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(54) **Railroad vehicle control assembly, and railroad vehicle equipped therewith**

Steuereinheit für ein Schienenfahrzeug und damit ausgerüstetes Schienenfahrzeug

Ensemble de commande pour un véhicule ferroviaire et véhicule ferroviaire équipé d'un tel ensemble.

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Description

[0001] The present invention relates to a control assembly for a railroad vehicle, in particular an electric locomotive.

[0002] Known locomotives are controlled from inside a driver's cab comprising a control console, in turn comprising an operating control or selector, which is operated manually by the driver to select various operating conditions, e.g. normal running, slow brake, fast brake, overload brake, isolation, etc.

[0003] The location of the operating control on the console varies according to the type of locomotive, and more specifically, according to the country in which the locomotive is operated.

[0004] In certain types of locomotive, particularly those used in Italy, the driver is stationed on the left-hand side of the cab and, with the left hand, operates a control comprising a drum rotating about a substantially vertical axis and controlled by a substantially horizontal lever.

[0005] In other types of locomotive, particularly those used in foreign countries such as Austria, the driver is likewise stationed on the left-hand side of the cab, but, with the right hand, operates a control located centrally on the console, and comprising a control lever which is rotated to various operating positions about a horizontal axis. In this type of locomotive, the console also comprises an emergency fast-brake button which is used in place of the normal operating control.

[0006] The difference in the design of the operating control and its location within the driver's cab poses serious problems when changing drivers, and particularly when crossing borders into countries other than those in which the locomotive is normally operated.

[0007] On approaching a border, in fact, local drivers are normally relieved by foreign drivers who, being called upon, for the above reasons, not only to work under different conditions but also to operate devices other than those to which they are accustomed, are at least initially disoriented at the expense of safety.

[0008] At present, the above problem is solved by changing the local locomotive, at the border, with another featuring a different console.

[0009] Though effective in solving the driver changeover problem, such a solution involves considerable expenditure in terms of time and cost.

[0010] It is an object of the present invention to provide a control assembly for solving the above problems in a straightforward, low-cost manner.

[0011] According to the present invention, there is provided a control assembly for a railroad vehicle as defined in Claim 1 and a railroad vehicle as defined in Claim 10.

[0012] The invention will be described with reference to the accompanying drawing showing a schematic plan view of a non-limiting embodiment.

[0013] Number 1 in the accompanying drawing indi-

cates a locomotive comprising a driver's cab 2, in turn comprising a front wall 3 and two lateral walls 4, 5.

[0014] Cab 2 houses a control console 6 presenting an operating station 7 and an additional station 8 located side by side and facing front wall 3.

[0015] Locomotive 2 also comprises a brake control assembly 9, in turn comprising a control system 10 of the type described and illustrated in Italian Patent Applications n. 67282-A/85 and n. 67097-A/87 (& EP-A-0 278 928) filed respectively on 22/03/1985 and 13/02/1987 by the present Applicant, and to which full reference is made herein in the interest of full disclosure.

[0016] More specifically, control system 10 comprises a main air pipe 11 connected to a compressed air source (not shown); and an air brake pipe 12 connected by a number of distributors (not shown) to a corresponding number of brake cylinders (not shown).

[0017] System 10 also comprises a known self-regulating device 12a connected to main pipe 11 and brake pipe 12 to supply and discharge pipe 12, and which in turn comprises a known electropneumatic circuit 12b, and an operating control 13 inside cab 2, adjacent to lateral wall 4, and associated with station 7. More specifically, control 13 is connected to electropneumatic circuit 12b, and comprises a drum 14 rotating about a substantially vertical axis 15, and an operating lever 16 for rotating drum 14 about axis 15 and selecting various operating conditions, such as normal running, slow brake, fast brake, isolation, etc.

[0018] Device 12a also comprises a known fast exhaust valve 17 (shown schematically) operated by control 13 and connected at the inlet to brake pipe 12; and a known isolating valve 18 switchable by control 13 to disconnect brake pipe 12 from main pipe 11. Alternatively, isolating valve 18 is replaced by an isolating solenoid valve 19 preferably activated in known manner by a known electronic control unit 20. Unit 20 forms part of device 12a, and provides for activating solenoid valve 19 in known manner, and more specifically in response to a signal supplied to it in known manner by control 13 when set to the isolating position.

[0019] Alternatively, according to a variation not shown, isolating solenoid valve 19 is operated directly by control 13.

[0020] As shown in the accompanying drawing, assembly 9 also comprises a further operating control 21 located centrally, substantially between stations 7 and 8, and associated with station 7. Control 21 performs the same functions as control 13, from which it differs by comprising a drum 22 rotating about an axis 23 perpendicular to axis 15, and an operating lever 24 for rotating drum 22 about axis 23 and selecting various operating positions.

[0021] Assembly 9 also comprises a further mechanically operated fast exhaust valve 25, which is operated by control 21 when lever 24 is set to the "fast" position, and is connected to brake pipe 12 in parallel with valve

17.

[0022] Assembly 9 also comprises an operating control 26 associated with station 8, located adjacent to lateral wall 5, and substantially similar to control 21. Control 26 operates a further mechanically operated fast exhaust valve 27 forming part of assembly 9 and connected at the inlet to brake pipe 12 in parallel with valves 17 and 25.

[0023] Controls 13, 21 and 26 present respective known signal generating devices 28, each connected electrically to a respective input of a known switching unit 29, the output of which is connected electrically to unit 20. More specifically, unit 29 provides for selectively activating controls 13, 21 and 26, and for supplying unit 20 with the control signals from the generating device 28 of the activated control.

[0024] Assembly 9 also comprises one or more further mechanically operated fast exhaust valves 30 (only one shown), each operated manually by the driver by means of a respective pushbutton 31 on console 6, each connected at the inlet to brake pipe 12 between and in parallel with valves 17 and 25, and each provided with a respective known signal generator 32 connected electrically to unit 20.

[0025] Operation of assembly 9 will now be described as of the condition in which the driver occupies station 7, and unit 29 is switched to activate control 13. In this condition, lever 16 may be rotated about axis 15 to supply unit 20, via unit 29, with a succession of electric signals, in response to which, unit 20 sets circuit 12b to a corresponding number of different operating positions; and control 13 may also be used for fast braking by discharging brake pipe 12 via valve 17, and for disconnecting brake pipe 12 from main pipe 11 by means of solenoid valve 19 or valve 18.

[0026] When changing drivers at a border crossing, control 21 may be operated in place of control 13 from the same station 7, by simply enabling control 21 by rotating lever 24 to a "recognition or enabling" position in which respective device 28 supplies unit 29 with a switching signal, in response to which unit 29 disables control 13 and enables control 21. More specifically, with known switching units 29 commonly used on trains, lever 24 must be so set as to select a greater braking force than that provided for by control 13, in which case, unit 29 disconnects control 13 from unit 20, and connects unit 20 to control 21, the lever 24 of which may then be used for performing the same operations as with control 13.

[0027] More specifically, brake pipe 12 may be disconnected from main pipe 11, pipes 11 and 12 may be connected to each other by switching solenoid valve 19, or brake pipe 12 may be discharged rapidly by activating valve 25.

[0028] Following the same procedure described above, it is then possible to disable control 21 and enable control 26 or control 13, to respectively control the brake function from station 8 using a different control, or

once more from station 7.

[0029] As compared with the known procedure, assembly 9 therefore provides for fast, troublefree changeover of the driver, and in particular for eliminating any uneasiness on the part of the new driver.

[0030] Equipping console 6 with a number of differently designed controls, and the particular location of the controls inside cab 2, provide for achieving optimum working conditions, in particular by creating a station 7 familiar to both drivers.

[0031] Moreover, each driver operates a control that is not only of the same design as that to which he is accustomed, but also occupies the same position in cab 2, and more specifically on console 6.

[0032] As compared with known assemblies, assembly 9 therefore provides for greatly reducing running cost and downtime by eliminating the need to change the locomotive at border crossings.

[0033] Clearly, changes may be made to assembly 9 as described and illustrated herein without, however, departing from the scope of the present invention as defined in the claims.

[0034] In particular, control 26 and valve 30 may be dispensed with; and at least one of controls 13, 21, 26 may be replaced by a control differing in design from that described by way of example.

Claims

1. A control assembly (9) for a railroad vehicle (1) comprising a driver's cab (2) housing a control console (6), the assembly (9) comprising a main pipe (11); a brake pipe (12); an electropneumatic circuit (12b) for supplying and discharging the brake pipe (12); and a first operating control (13) to be located on the control console (6) for selecting various operating conditions of the electropneumatic circuit (12b); characterized in that it also comprises at least a second operating control (21) differing from the first operating control (13), and to be located on said control console (6) for selecting various operating conditions of the electropneumatic circuit (12b); and switching means (29) for selectively connecting said first (13) and second (21) operating controls to said electropneumatic circuit (12b).
2. An assembly as claimed in Claim 1, characterized in that it comprises a third control (26) associated with said electropneumatic circuit (12b); said switching means (29) selectively connecting said controls (13)(21)(26) to the electropneumatic circuit (12b).
3. An assembly as claimed in Claim 2, characterized in that said third control (26) is an operating control.
4. An assembly as claimed in Claim 2 or 3, characterized in that, for each said control (13)(21)(26), it

comprises exhaust valve means (17)(25)(27) for rapidly discharging the brake pipe (12); said exhaust valve means (17)(25)(27) each being operated by the respective control (13)(21)(26).

5. An assembly as claimed in Claim 4, characterized in that said exhaust valve means (17)(25)(27) are connected in parallel to said brake pipe (12).
6. An assembly as claimed in any one of the foregoing Claims from 2 to 5, characterized in that, for each said control (13)(21)(26), it comprises isolating means (18)(19) for disconnecting said brake pipe (12) from said main pipe (11).
7. An assembly as claimed in one of the foregoing Claims from 2 to 6, characterized in that said switching means comprise an electronic control unit (29); and said controls (13)(21)(26) comprise respective signal generating means (28) connected electrically to respective inputs of said electronic control unit (29).
8. An assembly as claimed in Claims 6 and 7, characterized in that said isolating means comprise a solenoid valve (19) operated, in use, by the control (13)(21)(26) enabled by said electronic control unit (29).
9. An assembly as claimed in any one of the foregoing Claims, characterized in that it comprises fast exhaust means (30) connected pneumatically to said brake pipe (12); and manually operated pushbutton means (31) for controlling said fast exhaust means (30).
10. A railroad vehicle (1) comprising a driver's cab (2) housing a control console (6), and a vehicle control assembly (9); the control assembly (9) comprising a main pipe (11), a brake pipe (12), an electropneumatic circuit (12b) for supplying and discharging the brake pipe (12), and a first operating control (13) located in said cab (2) on the control console (6) and associated with, and for selecting various operating conditions of said electropneumatic circuit (12b); characterized in that said control assembly (9) also comprises at least a second operating control (21) differing from the first operating control (13) and located in said cab (2) on said control console (6); said second operating control (21) being associated with said electropneumatic circuit (12b); and switching means (29) being provided for selectively connecting said first (13) and second (21) operating controls to said electropneumatic circuit (12b).
11. A vehicle as claimed in Claim 10, characterized in that said cab (2) presents a front wall (3) and a first (4) and second (5) lateral wall, and houses an oper-

ating station (7); and said first (13) and second (21) operating controls are located in said cab (2) and both associated with said operating station (7); said first operating control (13) being adjacent to said first lateral wall (4); and said second operating control (21) being a given distance from said first operating control (13) and from said second lateral wall (5).

12. A vehicle as claimed in Claim 11, characterized in that said cab (2) also houses an additional operating station (8); and said assembly (9) also comprises a third control (26) adjacent to said second lateral wall (5) and associated with said additional operating station (8).
13. A vehicle as claimed in any one of the foregoing Claims from 10 to 12, characterized in that said assembly (9) also comprises fast exhaust means (30) connected pneumatically to said brake pipe (12); and manually operated pushbutton means (31) for controlling said fast exhaust means (30); at least part of said pushbutton means (31) being located between said first (13) and second (21) operating controls.

Patentansprüche

1. Steuereinheit (9) für ein Schienenfahrzeug (1) mit einem Führerhaus (2) für einen Fahrer, das eine Steuerkonsole (6) aufnimmt, wobei die Steuereinheit (9) eine Hauptleitung (11), eine Bremsleitung (12), einen elektropneumatischen Kreis (12b) zur Beaufschlagung und Entlastung der Bremsleitung (12) und eine erste Betriebssteuerung (13) umfaßt, die zur Auswahl verschiedener Betriebszustände des elektropneumatischen Kreises (12b) auf der Steuerkonsole (6) angeordnet ist, **dadurch gekennzeichnet**, daß sie weiterhin wenigstens eine zweite Betriebssteuerung (21), die von der ersten Betriebssteuerung (13) verschieden ist und zur Auswahl verschiedener Betriebszustände des elektropneumatischen Kreises (12b) auf der Steuerkonsole (6) angeordnet ist, und Schaltmittel (29) zur selektiven Verbindung der ersten (13) und zweiten (21) Betriebssteuerungen an den elektropneumatischen Kreis (12b) aufweist.
2. Einheit gemäß Anspruch 1, dadurch gekennzeichnet, daß sie eine dritte Steuerung (26) aufweist, die mit dem elektropneumatischen Kreis (12b) gekoppelt ist, wobei die Schaltmittel (29) die Steuerungen (13, 21, 26) selektiv mit dem elektropneumatischen Kreis (12b) aufweist.
3. Einheit gemäß Anspruch 2, dadurch gekennzeichnet, daß die dritte Steuerung (26) eine Betriebssteuerung ist.

4. Einheit gemäß Anspruch 2 oder 3, dadurch gekennzeichnet, daß sie für jede Steuerung (13, 21, 26) Auslaßventilmittel (17, 25, 27) zur schnellen Entlastung der Bremsleitung (12) aufweist, wobei die Auslaßventilmittel (17, 25, 27) jeweils durch die zugehörige Steuerung (13, 21, 26) angesteuert werden.
5. Einheit gemäß Einspruch 4, dadurch gekennzeichnet, daß die Auslaßventilmittel (17, 25, 27) parallel zu der Bremsleitung (12) angeschlossen sind.
6. Einheit gemäß einem der vorangehenden Ansprüche 2 bis 5, dadurch gekennzeichnet, daß sie für jede Steuerung (13, 21, 26) Trennmittel (18, 19) zur Trennung der Bremsleitung (12) von der Hauptleitung (11) aufweist.
7. Einheit gemäß einem der vorangehenden Ansprüche 2 bis 6, dadurch gekennzeichnet, daß die Schaltmittel eine elektronische Steuereinheit (29) aufweisen und daß die Steuerungen (13, 21, 26) jeweils über Signalerzeugungsmittel (28) verfügen, die elektrisch an zugehörige Eingänge der elektronischen Steuereinheit (29) angeschlossen sind.
8. Einheit gemäß Anspruch 6 und 7, dadurch gekennzeichnet, daß die Trennmittel ein elektromagnetisches Ventil (19) aufweisen, das bei Benutzung durch die Steuerung (13, 21, 26) aktiviert durch die elektronische Steuereinheit (29) angesteuert wird.
9. Einheit gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß sie schnelle Auslaßmittel (30), die pneumatisch an die Bremsleitung (12) angeschlossen sind, und von Hand betätigbare Druckknopfmittel (31) zur Steuerung der schnellen Auslaßmittel (30) aufweist.
10. Schienenfahrzeug (1) mit einem Führerhaus (2) für einen Fahrer, das eine Steuerkonsole (6) aufnimmt, und mit einer Fahrzeugsteuereinheit (9), wobei die Steuereinheit (9) eine Hauptleitung (11), eine Bremsleitung (12), einen elektropneumatischen Kreis (12b) zur Beaufschlagung und Entlastung der Bremsleitung (12) und eine erste Betriebssteuerung (13) aufweist, die in dem Führerhaus (2) auf der Steuerkonsole (6) angeordnet und zur Auswahl verschiedener Betriebszustände mit dem elektropneumatischen Kreis (12b) verbunden ist, **dadurch gekennzeichnet**, daß die Steuereinheit (9) weiterhin wenigstens eine zweite Betriebssteuerung (21) aufweist, die von der ersten Betriebssteuerung (13) verschieden und in dem Führerhaus (2) auf der Steuerkonsole (6) angeordnet ist, wobei die zweite Betriebssteuerung (21) mit dem elektropneumatischen Kreis (12b) gekoppelt ist, und Schaltmittel (29) zum selektiven Anschluß der ersten (13) und zweiten (21) Betriebssteuerungen an den elektropneumatischen Kreis (12b) vorgesehen sind.
11. Fahrzeug nach Anspruch 10, dadurch gekennzeichnet, daß das Führerhaus (2) eine Vorderwand (3) und eine erste (4) und zweite (5) Seitenwand aufweist und einen Führerstand (7) aufnimmt und daß die ersten (13) und zweiten (21) Betriebssteuerungen in der Kabine (2) angeordnet und beide mit dem Führerstand (7) gekoppelt sind, wobei die erste Betriebssteuerung (13) benachbart zu der ersten Seitenwand (4) und die zweite Betriebssteuerung (21) in einem vorbestimmten Abstand von der ersten Betriebssteuerung (13) und von der zweiten Seitenwand (5) ist.
12. Fahrzeug gemäß Anspruch 11, dadurch gekennzeichnet, daß das Führerhaus (2) weiterhin einen zusätzlichen Führerstand (8) aufnimmt und die Einheit (9) weiterhin eine dritte Steuerung (26) aufweist, die zu der zweiten Seitenwand (5) benachbart und mit dem zusätzlichen Führerstand (8) gekoppelt ist.
13. Fahrzeug gemäß einem der Ansprüche 10 bis 12, dadurch gekennzeichnet, daß die Einheit (9) weiterhin schnelle Auslaßmittel (30), die pneumatisch mit der Bremsleitung (12) verbunden sind, und von Hand betätigbare Druckknopfmittel (31) zur Steuerung der schnellen Auslaßmittel (30) aufweist, wobei wenigstens ein Teil der Druckknopfmittel (31) zwischen den ersten (13) und zweiten (21) Betriebssteuerungen angeordnet ist.

Revendications

1. Ensemble de commande (9) pour un véhicule ferroviaire (1) comprenant une cabine de conduite (2) qui abrite un pupitre de commande (6), l'ensemble (9) comprenant un conduit principal (11), un conduit de frein (12), un circuit électropneumatique (12b), destiné à alimenter et à purger le conduit de frein (12), et une première commande de fonctionnement (13) destinée à être placée sur le pupitre de commande (6), en vue de la sélection de divers états de fonctionnement du circuit électropneumatique (12b), caractérisé en ce qu'il comprend également au moins une deuxième commande de fonctionnement (21) différente de la première commande de fonctionnement (13) et destinée à être placée sur ledit pupitre de commande (6), en vue de la sélection de divers états de fonctionnement du circuit électropneumatique (12b), et des moyens de commutation (29) permettant de connecter sélectivement lesdites première (13) et deuxième (21) commandes de fonctionnement audit circuit électropneumatique (12b).

2. Ensemble selon la revendication 1, caractérisé en ce qu'il comprend une troisième commande (26) associée audit circuit électropneumatique (12b), lesdits moyens de commutation (29) connectant sélectivement lesdites commandes (13) (21) (26) au circuit électropneumatique (12b). 5
3. Ensemble selon la revendication 2, caractérisé en ce que ladite troisième commande (26) est une commande de fonctionnement. 10
4. Ensemble selon la revendication 2 ou 3, caractérisé en ce que, pour chacune desdites commandes (13) (21) (26), il comprend des moyens formant vanne d'échappement (17) (25) (27) permettant de purger rapidement le conduit de frein (12), lesdits moyens formant vanne d'échappement (17) (25) (27) étant chacun actionné par la commande respective (13) (21) (26). 15 20
5. Ensemble selon la revendication 4, caractérisé en ce que lesdits moyens formant vanne d'échappement (17) (25) (27) sont raccordés en parallèle audit conduit de frein (12). 25
6. Ensemble selon l'une quelconque des revendications précédentes 2 à 5, caractérisé en ce que, pour chacune desdites commandes (13) (21) (26), il comprend des moyens de découplage (18) (19) destinés à déconnecter ledit conduit de frein (12) dudit conduit principal (11). 30
7. Ensemble selon l'une des revendications précédentes 2 à 6, caractérisé en ce que lesdits moyens de commutation comprennent une unité électronique de commande (29), et lesdites commandes (13) (21) (26) comprennent des moyens générateurs de signaux respectifs (28) reliés électriquement à des entrées respectives de ladite unité électronique de commande (29). 35 40
8. Ensemble selon les revendications 6 et 7, caractérisé en ce que lesdits moyens de découplage comprennent une électrovanne (19) actionnée, en service, par la commande (13) (21) (26) validée par ladite unité électronique de commande (29). 45
9. Ensemble selon l'une quelconque des revendications précédentes, caractérisé en ce qu'il comprend des moyens d'échappement rapide (30), raccordés pneumatiquement audit conduit de frein (12), et des moyens formant bouton-poussoir (31) à actionnement manuel, destinés à commander lesdits moyens d'échappement rapide (30). 50 55
10. Véhicule ferroviaire (1) comprenant une cabine de conduite (2), qui abrite un pupitre de commande (9), et un ensemble de commande de véhicule (9),

l'ensemble de commande (9) comprenant un conduit principal (11), un conduit de frein (12), un circuit électropneumatique (12b), destiné à alimenter et à purger le conduit de frein (12), et une première commande de fonctionnement (13) située dans ladite cabine (2), sur le pupitre de commande (6), et associée, pour en permettre la sélection, à divers états de fonctionnement dudit circuit électropneumatique (12b), caractérisé en ce que ledit ensemble de commande (9) comprend également au moins une deuxième commande de fonctionnement (21) différente de la première commande de fonctionnement (13) et située dans ladite cabine (2), sur ledit pupitre de commande (6), ladite deuxième commande de fonctionnement (21) étant associée audit circuit électropneumatique (12b) et des moyens de commutation (29) étant prévus pour connecter sélectivement lesdites première (13) et deuxième (21) commandes de fonctionnement audit circuit électropneumatique (12b).

11. Véhicule selon la revendication 10, caractérisé en ce que ladite cabine (2) comporte une paroi avant (3) ainsi qu'une première (4) et une seconde (5) paroi latérale et abrite un poste de commande (7), et lesdites première (13) et deuxième (21) commandes de fonctionnement sont situées dans ladite cabine (2) et sont toutes deux associées audit poste de commande (7), ladite première commande de fonctionnement (13) étant adjacente à ladite première paroi latérale (4) et ladite deuxième commande de fonctionnement (21) étant à une distance donnée de ladite première commande de fonctionnement (13) et de ladite seconde paroi latérale (5).
12. Véhicule selon la revendication 11, caractérisé en ce que ladite cabine (2) abrite également un poste additionnel de commande (8), et ledit ensemble (9) comprend également une troisième commande (26) adjacente à ladite seconde paroi latérale (5) et associée audit poste additionnel de commande (8).
13. Véhicule selon l'une quelconque des revendications précédentes 10 à 12, caractérisé en ce que ledit ensemble (9) comprend également des moyens d'échappement rapide (30), raccordés pneumatiquement audit conduit de frein (12), et des moyens formant bouton-poussoir (31) à actionnement manuel, pour commander lesdits moyens d'échappement rapide (30), au moins une partie desdits moyens formant bouton-poussoir (31) étant située entre lesdites première (13) et deuxième (21) commandes de fonctionnement.

