May 26, 1942. M. A. CROSBY ET AL 2,284,187

SIDE LOADING HEARSE MECHANISM

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FIG. 1

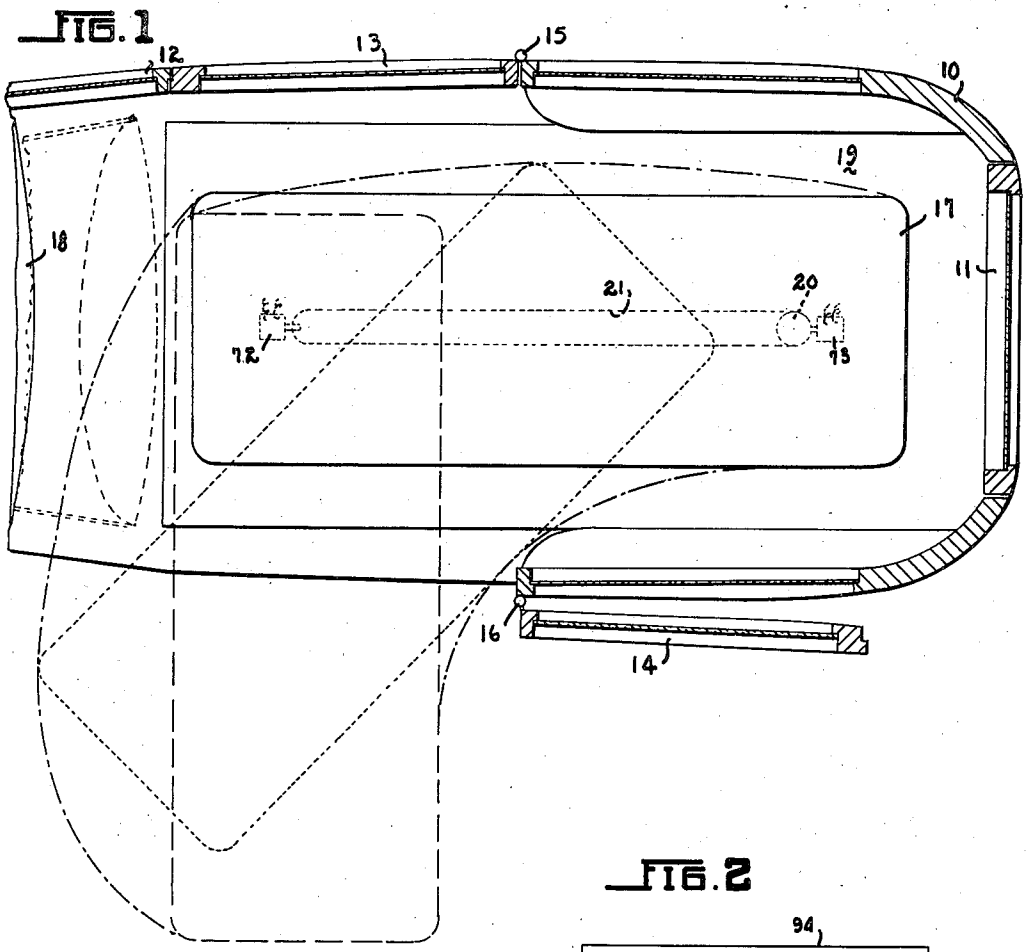
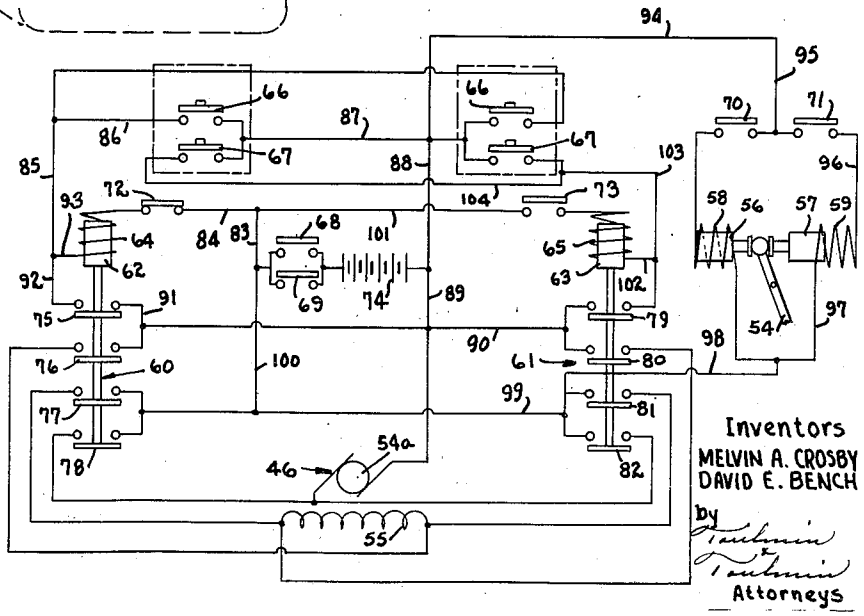



FIG. 2



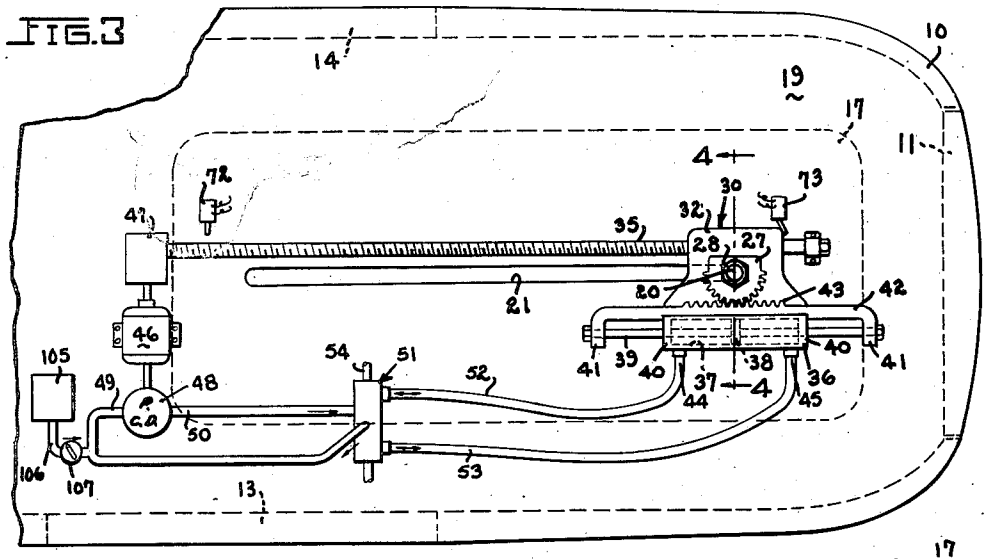

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FIG. 3



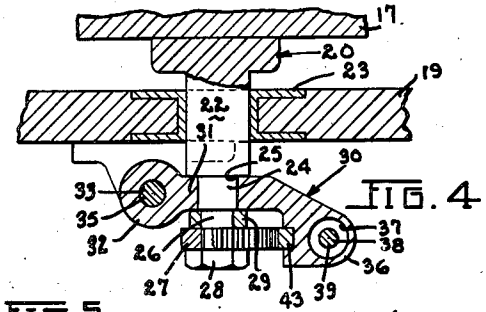




FIG. 4

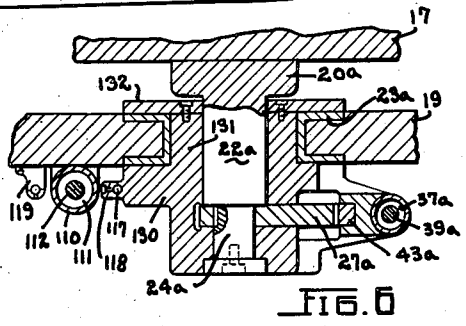
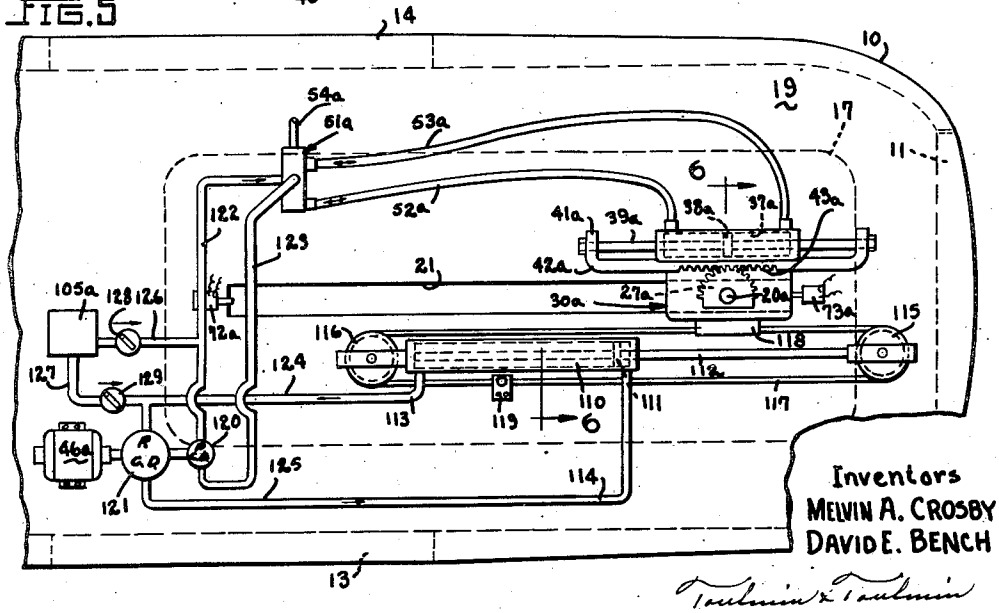



FIG. 6

FIG. 5




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FIG. 7

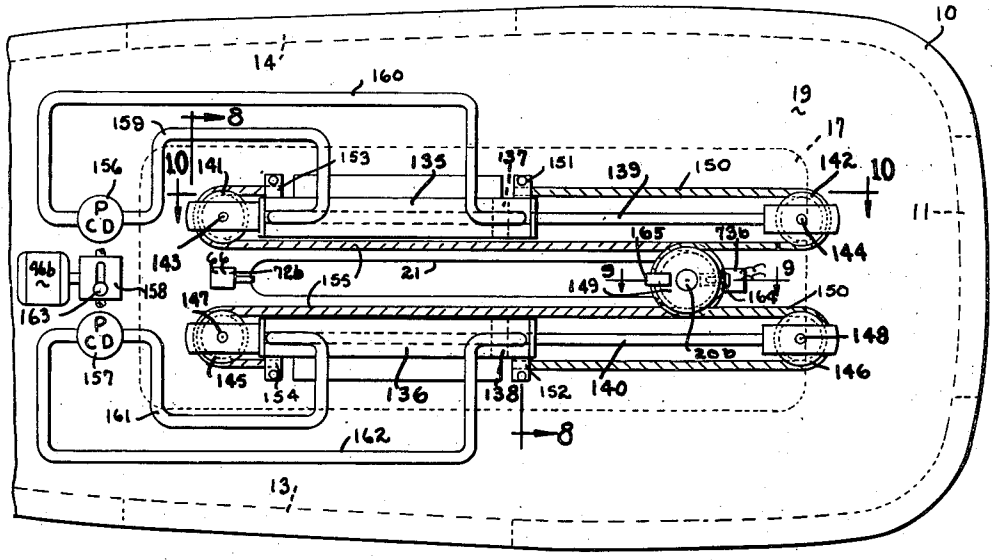



FIG. 8

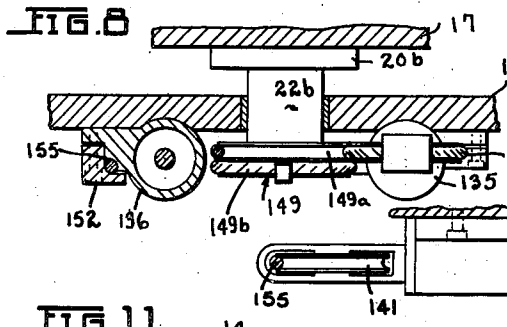



FIG. 9

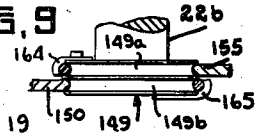



FIG. 10

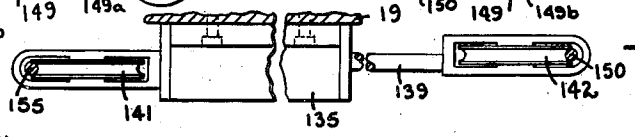
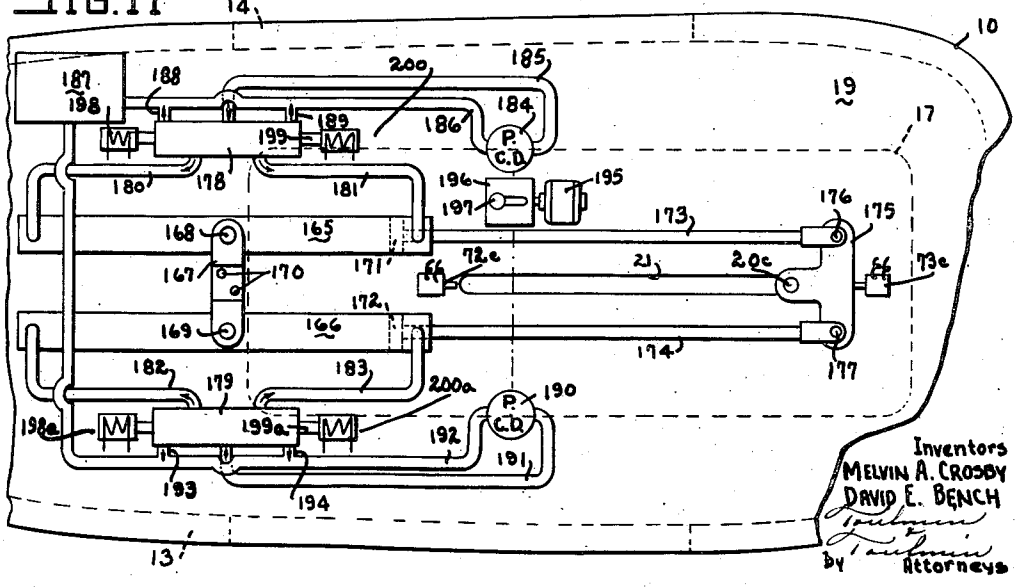



FIG. 11




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# UNITED STATES PATENT OFFICE

2,284,187

## SIDE LOADING HEARSE MECHANISM

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Application April 14, 1941, Serial No. 388,507

21 Claims. (Cl. 214—83)

This invention relates to a hearse of the side delivery type wherein mechanism is provided for moving the casket supporting table longitudinally within the body of the hearse and concomitantly rotating the same to extend the table through the side walls of the hearse. This invention particularly relates to hydraulic mechanism for accomplishing this purpose.

It is an object of the invention to provide a hydraulic mechanism which will rotate a casket carrying table while the same is being moved longitudinally within the hearse body.

It is another object of the invention to provide a hydraulic mechanism which rotates a casket supporting means within the hearse a predetermined increment of rotation for each increment of longitudinal travel of the table.

It is another object of the invention to provide a casket supporting table for a side delivery hearse having a rotatable axis which is moved longitudinally of the hearse with concomitant rotation, the longitudinal movement and the rotation being in a predetermined ratio which remains constant throughout the entire movement of the table.

It is still another object of the invention to provide a mechanical screw for moving the rotatable axis of a casket supporting table longitudinally of a hearse with hydraulic means for rotating the axis and to synchronize the operations to produce a predetermined path of travel of the table.

It is another object of the invention to provide hydraulic means for moving the rotatable axis of a casket carrying table longitudinally with respect the body of a hearse and to provide hydraulic means for rotating the axis, which hydraulic means are synchronized to produce a predetermined increment of rotation for each increment of longitudinal travel of the axis.

It is another object of the invention to provide a hydraulic mechanism for actuating a casket supporting device in accordance with the foregoing object wherein the rate of flow to one of the hydraulic means is at a different rate than to the other.

It is another object of the invention to provide a hydraulic actuating system for moving a casket supporting means from a longitudinal to a transverse position with respect a hearse body which system has means for multiplying the movement of the hydraulic actuating mechanism.

It is another object of the invention to provide an electrical control system for controlling the direction of flow of fluid in the hydraulic actuating mechanism for accomplishing the foregoing objects.

Further objects and advantages will become apparent from the drawings and from the following description.

In the drawings:

Figure 1 is a cross-sectional plan view of a hearse showing the normal position of a casket carrying table therein and the sweep thereof when shifted to the transverse position.

Figure 2 is an electrical diagram of the controls for actuating the mechanism which shifts the position of the casket carrying table.

Figure 3 is a bottom view of the hearse showing combined mechanical and hydraulic mechanism for imparting a predetermined motion to the table.

Figure 4 is a cross-sectional view taken along line 4—4 of Figure 3.

Figure 5 is a bottom view of a hearse showing a fully hydraulic mechanism for imparting a predetermined course of travel of a casket carrying table.

Figure 6 is a cross-sectional view taken along line 6—6 of Figure 5.

Figure 7 is a bottom view of a hearse showing a modified arrangement of a hydraulic mechanism for actuating the casket carrying table.

Figure 8 is a cross-sectional view taken along line 8—8 of Figure 7.

Figure 9 is a cross-sectional view taken along line 9—9 of Figure 7.

Figure 10 is a side elevational view of a hydraulic mechanism taken along line 10—10 of Figure 7.

Figure 11 is a bottom view of a hearse showing a modified arrangement of a hydraulic mechanism for actuating the casket carrying table of the hearse.

The mechanism of this invention is applied to a hearse of the side delivery type wherein the hearse body 10 is provided with a rear access door 11 and with front access doors 12 for use of the driver of the vehicle. The doors 13 and 14 are pivotally carried at 15 and 16 respectively to open a side wall of the hearse and permit discharge of the casket carrying table 17 from within the body of the hearse. The driver's seat 18 is movable toward the forward end of the hearse to provide an increased area for swinging the forward end of the table 17 when extending the same through the side wall. The casket carrying table 17 is supported upon the floor 19 of the hearse by the usual roller supports so that the main load of carrying the casket is supported

by the table and the rollers provided thereunder.

To extend the table 17 through a side wall of the hearse 10 a pivot post 20 is secured to the underside of the casket carrying table 17. The post 20 extends through a longitudinal slot 21 provided in the floor of the hearse and is adapted to engage a driving mechanism provided under the floor 19.

With reference to Figures 1, 2, 3 and 4, the pivot post 20 has a shank 22 which slides within the slot 21, which slot 21 is reinforced by the U-shaped metal member 23 which provides means for more easily sliding the pivot post 20 within the slot 21.

The shank 22 extends below the floor 19 of the hearse and engages a mechanism assembly comprising a lead screw nut and a hydraulically actuated piston. The shank 22 has an extending portion 24 which is reduced in diameter thereby providing a shoulder 25 which engages the upper surface of the operating mechanism assembly. A second reduced diameter portion 26 extends from the portion 24 and carries a gear segment 27 which is suitably carried upon the shank portion 26 and retained thereon by means of a nut 28. A spacing collar 29 is positioned between the gear segment 27 and the lower side of the operating assembly to position the gear segment with respect to the same.

The operating assembly 30 consists of the horizontal wall 31 through which the shank 24 extends. An enlarged body portion 32 is provided adjacent the horizontal wall 31 and has a threaded bore 33 extending therethrough. The bore 33 cooperates with the lead screw 35 which is suitably driven for rotation within the threaded bore 33 for moving the lead screw nut 32 longitudinally with respect the slot 21.

The assembly 30 is also provided with an enlarged portion 36 having a bore 37 which forms a hydraulic cylinder. A piston 38 cooperates with the bore 37 and is carried upon a plunger rod 39 which extends through opposite ends of the cylinder bore 37. The ends of the cylinder 37 are suitably closed by the end walls 40 which are provided with the usual packing glands to prevent loss of fluid from within the hydraulic cylinder 37.

The plunger rod 39 is carried within the extending arms 41 of a U-shaped bracket 42. The bracket 42 is provided with a rack 43 which is in meshing relationship with the gear segment 27 carried upon the pivot post 20. The hydraulic cylinder 37 is provided with fluid inlet and out ports 44 and 45 to permit fluid to be conducted to either end of the cylinder 37 for actuating the piston 38 longitudinally within the cylinder 37 and thus reciprocate the plunger 39. Reciprocation of the plunger 39 moves the gear rack 43 to rotate the pinion 27 whereby the pivot post 20 is rotated.

The lead screw 35 is driven by an electric motor 46 through means of a speed reducing mechanism 47. The electric motor 46 also drives a constant delivery fluid pump 48 which pump is provided with fluid conduits 49 and 50.

The pump 48 is adapted to deliver hydraulic fluid to the cylinder 37 through a flow control valve 51. The flow control valve 51 determines the direction of flow of fluid to and from the cylinder 37. The valve 51 is connected to the pump 48 by means of the conduits 49 and 50 and is connected to the cylinder 37 by means of the conduits 52 and 53. A shift rod 54 is provided for the valve 51 for shifting the position of the internal mechanism to determine the direction of flow of fluid within the conduits 52 and 53. The electric motor 46 is of the reversible type so that the lead screw and the pump 48 can be driven in either direction of rotation. Changing the direction of rotation of the lead screw 35 moves the operating mechanism 30 forwardly and reversely within the slot 21 while the reverse rotation of the motor 46 causes reverse direction of flow delivery from the pump 48. With the valve 51 set in a predetermined position concomitant rotation of the lead screw 35 and operation of the pump 48 causes the operating mechanism 30 to reciprocate within the slot while hydraulic fluid is delivered to the cylinder 37 to rotate the post 20 during such reciprocation. Since the valve 51 is set in the predetermined position the direction of rotation of the post 20 will be selected since the valve determines which side of the cylinder 37 shall be the delivery side for the hydraulic fluid. In order to reverse the direction of flow to the cylinder 37 the valve 51 is shifted to direct the delivery flow of fluid to the opposite side of the cylinder 37. The valve 51 thus controls the side of the hearse through which the table 21 will be extended when the pivot post 20 is reciprocated within the slot 21. The volume of fluid delivered to the cylinder 37 from the constant delivery pump 48 is predetermined since pump 48 and the screw 35 are driven by the same electric motor 46 the speeds of rotation will remain constant with respect to one another. With the output delivery of the pump 48 constant, the rotation of the post 20 can be established in a determined ratio with respect to the speed of rotation of the lead screw 35 so that the hydraulic cylinder 37 will rotate the pivot post 20 a determined increment of rotation for each increment of longitudinal travel of the post 20 within the slot 21. This arrangement thereby predetermines the pattern of travel of the casket carrying table when extending the same through the side of the hearse or during retraction thereof.

The sweep of the edges of the table 17 is indicated in Figure 1. The point of location of the pivot post 20 has been preselected to produce a sweep of the edges of the table 17 which will use the minimum area. The location of the pivot post 20 with respect the table 17 is toward the rear end thereof and is positioned from the rear end a distance between one-sixth and one-seventh the total length of the table. The exact position of the pivot post depends somewhat upon the clearance provided by the hearse 10 and the degree to which the table 17 is to be extended. With the pivot post 20 positioned adjacent the rear end of the table 17 between one-sixth and one-seventh of the total length of the table from the end thereof, and with a constant longitudinal motion of the post accompanied with constant rotation, which longitudinal movement and rotation is in a predetermined ratio, the minimum sweep of the table 17 is provided.

The electrical control system for actuating the heretofore described mechanism is disclosed in Figure 2 and consists of the reversible electric motor 46 having an armature 54a and a field 55. The actuating arm 54 of the valve 51 is carried between the armatures 56 and 57 which are actuated by the electric coils 58 and 59 respectively. Energization of the coil 58 or 59 causes movement of its cooperating armature to shift the rod 54 and thereby actuate the valve mechanism of the valve 51. The current flow to the electric

motor 46 is controlled by means of the relays 60 and 61, the relay 60 being actuated by the armature 62 while the relay 61 is actuated by the armature 63. Electric coils 64 and 65 actuate the armatures 62 and 63 respectively when energized by closing of the proper electric circuit. The relay 60 controls the outward movement of the table 17 while the relay 61 controls the inward or retracting movement of the table 17.

Adjacent each of the doors 13 and 14 of the hearse there is positioned a pair of push button switches of which the push button switches 66 control the outward movement of the table 17 while the push button switches 67 control the inward movement of the table 17. The switches 66 are arranged in parallel circuit relation which is also the same circuit condition of the switches 67 so that regardless of whether the door 13 or 14 is open the relays 60 and 61 will be actuated by the corresponding operation of the switches 66 and 67.

Limit switches 68 and 69 are actuated by the doors 13 and 14 respectively as are also the limit switches 70 and 71. The limit switch 72 is positioned adjacent the forward end of the slot 21 to be opened by engagement of the operating mechanism 30 when in the forward position, while the limit switch 73 is positioned adjacent the rear end of the slot 21 and is opened by the operating mechanism 30 when in the retracted position. The battery 74 supplies current to the electrical system.

The relay 60 is provided with the control blades 75, 76, 77 and 78, the contact blade 75 providing the holding circuit for the electric coil 64 while the blades 76, 77 and 78 control the direction of flow of current to the electric motor 46. The blade 78 controls flow of current to the armature 54 while the blades 76 and 77 control the flow of current to the field 55. The relay 61 is provided with the contact blades 79, 80, 81 and 82, the blade 79 providing a holding circuit for the electric coil 65 while the blades 80, 81 and 82 control the direction of flow of current to the motor 46. The blade 82 controls the flow of current to the armature 54 and maintains the flow of current in the same direction as when the blade 78 of the relay 60 is closed. The blades 80 and 81 control the flow of current to the field 55 and so direct the current that it passes through the field 55 in the reverse direction to that established by the blades 76 and 77 of the relay 60 when they are closed. The relays 60 and 61 thus control the forward and reverse directions of rotation of the motor 46 for changing the direction of rotation of the lead screw 35 and the fluid pump 48.

The electrical diagram of Figure 2 is shown with the various mechanisms in their normal position with both doors 13 and 14 closed and with the casket carrying table in the retracted position. In such position the limit switch 73 is open whereby current flow to the coil 65 cannot be established under any circumstance. If the door 14 should be opened for extending the table 17 therethrough the limit switch 69 will be closed and since the limit switch 72 is closed current flow can be established to the coil 62 upon actuation of the push button 66, the flow being established through the switch 69, the lines 83, 84, the limit switch 72, the coil 64, lines 85, 86, push button switch 66, line 87 and line 88 to the battery. The coil 64 will thus be energized to close the contact blades of the relay 60 against their cooperating contacts. The blade 75 then establishes a holding circuit for the coil 64, from the battery 74, the lines 89, 90, 91, 92, 93, 84, 83, the limit switch 69 to the battery. At the same time the blades 76, 77 and 78 establish current flow to the armature 54a and the field 55 of the electric motor 46.

When the door 14 was opened the limit switch 71 was closed whereby circuit is then capable of being established to the coil 59. Since the switches 71 and 69 close simultaneously electric circuit is established through the coil 59 from the battery 74 through the lines 88, 94, 95, the switch 71, the line 96, the coil 59, lines 97, 98, 99, 100, the switch 69 and return to the battery. The establishment of this circuit upon opening the door 14 shifts the actuating rod 54 of the valve 51 so that the valve 51 is in the position of deivery of fluid through the conduit 52.

Energization of the electric motor rotates the lead screw 35 and the pump 48 whereby the pivot post 20 is moved longitudinally within the slot 21 toward the forward end thereof and is also imparted with concomitant rotation by the delivery of hydraulic fluid through the conduit 52 from the pump 48. The electric motor will continue to drive the apparatus until the mechanism 30 engages the limit switch 72 at which time it will be opened to break circuit to the relay 64 and thus deenergize the motor 46.

When the turret is to be retracted to within the body of the hearse the door 14 is still open so that the valve 51 remains in the position as set for the forward motion of the table 17. At this time there is no further actuation of the switches 69 and 71 so that the circuit initially established through these switches remains during the retraction movement of the table 17.

The push button switch 67 is moved to close circuit through its cooperating contacts so that electric circuit is then established to the coil 65 of the relay 61 since the limit switch 73 is now closed and the limit switch 72 is open. The circuit establishing current flow to the coil 65 is from the battery 74 through the switch 69, the lines 83, 101, the switch 73, the coil 65, lines 102, 103, 104, the switch 67, lines 87, 88 to return to the battery. Energization of the relay 61 thus closes the blades 79, 80, 81 and 82 upon their cooperating contacts so that blade 79 now establishes a holding circuit for the coil 65 from the battery 74 through the switch 69, lines 83, 101, the switch 73, the coil 65, line 102, blade 79, lines 90 and 89 to return to battery. The blade 82 establishes circuit to the armature 54 of the electric motor 46 in the same direction of current flow as had been established by the blade 78 of the relay 60. The blades 80 and 81 establish circuit to the field 55 but in the reverse direction to that which had been established by the blades 76 and 77 of the relay 60. The motor 46 is thus reversed in its direction of rotation whereby the lead screw 35 and the pump 48 are reversed in their direction of rotation thus moving the operating assembly 30 toward the rear end of the slot 21 and delivering hydraulic fluid through the conduit 53 to the cylinder 37. The table 17 will thus follow the same path of travel as previously but in the reverse direction.

Since the plunger 39 extends from both ends of the cylinder 37 the displacement of the cylinder 37 is equal on both sides of the piston 38. It is therefore possible to merely deliver fluid from one side to the other of the piston 38 for moving the same with respect the cylinder 37. If, for

any reason, there should be leakage in the hydraulic system a fluid reservoir 105 is connected to the pump 48 through a conduit 106 and a check valve 107. At any time the system requires fluid it can be drawn from the reservoir 105 and admitted into the system when the pump is operating in the direction of operation wherein the conduit 49 is the suction line for the pump 48.

In Figure 5 there is shown a modified arrangement wherein the longitudinal travel of the pivot post for the table 17 is operated by means of a hydraulic mechanism. In this modification certain of the elements are identical with the elements heretofore described in Figures 1 to 4 inclusive. The like elements will therefore be referred to by like numerals but with the suffix "a". In this modification the pivot post 20a carries the gear segment 27a which is in engagement with the rack 43a carried by the plunger 39a of the hydraulic cylinder 37a.

The cylinder 37a is provided with the piston 38a and with the inlet and outlet conduits 52a and 53a respectively. The conduits 52a and 53a communicate with the flow control valve 51a which is actuated by the control rod 54a. The operation of the hydraulic cylinder 37a in rotating the pivot post 20a is identical with the operation of the device heretofore described.

The lead screw of the heretofore described device is replaced with a mechanism actuated by a hydraulic cylinder for reciprocating the pivot post 20a within the slot 21. This mechanism consists of a hydraulic cylinder 110 suitably secured to the floor 19 of the hearse and has a piston 111 for reciprocation therein. A piston 111 is carried upon a piston rod 112 which extends through both ends of the cylinder 110. A suitable packing gland is provided around the piston rod 112 at each end of the cylinder 110 to prevent leakage of hydraulic fluid therefrom. Fluid conduits 113 and 114 are connected to opposite ends of the cylinder 110 for conducting fluid to and from said cylinder. Opposite ends of the piston rod 112 carry freely rotatable pulley members 115 and 116. A cable 117 extends around the pulley members 115 and 116, the ends of the cable being secured to a boss 118 provided on the operating mechanism 30a. The cable 117 is securely fastened to the floor 19 of the hearse by means of a damping bracket 119.

The arrangement of the pulleys and cable with the hydraulic mechanism provides an apparatus whereby the reciprocable stroke of the piston 111 can be multiplied in order to move the pivot post 20a double the amount of the movement of the piston 111.

To supply hydraulic fluid to the cylinders 37a and 110, fluid pumps 120 and 121 respectively are provided. The pumps 120 and 121 deliver fluid to the hydraulic cylinders at different rates of flow, and which rates are proportioned to produce concomitant rotation of the pivot post 20a with longitudinal movement thereof, and which rotation is in determined increments of rotation for each increment of longitudinal travel. The pumps 120 and 121 are preferably driven by a common source of power, such as the electric motor 46a. The electric motor 46a is reversible in the same manner as heretofore described with respect the motor of Figure 3 whereby the direction of flow of hydraulic fluid can be reversed to the cylinders 37a and 110 to reverse the direction of motion of the casket carrying table 17. As heretofore described the valve 51a is for the purpose of selecting the side of the hearse through which the table will be extended. When the valve 51a has been shifted to extend the table through a selected side of the hearse it will not be again shifted until the table is retracted to within the hearse and only then if the direction of extension of the table is to be altered.

Conduits 122 and 123 connect the pump 120 with the valve 51a. The conduits 124 and 125 connect the pump 121 with the cylinder 110. It is not necessary to reverse the direction of flow in the conduits 124 and 125 except by means of the pump 121 since there is only one motion involved in the operation of the piston rod 112.

Since the piston rods 39a and 112 extend through their respective cylinders 37a and 110 the fluid pumps 120 and 121 respectively can deliver fluid from one side of the cylinder to the opposite side thereof with no need for make-up fluid. However, if there should be leakage in either of the hydraulic systems fluid can be drawn into the system from a fluid storage tank 105a, which is connected to the conduits 122 and 124 by means of the condüits 126 and 127 through the check valves 128 and 129 respectively. This arrangement permits fluid to be drawn into the hydraulic systems at any time the conduits 122 and 124 are on the suction side of the pumps 120 and 121 respectively.

The pivot post 20a is of a slightly modified construction from that described in Figure 4. However, the essential functioning of the post is identical with that described in Figure 4. In the modified structure disclosed in Figure 6 the shank 22a of the post 20a is journaled in a bearing 130 which is preferably provided with a square shank 131 positioned in the slot 21. The square shank 131 prevents rotation of the bearing 130 and the cylinder 37a carried thereby. The reduced shank 24a of the post 20a carries the gear segment 27a which engages the rack 43a in the manner heretofore described. A plate 132 is secured to the square shank 131 of the bearing 130 by suitable means and provides means for engaging the upper surface of the U-shaped guide track 23a.

The electrical system heretofore described in Figure 2 will apply to the operation of the device described in Figure 5 since the same elements are required to be controlled and in the same manner as set forth in the description of Figure 2, namely, the electric motor 46a is required to be reversed in its direction of rotation to reverse the flow of hydraulic fluid to the cylinders 37a and 110 to thereby concomitantly rotate and reciprocate the pivot post with respect the slot 21. Also, the valve 51a requires shifting to direct the flow of fluid to the cylinder 37a in accordance with the side of the hearse through which the table 17 is to be extended. The limit switches 72a and 73a control deenergization of the electric motor 46a when the pivot post 20a reaches the limit of its travel with respect the slot 21. It may thus be seen that the electrical system can be applied directly to the hydraulic system disclosed in Figure 5.

To obtain a predetermined path of travel of the table 17 when extending or retracting the same the fluid delivery from the pump 120 has a definite ratio with respect the fluid delivered from the pump 120 so that for each increment of longitudinal movement imparted to the post 20a by the pump 121 through the cylinder 110

a predetermined rotative increment will be imparted to the post 20a by the pump 120 through the cylinder 37a. By properly proportioning the volumes delivered from the pumps 120 and 121 any increment of rotation can be obtained and a proper ratio developed to the increment of horizontal movement of the post 20a whereby any predetermined path of travel can be provided for the table 17.

The pre-selected path of travel, however, will be the same as that with regard Figure 1 wherein the position of the pivot post 20a upon the table 17 has been pre-selected to produce a motion by the table 17 which involves a minimum area through which the sweep of the table will extend.

In Figures 7 to 10 inclusive there is shown a hydraulic system for imparting motion to the table as heretofore described with regard Figure 1 by means of a pair of hydraulic cylinders actuating a pair of cables. In this arrangement hydraulic cylinders 135 and 136 are secured to the floor 19 of the hearse and are arranged parallel with respect each other and with respect the slot 21 provided in the floor 19. The hydraulic cylinder 135 is provided with a piston 137 while the cylinder 136 is provided with a piston 138. Plungers or piston rods 139 and 140 are carried by the pistons 137 and 138 respectively and protrude from opposite ends of the cylinders 135 and 136 respectively.

The piston rod 139 carries the pulleys 141 and 142 at opposite ends thereof which are freely rotatable upon the pivot axes 143 and 144 respectively. The piston rod 140 carries the pulleys 145 and 146 at opposite ends thereof which are freely rotatable upon their axes 147 and 148 respectively.

The pivot post 20b carried by the table 17 has a shank portion 22b extending through the floor 19 which carries a double sheaved pulley 149 having the sheaves 149a and 149b.

A cable 150 is attached to the cylinder 135 by a clamp 151, the cable extending over the pulley 142 and around the pulley 149 on the pivot post 22b in the sheave 149b, the cable continuing around the pulley 146 and being attached at the opposite end thereof to the cylinder 136 by means of the clamp 152. The cable 150 is prevented from rotation with respect the pulley 149 since it is secured thereto by means of the clamp 164. A cable 155 is secured to the cylinder 135 by means of a clamp 153 the cable extending around the pulley 141 and the pulley 149 in the sheave 149a and then continuing around the pulley 145 and having the end thereof secured to the cylinder 136 by means of the clamp 154. The cable 155 is prevented from rotating with respect the pulley 149 since it is secured thereto by means of the clamp 165.

The electric motor 46b drives the constant delivery pumps 156 and 157 through a suitable speed reducing mechanism 158. The speed reducing mechanism is arranged to drive one of the pumps at a different rate of speed than the other so that the delivery from the pumps will be at different rated volume flow. The pump 156 is connected to opposite ends of the cylinder 135 by means of the conduits 159 and 160 while the pump 157 is connected to the opposite ends of the cylinder 136 by means of the conduits 161 and 162. Since the electric motor 46b is reversible in the same manner as heretofore described with regard the previous modifications either of the conduits 159, 160 or either of the conduits 161, 162 can be the delivery conduits for their respective cylinders 135 or 136. The pistons 137 and 138 of the respective cylinders can thus be reciprocated therein merely by changing the direction of delivery of fluid from the pumps 156 and 157 to their respective cylinders.

If the pumps 156 and 157 deliver fluid to both cylinders 135 and 136 at the same rate the pistons 137 and 138 will move in parallel within their respective cylinders so that a straight reciprocatory motion will be transmitted through the pulley 149 to the pivot post 20b. However, as heretofore described, the delivery to the cylinders 135 and 136 is at slightly different rates so that a rotative motion will be imparted to the pivot post 20b through the pulley 149 since one of the pistons will advance at a greater rate than the other tending to move its corresponding cable a greater distance than the other cable thereby causing the rotative movement of the pulley 149 and the pivot post 20b. The degree of rotative movement with respect each increment of longitudinal travel is pre-determined and pre-calculated by controlling the difference in the flow of fluid from the pumps 156 and 157.

To permit the table 17 to be extended through either side of the hearse 10 it is necessary that the rates of flow shall be shifted between the cylinders 135 and 136. The speed reducing mechanism 158 is capable of performing this function since there is provided the shifting lever 163 which is capable of shifting the mechanism in a manner to transfer the higher speed rotation to either of the pumps 156 or 157 in accordance with the position of the lever 163. Such speed reducing mechanisms and means for shifting the speed control thereof are well known in the arts and further description and disclosure is not deemed necessary.

The electrical control system disclosed in Figure 2 will operate the mechanism disclosed in Figure 7 in the same manner as heretofore described. This is true since the same controllable elements are in the apparatus of Figure 7 as are in the apparatus of Figure 3. The controllable elements of Figure 7 include the reversible electric motor 46b and the shiftable speed reducing device 158, the current to the electric motor being shifted in the manner described with regard Figure 2 and the lever 163 of the shiftable speed reducing mechanism being actuated in the same manner as the lever 54 described in the operation of the system of Figure 2.

In Figure 11 there is shown another modified arrangement of hydraulic actuating device wherein the plunger rods directly engage the pivot post for the table to reciprocate and rotate the same. In this arrangement hydraulic cylinders 165 and 166 are pivotally mounted to a bracket 167 by means of the pivots 168 and 169. The bracket 167 is secured to the under side of the floor 19 by means of the bolts 170. The pistons 171 and 172 are provided in the cylinders 165 and 166 respectively and are carried on the ends of the plunger rods 173 and 174 respectively.

The pivot post 20c carries a T-shaped bar 175, the stem of the T-bar 175 being secured to the pivot post 20c, while opposite ends of the cross bar of the T-bar 175 are pivotally secured to the rods 173 and 174 by means of the pivot pins 176 and 177 respectively. The T-bar 175 is thus actuated directly by the plunger rods 173 and 174.

The flow of hydraulic fluid to the hydraulic cylinders 165 and 166 is controlled by means of the flow control valves 178 and 179. The

valve 178 has conduits 180 and 181 connected thereto which conduits also connect to opposite ends of the cylinder 165. The valve 179 has conduits 182 and 183 connected thereto which also connect to opposite ends of the cylinder 166. A constant delivery fluid pump 184 delivers fluid through the conduit 185 to the valve 178. A suction conduit 186 connects the opposite side of the pump 184 with a fluid reservoir 187. The valve 178 has conduits 188 and 189 connecting the same to the suction return conduit 186.

A constant delivery fluid pump 190 delivers fluid through a conduit 191 to the valve 179 and has a suction conduit 192 which connects with the reservoir 187. The valve 179 has conduits 193 connecting the same with the suction return conduit 192 for the pump 190.

The pumps 184 and 190 are driven by an electric motor 195 through a speed reducing mechanism 196. The speed reducing mechanism 196 is adapted to drive one of the pumps 184, 190 at a speed which causes the pump to deliver more fluid than the other. Such an arrangement causes one of the pistons 171, 172 to advance in its respective cylinder at a greater rate than the other so that when fluid is concomitantly delivered to the cylinders 165 and 166 the pivot post 20c will be imparted a rotary motion by the difference in the rates of movement of the piston rods 173 and 174. Since the piston rods move at different rates the T-bar 175 will be rotated thus causing rotation of the pivot post 20c. The difference in the rate of delivery of the pumps 184 and 190 produces the same result as described with regard Figures 5 and 7 so that the same type of movement is imparted to the table 17 as heretofore disclosed with regard to previous figures.

The electric motor 195 of the apparatus of Figure 11 is a unidirectional motor to cause the pumps 184 and 190 to always deliver through the same conduit, namely, conduits 185 and 191 respectively. This arrangement is provided since the plunger rods 173 and 174 do not extend through the cylinders 165 and 166 so that a differential area is provided on opposite sides of the pistons 171 and 172 making it necessary to constantly supply fluid to the system when the pistons are actuated in one direction of their reciprocation. Thus, to control the forward and retraction motion of the pivot post 20c the valves 178 and 179 are shifted in order to alter the direction of flow of fluid to opposite ends of the cylinders 165 and 166 in accordance with the direction of reciprocation desired for the pivot post 20c.

To select the direction of rotation of the table 17 and thus select the side of the hearse through which the table will extend the speed reducing mechanism 196 is provided with a control lever 197 for shifting the higher speed of rotation of the pump mechanisms between the two pumps 184 and 190.

The hydraulic system of Figure 11 can be actuated by the electrical wiring system disclosed in Figure 2 with slight modifications. The essential modifications required of the wiring circuit of Figure 2 consists merely of the circuits connected to the relays 60 and 61, and particularly to the blades 76, 77 and 78 of relay 60 and blades 80, 81 and 82 of the relay 61. Since the system of Figure 11 has a unidirectional motor 195 it is not necessary to use the relays 60 and 61 for reversing current flow therethrough. Thus, the blade 76 of the relay 60 and the blade 80 of the relay 61 can control the circuit to an ordinary unidirectional motor. In order to shift the valves 178 and 179 solenoids 198 and 198a are provided on one end of the control rods 199 and 199a for the respective valves while the solenoids 200 and 200a are provided on the opposite ends of the respective control rods. Energization of the solenoid 198 can shift the valves 178 and 179 to direct flow of fluid to the left and of the cylinders 165 and 166 while the solenoids 200 and 200a when energized will shift the valves 178, 179 to direct the flow of fluid to the right and of the cylinders 165 and 166. The solenoids 198 and 198a may thus be connected in circuit relation with the blades 77 and 78 of the relay 60 which controls the outward movement of the table 17 while the solenoids 200 and 200a can be connected in circuit relation with the blades 81 and 82 of the relay 61 which relay controls the retraction motion of the table 17. Since it is still necessary to control the proportionate flow of hydraulic fluid to the cylinders 165 and 166 the shiftable speed reducing mechanisms requires that it be shifted to transfer the higher speed of output between the pumps. The lever 54 of the mechanism of Figure 2 can thus be used to shift the lever 197 of the speed reducing mechanism 196. With these slight modifications the electric system disclosed in Figure 2 suffices in complete automatic operation of the hydraulic system disclosed in Figure 11 so that the system will then function in the same manner as previously described with regard Figure 2.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a hearse, means for supporting a casket and independent hydraulic means having different power output and operating in a predetermined ratio for rotating said support a determined angular increment for each increment of longitudinal travel.

2. In a hearse, means for supporting a casket, a single power source, and independent means driven by said power source in a predetermined power output ratio for concomitantly rotating said support and moving the same longitudinally of the hearse.

3. In a hearse, means for supporting a casket, a single power source, and independent means driven by said power source in a predetermined power output ratio for concomitantly rotating said support and moving the same longitudinally of the hearse, one of said means being a hydraulic means.

4. In a hearse of the side delivery type, a table adapted to be supported upon the floor of the hearse, a pivot for said table, a screw in threaded engagement with said pivot for moving said pivot longitudinally of said hearse, power means for rotating said screw, a hydraulic motor drivingly connected to said pivot for rotating the same, and means driven by said power means for supplying fluid to said motor at a determined delivery rate which is proportioned to the speed of rotation of said screw for rotating said pivot a determined angular increment for each increment of longitudinal travel thereof.

5. In a side loading hearse, a platform, a pivot for said platform, hydraulic means for moving said pivot longitudinally of said hearse, hydraulic means for rotating said pivot, both of said hydraulic means acting upon said pivot concomitantly, and means for delivering different volumes of fluid to said hydraulic means and in

a proportioned ratio to rotate said pivot at a constant rate proportioned to the longitudinal travel of said pivot for rotating said pivot a determined angular increment for each increment of longitudinal travel.

6. The combination for a side loading hearse of a platform, a hydraulic motor for moving said platform longitudinally of said hearse, a hydraulic motor for rotating said platform, and means for delivering fluid to said last mentioned motor at a different rate than the first mentioned motor to rotate the platform at a constant rate having a predetermined ratio to equal increments of longitudinal travel of the rotating axis.

7. In combination in a side delivery hearse, means for supporting a casket, a rotatable screw drivingly engaging said supporting means for moving the same longitudinally of the hearse, a hydraulic motor drivingly connected to said supporting means for rotating the same, and means for supplying fluid to said motor at a predetermined fluid delivery rate proportioned to the speed of rotation of said screw for rotating said supporting means at a constant rate proportioned to the longitudinal travel of said supporting means for rotating said supporting means a determined angular increment for each increment of longitudinal travel thereof.

8. In combination in a side delivery hearse, means for supporting a casket, a rotatable screw drivingly engaging said supporting means for moving the same longitudinally of the hearse, a hydraulic motor drivingly connected to said supporting means for rotating the same, and means for supplying fluid to said motor at a predetermined fluid delivery rate proportioned to the speed of rotation of said screw for rotating said supporting means at a constant rate proportioned to the longitudinal travel of said supporting means for rotating said supporting means a determined angular increment for each increment of longitudinal travel thereof, means for reversing the direction of rotation of said screw and the direction of flow of said fluid for advancing and retracting said supporting means, and means for regulating the direction of flow of fluid to said motor to select the side of the hearse through which the supporting means extends.

9. In combination in a side delivery hearse, means for supporting a casket, a rotatable screw drivingly engaging said supporting means for moving the same longitudinally of the hearse, a hydraulic motor drivingly connected to said supporting means for rotating the same, and means for supplying fluid to said motor at a predetermined fluid delivery rate proportioned to the speed of rotation of said screw for rotating said supporting means at a constant rate proportioned to the longitudinal travel of said supporting means for rotating said supporting means a determined angular increment for each increment of longitudinal travel thereof, and means actuated by the opening of one of the side entry doors of the hearse for selecting the direction of flow of fluid to said motor to determine the side of the hearse through which the supporting means extends.

10. In a hearse of the side delivery type, means for supporting a casket having a pivot post, a pair of hydraulic cylinders, a plunger rod extending through each of said cylinders, each rod carrying a piston for cooperation with its respective cylinder, pulley means on oposite ends of said rods, pulley means on said pivot post, cable means extending from said cylinders around said pulley means on said rods and said pulley means on said pivot post, and means for delivering hydraulic fluid to said cylinders for moving one of said pistons at a greater rate than the other, whereby said pivot post is moved longitudinally and concomitantly rotated.

11. In a hearse of the side delivery type, means for supporting a casket having a pivot post, a pair of hydraulic cylinders, a plunger rod extending through each of said cylinders, each rod carrying a piston for cooperation with its respective cylinder, pulley means on opposite ends of said rods, pulley means on said pivot post, cable means extending from said cylinders around said pulley means on said rods and said pulley means on said pivot post, means for delivering hydraulic fluid to said cylinders for moving one of said pistons at a greater rate than the other, whereby said pivot post is moved longitudinally and concomitantly rotated, and means for shifting fluid flow between said cylinders for causing either piston to move more rapidly than the other.

12. In a side delivery hearse means for carrying a casket having a pivot post, gear means carried by said post, a gear rack in operative association with said gear means, hydraulic means for actuating said rack, a hydraulic cylinder, plunger means extending from said cylinder having pulley means on opposite ends thereof and carrying a piston within said cylinder for actuation of said plunger means, cable means extending around said pulley means and connected to said pivot post, and means for delivering hydraulic fluid to both of said hydraulic means.

13. In a side delivery hearse means for carrying a casket having a pivot post, gear means carried by said post, a gear rack in operative association with said gear means, hydraulic means for actuating said rack, a hydraulic cylinder, plunger means extending from said cylinder having pulley means on opposite ends thereof and carrying a piston within said cylinder for actuation of said plunger means, cable means extending around said pulley means and connected to said pivot post, and means for delivering hydraulic fluid to both of said hydraulic means but at different rates of flow whereby said first mentioned hydraulic means rotates said pivot post concomitant with longitudinal movement thereof caused by said second mentioned hydraulic means.

14. In a side delivery hearse means for carrying a casket having a pivot post, gear means carried by said post, a gear rack in operative association with said gear means, hydraulic means for actuating said rack, a hydraulic cylinder, plunger means extending from said cylinder having pulley means on opposite ends thereof and carrying a piston within said cylinder for actuation of said plunger means, cable means extending around said pulley means and connected to said pivot post, means for delivering hydraulic fluid to both of said hydraulic means but at different rates of flow whereby said first mentioned hydraulic means rotates said pivot post concomitant with longitudinal movement thereof caused by said second mentioned hydraulic means, and means for shifting the direction of flow of fluid to said first mentioned hydraulic means.

15. A side delivery hearse including means for supporting a casket having a pivot post, a pair of hydraulic cylinders, plunger means extending

from said cylinders carrying pistons on the end thereof, the opposite ends of said plungers being pivotally connected to said pivot post, and means for delivering fluid to said cylinders to cause one of said pistons to advance more rapidly than the other, whereby said pivot post is moved longitudinally and concomitantly rotated.

16. A side delivery hearse including means for supporting a casket having a pivot post, a pair of hydraulic cylinders, plunger means extending from said cylinders carrying pistons on the end thereof, the opposite ends of said plungers being pivotally connected to said pivot post, means for delivering fluid to said cylinders to cause one of said pistons to advance more rapidly than the other, whereby said pivot post is moved longitudinally and concomitantly rotated, and valve means for shifting the direction of flow of fluid between opposite ends of said cylinders.

17. A side delivery hearse including means for supporting a casket having a pivot post, a pair of hydraulic cylinders, plunger means extending from said cylinders carrying pistons on the end thereof, the opposite ends of said plungers being pivotally connected to said pivot post, means for delivering fluid to said cylinders to cause one of said pistons to advance more rapidly than the other, whereby said pivot post is moved longitudinally and concomitantly rotated, valve means for shifting the direction of flow of fluid between opposite ends of said cylinders, and means for shifting the flow of fluid between said cylinders to cause either of said pistons to advance more rapidly than the other.

18. A side delivery hearse including means for supporting a casket having a pivot post, a pair of hydraulic cylinders, plunger means extending from said cylinders carrying pistons on the end thereof, the opposite ends of said plungers being pivotally connected to said pivot post, means for delivering fluid to said cylinders to cause one of said pistons to advance more rapidly than the other, whereby said pivot post is moved longitudinally and concomitantly rotated, valve means for shifting the direction of flow of fluid between opposite ends of said cylinders, means for shifting the flow of fluid between said cylinders to cause either of said pistons to advance more rapidly than the other, means for automatically shifting said valve means, and means for automatically shifting said last mentioned fluid shifting means in response to actuation of the side entry doors of said hearse.

19. A system for controlling the actuation of a hydraulically actuated casket carrying table for a side delivery hearse including an electrically actuated valve means for selecting the direction of flow of hydraulic fluid to the hydraulic actuating mechanism and a reversible electric motor, a relay means for controlling the direction of flow of current to said motor, a second relay means for controlling the flow of current to said motor but in a reverse direction, switch means actuated by one of the side doors of the hearse for establishing a power circuit, switch means actuated simultaneously with said first mentioned switch means for establishing a selected electric circuit for said electrically operated valve, switch means for energizing one of said relay means, and switch means actuated by the position of the casket carrying table for deenergizing said energized relay means.

20. A system for controlling the actuation of a hydraulically actuated casket carrying table for a side delivery hearse including a reversible electric motor, relay means for controlling the direction of flow of current to said motor, a second relay means for controlling the flow of current to said motor but in a reverse direction, individual switch means for actuating said relay means, switch means responsive to the extended or retracted positions of the casket carrying table for deenergizing said relay means, and switch means actuated by the closing of the side entry doors of the hearse for completely deenergizing the electrical control circuit.

21. A system for controlling the actuation of a hydraulically actuated casket carrying table for a side delivery hearse including a reversible electric motor, relay means for controlling the direction of flow of current to said motor, a second relay means for controlling the flow of current to said motor but in a reverse direction, and solenoid means energized by the closing of switch means upon opening of one of the side entry doors of the hearse for controlling the hydraulic actuating mechanism to select the side exit through which the table of the hearse will be extended.

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