Nov. 30, 1937. W. C. EDWARDS 2,100,657

SWITCH

Filed March 9, 1934 2 Sheets-Sheet 1

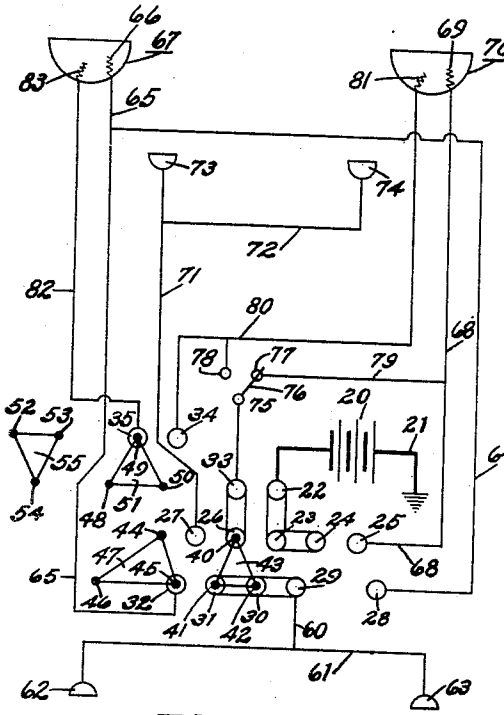


Fig. 1

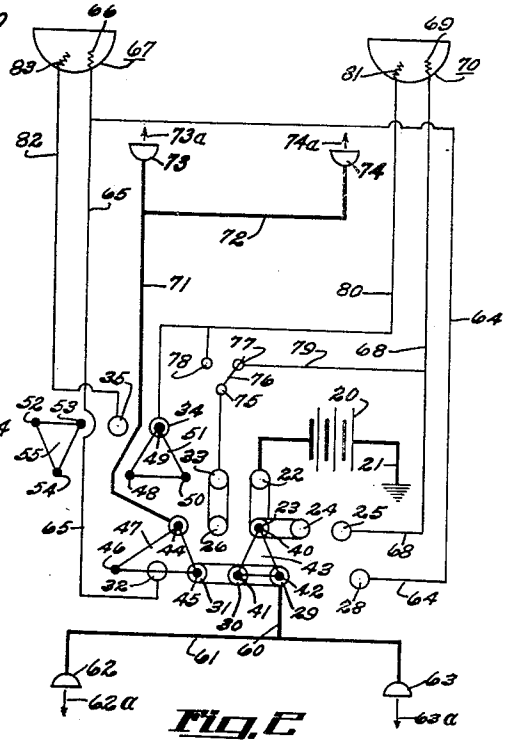


Fig. C

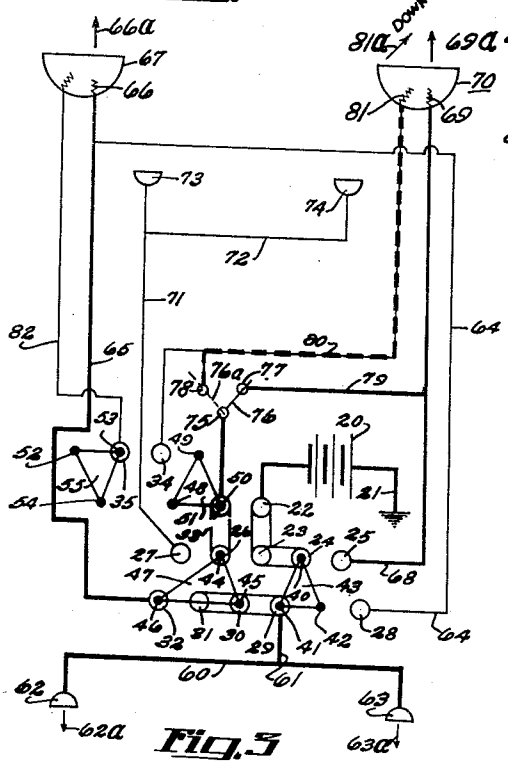


Fig. 3

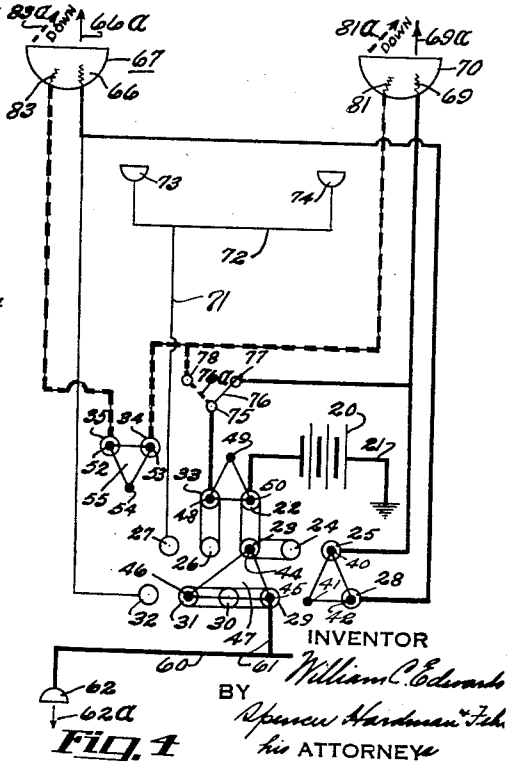


Fig. 4

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SWITCH

Filed March 9, 1934 2 Sheets-Sheet 2

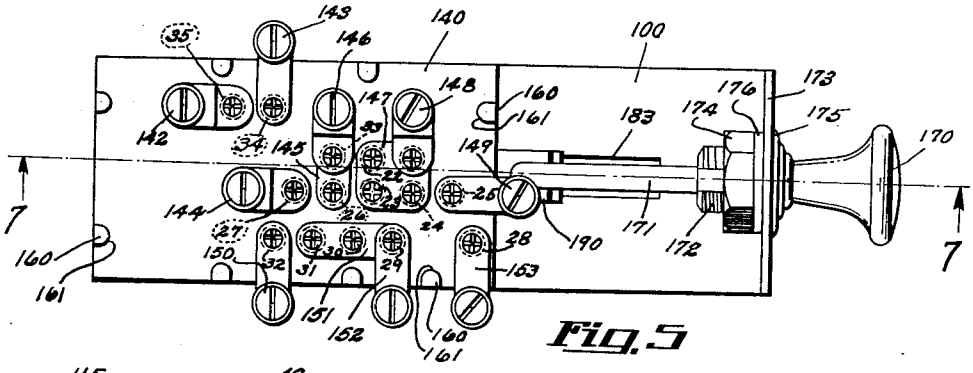


Fig. 5

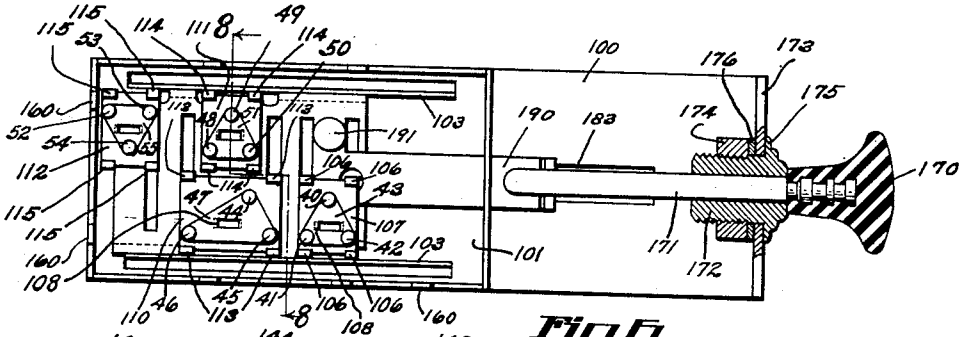


Fig. 6

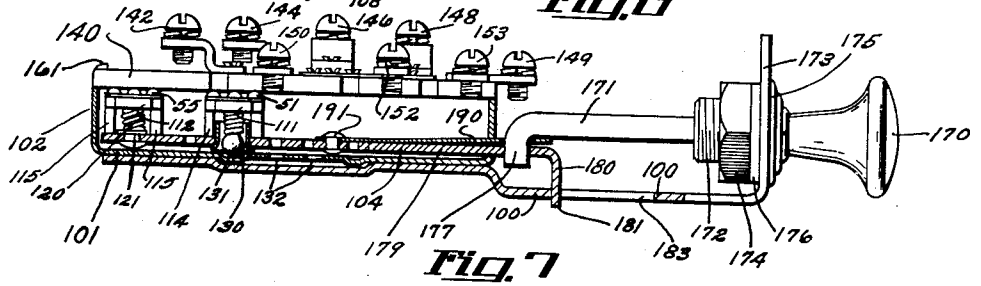


Fig. 7

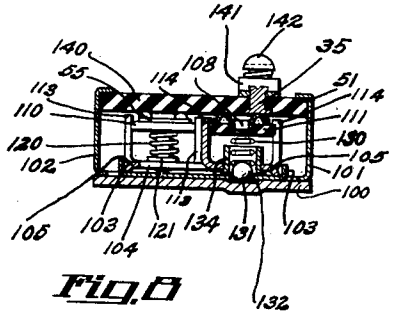


Fig. 8

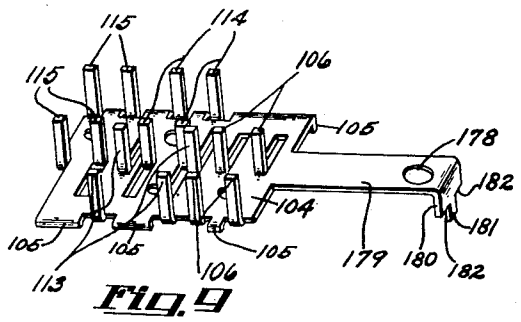


Fig. 9

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Patented Nov. 30, 1937 2,100,657

UNITED STATES PATENT OFFICE

2,100,657

SWITCH

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Application March 9, 1934, Serial No. 714,789

7 Claims. (Cl. 200—16)

This invention relates to switches for controlling vehicle lamp circuits, particularly those circuits which include a tail lamp, a parking lamp and head lamp having main and supplemental filaments, and which include a two-way switch for selecting either the main or the supplemental filaments.

One object of this invention is to provide a main controller switch which will operate in conjunction with the two-way switch referred to, to render the two-way switch operative to control the filament circuits of one head lamp only when the main switch is in one of its positions or to render the two-way switch operative to control the filament circuits of both head lamps when the main switch is in another of its positions. In addition to these objects, it is a further object to control the parking lamp and tail lamp circuits.

A further object is to simplify and thus reduce the cost of manufacture of light circuit switches of this type.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a wiring diagram of the lighting circuit embodying the present invention. In this diagram all of the lights are turned off.

Fig. 2 is a diagram similar to Fig. 1 showing the parking lights on.

Fig. 3 is a diagram showing the battery to lamp circuits which are closed when driving in the country.

Fig. 4 is a diagram showing the battery to lamp circuits while driving in the city.

Fig. 5 is a plan view of the main lighting switch shown in the diagram.

Fig. 6 is a view of the lighting switch with the switch terminal block removed.

Fig. 7 is a sectional view of the switch taken on the line 7—7 of Fig. 5.

Fig. 8 is a sectional view on the line 8—8 of Fig. 5.

Fig. 9 is a perspective view of the switch contact carriage.

In the diagrams, 20 designates a storage battery grounded at 21. It will be understood that each of the lamps to be described is grounded. The battery 20 is connected with a stationary contact 22 which is connected with stationary contacts 23 and 24. In the same row with contacts 23 and 24 are contacts 25, 26 and 27. Paralleling this row of contacts is a second row comprising contacts 28, 29, 30, 31 and 32. Contacts 20, 30 and 31 are connected together. A third row of contacts includes the contact 22 and the contact 33. A fourth row of contacts comprises contacts 34 and 35. Contact 33 is connected with contact 26. Certain contacts of the row including 23 to 27 and certain contacts of the row including contacts 28 to 32 are engaged by movable contacts. Three of these movable contacts are designated by the small black circles numbered 40, 41 and 42 and are provided at the apexes of a triangular plate 43. Three other movable contacts indicated by the solid circles 44, 45 and 46 are provided at the apexes of a triangular plate 47. Certain contacts of the row comprising stationary contacts 22 and 33 and certain contacts of the row comprising stationary contacts 34 and 35 are engaged by certain movable contacts. Three of these movable contacts are indicated at 48, 49 and 50 and are provided at the apexes of the triangular plate 51. Three other contacts are indicated at 52, 53 and 54 and are provided in the apexes of the triangular plate 55. By means to be described later all of the triangular plates 43, 47, 51 and 55 are moved simultaneously in a horizontal direction into the different positions shown in Figs. 2, 3 and 4.

Contact 29 is connected by wires 60 and 61 with tail lamps 62 and 63. Contact 28 is connected by wire 64 leading to wire 65 connected with main filament 66 of head lamp 67. Wire 65 is connected also with contact 32. Contact 25 is connected by wire 68 with main filament 69 of head lamp 70. Contact 27 is connected by wires 71 and 72 with parking lamps 73 and 74. Contact 33 is connected to a two-way switch comprising a common terminal 75 and a movable contact 76 which connects the terminal 75 either with a branch terminal or contact 77 or with a branch terminal contact 78. Contact 77 is connected by wire 79 with wire 68. Contact 78 is connected with a wire 80 connecting contact 34 with supplemental filament 81 of head lamp 70. Contact 35 is connected by wire 82 with supplemental filament 83 of head lamp 67.

The main filaments 66 and 69 of the head lamps 67 and 70 respectively are each arranged within the head lamp reflector so as to illuminate the road a considerable distance ahead of the car. The supplemental filaments 83 and 81 of the lamps 67 and 70 respectively are arranged to illuminate the road only a short distance ahead of the car. In other words, the main filaments 66 and 69 give only a slight inclined beam and the supplemental filaments 83 and 81 give a considerably inclined beam generally known as the depressed beam.

Fig. 1 shows the light circuits in "off" position. It will be noted that the battery is disconnected from all lamp circuits. To turn on the parking lamps the driver moves a switch operating rod, to be described later, toward the right in the

drawings so as to bring the movable contact carrying plates 43, 47, 51 and 55 to the first position shown in Fig. 2. In this position of the contact carrying plates the battery is connected with the tail lamps 62 and 63 causing them to burn as indicated by the arrows 62a and 63a. The battery is also connected with the parking lamps 73 and 74 causing them to burn as indicated by the arrows 73a and 74a. By pulling the operating rod further toward the right the movable contacts of the main lighting switch are moved into the position shown in Fig. 3 for country driving. It will be noted by the heavy lines in Fig. 3 that the battery is connected with the tail lamps 62 and 63 causing them to burn as indicated by the arrows 62a and 63a and with the main filaments 66 and 69 of the head lamps 67 and 70 respectively, causing them to produce beams substantially straight ahead as indicated by the arrows 66a and 69a respectively, provided that the contact 76 of the two-way switch connects the terminal 75 with the contact 77. The circuits are indicated by heavy solid lines. When passing an approaching car while driving in the country, the driver moves the switch contact 76 of the two-way switch into the dotted line position 76a shown in Fig. 3 thereby disconnecting the filament 69 of the battery and causing the filament 81 to burn and to produce a depressed beam as indicated by the arrow 81a. The circuit to filament 81 is indicated by the heavy broken line superposed on a lighter solid line. This will give better illumination of the right hand edge of the road while passing an approaching car. It will be understood that the two-way switch referred to is one which can be conveniently operated by the foot of the driver and is of the type described and claimed in the patent to Harry E. Norviel, No. 1,798,751 patented March 31, 1931.

Further movement of the operating rod toward the right will cause the movable contacts of the main lighting switch to be brought into the position shown in Fig. 4 for city driving. The tail lamps will burn as before and also the filaments 66 and 69 of the lamps 67 and 70 respectively, the circuits to the tail lamps and filaments 66 and 69 are clearly shown by the heavy lines. However, it is preferable to drive in the city with only the depressed beams from the head lamps. Therefore, after operating the main light switch to produce the circuit shown in Fig. 4 the operator moves the two-way switch contact member 76 into the position shown at 76a thereby disconnecting the filaments 66 and 69 from the battery and connecting only the filaments 83 and 81 causing them to produce depressed beams as indicated by the dotted arrows 83a and 81a respectively. The circuits to the filaments 83 and 81 are indicated by the heavy dotted line superposed on a lighter solid line.

Referring to Figs. 5 to 9, a preferred embodiment of the main lighting switch which heretofore has been described diagrammatically will now be described in detail. The switch comprises a frame or bracket 100 to which the bottom wall 101 of a rectangular switch case 102 is attached. The wall 101 is provided with inwardly extending flanges 103 which serve as means for guiding an actuating plate or carriage 104 having downwardly extending flanges 105 which bear upon the wall 101 and space the plate 104 therefrom. The plate 104 is provided with a plurality of vertically projecting fingers or prongs. There are four of these prongs associated with each of the four movable switch contacts 43, 47, 51 and 55 making a total of 16 prongs in all. The prongs associated with the contact plate 43 are numbered 106 and are arranged so as to be received each by a notch provided at the corner of a contact supporting block 107. The block 107 has a central oblong hole adapted to receive tangs 108 which extend downwardly from and are integral with the contact plate 43. In a similar fashion the contact plates 47, 51 and 55 are drivingly connected with non-conducting plates 110, 111 and 112 respectively, and these plates are laterally supported and guided for vertical movement by sets of four fingers marked 113, 114 and 115 respectively. Each of the plates 43, 47 and 55 is yieldingly urged upwardly by spring 120 located between that non-conducting plate which supports the contact plate and the actuator plate 104 and surrounding a stud 121 attached to the plate 104. In the case of the contact 51, however, it is yieldingly urged upwardly by a spring 130 pressing upwardly against the non-conducting plate 111 and downwardly against a small ball which serves as a detent. The bottom wall 101 of the case is provided with a series of holes 132 into which the ball 131 is adapted to extend. Along the row of holes the frame 100 is provided with a groove to permit the ball to extend below the bottom wall 101. The ball 131 and the spring 130 are laterally supported by a bushing 134 which is press-fitted into the plate 104. The holes 132 are so located that the ball 131 will drop into one of these holes when the switch contacts are moved into either of the four different positions shown in the wiring diagrams. Thus the switch contact actuator plate is yieldingly maintained in any of its positions and the operator can easily tell when the switch is occupying any of its operating positions.

The stationary contacts of this switch which have been referred to in the diagram are supported by a non-conducting terminal block of the switchback 140. One of these contacts, numbered 35 in the diagram as shown in Fig. 8, is formed by the head of a rivet which secures upon the outside of the switchback 140, a connector 141 leading to a terminal screw 142. The other stationary contacts shown in the diagrams are indicated in Fig. 5 by the dotted circles which have been numbered to correspond with the wiring diagram. The terminal 142 is connected with wire 82 of the diagram. The contact 34 is connected by a terminal 143 with wire 80. The contact 27 is connected by a terminal 144 with wire 71. The contact 26 is connected with contact 33 by strap 145 which is connected with terminal 146 to which the common terminal 75 of the two-way switch is connected. Contacts 24, 23 and 22 are connected together by a plate 147 which is connected with a terminal 148 to which the battery 20 is connected. Contact 25 is connected with a terminal 149 to which wire 68 is connected. Contact 32 is connected by a terminal 150 with wire 65. Contacts 31, 30 and 29 are connected together by a strap 151 and are connected by terminal 152 with wire 60. Contact 28 is connected by terminal 153 with wire 64. The switch terminal block 140 is maintained upon the upper rim or edges of the four sides of the box 102 by a plurality of tangs 160 which extend through notches of the block 140 and are bent over as indicated at 161.

The switch is actuated by a knob 170 of non-conducting material molded upon a rod 171 which passes through a bushing 172 extending thru a hole formed in an ear 173 of the bracket 100.

The bushing is held in place by a nut 174 between which and the flange 175 of the bushing 172 the ear 173 and a lock washer 176 are clamped. The rod is provided with a downwardly bent end 177 which extends thru a hole 178 provided in an extension 179 of carriage 104 which is provided with downwardly bent end 180 having an extension 181 of smaller width thereby providing shoulders 182. The extension 181 is received by a slot 183 in the bracket 100. As the plate 104 is moved along by the knob 170 the shoulders 182 engage the upper surface of the bracket 100 and are yieldingly placed thereagainst due to the fact that the springs 130 which urge the movable contact plates upwardly also yieldingly press the carriage 104 downwardly. In order to prevent noises due to vibration of the rod 171, the carriage 104 carries a leaf spring member 190 fixed at one end by rivets 191. This spring 190 is so biased that its free ends press upwardly against the upper side of the rod 171 thereby tending to cause the rod to take up any lost motion it may have within its guiding bushing 172.

It is therefore apparent that a switch of compact and simple construction has been provided for controlling the lamp circuits of an automotive vehicle. By reason of the present lighting system and controlling switches, the problem of controlling the various lighting circuits for parking, county and city driving has been much simplified. To turn all of the lights off the operator pushes the knob of the switch toward the bracket as far as it will go, for city driving which is generally more frequent than country, the operator pulls the knob out as far as it will go, for country driving the operator pushes the knob in one position. It is easy to remember the parking position since it is one position removed from the "off" position. By a simple movement of the two-way switch the operator can change from straight beams to deflected beams for country and city passing.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a switch, the combination of stationary contacts, a plurality of contact plates, movable contacts provided by each contact plate, a carriage providing individual guiding means for each contact plate, said guiding means comprising fingers integral with the carriage and struck out from slots therein to extend substantially parallel therefrom and received by notched portions of the contact plates.

2. In a lighting switch, the combination comprising, an open sided rectangular housing, a dielectric member closing the open side of the housing and providing a plurality of rows of terminal contacts, a carriage movable within the housing and having parallel flanges riding on the bottom wall of the housing, said bottom wall of the housing having inwardly struck ribs providing a pair of parallel guides between which the carriage slides and by which it is guided, said carriage having tongues struck up from the body thereof to provide parallel guide-ways, and contact carriers each having a contact plate resiliently supported each within a group of the carriage tongues.

3. In a lighting switch, the combination comprising, an open sided rectangular housing, means closing the open side of the housing, terminal contacts insulatedly supported by the housing, a carriage movable within the housing, and guides provided by the housing directing the movement of the carriage, an extension at one end of the carriage projecting through an aperture in one of the end walls of the rectangular housing, a bracket fixed to the bottom of the housing and providing an angular extension spaced from the apertured end wall of the housing, a control rod mounted for reciprocation in the angular extension and connected with the extension of the carriage, and means secured to the carriage and interposed between the carriage extension and control rod taking up the lost motion in the control rod connection.

4. The combination set forth in claim 3, wherein the carriage extension has a right angular arm projecting through a guide slot in the bracket extension, the angular arm and bracket slot providing stops limiting the reciprocable movement of the carriage.

5. In a lighting switch, the combination comprising, a housing having a bottom wall and surrounding walls, a pair of inwardly projecting parallel ribs in the bottom wall, a contact carriage mounted for reciprocation between the said ribs and having an extension projecting through an aperture in the side wall of the housing, and means coupled with the carriage extension without the case for actuating the carriage.

6. In a lighting switch, the combination comprising, a housing having a bottom wall and surrounding walls, a pair of inwardly projecting parallel ribs in the bottom wall, a contact carriage mounted for reciprocation between the said ribs and having an extension projecting through an aperture in the side wall of the housing, and means coupled with the carriage extension without the case for actuating the carriage, said carriage having parallel tongues struck up from the body thereof to provide guide means for a contact carrier, said guide means being arranged in groups of four, a stud carried by the carriage and projecting upwardly and disposed substantially centrally of each of said group of tongues, a contact carrier loosely fitting between the tongues of each group, and a spring encircling the stud and engaging the contact carrier to normally urge it away from the carriage, said stud forming a stop limiting the approach of the contact carrier toward the body of the carriage.

7. The combination set forth in claim 6, in which the carriage has two parallel flanges at its edges fitting between the ribs of the housing, said carriage having an extension projecting through an aperture in the side wall of the housing and thence ending in an angular extension, a bracket fixed to the bottom wall of the housing and extending substantially parallel with the carriage extension, control means supported by the bracket for reciprocating the carriage, and stop means comprising a slot in the bracket extension receiving the angular extension of the carriage.

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