

PATENT SPECIFICATION



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224,668

Complete Left: July 2, 1924.

Complete Accepted: Nov. 20, 1924.

PROVISIONAL SPECIFICATION.

Improvements in and relating to Electric Traction Systems.

We, THE ENGLISH ELECTRIC COMPANY LIMITED, a company registered under British law, of Queen's House, 28, Kingsway, London, W.C. 2, and Sir JOHN AUDLEY FREDERICK ASPINALL, of Deerstead House, St. John's, Woking, in the County of Surrey, a British subject, do hereby declare the nature of this invention to be as follows:—

10 This invention has reference to electric traction systems and more particularly to means for energising the motors of a vehicle or train of vehicles in traction systems wherein more than one voltage or condition of supply is employed and when the train has come to a standstill at a part of the track where the condition of supply changes and where as usual an appropriate distance intervenes between the third rail or overhead conductors of one condition and those of the other condition so that the normal current collecting shoes or overhead gear are for the time being out of contact with the source of both conditions of supply.

When the train has come to rest in this intermediate zone it cannot be started again in the usual way and according to this invention, in order to make it possible to re-start it, the above mentioned intervening distance on the track is completely or almost completely bridged by additional third rails or overhead conductors in positions displaced from the normal positions in such a manner that these additional rails or conductors cannot make contact with the normal current collecting means on the train and can only be brought into action to energise the motors by means of emergency current collecting means on the train which can be brought by manual, automatic, or other suitable means into contact with the additional rails or conductors when required.

For example in the case of a train

[Price 1/-]

supplied with current at one part of a track from an overhead conductor at 1500 volts and at another part of the track from a third rail at 600 volts, the intervening distance could be appropriately bridged with an additional 600 volt third rail not in line with the normal third rail. If the train comes to rest in the intervening space so that it cannot pick up energy from either of the normal systems of supply, the driver may by automatic or manual means or otherwise cause an additional collecting shoe or shoes to be brought temporarily into contact with the additional third rail until the train has reached a point where it can again pick up energy by normal means from one or other of the sources of supply. Instead of bridging the intervening distance in the above example with an additional 600 volt third rail it could of course be bridged instead with an additional 1500 volt overhead conductor or third rail.

It will usually be necessary in order to prevent a short circuit between the two sources of supply to interlock the means for lowering or bringing into action the additional shoes with the normal supply circuits on the train in such a manner that the motors cannot receive current except by way of the additional third rail until the additional shoes have been again raised or brought out of action. One way of doing this would be to cause the mechanism for the lowering of an additional shoe to bring into action cut out switches in the normal supply circuits and to re-set these switches as soon as the shoe was again raised.

Dated this 1st day of October, 1923.

R. L. CLEAVER,
Chartered Patent Agent,
Room 108, Caxton House, (East Block),
Westminster, S.W. 1.

COMPLETE SPECIFICATION.

Improvements in and relating to Electric Traction Systems.

We, THE ENGLISH ELECTRIC COMPANY LIMITED, a company registered under British law, of Queen's House, 28, Kingsway, London, W.C. 2, and Sir JOHN AUDLEY FREDERICK ASPINALL, of Deerstead House, St. John's, Woking, in the County of Surrey, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to electric traction systems and more particularly to means for energising the motors of a vehicle or train of vehicles in traction systems, wherein more than one voltage frequency or the like condition of supply is employed, when the train has come to a standstill at a part of the track where the condition of supply changes and where as usual an appropriate distance along the track intervenes between the third rail or overhead conductors of one condition and those of the other condition so that the normal current collecting shoes or overhead gear are for the time being out of contact with the source of both conditions of supply.

When the train has come to rest in this intermediate zone it cannot be started again in the usual way and, according to this invention, in order to make it possible to re-start it, the above mentioned intervening distance on the track is completely or almost completely bridged by additional third rails or overhead conductors permanently electrically connected to a suitable source of power supply and arranged in positions displaced from the normal positions in such a manner that these additional rails or conductors cannot make contact with the normal current collecting means on the train and can only be brought into action to energise the motors by means of emergency current collecting means on the train which can be brought by manual, automatic, or other suitable means into contact with the additional rails or conductors when required. Such current collecting means could for example take the form of an electric switch under the driver's control for connecting a shoe or overhead collector, which normally is in contact with the additional third rail or overhead conductor, to the motor circuits, or it could take the form of a switching arrangement under the driver's control

which would move the shoe or overhead collector (normally connected to the motor circuits) into or out of contact with the additional third rail or overhead conductor.

It will usually be necessary in order to prevent a short circuit between the two sources of supply to interlock the emergency current collecting means with the vehicle mechanism in such a manner that the driving motors cannot receive current except by way of the additional third rail or overhead conductor until the emergency current collecting means has been brought out of action.

The invention will now be described by way of example with reference to the accompanying diagrammatic drawings, of which Figure 1 represents a side elevation of an electric locomotive operating upon a track supplied by overhead conductors at two different voltages in conjunction with an additional third bridging rail. Figure 2 shows an emergency current collecting means and interlock suitable for the arrangement in Figure 1. Figures 3 and 4 are views similar to Figures 1 & 2 respectively except that the track is supplied by third rails throughout. Figure 5 is a plan view of Figure 3.

Referring to Figures 1 and 2 the motors of an electric locomotive 1 are normally supplied with current through the pantograph overhead collector 2, on the one hand from an overhead conductor 3 at 1500 volts, and on the other hand from an overhead conductor 4 at 600 volts. These conductors are separated by the road bridge 5 and an additional third rail 6, supplied at 600 volts through the connection 7, is arranged to span the gap. If the locomotive has come to a standstill in a position where the collector 2 cannot take current from either of the overhead conductors 3 or 4, the driver can move the change over switch 8 from its normal position as in Figure 2, where the pantograph 2 is connected to the motor circuit 9 owing to the fixed contacts 10 and 11 being bridged by the drum contact 12, into its opposite position, where the shoe collector 13 which is in contact with the additional third rail 6, is connected to the motor circuit 9 owing to the fixed contacts 11 and 14 being bridged by the drum contact 15. The motor circuit 9 is then energised from the rail 6 and at the same time the collector 2 is isolated from

the circuit 9 by the switch 8 which thus also forms the short circuit preventing interlock referred to above.

5 The numerals denoting the various parts in Figures 3, 4 and 5 agree with the numerals denoting like parts in Figures 1 and 2. In Figure 3 a fifteen hundred volt third rail 3 and a six hundred volt third rail 4 respectively take the place of the overhead conductors 3 and 4 in Figure 1 and a shoe 2 (which takes the place of the pantograph 2 in Figure 1) collects current from these third rails.

15 Instead of bridging the intervening distance in the above examples with an additional 600 volt third rail it could of course be bridged with an additional 1500 volt overhead conductor or third rail.

20 In cases where the emergency current collecting means takes the form of a movable shoe or overhead collector 13 moved by the driver into or out of contact with the additional third rail or conductor by means of suitable mechanism, the interlocking could be obtained by removing the handle of the switch 8 as well as the contacts 14 and 15 thereof since they would not be required owing to the shoe 13 being directly connected to the motor circuit 9. The mechanism would then be connected by gearing or otherwise to the shaft of switch 8 in such a way that when the shoe 13 is in contact with the third rail the fixed contacts 10 and 11 would not be bridged by the drum contact 12 but as soon as the shoe 13 is brought out of contact with the third rail this bridging would take place.

40 Although in the drawings the invention is shown applied to a locomotive provided with only one normal current collector, it is clear that a plurality of current collectors could be provided situated either on the locomotive or at points along the length of a train operated on the multiple unit principle. Also in the drawings the gap between

the two conductors is represented by a road bridge but it could evidently be of any desired length and in the case of a multiple unit train of vehicles it would probably have to extend for at least the length of the train.

55 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

60 1. In electric traction systems comprising sections whose conditions of power supply are different, and distances or gaps along the track between a section of one supply condition and a section of another supply condition, a third rail or overhead conductor permanently energised from a suitable source of power supply displaced along the gap from the normal position and emergency current collecting means on a vehicle or train of vehicles adapted to make electrical contact with the said rail or conductor and thereby collect current whilst in the gap.

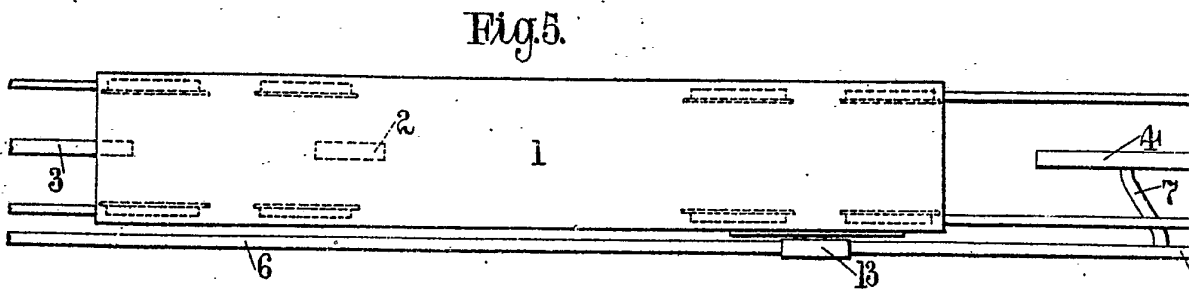
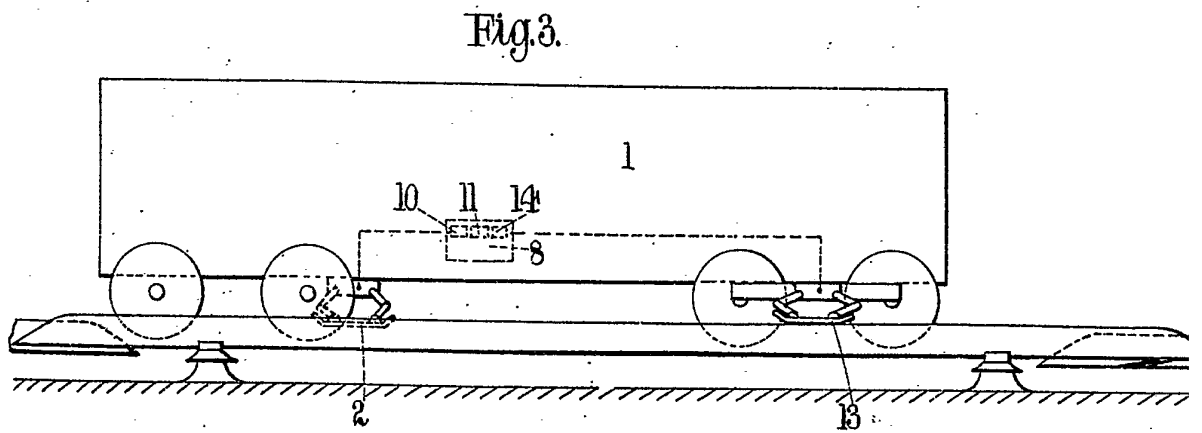
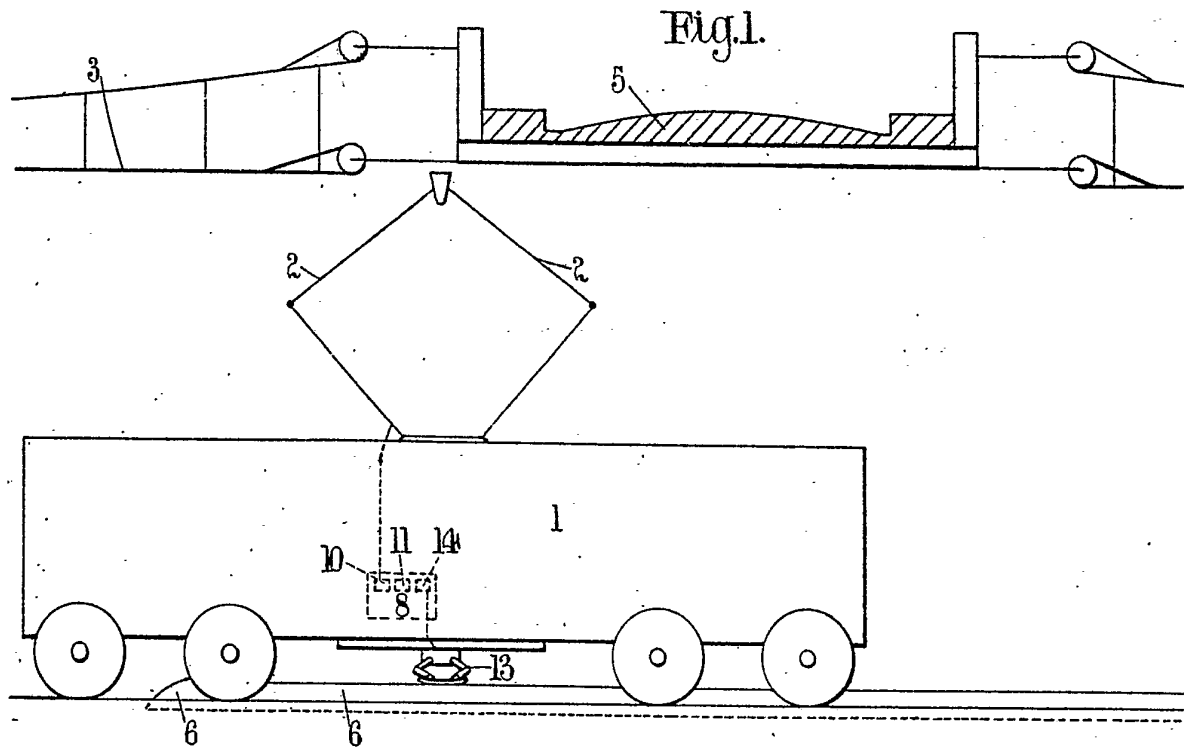
75 2. In electric traction systems arranged as in Claim 1 an arrangement for interlocking the emergency current collecting means with mechanism on the vehicle in such a manner that the driving motors cannot receive current, except by way of the additional third rail or overhead conductor, until the emergency current collecting means has been brought out of action, substantially as described.

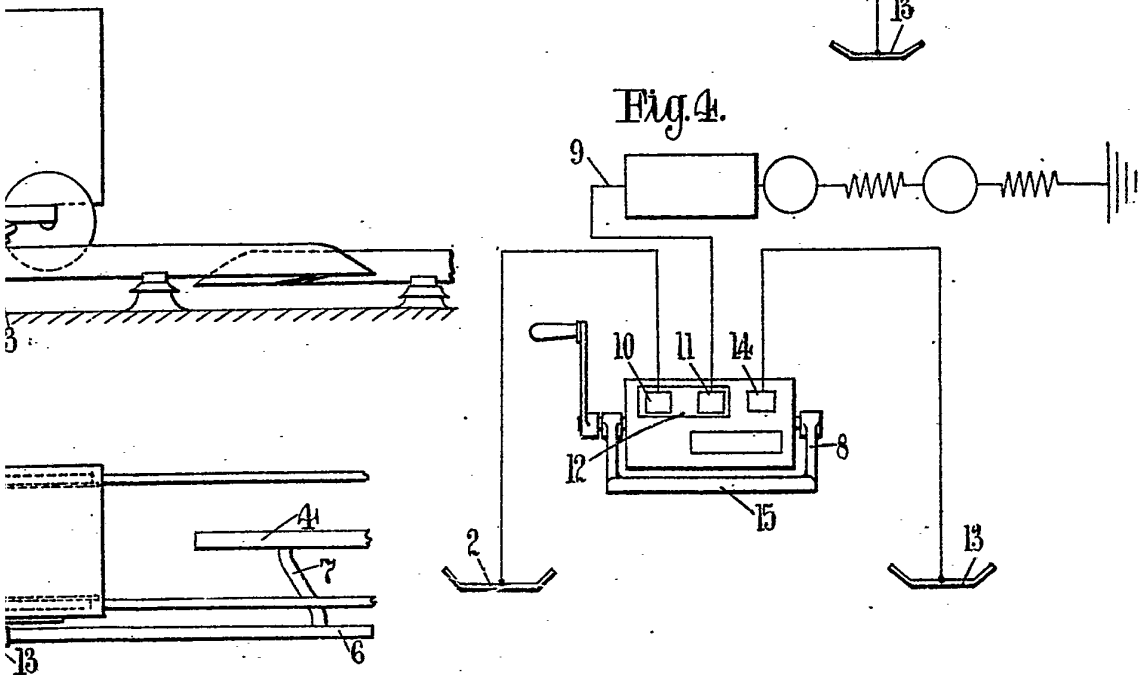
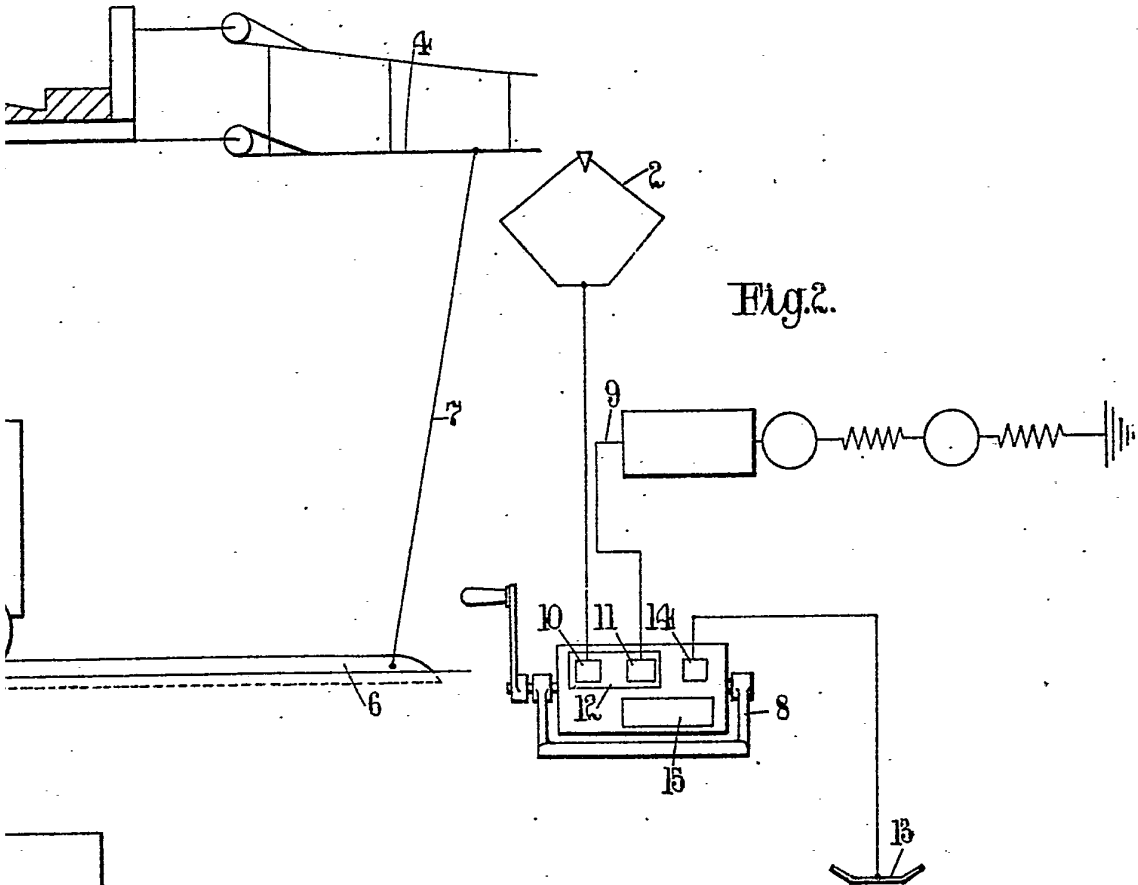
80 3. In an electric traction system the arrangements whereby a vehicle or a train of vehicles can collect current at a part of a track where the condition of the electric supply changes substantially as described with reference to the accompanying drawings.

Dated this 2nd day of July, 1924.

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[This Drawing is a reproduction of the Original on a reduced scale.]





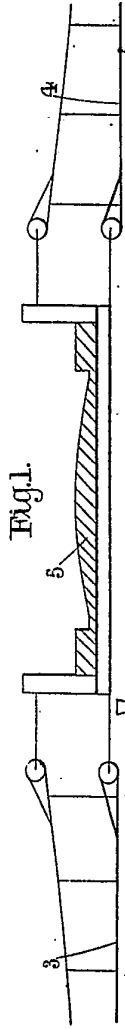


Fig. 1.

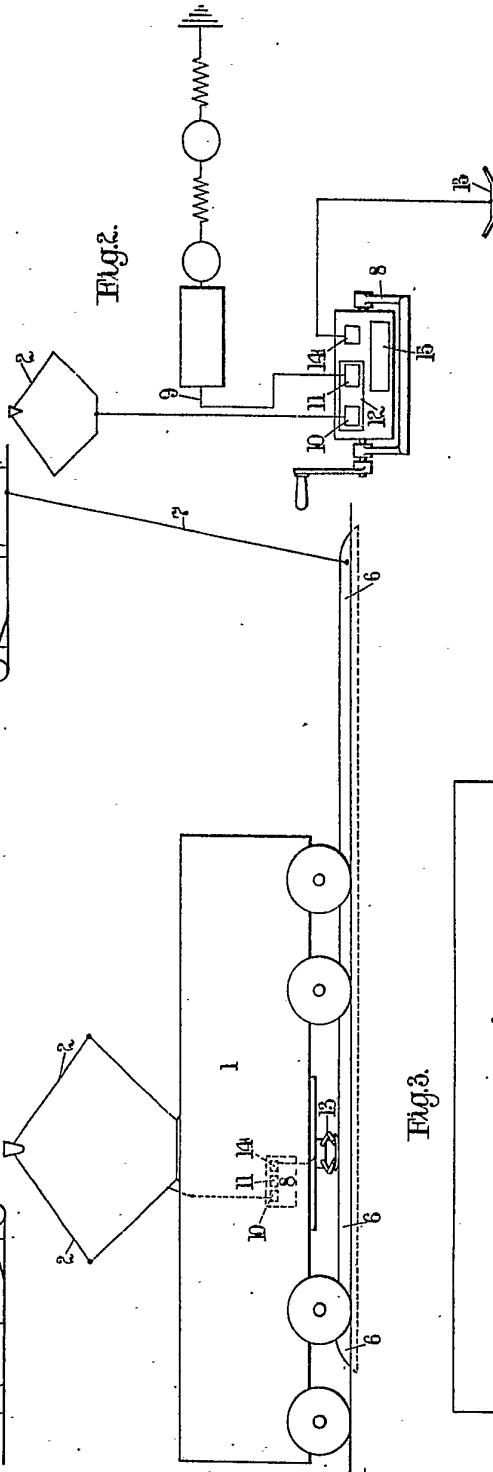


Fig. 2.

Fig. 3.

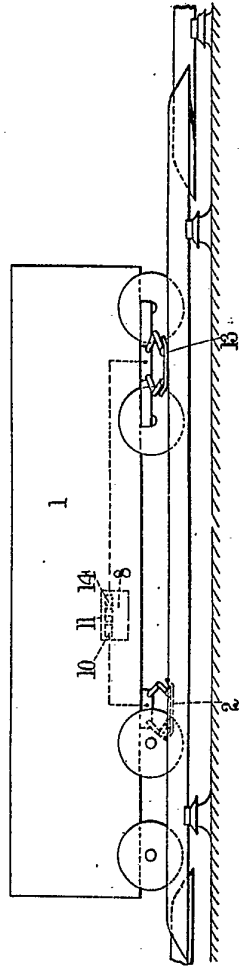


Fig. 4.

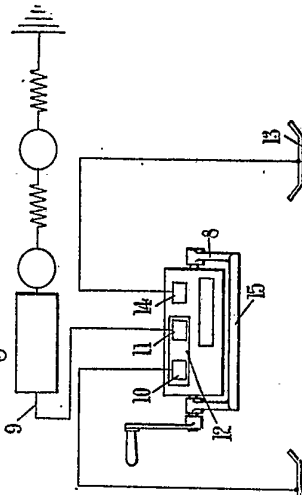
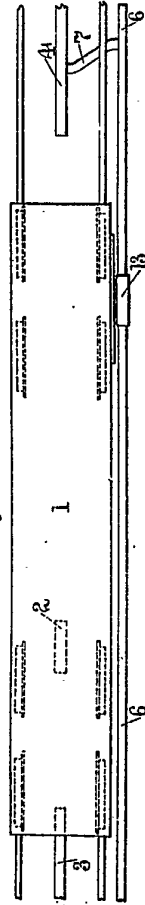


Fig. 5.



[This Drawing is a reproduction of the Original on a reduced scale]