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ARRANGEMENT FOR CHANGING THE MACHINERY OF HIGH SPEED SUSPENSION
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Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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This invention relates to an arrangement for the rapid replacement of machinery, particularly with regard to high speed suspension cars, that are driven by means of an air screw. Such an arrangement can be used for the rapid replacement of a broken down motor, or for fitting a different type of motor, if the car is to travel at a different speed. In the case of a normal railway, where a number of separate cars are coupled together, the separation of the machinery or power means, that is the locomotive, is very simple, and moreover the coupling is arranged without any considerations of air-resistance, but with the high speed suspension car an entirely different problem is presented. Owing to the much higher speed the machinery of a high speed suspension car takes up about 30% of the whole space and its weight is about 50% of the whole weight. Moreover the body of the car containing the machinery must be of streamline form and must act aerodynamically as a single body.

In the accompanying drawings are shown several arrangements for separating the machinery from the car. In several of the arrangements provision has been made, at the same time for insulating the vibrations and noise of the machinery from the passenger compartment.

Figs. 1 and 2 show in longitudinal and transverse section one form of car.

Figs. 3, 4 and 5 show another arrangement, being respectively, a vertical longitudinal section, a horizontal longitudinal section and a vertical cross-section.

Figs. 6 and 7 show in horizontal and vertical sections a modified form.

Fig. 8 shows in transverse section means for preventing shock.

Figs. 9-12 show other modified forms of connecting the sections of the car.

Figs. 13-15 show means for closing the gap between the sections.

In Figs. 1 and 2 of the drawings is shown an arrangement in vertical and cross sections, whereby the machinery can be removed and replaced from below.

The engine 1, which drives the propeller-shaft 2 through the coupling 5 is supported on the lugs 7 on the brackets 3, which are fixed to the main bed 4 of the car body. Below the engine there is a suitable removable floor-section 6, which makes possible the removal of the motor, for which purpose the engine bolts between the lugs 7 and the brackets 3 are removed. In the same way the other connections of the motor, for instance, the coupling 5 and the petrol-cooling water—and oil pipes are disconnected, and then the motor may be moved lengthwise of the brackets 3 and lowered through the opening provided by the removal of the floor section 6. Similarly a fresh engine can be put in from below. The floor-section 6 serves for closing the lower opening and is made in streamline form.

Another arrangement is shown in Figs. 3, 4 and 5, in vertical-longitudinal section, horizontal-longitudinal section and vertical cross-section. In this modification the motor 1 is carried on a U-shaped bed 8, which is combined in one unit with the bottom plate, so that when the motor is removed, the bed and bottom plate come away together.

The unbolting and disconnection of flanges and other parts is objectionable, and can be avoided by the arrangements shown in Figs. 6 and 7. The machinery together with the propeller drive is carried on a single bed 9, which both underneath and at the rear is made in streamline form, and fits into a special opening of the car body. For changing the machinery in this arrangement fewer disconnections need to be made, in fact, possibly none except the removal of the holding down bolts, which hold the machinery into the body of the car.

In order to insulate the car from shocks and vibrations of the motor unit 1, the latter is supported on a frame shown in Fig. 8, supported by means of the springs 10, which rest on the brackets 11, while lateral vibrations are taken up by the springs 12 and 13.

In the further arrangements shown in Figs. 9-15 the entire motor compartment or the motor alone is arranged as a separate part of the car, which may be carried on its own running gear. Naturally it is made to conform with the streamline form of the
whole car. For replacement the car-section, containing the machinery is separated from the main-body of the car, and can, for example, move along the rail on its own running-gear, or be removed by means of a crane.

In the arrangement shown in Fig. 9, the section 15 containing the machinery, and the section for passengers or freight 14 runs on one or more bogies 16—17 and each part is supported on the springs 18—19. Both parts, in order to transfer the longitudinal forces in a vibrationless manner, are connected together by means of the springs 20 and the flanges 21. In Fig. 10 the section 14 is pivotally supported by means of the arm 22 and the spring 23 on the section 15 which is fixed to the turntable bogie 16. In order to prevent too great a relative movement of the two sections, there is arranged, for example, a spring connection 24 between them which reduces this movement in both longitudinal and lateral directions. In Fig. 11 the section 14 is fastened to the section 15 by means of the flange 25 and radially arranged vertical and horizontal springs 26 and by a longitudinal spring 27. By means of the springs 26 vertical shocks are taken up, while the spring 27 acts as a coupling and for taking up horizontal shocks.

In the arrangement shown in Fig. 12 two machine-sections 15 are coupled with the passenger or freight section 14. Instead of supporting the sections 15 on running-gears these can be fitted to the section 14. In this case the connections between the two sections must be able to withstand bending. The arrangements of the Figs. 9—12 naturally can be combined with those of Figs. 1—8 and instead of the spring other elastic means, such as rubber, air-buffers etc. can be used.

The space 28, resulting from the separation of the machine room, can be closed for aerodynamic, acoustic or atmospheric reasons, for example as shown in Figs. 13—15. The rubber collar 29 is fastened to one section, and is slidable fitted on the other but securely held by springs so, that it does not lift if a longitudinal movement takes place, as shown in the longitudinal section Fig. 14. The formation of folds or corrugations in the collar during circumferential stress is prevented for example by means of longitudinal inserts of very flexible wire or the like. Another manner of securing the sections is shown in Fig. 15. The collar 30 is contracted in V-form and the form can be maintained by the spring 31. The resulting space between its limited width has no great influence on the air-resistance. The resulting closed intermediate space serves for sound insulation.

What we claim is:

1. A high speed suspension car provided with driving mechanism, the car body having an opening in the bottom of the hull, said opening being so located as to permit the driving mechanism to be dropped there-through clear of the car body.

2. A car as claimed in claim 1 in which the opening is closed by a closure shaped to preserve the stream-line form of the car.

3. A car as claimed in claim 1 in which the driving mechanism is mounted on a bed plate located in the opening, the lower surface of the bed plate conforming to the stream-line form of the car.

4. A high speed suspension car provided with driving mechanism, said mechanism being located in a compartment removably secured to the main body portion of the car, an opening in the hull of the compartment so located as to permit removal of the driving mechanism.

5. A car as claimed in claim 4 in which the opening is closed by a closure shaped to preserve the stream-line form of the car.

6. A car as claimed in claim 4 in which the driving mechanism is mounted on a bed plate located in the opening, the lower surface of the bed plate conforming to the stream-line form of the car.

7. A car as claimed in claim 4 in which the compartment wherein the driving mechanism is located is provided with individual running gear.

8. A car as claimed in claim 1 in which the driving mechanism is secured to the car body by means of elastic supports to take up shocks and vibrations.

9. A car as claimed in claim 1 in which the driving mechanism is mounted on a bed plate located in the opening, the lower surface of the bed plate conforming to the stream-line form of the car, said bed plate being secured to the car body by means of elastic supports to take up shocks and vibrations.

10. In combination, in a high speed suspension car, a main body portion having suspension wheels secured thereto, a detachable compartment provided with driving mechanism and individual suspension wheels, means for flexibly connecting the mechanism compartment with the main body portion.

11. A car as claimed in claim 4 in which the mechanism compartment is secured to the main body portion of the car by flexible connecting means.

12. A car as claimed in claim 1 in which the mechanism compartment is secured to the main body portion of the car by flexible connecting means comprising a spring.

13. A car as claimed in claim 1 in which the mechanism compartment is secured to the main body portion of the car by flexible connecting means comprising a spring centrally located with respect to the longitudinal axis of the car.
14. A car as in claim 10 in which the flexible connecting means comprises a spring.
15. A car as in claim 10 in which the flexible connecting means is so disposed as to form an insulating air space between the mechanism compartment and the main body portion.
16. A car as in claim 4 in which the mechanism compartment and the main body portion are secured by flexible connecting means so arranged as to form an insulating air space therebetween.

In testimony whereof we affix our signatures.

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