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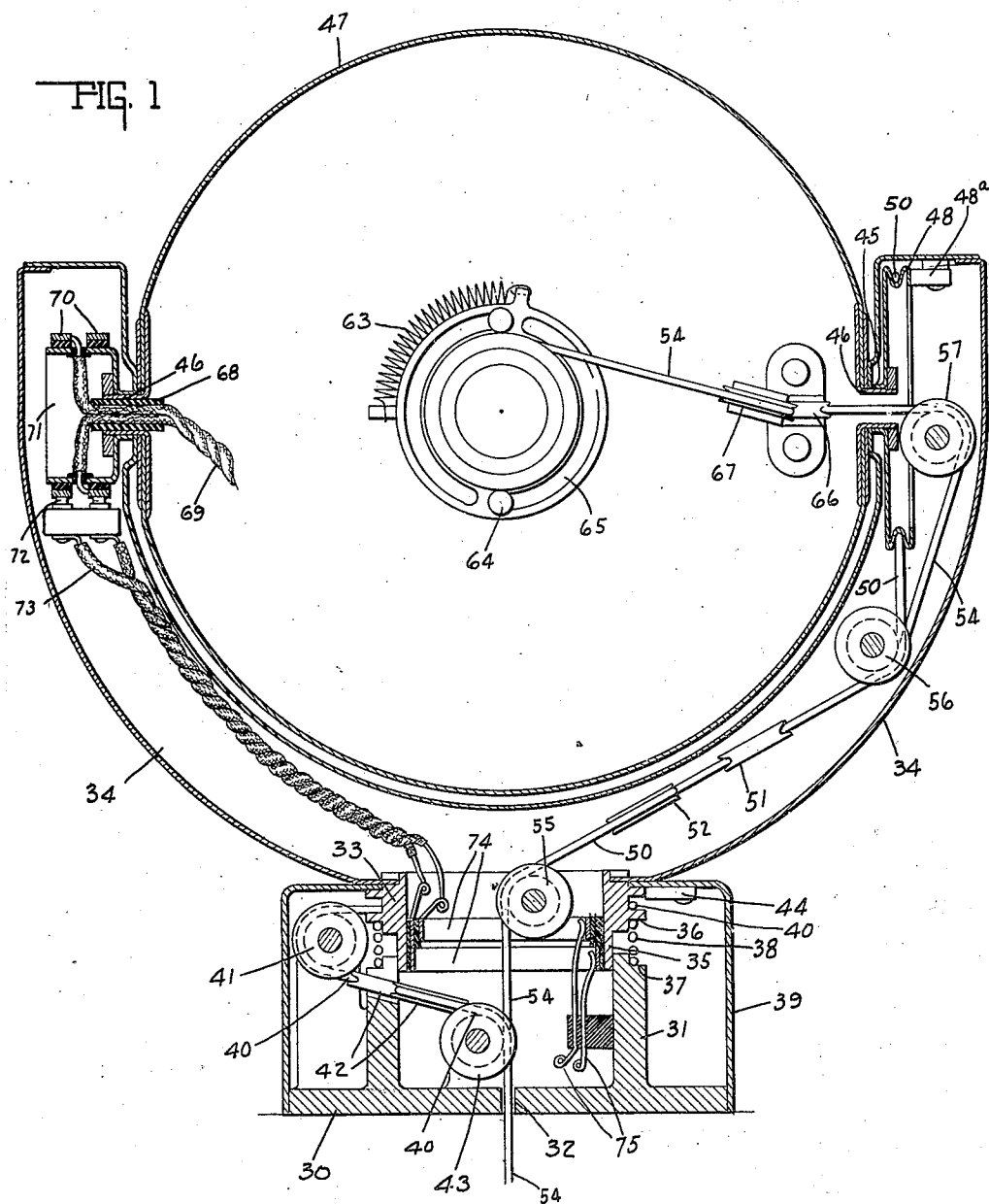
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1,694,477

DIRIGIBLE MOUNTING AND CONTROL MECHANISM THEREFOR

Filed April 2, 1921

8 Sheets-Sheet 1



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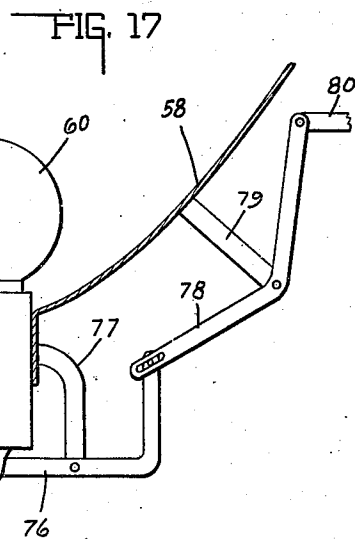
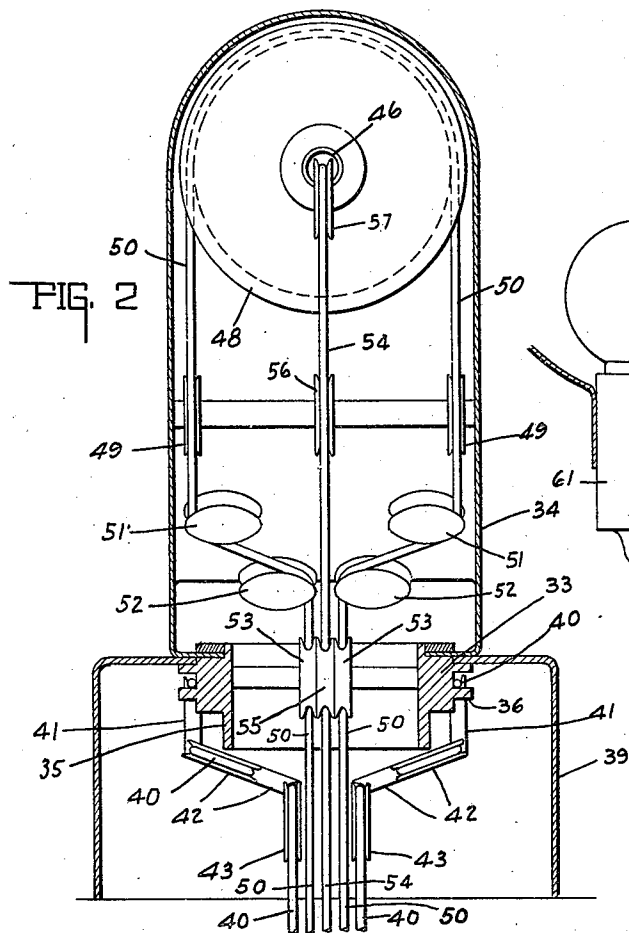
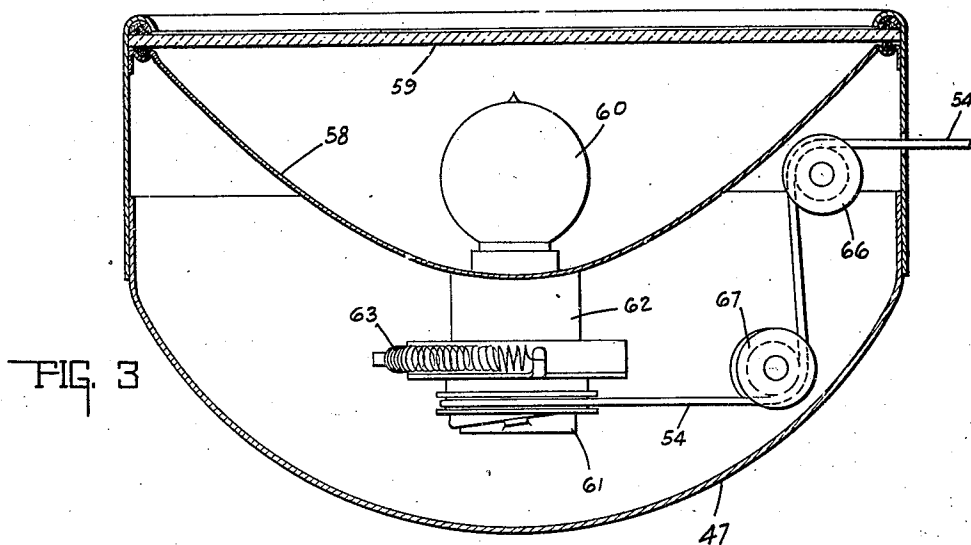
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8 Sheets-Sheet 3

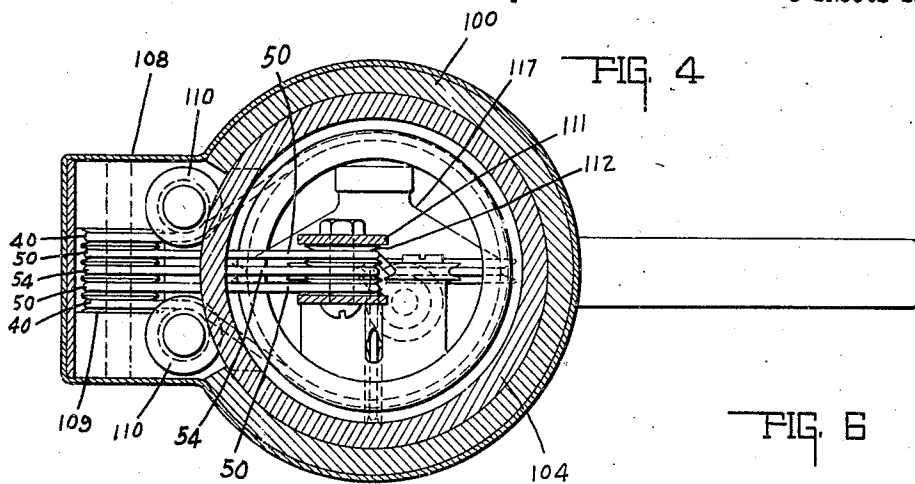
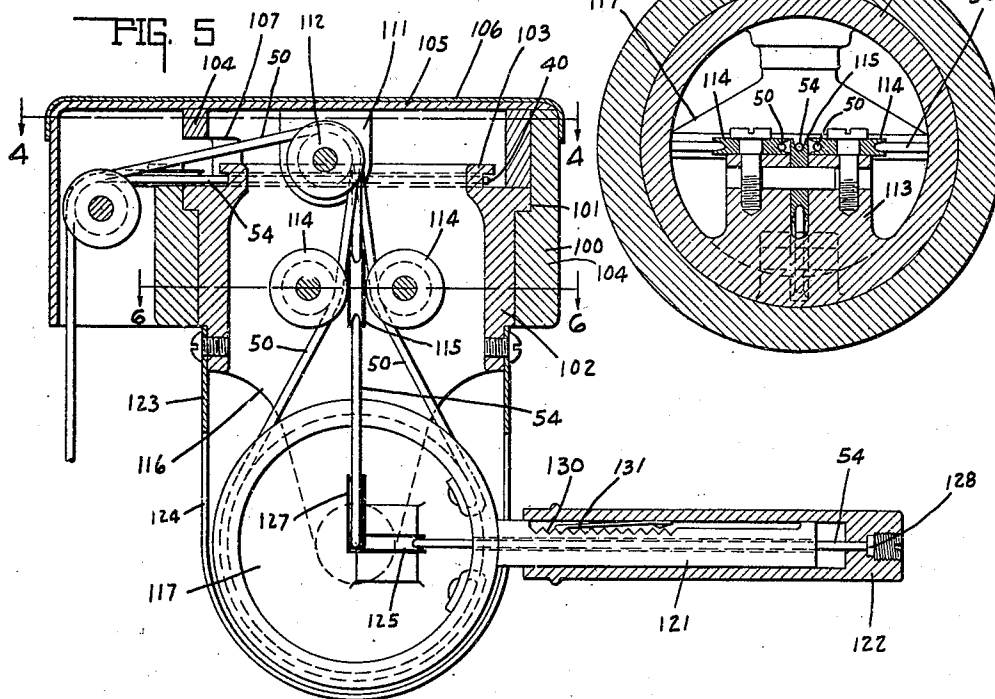


FIG. 6



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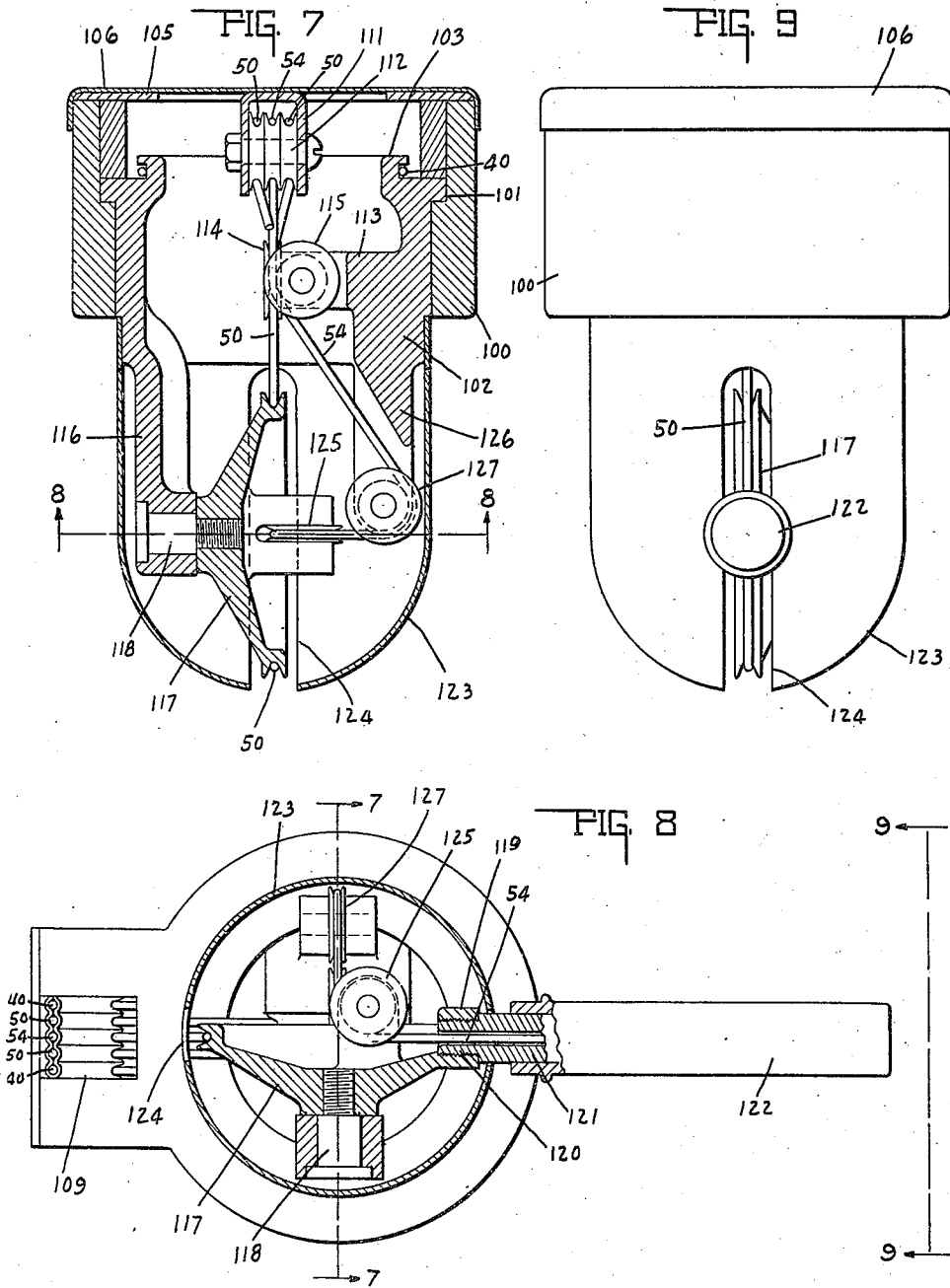
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Filed April 2, 1921

8 Sheets-Sheet 4



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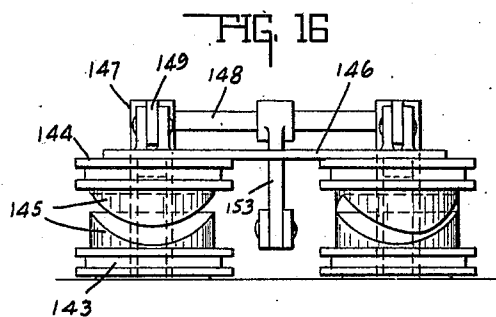
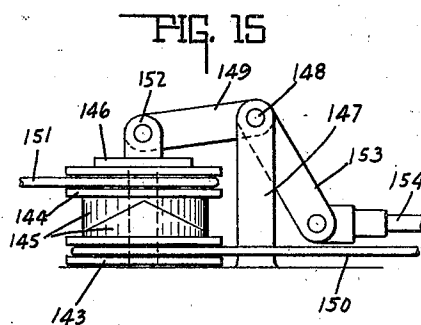
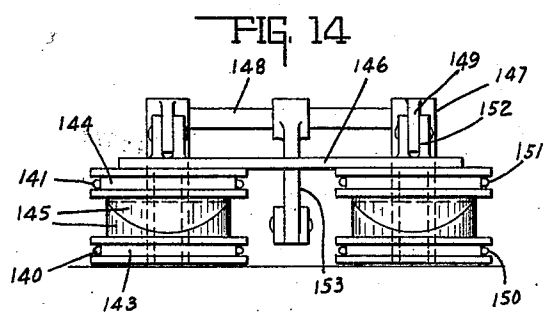
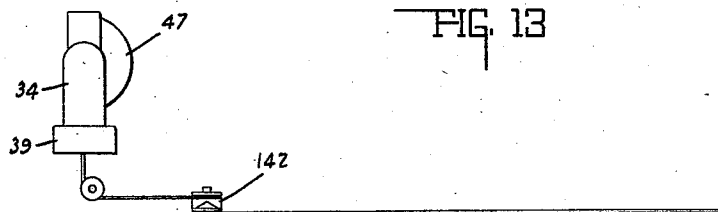
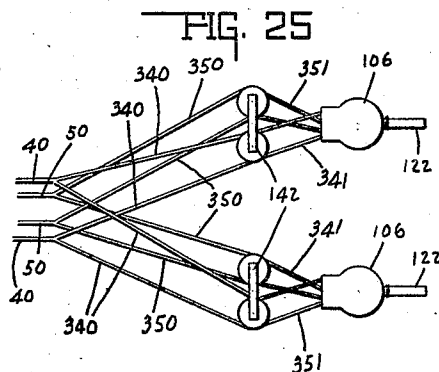
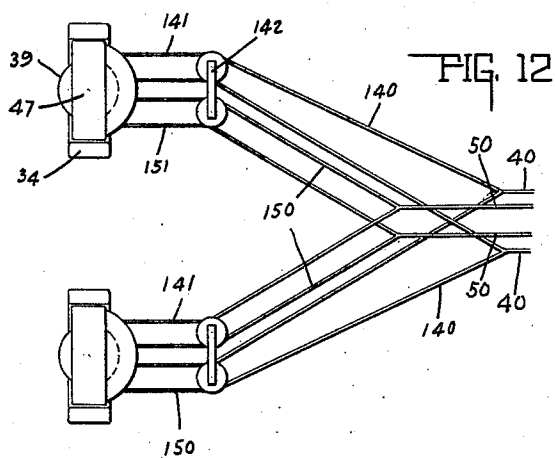
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8 Sheets-Sheet 6



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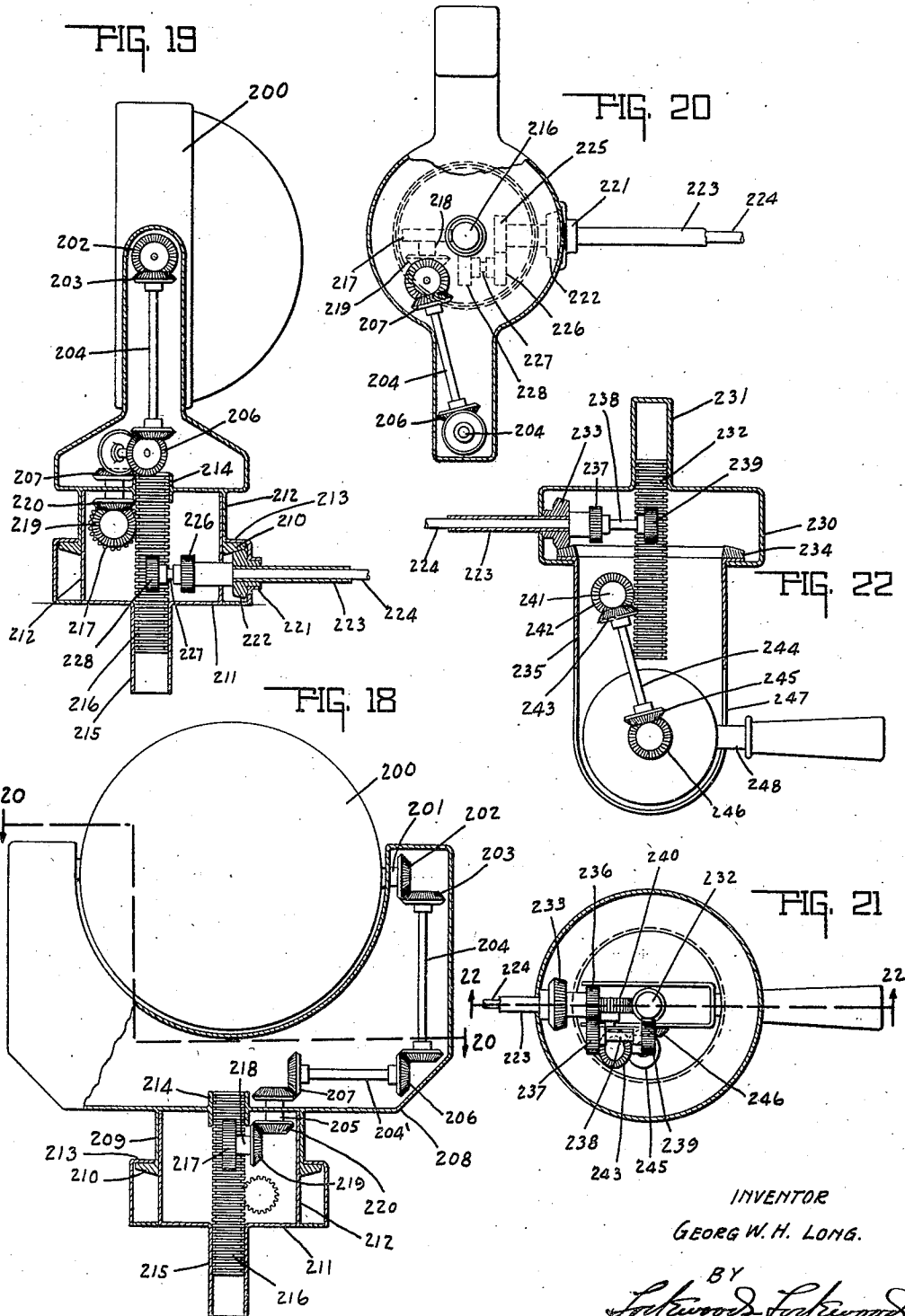
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Filed April 2, 1921

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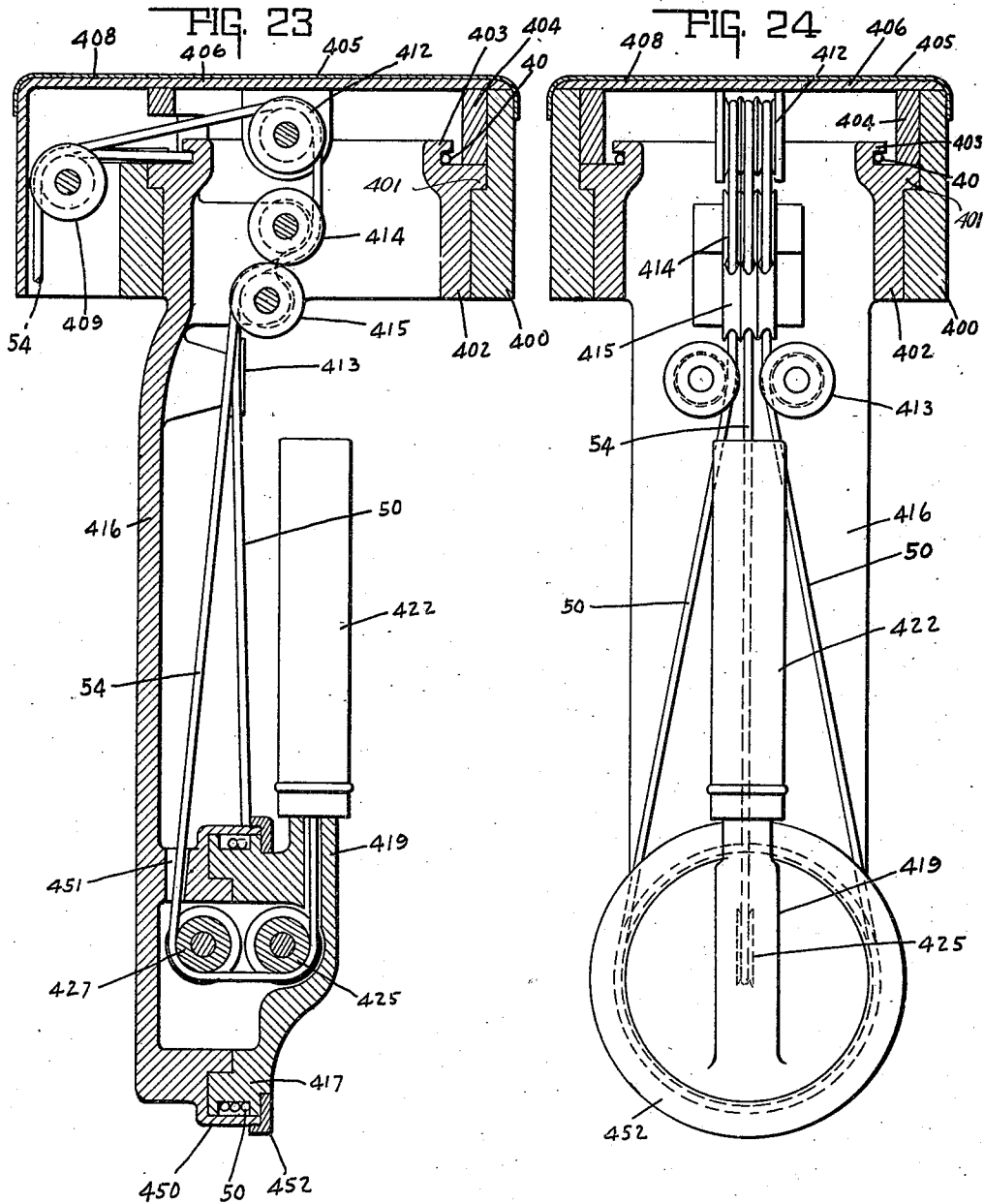
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Filed April 2, 1921

8 Sheets-Sheet 8



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DIRIGIBLE MOUNTING AND CONTROL MECHANISM THEREFOR.

Application filed April 2, 1921. Serial No. 458,013.

This invention relates to a dirigible mounting, such as associated with a dirigible headlight, and dirigible means for controlling the mounting such that the controlling means and the mounting are completely tiltably and completely turnably and synchronously movable.

The chief object of the invention is to provide a dirigible mounting and dirigible means with means connecting the same such that movement of the controlling means automatically and synchronously moves the mounting to the same extent and in the same direction as the controlling means.

Another object of the invention is to provide such a mounting when associated with a lamp construction with lamp controlling means and provide the dirigible controlling means with additional controls associated with the lamp controlling means, and which is independent thereof.

The chief feature of the invention consists in the arrangement of the several parts of the dirigible mounting and of the dirigible controlling means connected thereto, such that the dirigible movement of each is about two transverse axes which intersect, whereby the chief object of the invention is accomplished.

Another feature of the invention consists in associating with the dirigible mounting and the dirigible controlling means suitable connecting means and providing said connecting means with tautening means.

Another feature of the invention consists in associating with a plurality of dirigible mountings a single dirigible controlling means.

Still a further feature of the invention consists in associating means with the aforesaid plural dirigible mountings whereby any one of said dirigible mountings may be disassociated from its association with the single dirigible control.

Another feature of the invention consists in associating a plurality of dirigible mountings with a plurality of dirigible controlling means whereby any one or all of the dirigible controlling means are adapted to control any one or all of the dirigible mountings.

The full nature of this invention will be understood from the accompanying drawings and the following description and claims.

In the drawings Fig. 1 is a central sectional view of a dirigible mounting associated with a lamp construction, and means for con-

trolling the lamp. Fig. 2 is a sectional view of a dirigible mounting shown in Fig. 1 and is taken at right angles to said figure. Fig. 3 is a transverse sectional view of the lamp shown in Fig. 1 and is taken at right angles to said figure. Fig. 4 is a cross sectional view of a dirigible controlling handle and is taken on the line 4—4 of Fig. 5. Fig. 5 is a central cross sectional view of the dirigible handle and means associated therewith, said view being taken in a plane at right angles to the view shown in Fig. 4. Fig. 6 is a cross sectional view taken on line 6—6 of Fig. 5. Fig. 7 is a cross sectional view taken on line 7—7 of Fig. 8 and at right angles to said figure. Fig. 8 is a cross sectional view taken on the line 8—8 of Fig. 7. Fig. 9 is a side elevational view of the dirigible handle controlling means. Fig. 10 is a side elevational view of the dirigible mounting, lamp construction associated therewith, the steering mechanism of a motor vehicle, the dirigible handle controlling means suitably mounted thereon, and connecting means associating the dirigible handle and the dirigible mounting together. Fig. 11 is a top plan view of the aforesaid lamp construction, mounting and dirigible handle, dotted lines indicating the positions of the mounting and the handle. Fig. 12 is a top plan view of a plurality of dirigible mountings each identical with the previously illustrated mountings and showing the same associated with suitable connecting means, which means are connected together to form a single control. Fig. 13 is a side elevational view of a plural mounting construction shown in Fig. 12. Fig. 14 is an enlarged front elevational view of the means interposed between each of the dirigible mountings and the universal control of a control construction as shown in Figs. 12 and 13, said means being shown in the controlling position. Fig. 15 is a side elevational view of means shown in Fig. 14. Fig. 16 is a view similar to Fig. 14, excepting that said means is shown in another position. Fig. 17 is a sectional view of a modified form of lamp construction control and is similar to Fig. 3. Fig. 18 is a partial sectional view of a modified form of mounting wherein the cable construction shown in the previous figures has been replaced by a gear construction. Fig. 19 is a sectional view of the same mounting and is taken at right angles to the view shown in Fig. 18. Fig. 20 is a top plan and partial sectional view of the dirigible mount-

ing with the cable means replaced by a gear construction. Fig. 21 is a cross sectional view of the gear construction dirigible handle. Fig. 22 is a cross sectional view of the handle mounting with the gear mechanism and is taken at right angles to the section shown in Fig. 21. Fig. 23 is a central cross sectional view of a universal rotatably dirigible controlling means. Fig. 24 is a central cross sectional view of the controlling means shown in Fig. 23 and is taken at right angles to said Fig. 23. Fig. 25 is a diagrammatic plan view of a plurality of dirigible controlling means associated with a single set of cable means.

Reference will first be had to Figs. 1, 2 and 3 wherein a dirigible mounting is shown associated with a lamp construction and with means for controlling the lamp. In said figures 30 indicates a base provided with a tubular sleeve portion 31 with a central opening 32. A tubular base 33 supports a two pronged fork, the arms of which are designated by the numeral 34 and said arms are preferably hollow, as shown, and communicate with the tubular support 33. The tubular support 33 is provided with a concentric spaced portion 35 and is rotatably and slidably supported upon the same. A flange 36 on said tubular base 33 and a cutaway portion 37 forms a seat for a coiled and concentric spring 38, which normally forces the tubular member 33 outwardly from the base 30. The outward movement of said tubular base 33 is limited by a housing 39, which substantially encloses all of the aforesaid mechanism except the forked arms.

Thus, the fork or yoke is rotatably and slidably supported upon the base 30. The means for rotating said yoke or fork upon the base 30 comprises an endless cable 40 which is suitably secured to the tubular base 33. Associated with the cable 40 are a pair of positioning, aligning or centering pulleys 41 which are positioned upon opposite sides of said tubular base 33, such that the peripheries of said pulley wheels 41 will lie tangentially of the circumference of said tubular support, as shown clearly in Fig. 2. Another pair of pulley wheels 42 direct the cable 40 to the first mentioned pair of pulley wheels 41, while another pair of pulley wheels 43 are aligned and their peripheries are positioned centrally of the center of the tubular base 33 and the tubular portion 31, as shown clearly in Fig. 1. Thus, tension upon one end of the cable 40 will rotate the tubular base 33 in one direction while tension upon the other end of said cable will rotate the tubular base in another direction. Suitable means, see Fig. 1, which may consist of a ratchet wheel and spring herein designated by the numeral 44, is adapted to yieldingly engage the tubular base 33 yet permit the forcible rotation

of the same when the other end of the cable 40, as shown in Fig. 2, is actuated.

Each fork arm 34 is provided adjacent its free end with an opening 45 which openings are in axial alignment with each other and may be of the same or different size. Said openings are adapted to receive hollow trunnions 46 carried by the lamp housing 47 and suitable means may be introduced through each or both of said hollow trunnion means about said lamp housing. Associated with one of the trunnions is a wheel 48 which wheel is apertured centrally to provide a free passage through the hollow trunnion and in the present instance the wheel 48 is illustrated as a pulley wheel with which is associated an endless cable 50. A pair of oppositely positioned and axially aligned pulleys 49 have their peripheries tangentially aligned with respect to the circumferences of the pulley wheel 48, as shown clearly in Fig. 2, whereby said cable 50 will be aligned with respect to said pulley wheel 48. Two intermediate pairs of pulley wheels 51 and 52 also align the cable 50 and present the same to a pair of pulley wheels 53, the peripheries of which are substantially tangential with respect to the central axis of the tubular base 31 and the tubular support 33, such that the cable 50 also extends through the central aperture 32 in the base 30, see Figs. 1 and 2. A ratchet construction 48^a yieldingly holds the lamp mounting but permits forcible movement thereof.

Another cable 54, see the same figures, is centrally positioned with respect to the central axis of the base 30 and the tubular support 33 and is conveyed through said base by means of a pulley 55 axially aligned with and adjacent to and interposed between the pair of pulleys 53. The cable 54 also is associated with another pulley 56 centrally positioned with respect to the aligned pulleys 49 and intermediate the same. A pulley 57 is positioned adjacent the wheel 48 and a tangent to said pulley periphery coincides with the trunnion axis, which permits the cable 54 to be introduced through said hollow trunnion into the lamp housing. Although but a single cable has been herein described associated with one trunnion, other cable means may be associated with the same or other trunnion without departing from the invention.

The lamp housing 47 contains a reflector 58 and a transparent closure member 59 suitably associated therewith. Between the reflector and the transparent closure member is the usual lamp or source of illumination 60 positioned in a socket 61 in turn supported in an outer socket 62 stationarily positioned. The sockets 61 and 62 have a spiral threaded connection, as shown clearly in Fig. 3. Interposed between said sockets is a tension spring 63, having one end secured to the

socket 61 and the other end secured to the socket 62. Associated with said sockets, is a pin and slot connection designated by the numerals 64 and 65 respectively, which limits the movement of said sockets with respect to each other. The cable 54 introduced laterally through the hollow trunnion into the housing 47 is passed by means of the pulleys 66 and 67 and has its free end secured to the socket 61. Thus, a pull or tension on the cable 54, as shown clearly in Figs. 1 and 3, will cause the socket 61 to rotate with respect to the socket 62 and by means of the threaded engagement between the sockets 61 and 62 will cause said socket 61 to advance longitudinally and axially of the socket 62. In the preferred construction the lamp or source of illumination positioned in the socket 61 is normally focused with respect to the reflector also in said lamp housing by the spring and is maintained therein such that said lamp, when tension is applied to the cable 54, will be moved out of focus. It will, of course, be understood that instead of the spring means herein shown and single cable, the cable 54 may be secured to the socket 61, wrapped around the same and then returned through the admitting trunnion or passed out through the other hollow trunnion and be passed through the other hollow form arm 34 and thence through the tubular support 33 and the base 30 without departing from the broad idea of this particular feature of the invention.

When the device is constructed with the last mentioned feature, the other hollow trunnion is suitably constructed to provide for the intersection of the current carrying means, whereby said means form the hollow trunnion. Such a construction would comprise substantially a pair of concentric current conducting sleeves supported and separated by insulating sleeves, as desired. However, another form of the means for introducing current to the lamp housing and to the lamp and socket therefor is shown clearly in Fig. 1, wherein an insulating bushing 68 is adapted to provide a passage for the insulated current carrying wires 69. The wires 69 are each connected with current conducting rings 70 suitably insulated from and supported upon a cylinder 71 rotatable with the trunnion and forming a portion thereof. A pair of brushes of any usual or preferred form 72 are connected by cable means to a pair of rings 74 and the brushes 72 bear upon and are in contact with the ring 70, as shown. The rings 74 are secured to and carried by the tubular support 33, and suitably supported and insulated from each other upon the stationary base 30 are a pair of contacts 75 which bear upon the rings 74 to form an electric circuit from said stationary base to the lamp and return and yet permit said yoke or fork to be rotated upon said base and said

lamp housing to be rotated in said fork or permit both the fork and the lamp to be rotated simultaneously. It will be readily understood that with the construction illustrated in Fig. 1, current supplying means for the lamp may be introduced through the hollow trunnion associated with the wheel 48, and the lamp focusing means may be associated with the other hollow trunnion.

Included within the breadth of the foregoing feature of the invention is means for focusing the lamp in the lamp housing such as is illustrated in the modified form in Fig. 17. In this modification the slidable socket 61 is associated with a lever 76 pivotally supported on a bracket arm 77 rigid with the reflector 58 or otherwise supported in the lamp housing. The other end of the lever 76 is connected to a bell crank lever 78 also pivotally supported in said lamp housing on a bracket 79, and said lever is suitably tilted by means of a lever 80 suitably actuated by means not shown, but which is introduced to the lamp housing through the hollow trunnion.

Reference will now be had to Figs. 4 to 9 inclusive wherein the dirigible controlling handle means is illustrated in detail. In said figures 100 indicates a stationary tubular base cut away at 101 to rotatably support an inner and concentric sleeve 102 having a complementary flange seatable in the cut away portion 101. The sleeve or tube 102 constitutes a wheel, and in the present invention is shown as a pulley wheel, the upper portion 103 thereof being suitably formed so as to receive the cable 40 hereinbefore described. A spacing sleeve 104 in association with the cover 105 and cap 106 closes the upper end of the tubular construction hereinbefore described, while said sleeve 104 is apertured at 107 to permit the several cables to pass through the same.

The closure 105 is extended outwardly at one portion 108 to form a receiving chamber wherein there are positioned a plurality of aligned pulleys 109, see Figs. 4 to 8 inclusive, which receive the several cables 40, 50 and 54 hereinbefore described. Positioned upon opposite sides of the pulleys 109 and lying in a plane tangentially to said pulleys is another pair of pulleys 110 over which the cable 40 passes so as to align the cable 40 so that the same may be readily receivable by the pulley portion 103 of the wheel or tubular construction 102. Thus, movement of the tubular wheel 102 will cause the cable 40 to be moved which will cause the means hereinbefore described as associated with the mounting, to be simultaneously moved.

In the bracket means 111, see Figs. 4, 5 and 7, there is rotatably mounted a plurality of aligned pulleys 112. The pulleys 112 are herein shown as three in number to accommodate the single cable 54 and the endless cable

50. The pulleys 112 are stationarily positioned on or immediately adjacent the wheel 102. When the wheel 102 rotates, the cables do not foul, and the slack, if there be any, is removed by means hereinafter to be described. On a slotted bracket 113, see Fig. 6, secured to the wheel 102 is a pair of pulleys 114; and in the bracket slot is mounted an intermediate pulley 115 with its axis at right angles to the axes of the pair of pulleys which have their axes parallel to each other. The three pulleys are rectangularly positioned and have their adjacent peripheries substantially tangential to the axis of the wheel 102, this arrangement being clearly shown in Fig. 6. One portion of the tubular wheel 102 extends outwardly from the stationary base 100 and is herein indicated by the numeral 116. In the free end of said extension there is rotatably supported a wheel 117, herein shown in the form of a pulley wheel, which carries the cable 50, the pulley wheel being suitably and rotatably secured in said bracket by suitable pivot bolt means 118. The pulley wheel 117 at one point in its periphery is enlarged to form a boss 119 which has a threaded opening adapted to receive the threaded stem 120 of a tubular shank 121 of a handle, said handle being provided with an enclosing sleeve 122. The projecting portion of the wheel base 102 and the pulley wheel 117 and the associated mechanism is enclosed in a housing 123 having a slot 124 therein which permits the handle to revolve between 300 and 360 degrees. Thus, rotational movement of the handle 122 in the plane of the pulley 117, which plane also includes the axis of rotation of the pulley wheel 102, provides that the cable 50 will be transferred to the mechanism associated therewith. Thus the dirigible mounting will be rotated in said mounting means in substantially the same manner and to the same degree as the handle 122 is revolved. The handle 122 as clearly shown in Fig. 9 is also adapted to revolve in a plane at right angles to the pulley wheel 117 and parallel to the pulley wheel 102. The handle 122 is also adapted to revolve in any other plane about the center of the intersection of the axes of the pulley wheel 117 and the pulley wheel 103, thus providing for substantially universal rotational movement, which universal rotational movement of the handle means will be transmitted to the universally rotatable mounting means previously described.

The pulley wheel 117 supports another pulley wheel 125 at right angles thereto, which pulley wheel 125 is so positioned that the axis of said pulley wheel 117 is substantially tangential to a portion of the periphery of the pulley wheel 125. The axis of the pulley wheel 102 is also substantially tangential to the periphery of said pulley wheel 125. Positioned in a bracket or arm 126 also ex-

tending from the tubular wall 102 is another pulley wheel 127, which is in alignment with the pulley wheel 125, as clearly shown in Figs. 7 and 8. The cable 54 passes over the pulley 115 to the pulley 127 and thence to the pulley 125. The cable 54, see Figs. 5 and 8, extends through the threaded boss 119 and into the tubular handle shank 121 since axis of said handle is also tangential to the pulley 125 and is rigidly secured at 128 to the handle sleeve 122, as shown. The handle tube 121 or shank in the present invention is provided with a plurality of teeth 130 on its outer surface and a spring tooth 131 has one end secured to the handle sleeve 122 so that said spring tooth engages in the toothed surface 130 to maintain said handle sleeve 122 in position upon the shank 121. It will be understood that the spring tooth 131 permits forcible movement of the handle sleeve 122 with respect to the shank 121, but has sufficient resistance to maintain said handle in any adjusted position on said shank. Thus, as the handle sleeve is moved longitudinally of the shank tube the cable 54 is actuated to actuate and turn the focusing mechanism hereinbefore described as associated with the lamp. It will be thus noted that the focus controlling mechanism is centrally positioned or is associated with the dead centers of all of the aforesaid constructions and, therefore, in all of the movement of the handle other than the longitudinal movement of the sleeve with respect to the shank, said cable 54 is neither foreshortened nor lengthened in any material degree by the universal movement described.

Reference will now be had to Figs. 10 and 11 wherein the dirigible handle and the dirigible mounting is shown associated with a motor vehicle wherein 90 indicates a suitable supporting portion of the vehicle and 91 indicates a portion of the steering mechanism thereof illustrated as the steering column tube associated with the steering wheel. The cables, see Fig. 11, 40, 50 and 54 are brought out from the dirigible mounting as shown in Fig. 10 and are extended to the universal handle, which handle is adjustably supported upon the motor vehicle and preferably upon the steering mechanism hereinbefore described by means of the brackets or clamps 92. In the present invention said handle means is positioned such that the several axes are parallel with the axes of the universal mounting and since the center of universal rotation of the handle means coincides with the intersection of the axes of the pulley wheels the "feel" of said handle coincides with the dirigible mounting such that said handle, when moved to any position, will move the lamp in the mounting to the same position and said handle, since the same is not off center, will have what may be termed the correct feeling that the lamp has been

moved with the handle and simultaneously therewith and to the same extent.

In Fig. 10 there is illustrated suitable tautening means herein shown in the form of brackets 93, suitably secured to the vehicle chassis or frame and slidably supported in said brackets are pulley supports 94 carrying the pulleys 95 which are associated with the several cable means. The pulley support 94 is provided with a sliding and yielding connection with the bracket 93 by suitable coil spring means 96, as shown. Thus, the bracket means 96 normally maintains the cables 40 and 50 taut at all times, but has not sufficient tension to prevent movement of the universal mounting when the handle is moved. Other means such as the connectors 97 in the form of turn-buckles or other usual or preferred means are provided whereby the length of the several cables may be readily adjusted so that the amount of tension and slack to be taken up by the means previously described will be substantially similar for all the cables. The aforesaid adjusting or connecting means also permits the cables to be readily threaded through the pulleys and be brought to a convenient point to be connected.

Reference will now be had to Figs. 12 to 16 inclusive wherein a plurality of mountings, herein shown as two in number, are associated together in parallel and so connected that a single set of cables controlled by a single handle means is sufficient to actuate all of said mountings simultaneously. As shown clearly in Fig. 12 one portion of the cable 40 is branched to form a loop 140, and the loop is also connected with a similar loop 140 formed by the branched connection of the other portion of the cable 40. Thus, movement of the cable means 40 will move both of the mountings. Similarly the cable 50 is branched as at 150 and is similarly moved.

In the present invention, however, the branched cables 140 and 150 do not extend directly to the lamp mounting, but subsidiary cable means is associated therewith and said subsidiary means is suitably connected to the branched cable means by connecting means which permits either of said mountings to be disconnected from operative association with the cable means 40 and 50 so that the receiving lamp or lamps or mountings will still be responsive to the actuation of the handle. Such means includes the subsidiary connections 141 and the subsidiary connections 151, which are associated with the branched connections 140 and 150 and are actuated thereby. Each of the connections 141 and 151 constitutes a closed loop and is associated with the mounting in substantially the same manner as the cables 40 and 50 respectively were associated with said mounting, the details of the mounting being clearly shown in Figs. 1 to 3 inclusive. Suitable means indi-

cated in Figs. 12 and 13 by the numeral 142 includes a pair of similar cams, each cam portion being associated with a pulley wheel.

Reference will now be had to Figs. 14 to 16 inclusive and in said figures the connecting means 142, shown in Figs. 12 and 13 and illustrated in detail, comprises a pulley wheel 143 in parallel relation with a pulley wheel 144, said pulley wheels being slidably supported with respect to their axes so that the pulley wheels may be movable toward and away from each other. Herein the intermediate connecting means positioned between said pulley wheels, whereby when said pulley wheels are moved towards each other, said pulley wheels will move together as a unit, is shown as a pair of similarly and oppositely formed cams 145. Each of the aforesaid constructions is provided for each branched connection and for each subsidiary loop cable, and since two controls are illustrated for each mounting in Figs. 12 and 13, although additional controls may be added in a similar manner, the connecting means hereinbefore described for the several controls for each mounting are associated together so that said connecting means for each mounting may be rendered non-operative as a whole, although of course, individual controlling or actuating means may be provided, if desired. Herein the common control for the plural controls of a dirigible mounting in parallel relation with other dirigible mountings is shown including a cross bar 146 to which is secured the pulley wheels 144. Pivotally supported in standard means 147 is a rock shaft 148 and associated with said shaft and rockable therewith are the levers 149, each associated with the ears 152 on the plate 146 whereby a balanced construction is secured. A common lever 153 is medianly positioned upon the rock shaft 148 and between the connecting means hereinbefore described and suitable actuating means 154 is connected to the other end of the lever 153 for rocking the shaft 148 and associated mechanism to elevate the cams 145 and pulley wheels 144 out of association with the complementary cam means 145 and pulley wheel 143, thereby disconnecting the connection or association of the subsidiary controls with the branch controls just described. Thus, when the actuating rod 154 is actuated by any suitable means, such as a pedal or the like, or handle means positioned in the driver's compartment of the motor vehicle, the desired universal mounting in parallel association with other mounting or mountings may be disconnected from said branch association and rendered inoperative with respect to the handle actuation.

Figs. 18 to 22 illustrate a complete gear construction embodying the same features hereinbefore described and the broader features of the invention are identical with those now to be described, although the specific features

thereof differ slightly. Figs. 18, 19 and 20 illustrate in detail the universal mounting when associated with a lamp construction, while Figs. 21 and 22 illustrate a similar handle means. In order to illustrate the gear construction the same has been reduced to the tiltable and turnable headlight wherein a complete turn can be made which thereby gives adjustment in any position of the sphere of possible movement. In the aforesaid figures the lamp housing and the usual construction is indicated generally by the numeral 200 and the trunnion by 201. The trunnion 201 may, of course, be hollow or may be solid, depending upon whether means is to be introduced into the lamp housing or not. Upon the trunnion 201 is a beveled gear 202 meshing with a bevel gear 203, which bevel gear is rotatable by a shaft 204 in turn rotatable by another shaft 204', said shaft being connected to a third shaft 205 by the intermediate bevel gears 206 and 207 respectively. All the aforesaid construction is contained within the hollow yoke 208, as shown clearly in Fig. 18. The yoke 208 is provided with a circular sleeve portion 209 which terminates in a gear wheel or bevel gear 210. A stationary base 211 is provided with a tubular guide portion 212, which is associated with the tubular portion 209 and rotatably supports the fork and prevents the movement of said fork toward said base 211. Outward movement of the fork upon said base is prevented by the circular closure or guard member 213. The fork 208 is provided with a circular guide 214 while the base is provided with a similar guide 215, said guides being in aligned relation and adapted to slidably support a circular or cylindrical rack 216. The rack 216 engages a gear 217 supported upon a shaft 218 which is rotatable with the fork 208. The other end of the shaft 218 carries a bevel gear 219 which meshes with a similar bevel gear 220 upon the shaft 205. Thus, in any position of the fork the circular rack is always in mesh with the gear 217 to tilt the lamp construction 200 upon the trunnion axis. The fork in turn is rotatable through the gear wheel 210. Thus, the axes of the circular rack 216 and the circular gear 210 coincide. The closure 213 is provided with a bearing 221 and in said bearing is rotatably supported a pinion gear 222 which meshes with the gear wheel 210. The wheel 222 is rotatable by a sleeve 223 or by a hollow flexible shaft or equivalent means. Within the sleeve of the hollow flexible shaft 223 is a shaft, solid or tubular as preferred and stiff or flexible also as preferred, said shaft being indicated by the numeral 224. The shaft 224 extends through the hollow shaft 223 and extends within the circular guide support 212 and upon its other end carries a gear 225 which meshes with an offset gear 226 supported upon a shaft 227 which shaft carries another gear

228 also in mesh with the circular rack 216.

The handle means is illustrated in Figs. 21 and 22 and comprises a substantially similar construction to that hereinbefore described. In said figures the stationary base is indicated by the numeral 230 and is provided with a cylindrical guide 231 which receives a circular cylindrical rack 232 substantially similar to the circular rack 216. The stationary housing is apertured and receives the hollow shaft 223 and the shaft 224, as shown. Upon the hollow shaft 223 and rotatable therewith is a bevel pinion 233 which meshes with a bevel gear wheel 234 rotatably supported in the housing 230. Secured to said bevel gear and rotatable therewith is a housing 235. The circular rack 232 is mounted axially with the gear wheel 234. The shaft 224 terminates within the housing and carries a gear 239. Thus, in spite of rotational movement the rack will always be in mesh with the gear 239. Also in mesh with the cylindrical rack 232 is another gear 240 which is carried on a shaft 241 which also carries a bevel gear 242, which in turn meshes with another bevel gear 243 upon one end of the shaft 244. The other end of the shaft 244 carries a bevel gear 245 in mesh with a bevel gear 246. The axis of the bevel gear 246 intersects the axis of the bevel gear 234 and also the circular rack 232. The housing 235 is suitably slotted at 247 and through the same extends a handle 248 which is rigid with the gear 246. Thus, the handle 248 is rotatable in a plane the center of which is the intersection of the axis of the gear 234 and the gear 246 to provide for universal movement.

Reference will now be had to Figs. 23 and 24 wherein the dirigible control handle means is illustrated in detail and said handle being a universally movable handle, it, of course, being understood that the handle means illustrated in Figs. 4 to 9 inclusive is not entirely but substantially universally movable since there is a portion of the sphere of rotation which is obstructed by the housing, since the form in Figs. 4 to 9 is designed for compactness yet be suitable for the average requirement. In Figs. 23 and 24, 402 indicates the wheel provided with a pulley wheel portion 403 about which the cable 40 is wrapped. Herein but one wrap is illustrated. The pulley wheel 402 is rotatably supported in the stationary base 400 upon the ledge 401. The spacing sleeve 404 is associated with said wheel to retain the same upon the ledge. The usual closure members 405 and 406 are associated with the base in substantially the same manner as the similarly numbered numbers in the 100 series are associated. Depending from the wheel 402 is a bracket arm 416 which terminates in the rotatable bearing 450, as shown. Said bearing is apertured to receive the cable 54 and rotatably supported in the bearing 450 is a pulley wheel 417 to which the

cable 50 is wrapped several times. A cover 452 secures said pulley wheel in said rotatable bearing 450. With the exception of the foregoing and the offset pulleys 415^a, the other parts in Figs. 23 and 24 which are similar to the parts in Figs. 4 to 9 inclusive are similarly numbered except that the first group is in the 400 series while the other group is in the 100 series.

10 In Fig. 25 there is illustrated an extension and not a modification of the invention. In this extension there is shown a plurality of dirigible handles or controlling means associated with the single cables and in said figure 15 106 indicates the housing and 122 the handle universally movable therein. The numerals 40 and 50 also indicate the cable means hereinbefore described. Associated with each end of the cable 40, substantially similar to the branched cables 140, illustrated in Fig. 12, are the branch cables 340, while associated with the cables 50 are the branch cables 350. The branch cables 340 and 350 are each associated with suitable connecting means generally indicated by the numeral 142, said connecting means being shown clearly in detail in Figs. 14 to 16 inclusive. Also associated with said connecting means and connecting the same with the handle means hereinbefore described, are the loops 341 and 351 respectively associated with the branch connections 340 and 350 in turn connected to the single cables 40 and 50. As shown clearly in Fig. 25 the single cables 40 and 50 may be connected to either a single dirigible mounting or a plurality of dirigible mountings similarly connected, as shown in Fig. 12, Fig. 25 illustrating an extension of Fig. 12, said last, if desired, being connected by the connecting device such as that indicated by the numeral 97 in Fig. 11.

Thus, the mechanism described and illustrated in the foregoing specifications broadly includes a plurality of dirigible mountings, a plurality of dirigible handles associated together such that but a single handle or control means is adapted to actuate one or any one mounting or all of the handles are adapted to actuate any or all of the mountings, each mounting being as illustrated in detail in Figs. 1 to 3 inclusive, and each handle being illustrated in detail in Figs. 4 to 9 inclusive and in Figs. 2 and 24 as well, while the positioning of the mounting and the handle means in the preferred position is illustrated in Figs. 10 and 11.

In the claims the term "completely dirigible" is intended to include a device capable of rotating about two transverse axes for 360° of rotation.

The invention claimed is:

1. A dirigible construction including a completely dirigible movable mounting, a completely dirigible movable handle, cable means connecting said handle and said

mounting, and means for maintaining said cable means taut at all times.

2. A dirigible construction including a completely dirigible movable mounting, a completely dirigible movable handle, cable means connecting said handle and said mounting, means for adjusting the length of the cable means to the handle and the mounting, and means for maintaining the adjusted cable means taut at all times.

3. A dirigible construction including a completely rotatable supporting member and a second member pivotally mounted thereon and completely rotatable on the pivotal mounting, in combination with two wheels mounted to revolve on axes at right angles to each other but having different centers of rotation, handle means associated with both of said wheels and adapted to control either or both at will, and connecting means connected to said wheels and said first mentioned supporting member and said second mentioned member respectively, whereby movement of the handle is transmitted to the second mentioned member.

4. A dirigible construction including a completely rotatable supporting member and a second member pivotally mounted thereon and completely rotatable on the pivotal mounting, in combination with two wheels mounted to revolve on axes at right angles to each other, a handle means associated with both of said wheels and adapted to control either or both at will, and connecting means connected to said wheels and to said first mentioned member and the second mentioned member respectively whereby movement of the handle means is transmitted to the second mentioned member, said handle and second mentioned member being connected to the connecting means and wheels such that said second member will always take the direction of the handle.

5. A dirigible construction comprising a controlled member, a base tiltably and turnably mounting the same, a handle, another base tiltably and turnably mounting said handle, and means constantly connecting the handle to the member for movement whereby the member will be moved synchronously by and with the handle, said bases being positioned with respect to each other such that the direction of the handle and the member will always be coincident or parallel.

6. A device of the character described in claim 5, characterized by a connection between the controlled member and its supporting base and another connection between the handle and its supporting base whereby coincident or parallel movement is secured and complete turning movement through 360 circular degrees is possible.

7. A dirigible construction including in combination a plurality of members each dirigibly mounted for tilting and turning

movement, a single controlling means, means connecting said dirigibly mounted members in parallel, means connecting said parallel connecting means to said controlling means, and interlocking cam means interposed in each of said parallel connecting means to connect and disconnect the dirigibly mounted members with and from said single controlling means.

8. A dirigible construction including in combination a plurality of members each dirigibly mounted for tilting and turing movement, a single controlling means, means connecting said single controlling means with all of said dirigibly mounted members and simultaneously controlling the same, means interposed in said connecting means for disconnecting one of said dirigibly mounted members from said simultaneous connections, and means for holding said separated dirigibly mounted member from free swinging movement.

9. A dirigible construction including in combination a plurality of dirigibly mounted members, controlling means therefore, dual controlling connectors for each dirigibly mounted member and connected to the controlling means, a separable controlling device for each dual connector, and a common means for operating the pair of separable devices for connecting and disconnecting the dirigibly mounted member controlled thereby.

10. A mounting including a base, a support rotatably and slidably mounted on the base, spring means for forcing said support in one direction, means on the base for limiting said slidable movement of said support, and means for rotating said support on said base.

11. A mounting including a tubular base, a support rotatably and slidably mounted in the tubular portion of said base and having a portion extending below said tubular portion and extending outwardly, spring means for forcing the support from said base, and means extending outwardly from said base to limit the movement of said support.

12. A mounting including a tubular base, a support rotatably and slidably mounted in the tubular portion of said base and having a portion extending below said tubular portion and extending outwardly, spring means for forcing the support from said base, means enclosing said tubular construction and extending outwardly from said base to limit the outward movement of said support, and means within said enclosed means for turning said support on said base.

13. A mounting including a tubular base, a tubular support rotatably mounted in the tubular portion of said base and having a portion extending downwardly and extending outwardly, a member movably supported by said support, a spring for forcing the support from said base, means enclosing said

tubular support and extending outwardly from said base to limit the outward movement of said support, means within said enclosing means for turning said support on said base, and operating mechanism for moving said member and positioned in said tubular support so as to be undisturbed by movement of the support upon the base.

14. A controller for a dirigible construction including a stationary base, a wheel rotatably mounted on said stationary base, a second wheel rotatably mounted on said first wheel with intersecting transverse axes, and a handle mounted on the second wheel and clearing said base for complete dirigibility.

15. A dirigible controller for a dirigible construction including a stationary base, a wheel rotatably mounted on said stationary base, and a second wheel rotatably mounted on said first wheel, said wheels having different centers and lying in planes at right angles to each other but having intersecting axes forming a right angle.

16. A controller for a dirigible construction including a stationary base, a hollow wheel rotatably mounted on said stationary base, a second hollow wheel rotatably mounted on said first hollow wheel, a handle associated with said wheels for turning either or both, and means associated with the handle and centrally positioned with respect to said hollow wheels for providing a third control.

17. A controller for a dirigible construction including a stationary base, a centrally apertured wheel rotatably mounted on said base, a second wheel rotatably mounted on said first mentioned wheel, means centrally positioned in said aperture and centrally positioned with respect to the axis of said second wheel, handle means associated with said wheels for turning either or both, said handle means including a plurality of relatively movable means, said central positioned means being associated with one of said relatively movable handle means for providing a third control.

18. A controller for a dirigible construction including a stationary base, a centrally apertured wheel rotatably mounted on said base, a second wheel rotatably mounted on said first mentioned wheel, means centrally positioned in said aperture and centrally positioned with respect to the axis of said second wheel, handle means associated with said wheels for turning either or both, said handle means including a plurality of relatively movable means, said centrally positioned means being associated with one of said relatively movable means for providing a third control, and means associated with said relatively movable means for yieldingly retaining said relatively movable handle means in adjusted position yet permit forcible relative movement thereof.

19. A dirigible construction including in

combination a plurality of pivotally supported supporting members, another member pivotally mounted on each of said supporting members, two wheels associated with each pair of associated members and mounted to revolve on axes at right angles to each other and adjacent each other, a single handle means associated with both of said wheels, means connected to one of said wheels, other means connected to the other of said wheels, branch means connected to the supporting member and to one of said connecting means, other branch means connected to the other connecting means whereby movement of the handle means is transmitted to all of said associated members, interlocking cam means for each branch connection, means associated with said cam means of each pair of associated members to render inoperative the connections thereto from the handle means, and means associated with each of said dirigibly mounted members for holding the supported dirigibly mounted member against free swinging movement but permitting the forcible universal movement thereof when connected to the controlling means.

20. A dirigible construction including in combination a plurality of pivotally supported supporting members, another member pivotally mounted on each of said supporting members, two wheels associated with each pair of associated members and mounted to revolve on axes at right angles to each other and adjacent each other, a single handle means associated with both of said wheels, means connected to one of said wheels, other means connected to the other of said wheels, branch means connected to the supporting member and to one of said connecting means, other branch means connected to the other connecting means whereby movement of the handle means is transmitted to all of said associated members, interlocking cam means for each branch connection, and means associated with said cam means of each pair of associated members to render inoperative the connections thereto from the handle means.

21. A dirigible construction including in combination a plurality of pivotally supported supporting members, another member pivotally mounted on each of said supporting members, two wheels associated with each pair of associated members and mounted to revolve on axes at right angles to each other and adjacent each other, a single handle means associated with all of said pairs of said wheels, means connected to one of said wheels, other means connected to the other of said wheels, branch means connected to the supporting member and to one of said connecting means, other branch means connected to the other connecting means whereby movement of the handle means is transmitted to all of said associated members, and separable means associated with the branch connections of

each pair of associated members to render inoperative the connection between said pair of associated members and the handle.

22. A dirigible construction including in combination a plurality of pivotally supported supporting members, another member pivotally mounted on each of said supporting members, two wheels associated with each pair of associated members and mounted to revolve on axes at right angles to each other and adjacent each other, a single handle means associated with all of said pairs of said wheels, means connected to one of said wheels, other means connected to the other of said wheels, branch means connected to the pivotally supported supporting member and to one of said connecting means, and other branch means connected to the other connecting means whereby movement of the handle means is transmitted to all of said plural pairs of pivotally associated members.

23. A device of the character described in claim 5, characterized by a connection between the controlled member and its supporting base and another connection between the handle and its supporting base whereby coincident or parallel movement is secured and complete turning movement through 360 spherical degrees is possible.

24. In a dirigible construction the combination of a controlled member, a support therefor tiltably and turnably supporting the same having a pair of axes intersecting, a handle, a support therefor tiltably and turnably supporting the same having intersecting axes, and means constantly connecting the handle and the controlled member for tilting or turning movement without interference from the other movement.

25. In a dirigible construction the combination of a controlled member, a support therefor tiltably and turnably supporting the same, having a pair of axes intersecting, a handle, a support therefor tiltably and turnably supporting the same having intersecting axes, and means constantly connecting the handle and the controlled member for movement for simultaneously tilting and turning movement without interference.

26. A device of the character described in claim 25, characterized by the handle and the controlled member being so supported that the movement of each will be simultaneously and constantly synchronous and parallel.

27. A dirigible construction including in combination a plurality of dirigibly mounted members, a plurality of dirigible controlling means, means connecting said controlling means in parallel, other means connecting said dirigibly mounted members in parallel, and means connecting said parallel connecting means whereby any one of said dirigible controlling means is adapted to control all of said dirigibly mounted members.

28. A dirigible construction including in

combination a plurality of dirigibly mounted members, a plurality of dirigible controlling means, means connecting said controlling means in parallel, other means connecting said dirigibly mounted members in parallel, means connecting said parallel connecting means whereby any one of said dirigible controlling means is adapted to control all of said dirigibly mounted members, and individual means for each dirigibly mounted member interposed in said dirigibly mounted member parallel connection for disconnecting said parallel connection from the dirigibly mounted member.

29. A dirigible construction including in combination a plurality of dirigibly mounted members, a plurality of dirigible controlling means, means connecting said controlling means in parallel, other means connecting said dirigibly mounted members in parallel, means connecting said parallel connecting means whereby one and all of said dirigible controlling means is adapted to control one

and all of said dirigibly mounted members, means for each dirigibly mounted member interposed in said dirigibly mounted member parallel connecting means for disconnecting said parallel connection from the dirigibly mounted member, means associated with each dirigibly mounted member for preventing free swinging movement thereof when disassociated by said interposed means, and means for each dirigible controlling means interposed in said dirigible controlling parallel connecting means for disassociating said parallel connection from adjacent dirigible controlling means.

30. A completely dirigible construction including a completely dirigible mounting, a completely dirigible control and means connecting said mounting to said control for synchronous movement of the former by and with the latter.

In witness whereof, I have hereunto affixed my signature.

GEORGE WM. H. LONG.