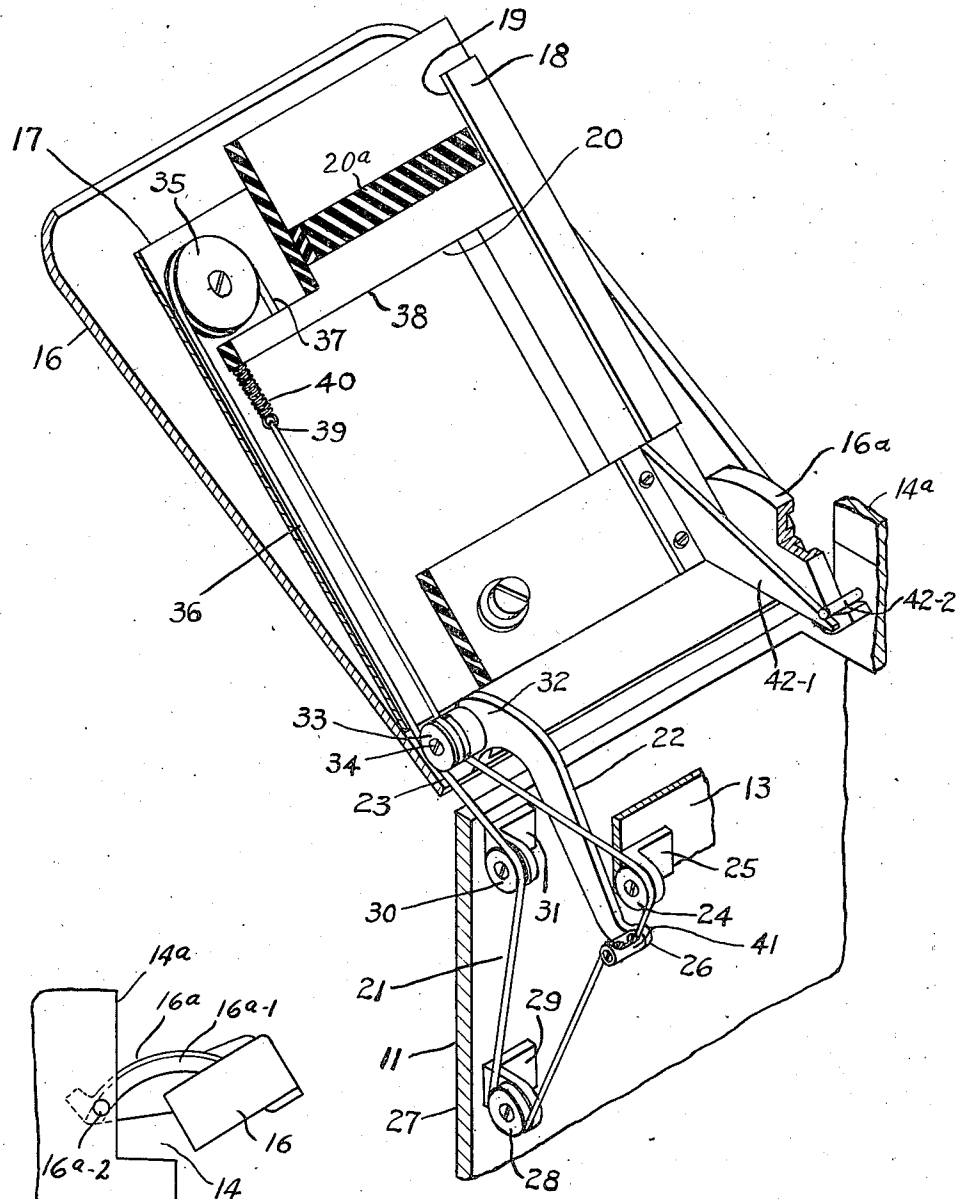


Fig. 4

Fig. 5

Inventor

Edward L. Monnot

By Frease and Bishop

Attorneys

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INSTRUMENT HOLDER CONSTRUCTION FOR DENTAL UNITS AND THE LIKE

Edward L. Monnot, Canton, Ohio, assignor to The Weber Dental Manufacturing Company, Canton, Ohio, a corporation of Ohio

Application November 4, 1943, Serial No. 508,933

12 Claims. (Cl. 312—22)

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The invention relates to instrument holder doors for dental units and the like, including a mounting member such as a door frame, a door or first swinging member operatively mounted for swinging movement on the mounting member, preferably a second swinging member operatively mounted for swinging on the first swinging member during movement of the first swinging member, and a slide operatively mounted for sliding on the second swinging member during movement of the second swinging member and the first swinging member.

In a dental unit, the door may swing to and from closed and open positions in the door frame opening of an instrument panel compartment, and the slide may be an instrument mounting bracket, the operation being such that when the door is swung about a horizontal hinge axis to an open position with respect to the opening, the second swinging member swings away from the inner face of the door, and the instrument mounting bracket slide with the instruments mounted therein slides outwardly on the second swinging member away from the horizontal hinge axis of the door.

Various arrangements of such dental instrument holder doors have been used in an effort to obtain automatic operation of the swinging and slide parts with respect to each other, but prior to the present improvements none have been satisfactory to the desired degree in providing definite and certain repeating movements of the parts without interference, and at the same time being of simplified construction and arrangement.

The objects of the present invention include the provision of instrument holder construction for dental units and the like in which a slide is operatively mounted on a swinging member which may itself be mounted on another swinging member, and in which relative movement of the parts is obtained in such manner that the relative movements are exactly repeated.

Further objects of the present invention include the provision of such dental instrument holder doors in which the parts are of simplified construction and arrangement, whereby the apparatus may be economically manufactured and maintained.

The foregoing and other objects are attained by the door apparatus, parts, combinations, and sub-combinations which comprise the present invention, and the nature of which is set forth in the following general statement, and preferred embodiments of which are set forth in the following description, and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

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The nature of the improved dental instrument holder construction of the present invention may be stated in general terms as including a mounting member, a first swinging member operatively mounted for swinging movement on the mounting member, preferably a second swinging member operatively mounted for swinging on the first swinging member, and a slide operatively mounted for sliding on the second swinging member, and belt and pulley means operatively associated with the slide and swinging members for automatically moving the slide with respect to the swinging members during operation of the swinging members.

By way of example, preferred embodiments of the instrument holder and door apparatus of the present invention and of improved parts thereof, are illustrated in the accompanying drawings forming part hereof in which

Figure 1 is a fragmentary elevational view with portions in section showing a dental unit including one embodiment of the improved instrument holder and door apparatus hereof, the instrument holder and door parts being shown in their relative positions when the door is open;

Fig. 2, a fragmentary view looking in the direction of the arrows 2—2 Fig. 1, showing the relative positions of the parts when the door is closed;

Fig. 3, a transverse sectional view thereof as on line 3—3 Fig. 2, with certain distant parts removed;

Fig. 4 is a fragmentary perspective view of the door in open position as in Fig. 1; and

Fig. 5 is a fragmentary elevation illustrating details of the hinge means for the door.

Similar numerals refer to similar parts throughout the several views.

The dental unit indicated generally by 10 includes a hollow standard or column 11 having an upper compartment 12 in which is located an instrument panel 13 at the rear of the door frame indicated generally by 14 formed in front walls of the column 11.

The door frame 14 surrounds the door opening 15, and a door 16 is operatively mounted or hinged on a horizontal axis on the column 11 as by usual hinge means for swinging to and from closing position in the door opening 15 of the door frame 14. The open position of the door 16 is controlled by stop finger 16a mounted on the

door and engaging pin 42—2 carried by the door frame.

As shown, for providing the hinge means, one stop finger 16*a* is mounted at each side of the door in the form of a segmental plate on the outer face of which is provided an arcuate groove 16*a*—1 which rides on a pin 16*a*—2 extending from the adjacent side member 14*a* of the door frame 14, as illustrated in Figs. 4 and 5, and which is not practical to be illustrated in the other views, Figs. 1, 2, and 3.

The column 11 and its door frame 14 thus constitute a mounting member in which the door or first swinging member 16 is operatively mounted for swinging about a horizontal hinge axis.

On the door or first swinging member 16, guide means 17 constitute a second swinging member which are operatively mounted for swinging about a horizontal axis on the first swinging member 16 as by a hinge connection generally indicated at 17*a* between the members 17 and 16*a*. The guide means 17, as shown, include a rectangular panel having outer parallel guide channels 18 having opposite channel openings 19 opening toward each other.

An instrument mounting bracket slide, indicated generally by 20, as shown consists of a transverse panel bar 38 with a flange 20*a*. The edges of panel 38 are slidable in the guide channels 18 toward and away from the hinge axes of the first and second swinging members 16 and 17. Belt and pulley actuating means indicated generally by 21 are operatively associated with the swinging members 16 and 17, the slide member 20, and the mounting member 11.

As shown, the belt and pulley actuating means 21 include an arm 22 extending rearwardly from the inner face of the lower end 23 of the door or first swinging member 16.

A pulley 24 is operatively mounted on a bracket 25 on the rear face of the lower end of the instrument panel 13 above the outer end 26 of the arm 22 within the column 11. On the inner face of the front wall 27 of the column 11 below the outer end 26 of the arm 22, a lower pulley 28 is operatively mounted on a bracket 29.

An upper pulley 30 above the lower pulley 28 is similarly operatively mounted on a bracket 31 on the inner face of the column front wall 27 below the door opening 15.

On one side face 32 of the arm 22 adjacent the inner face of the inner end 23 of the door or first swinging member 16, a pair of side by side pulleys 33 are mounted as by a screw shaft 34.

The second swinging member 17 preferably as shown is in the form of a rectangular panel, and has formed therein a depressed portion 17—1 opening away from the first swinging member 16, and within the depressed portion 17—1 of the second swinging member 17 and is operatively mounted a pulley 35.

A cord belt 36 has one end 37 connected to the transverse panel bar 38 of the instrument mounting bracket slide 20, and the cord belt 36 extends from its end 37 around the pulley 35, beneath and around the outermost pulley 33, above and around the pulley 30, beneath and around the pulley 28 above and around the pulley 24, beneath and around the other pulley 33, and has another end 39 which is preferably connected with one end of a tension spring 40, the other end of which is connected with the transverse panel bar 38.

The depressed portion 17—1 of the second swinging member 17 opens away from the first swinging member 16, as above stated, and also towards the instrument mounting bracket slide 20, and in addition to the pulley 35 the depressed portion 17—1 accommodates the cord belt 36 and the tension spring 40.

Between the pulleys 24 and 28, the outer end 26 of the arm 22 has a connection 41 by two screws with the pulley cord 36.

The guide means or second swinging member 17 is arranged for automatic swinging on the door or first swinging member 16, as shown by providing at one or both sides of the swinging member 17 an arm 42—1 extending below and rearwardly of the hinge connection 17*a* of the second swinging member 17, the rear end of each arm 42—1 being abuttable against the pin 42—2 extending inwardly from the adjacent side member of the door frame 14.

At the lower hinged end of the second swinging member 17, as shown, there is located a cross bar 17—2 on the upper face of which is secured the arm or arms 42—1. The hinged connection 17*a* of the second swinging member 17, as shown, is a headed screw 17—4 having a shank passing through enlarged apertures in the bar 17—2 and in the lower end of the rectangular panel swinging member 17, and the shank being screwed into the lower end of the door or first swinging member 16. The connection of the second swinging member 17 on the first swinging member 16, as shown, may otherwise be described as a loose connection permitting swinging of the members 17 and 16 with respect to each other.

The instrument mounting bracket slide 20, as shown, includes a plurality of tubular holders 43 and 44 mounted on flange 20*a*, in each of which may be inserted in a usual manner an instrument not shown, which may be served in a usual manner by a flexible tubular conduit, not shown, extending into the column 11.

In operation, when the door is closed, the parts of the improved door apparatus are in the relative positions shown in Fig. 2 with the instrument mounting bracket slide 20 retracted in the guide means 17 to its position closest to the lower end 23 of the door 16.

Upon opening the door 16 to the position shown in Fig. 1, the guide means 17 swings upwardly to the position shown in Fig. 1, and the operation of the belt and pulley means 21 is such as to extend the instrument mounting bracket slide 20 to the outermost position shown in Fig. 1, where the instruments carried thereby are accessible for use.

The relative movements of the swinging members 16 and 17 and the slide member 20, are exactly repeated with each opening and closing of the swinging member or door 16, by the action of the belt and pulley means 21. Thus there is no interference of the parts with each other or with instruments carried on the slide 20, as is otherwise the case, when the automatic movement of the parts is not provided.

The cord belt 36 may be otherwise described as having a closed loop connection with the instrument mounting bracket slide 20, the closed loop passing around the pulley 35 on the second swinging member 17, and the outermost pulley 33 on the first swinging member 16, and the pulleys 30, 28, and 24 on the mounting member 11, and the other pulley 33 on the second swinging member 17.

The embodiments of the present improvements illustrated and described herein are by way of example, and the scope of the present in-

vention is not limited to the same or to the particular details thereof, but is commensurate with any and all novel subject matter contained herein which may at any time properly under the United States patent laws be set forth in the claims hereof or originating herein, and the elements of any such claims are intended to include their reasonable, mechanical and functional equivalents.

I claim:

1. In dental instrument holder construction and the like, a mounting member and a swinging member, means operatively mounting the swinging member for swinging movement on the mounting member, a slide, means operatively mounting the slide for sliding on the swinging member, belt and plural pulley means operatively associated with the slide and swinging member and mounting member for automatically moving the slide relatively to the swinging member during movement of the swinging member, the belt and pulley means including a belt having a closed loop connection with the slide and passing around the several pulleys, and there being belt actuating connecting means between the belt and the swinging member.

2. In dental instrument holder construction and the like, a mounting member and a first swinging member, means operatively mounting the first swinging member for swinging movement on the mounting member, a second swinging member, means operatively mounting the second swinging member for swinging movement on the first swinging member, a holder slide, means operatively mounting the slide for sliding on the second swinging member, and belt and plural pulley means operatively associated with the slide and swinging members and mounting member for automatically moving the slide relatively to the swinging members during movement of the swinging members.

3. In dental instrument holder construction and the like, a mounting member and a first swinging member, means operatively mounting the first swinging member for swinging movement on the mounting member, a second swinging member, means operatively mounting the second swinging member for swinging movement on the first swinging member, a holder slide, means operatively mounting the slide for sliding on the second swinging member, and means operatively associated with the slide and swinging members and mounting member for automatically moving the slide relatively to the swinging members during movement of the swinging members.

4. In dental instrument holder construction and the like, a mounting member and a movable member, means operatively mounting the movable member for movement towards and away from the mounting member, a slide, means operatively mounting the slide for sliding on the movable member, and closed loop belt and plural pulley means operatively associated with the slide and movable member and mounting member for automatically moving the slide relatively to the movable member during movement of the movable member.

5. In dental instrument holder construction and the like, a mounting member and a first movable member, means operatively mounting the first movable member for movement towards and away from the mounting member, a second movable member, means operatively mounting the second movable member for movement on the first movable member, a slide, means operatively mounting the slide for sliding on the second movable member, and belt and pulley means operatively associated with the slide and movable members and mounting member for automatically moving the slide relatively to the movable members during movement of the movable members.

6. In dental instrument holder construction and the like, a mounting member and a first movable member, means operatively mounting the first movable member for movement towards and away from the mounting member, a second movable member, means operatively mounting the second movable member for movement on the first movable member, a slide, means operatively mounting the slide for sliding on the second movable member, and means operatively associated with the slide and movable members and mounting member for automatically moving the slide relatively to the movable members during movement of the movable members.

7. In dental instrument holder construction and the like, a mounting member and a movable member, means operatively mounting the movable member for movement towards and away from the mounting member, a reciprocating holder member, means operatively mounting the reciprocating member for reciprocating movement on the movable member, and closed loop belt and plural pulley means operatively associated with the reciprocating member and movable member and mounting member for automatically moving the reciprocating member relatively to the movable member during movement of the movable member.

8. In dental instrument holder construction and the like, a mounting member and a first movable member, means operatively mounting the first movable member for movement towards and away from the mounting member, a second movable member, means operatively mounting the second movable member for movement on the first movable member, a reciprocating holder member, means operatively mounting the holder member for reciprocating on the second movable member, and belt and pulley means operatively associated with the reciprocating member and movable members and the mounting member for automatically moving the reciprocating member relatively to the movable members during movement of the movable members.

9. In dental instrument holder construction and the like, a mounting member and a first movable member, means operatively mounting the first movable member for movement towards and away from the mounting member, a second movable member, means operatively mounting the second movable member for movement on the first movable member, a reciprocating holder member, means operatively mounting the holder member for reciprocating on the second movable member, and means operatively associated with the reciprocating member and movable members and the mounting member for automatically moving the reciprocating member relatively to the movable members during movement of the movable members.

10. In dental instrument construction and the like, a mounting member and a movable member, means operatively mounting the movable member for movement towards and away from the mounting member, a holder member, means operatively mounting the holder member for movement on the movable member, and closed loop belt and plural pulley means operatively

associated with the members for automatically moving the holder member relatively to the movable member during movement of the movable member.

11. In dental instrument holder construction and the like, a mounting member and a first movable member, means operatively mounting the first movable member for movement towards and away from the mounting member, a second movable member, means operatively mounting the second movable member for movement on the first movable member, a third movable member adapted for use as an instrument holder and the like, means operatively mounting the third movable member for movement on the second movable member, and belt and pulley means operatively associated with the movable members and the mounting member for automatically moving the third movable member relatively to the first and second movable members during movement of the first and second movable members.

12. In dental instrument holder construction and the like, a mounting member and a first movable member, means operatively mounting

the first movable member for movement towards and away from the mounting member, a second movable member, means operatively mounting the second movable member for movement on the first movable member, a third movable member adapted for use as an instrument holder and the like, means operatively mounting the third movable member for movement on the second movable member, and means operatively associated with the movable members and the mounting member for automatically moving the third movable member relatively to the first and second movable members during movement of the first and second movable members.

EDWARD L. MONNOT.

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