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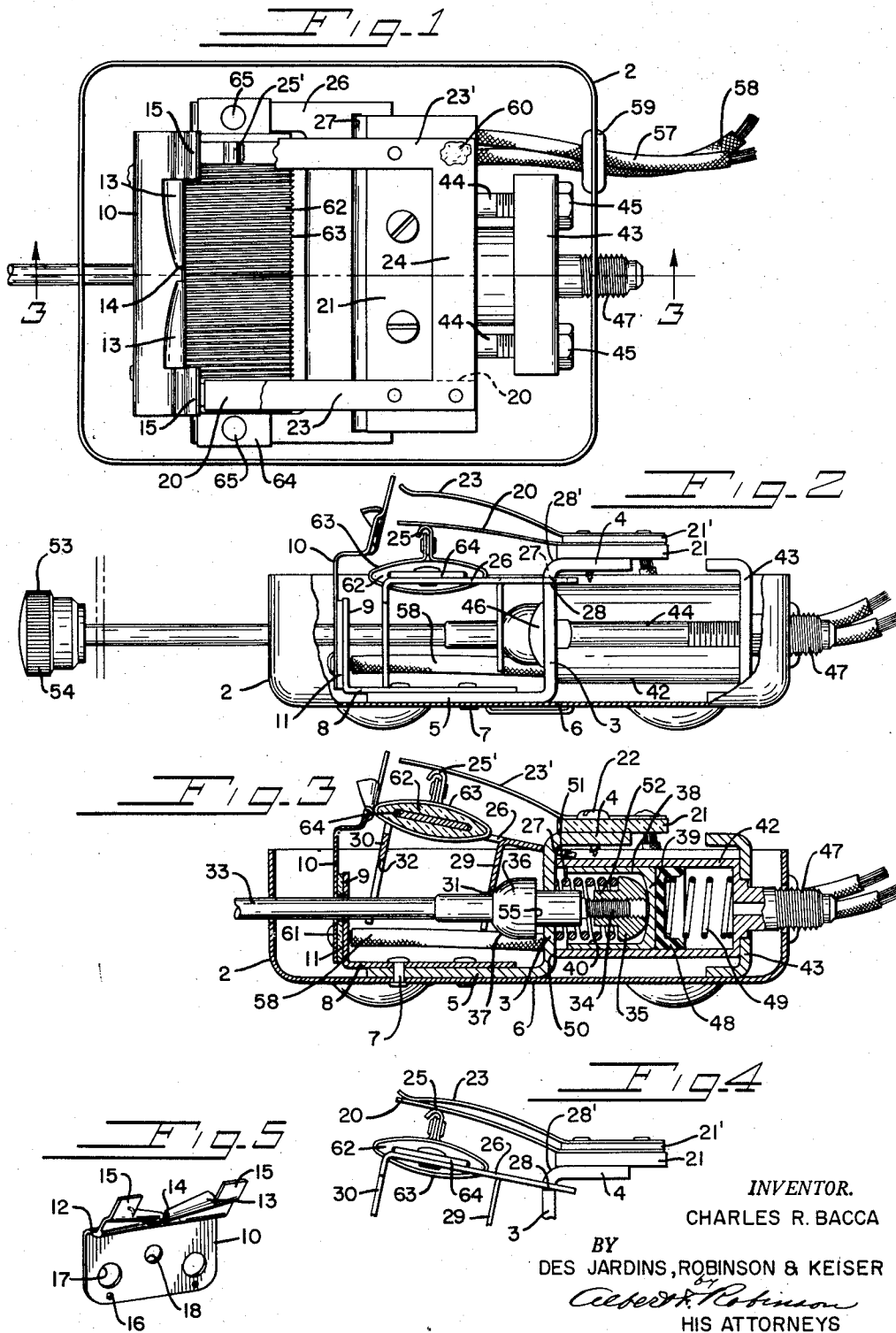
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ELECTRICAL CONTROL DEVICE FOR TRAILER BRAKES

Filed July 22, 1955

2 Sheets-Sheet 1



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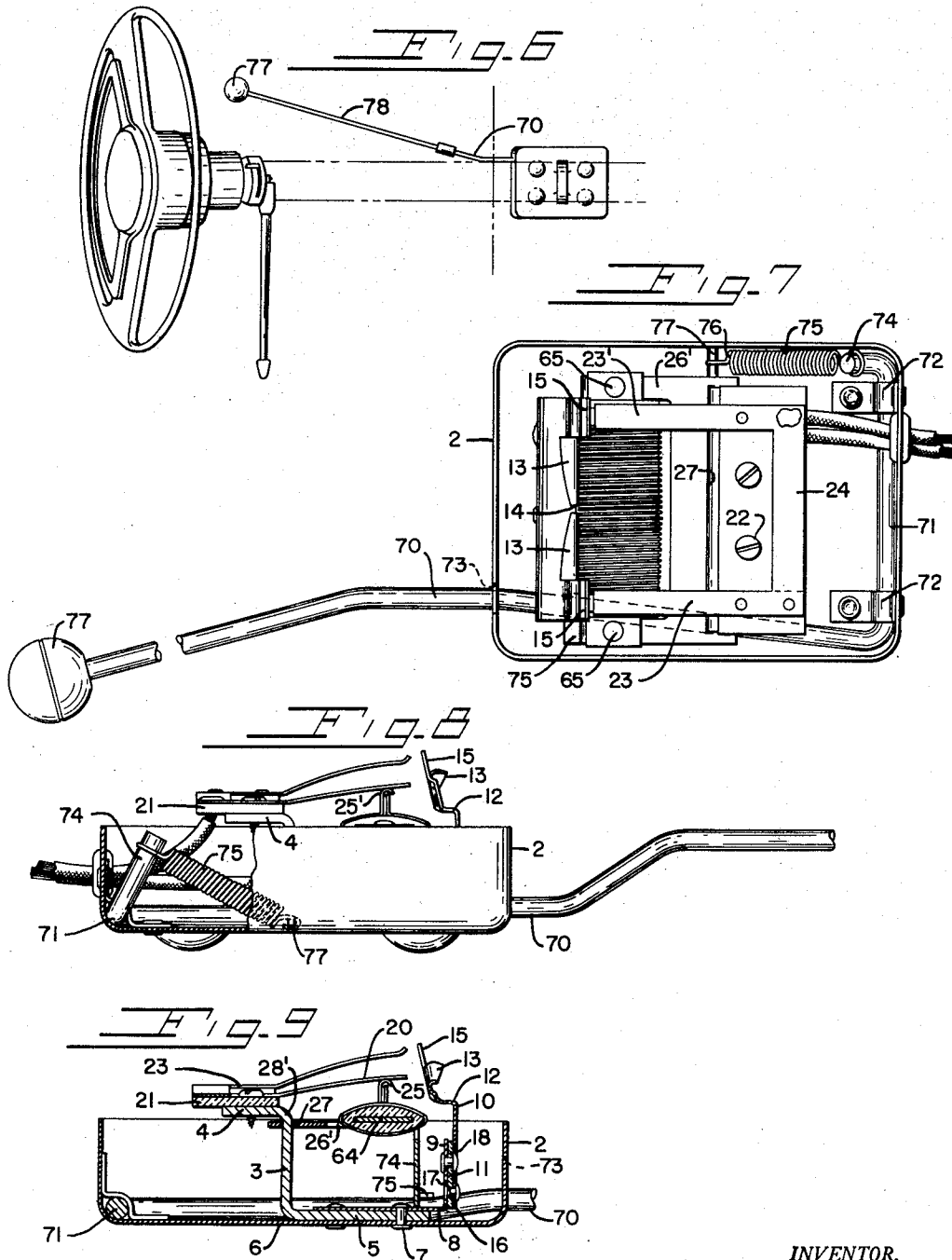
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1

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ELECTRICAL CONTROL DEVICE FOR TRAILER BRAKES

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23 Claims. (Cl. 338—39)

This invention relates to an electrical control device, and particularly to an electrical control device for the electric brakes of trailers for motor vehicles. The electrical control is one which is independently hand or hydraulically operated, or is selectively hand or hydraulically operated.

The invention is an improvement upon the control devices of my Patents 2,551,523 and 2,615,103, granted May 1, 1951, and October 21, 1952, respectively.

The control device comprises a minimum number of parts constructed to be simple in manufacture and assembly, and efficient and positive in operation by reason of rubbing or brushing movement between the contacting parts with continuous contact of said parts being provided through the whole range of movement between the relatively movable parts. The movable contact member is elongated, providing a longitudinal edge disposed generally parallel with a stationary elongated contact member against which the longitudinal edge of the other contact member moves in brushing or rubbing relationship. The movable member is pivoted on an axis disposed longitudinally in respect to elongated edges.

Accordingly, one of the main objects of the invention is an electrical control device which is simple in construction as well as being positive and efficient in operation.

Another object of the invention is an electrical control device comprised of a minimum number of parts.

Another object of the invention is an electrical control device in which the movable contact part is mounted on a pivoted member common to two operating means.

Another object of the invention is an electrical control device in which the contact parts are in rubbing or brushing relation.

Still another object of the invention is a control device having contact members which are of a construction to be connected in a series circuit or in combined series and parallel circuit.

A still further object of the invention is an electrical control device having a handle adapted to have readily detachable section.

A still further object of the invention is an electrical control device having one contact member pivotably mounted for being operatively connected to another contact member, and with the pivoted member operated selectively by an handle or hydraulic means.

Other objects, and objects relating to details of construction and economies of operation, will readily appear from the detailed description to follow. In one instance, the objects of the invention have been accomplished by the device and means set forth in the following specification. The invention is clearly defined and pointed out in the appended claims. Structures constituting preferred embodiments of the invention are illustrated in the accompanying drawings, forming a part of this specification, in which:

Fig. 1 is a top plan view of an electrical control device, hydraulically operated, in a box-like casing with the top removed.

Fig. 2 is a side elevation of Fig. 1 with a portion of the side of the housing cut away.

2

Fig. 3 is a cross section on line 3—3 of Fig. 1, looking in the direction of the arrows.

Fig. 4 is a detailed view of a portion of Fig. 3.

Fig. 5 is a perspective view of the stationary contact member.

Fig. 6 is a view of the electrical control device mounted on the steering column of a motor vehicle.

Fig. 7 is a top plan view, similar to Fig. 1, of a hand operated electrical control device.

Fig. 8 is a side elevation of Fig. 7 with the end of the handle removed.

Fig. 9 is a cross-sectional view of Fig. 8 similar to Fig. 2.

Referring specifically to the drawings in which like numerals designate like parts, numeral 2 is the bottom of a box-like casing which is adapted to be closed by a top lid fitted thereto for enclosing the electric control mounted within the casing.

A bracket having a web 3 between a top flange or head 4 and a bottom flange or foot 5 secured to the bottom wall 6 of the casing bottom 2 by rivets 7, the web 3 being vertically disposed and the top and bottom flanges 4 and 5 being generally parallel with the bottom wall 6. These rivets 7 are also common to a supplementary bracket 8 having a flanged end 9 to which a metal contact strip 10 is secured by an interposed insulating shim 11. This contact strip 10 has a main base part, with a bent-over edge 12 terminating in a rolled edge 13 diverging from a mid-point 14 towards the oppositely disposed spring fingers 15. This contact 10 is secured to shim 11 by rivets extending through perforations 16. The shim 11 in turn is similarly fixed to the flanged end 9 by similar rivets, the head of said rivets being out of contact with the contact 10 by reason of enlarged recesses 17 as is common practice. Another perforation 18 is formed in base part of strip 10.

Another spring finger 20 is mounted on the top flange 4 by an insulator shim 21 secured by clamp screws 22. This spring finger 20 is supplementary to a pair of spring fingers 23 and 23' fixed to a supplementary insulator shim 21' superimposed on shim 21. This superimposed pair of spring fingers 23 and 23' may be separate or joined into a U-shaped strip by a base 24, depending on whether a series circuit or a combined series and parallel circuit is desired. With the diverging rolled edge 13 for the contact strip 10, these fingers are joined by the base 24.

Other contact members 25 and 25', for opening and closing the electrical circuit, are mounted on a member 26 that is pivoted to the bracket 3 by being slotted at 27 for the top flange 4 to be projected therethrough before the spring fingers 20, 23 and 23' and the insulator shims 21 and 21' are fixed thereto. This top flange 4 is narrower in width than the web 3 to provide end shoulders 28 that serve as limit stops adjacent the corner bend 28' about which the member 26 pivots. This member 26 has two downwardly extending legs 29 and 30. One leg 29 is recessed at 31, and the other leg 30 is recessed at 32 to accommodate a rod 33 which is screw-threaded at end 34 into the socket of a knob 35. A collar 36, having a beveled shoulder 37, is fixed to the rod with the beveled shoulder adjacent to the leg 29 for causing the member 26 to be pivoted upwardly when actuated by the hollow piston 38. The hollow piston 38 is closed at one end by head 39 and is open at the other end to provide a chamber 40 in which the knob 35 seats. Accordingly, this leg 29, cooperating with the rod 33, functions to operate the movable contact member which is mounted thereon, in and out of contact with the stationary contact, whereas the other leg 30 cooperates with a hand lever, as hereinafter described, with which the hydraulically op-

3

erated control device may also be provided as in the embodiment of Figs. 6 to 9.

The piston 38 is slidably mounted in a cylinder 42 clamped between the web 3 of the bracket and a yoke 43 by a pair of bolts 44 extending therethrough and tightened by nuts 45. The heads 46 of the bolts 44 abut the web 3. This cylinder 42 has a screw-threaded nipple 47 to which one end of a tube may be connected leading to the hydraulic system of the motor vehicle. A cup-shaped gasket 48 is fitted in the cylinder with its bottom side adjacent the piston head and its open side towards the nipple. A compression spring 49 is inserted in the cylinder between the head of the cylinder and the cup side of the gasket, one end being seated in the cupped side of the gasket and the opposite end being seated against the nipple end of the cylinder. The open end 50 of the cylinder 42 is closed by the web 3 against which it abuts.

Another compression spring 51 is inserted between the web 3 and the knob 35 that is screw-threaded on the end of rod 33, a seating shoulder 52 being provided on said knob for the end of the spring 51. By turning the rod 33 clockwise or counterclockwise, the screw threads will move the knob 35 to compress the spring more or less, as desired, for regulating its resistance to the hydraulic pressure. The opposite extended end of the rod 33 is advantageously provided with a head knob 53, preferably knurled at 54, to facilitate turning the rod. The perforation 18, above described, in the contact member 11, accommodates the rod 33. The rod 33 is also provided with a shoulder 55 adjacent the screw end for the knob to serve as a stop for abutting the knob at one extreme position of the screw adjustment. The collar 36 will be spaced from the web 3 a sufficient distance to allow for its relative movement necessary for pivoting member 26. The shoulder 56 of the collar is preferably in abutting or nearly abutting relation with the web 3 when the pivoted member 26 is in its lowermost position.

Lead wires 57 and 58 extending through a rubber eyelet 59 in the casing part 2 are connected to the contact members, wire 57 being connected at 60 to the spring fingers 23 and 23' and wire 58 being connected at 61 to the other contact member 10.

The contact members 25 and 25', which are mounted on the pivoted member 26, have an insulated core 62 wound with wire 63 whose opposite ends are connected to the contacts 25 and 25' against which the spring fingers 20 and 23' are in rubbing or brushing contact. Finger 20 is in direct and continuous contact with member 25 and subsequent elevation of the pivoted member, carrying the coiled wire 63, brings said finger 20 in rubbing or brushing contact with finger 23, disposed thereabove. The core 62 is hollowed lengthwise to receive a metal strip 64 whose opposite ends are connected to the pivoted plate 26 by rivets 65.

The leg 30 of the pivoted member 26 is not operatively connected with rod 33 but with the hand lever if one is to be used for selective operation in lieu of the hydraulic. The pivoted member 26 is provided with both legs 29 and 30 so that it can be used with the hand or hydraulically operated device or with the combined hand and hydraulically operated device. While two legs 29 and 30 have been shown, one operatively connected to the manually operated handle and the other to the hydraulic means, it will be understood that the collar 36 could be disposed on rod 33, adjacent leg 31, to cooperate with said leg as it cooperates with leg 29.

This control device can be clamped to the steering column of a motor vehicle in the same manner as the hand control illustrated in Figs. 6 and 9.

The embodiment illustrated in Figs. 7 and 9 is a hand-operated control device, whereas that in Figs. 1 and 3 is selectively hydraulically or hand-operated.

4

The hand control comprises the handle 70 with its angular end 71 pivoted to the inside wall of the bottom part 2 of the casing, in one end corner, by a pair of spaced apart brackets 72 that are secured to said casing part 2 as by welding. The main part of handle extends through an elongated slot 73 of the casing part 2 to project therebeyond at a point accessible to the operator, with the angular end 71 transverse to one end of the casing part 2 and terminating in an angular arm 74 for being connected to one end of the spring 75 whose opposite end 76 is connected to some fixed part of the casing part 2 as by an eyelet 77 formed therein. This spring 75 is tensioned to retain the handle 70 in its normal position shown in Figs. 7 and 8, in which position the contacts of the electrical device will be out of engagement. This slot 73 is elongated, of course, in the direction of the pivotal movement of the handle so as to provide clearance therefor.

The pivoted member 26', corresponding to pivoted member 26 of the first embodiment, is pivoted to the bracket having the web 3 between top flange 4 and the bottom flange 5. It has a downwardly extending leg 74, corresponding to leg 30, and is of like construction. A bottom edge portion is bent into a lip 75 which the handle 70 contacts when said handle is pivoted away from its normal position, moving member 26' to bring the movable contact members 25 and 25' into engagement with the stationary contact strip member 10, and tensioning spring 76. Accordingly, when the handle is released, the tensioned spring will return it to normal position with the contact member out of engagement.

The handle 70 is provided with a hand knob 77, and there is also provided a handle extension 78 which may be used if desired. This permits the device to be secured in any place to which it may be attached, with the handle positioned at a point readily accessible to the operator.

From the foregoing description, it will be readily apparent that the device may be provided either with the hydraulically operated means, the manually operated handle, or both. The control device is adapted for either manual or hydraulic operation, or both, with either selectively used. Whether hand or hydraulically operated, the pivoted member 26 or 26' is normally biased with the electric contact members out of engagement. The said pivoted member is hydraulically or hand operated to elevated position to bring the contact member, mounted thereon, in rubbing or brushing contact with the stationary contact member. There is also brushing or rubbing contact between the spring fingers 20 and 23' as well as between spring fingers 15, at the opposite ends of rolled edge 13 which also has rubbing or brushing contact with the coiled wire 63 between bands 25 and 25'. Accordingly, good electrical contact is provided between all the movable parts. The device is simple in construction and efficient in operation, comprising a minimum number of parts and simply and easily arranged. The pivoted member, carrying the electrical contact member, is biased, by gravity, out of contact with the other electrically contact member. The pivoted member carrying the contact member is actuated by either the handle or hydraulic device to move the movable contact member progressively in contact with the other one. While the handle 33 is mainly for adjusting the resistance of the spring to the piston, it, too, could be hand operated in addition to or in lieu of handle 70, if said handle 70 be used with the hydraulic means.

I am aware that there may be various changes in details of construction without departing from the spirit of the invention.

Having fully described my invention, what I desire to secure by United States Letters Patent is:

1. In an electrical control device for electric brakes for trailers for motor vehicles, a casing in which said control is contained, a bracket secured to the casing having a contact member mounted thereon providing an elongated edge, a member movably mounted in the casing carrying

a resistor disposed lengthwise of the contact member, and means for actuating the movable member to move the resistor in rubbing relation with the other member.

2. The control device of claim 1 in which the movable member, on which the resistor is mounted, is pivoted to the bracket.

3. The control device of claim 2 in which the pivoted member is operatively connected with an operating handle.

4. The control device of claim 3 in which the pivoted member is operatively connected with an operating handle and an hydraulically operated means.

5. The control device of claim 4 in which said handle is adjustable for regulating resistance to the hydraulically operated means.

6. In an electrical control device for electric brakes for trailers for motor vehicles, a casing in which said control is contained, an angular bracket having oppositely disposed ends projecting from a medial web, a member pivoted to the web adjacent one end, a resistor carried by the pivoted member, a contact member fixed to the bracket adjacent to the resistor on the pivoted member, and a pair of spring fingers in rubbing contact with the resistor on the pivoted member.

7. The control device of claim 6 in which the resistor on the pivoted member is a coiled wire terminating in end bands with contact points in rubbing contact with the spring fingers.

8. The control device of claim 7 in which the contact fixed to the bracket is provided with a rolled edge for contact with the other contact member.

9. The control device of claim 8 in which the rolled edge diverges outwardly from a medial point.

10. The control device of claim 9 in the rolled edge diverging outwardly and there is a spring finger at each outer end.

11. In an electrical control device for electric brakes for trailers for motor vehicles, a fixed electric contact member, a resistor disposed adjacent said contact member, means on which resistor is mounted for being moved in and out of contact with the contact member, an handle for moving said resistor, and means on said handle for selectively detachably connecting an extension thereto.

12. An electrical control for electric brakes comprising a housing, a stationary bracket mounted in said housing provided with electrical contact members, each connected to a lead line of an electrical circuit, one of the contact members being spaced-apart spring fingers and the other contact member being an elongated spring strip disposed adjacent to the spring fingers and spanning the space therebetween, a coiled wire resistor pivoted to a bracket adapted to be moved in and out of brushing contact with the electrical contact members for opening and closing the electrical circuit, and an operating handle for actuating the pivoted member.

13. The electrical control of claim 12 provided with a second operating handle for actuating the pivoted member.

14. The electrical control of claim 13 in which one of the handles is hand operated and the other handle is actuated by an hydraulic means connected to the control.

15. An electrical control unit for electric brakes comprising a sectional housing, a bracket support fixed to one of the housing sections, spaced apart pairs of terminal spring fingers fixed to one end of the bracket, a spring terminal plate spanning the space between said spaced apart fingers and provided with a spring finger on each of its opposite ends, a coiled wire resistor extending the length of the spring terminal plate and adapted to be contacted with said spring plate between one pair of fingers thereon and having means at its opposite ends for contacting with the other pair of spring fingers on the spring plate, and handle means for moving the coiled wire member to make and break contact with spring fingers and spring plate.

16. The electrical control means of claim 15 in which the coiled wire resistor is pivoted to the bracket and is provided with means disposed to be operated by the handle, and the handle is pivotally mounted in the housing.

17. An electrical control unit for electric brakes comprising an electric contact member mounted in fixed position, a resistor disposed to be progressively moved in and out of contact with the electrical contact member, a pivoted support carrying the movable resistor, and an hydraulically operated means disposed to pivot said pivoted support for bringing the contact and resistor members into contact with each other.

18. The electrical control unit of claim 17 in which a portion of the manually operated handle is interposed between said pivoted support and the hydraulically operated means to selectively operate said unit.

19. An electrical control unit for electric brakes comprising an electrical contact member mounted in fixed position, a coiled wire resistor disposed to be progressively moved in and out of contact with the fixed electrical contact member, tension means for normally biasing the movable resistor away from the fixed contact member, a pivoted support carrying the movable resistor, a manually operated handle operatively connected to the pivoted member for moving the movable resistor toward the fixed contact, and an hydraulically operated means for also actuating the pivotal support for the movable resistor.

20. The control unit of claim 19 in which a portion of the handle is interposed between the hydraulically operating means and the pivoted member.

21. An electrical control for electric brakes comprising an housing, a stationary bracket mounted in said housing provided with electrical contact members, each connected to a lead line of an electrical circuit, one of the contact members being spaced-apart spring fingers and the other contact member being an elongated spring strip disposed adjacent to the spring fingers and spanning the space therebetween, a metal resistor pivoted to a bracket adapted to be moved in and out of brushing contact with the electrical contact members for opening and closing the electrical circuit, and operating handle for actuating the pivoted member.

22. An electrical unit for electrical brakes comprising a casing, a control member mounted within the casing and secured to one wall thereof, said control comprising a resistor coil member, an elongated flexible contact plate member disposed lengthwise of the resistor coil member for contact therewith, terminals for connecting lead wire to the opposite ends of the coil, pivot means for supporting one of said members to be moved in and out of contact with the other member, means for biasing the pivoted means for normally holding said coil and contact plate members out of contact, a handle for moving the pivot means in opposition to the biasing means for contacting said members, and hydraulic operated means operatively connected to the handle, whereby said handle is adapted to be selectively manually or hydraulically operated.

23. The electrical unit of claim 22 in which the contact plate member is disposed at an angle to the coil for progressively contacting said coil inwardly from one end toward its opposite end.

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