

[54] MOUNTING OF A CLUTCH MEMBER AT THE END OF TOY AND MODEL VEHICLES

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[22] Filed: Dec. 22, 1969

[21] Appl. No.: 887,117

[30] Foreign Application Priority Data

Dec. 21, 1968 Germany.....P 18 16 388.7

[52] U.S. Cl.....46/216, 46/221

[51] Int. Cl.....A63h 19/00

[58] Field of Search.....46/23, 26, 216, 217, 218, 29, 46/25

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[57]

ABSTRACT

A coupling arrangement for toy or model railroad cars in which one coupling part comprises a pair of resilient legs with projections on the outer sides thereof, while the second coupling part has an aperture to receive the ends of said legs and a chamber with which the aperture communicates. The second coupling part has inclined surfaces leading to the aperture at the sides and top and a flat wall at the bottom of the aperture whereby the first coupling part can tilt laterally or upwardly on said second coupling part but is inhibited from tilting downwardly. The sidewalls of said chamber and the outer surfaces of said projections on the legs converge in a direction toward the side of the chamber disposed opposite the aperture.

7 Claims, 9 Drawing Figures

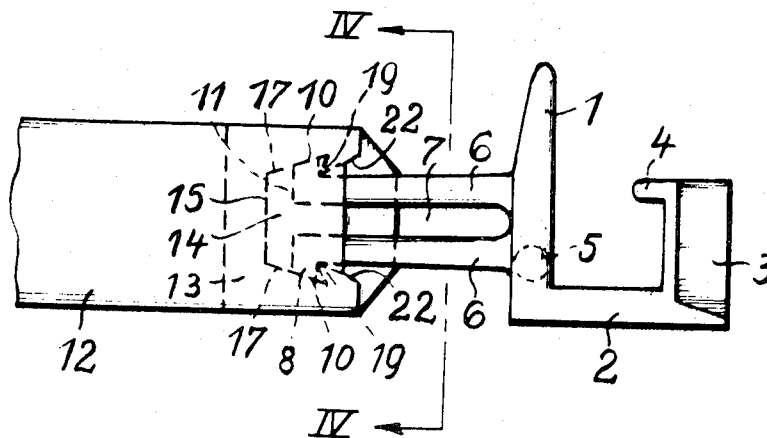


Fig. 1

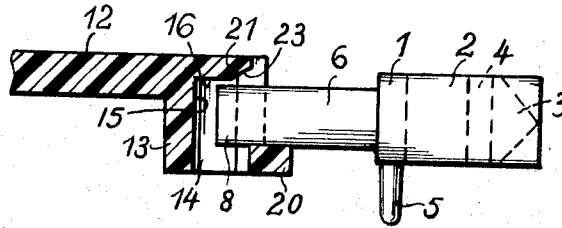


Fig. 2

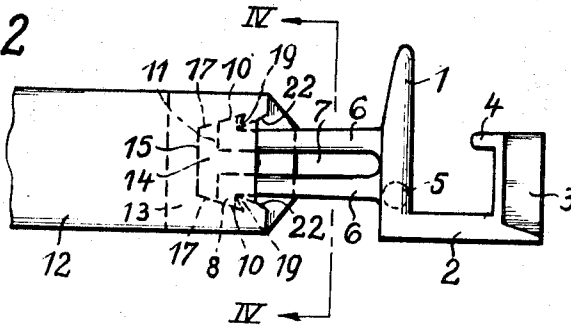


Fig. 3

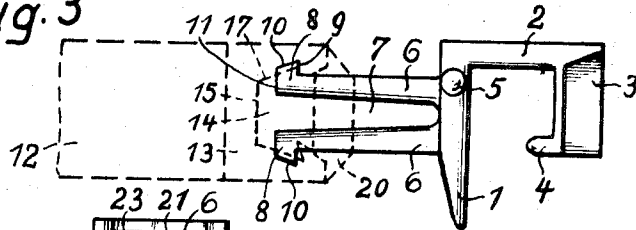


Fig. 4

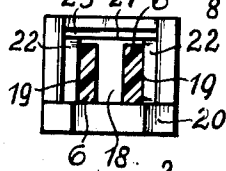


Fig. 5

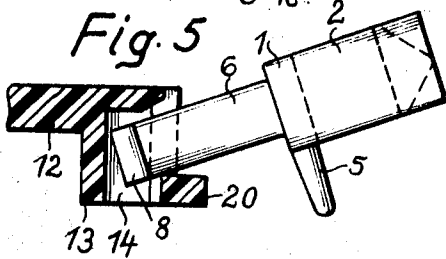
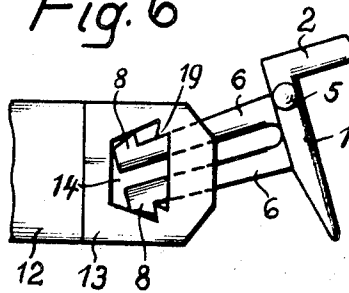


Fig. 6

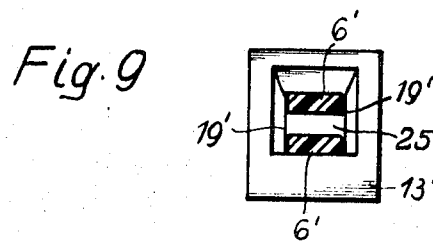
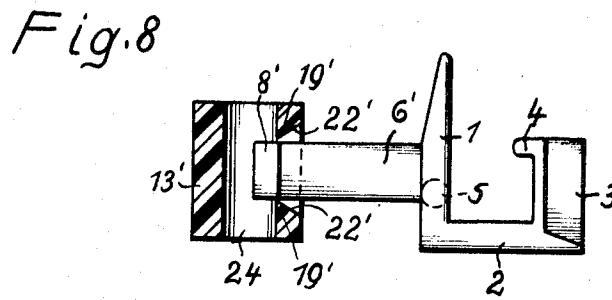
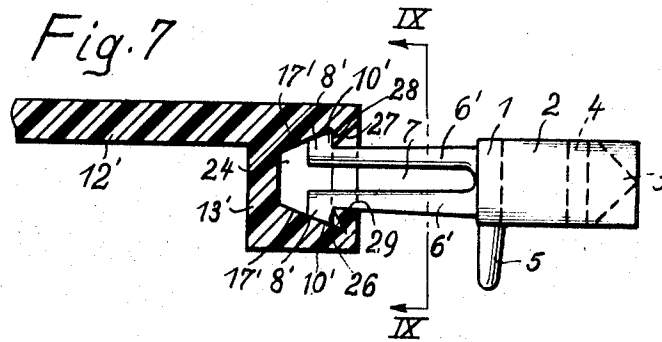


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MOUNTING OF A CLUTCH MEMBER AT THE END OF TOY AND MODEL VEHICLES

The present invention relates to the mounting of a clutch member at the end of toy and model railroad vehicles, in which the clutch member proper when seen from the top has a hook-shaped contour and is pivotable about a vertical axis to both sides and furthermore for purposes of engaging and disengaging the clutch is adapted from a central position to be pivoted against the thrust of a spring in upward direction. That end of the clutch member which serves as a mounting or bearing is with this clutch formed by a shank with a preferably rectangular cross section and also comprises a supporting member arranged on said shank and protruding beyond the cross section thereof. The shank and supporting member are mounted in a chamber arranged on the vehicle end, which chamber at its end face is provided with an opening of rectangular cross section to permit the passage of said clutch shank. Between the chamber and the said passage on one hand, and the clutch shank and the supporting member on the other hand, there is provided sufficient play to permit the said clutch member to be pivoted toward both sides and also against the thrust of the spring in upward direction, said spring being adapted to return said clutch member to its horizontal starting position when the upwardly pivoting force subsides.

While such mounting of one clutch member makes possible an easy engagement and disengagement of the clutch by pivoting upwardly one of the two clutch hooks and also permits a lateral pivoting when driving through a curve and an easy spring back when two vehicles hit upon each other, still a relatively great number of elements are necessary to build up such clutch, inasmuch as after the insertion of the supporting part into the journaling chamber, it is necessary to provide a pressure spring in order to maintain the clutch member in its central position. Furthermore, means have to be provided in order to close the journaling chamber which is open at least toward one side and in order also to close the passage for the supporting member and the shank to prevent the said clutch member and pressure spring from dropping out of said chamber.

It is also known to produce one clutch member of a clutch pivotable in vertical direction, together with the fastening means therefor of one single piece of synthetic material in such a way that the rearward end of the clutch hook is, through a thin horizontally located lamella connected with the holding means therefor, especially the bogie of a vehicle. While in this way the clutch hook for engaging and disengaging the clutch can be pivoted in vertical direction, it is necessary for the horizontal movement of the clutch hook to employ the turning movability of the bogie, and if no bogie is provided, such clutch hook has to be journaled on a separate element in order to permit a pivoting movement about a vertical axis on the vehicle.

A further drawback of this clutch mounting consists in that the lamella which consists of synthetic material must, for reasons of strength have a certain thickness so that it will be relatively stiff, and greater forces are necessary in order to lift the clutch hook for purposes of carrying out a disengaging movement. Moreover, after a more frequent use of the clutch, a fatigue in the lamella occurs so that the clutch hook will no longer return to its horizontal starting position.

Still another drawback of this arrangement consists in that the clutch when two vehicles move against each other in the longitudinal direction of the vehicles will not deflect.

It is, therefore, an object of the present invention to provide a mounting for one of two clutch members on a vehicle of toy and model railroads which will overcome the above-mentioned drawbacks while being simple and inexpensive to manufacture.

These objects and other objects and advantages of the invention will appear more clearly from the following specification, in connection with the accompanying drawings, in which:

FIG. 1 illustrates partly in side view and partly in section the mounting of one clutch member according to the invention with the supporting part therefor.

FIG. 2 is a top view of the arrangement shown in FIG. 1.

FIG. 3 illustrates a bottom view of the clutch hook removed from its mounting while the mounting part is indicated in dot-dash lines.

FIG. 4 illustrates the mounting of one clutch member according to FIGS. 1 and 2, as seen from the front, and represents a section taken along the line IV—IV of FIG. 2.

FIG. 5 is a side view of the mounting for one clutch member according to FIGS. 1 to 4 with the clutch hook in lifted position and the mounting part therefor in section.

FIG. 6 illustrates the mounting of one clutch member as illustrated in the preceding figures while being seen from the bottom and occupying a laterally pivoted position of the clutch hook.

FIG. 7 represents a modification of the clutch member mounting shown in FIGS. 1 to 6 with the supporting part for said one clutch member shown in section.

FIG. 8 is a top view of the clutch member mounting shown in FIG. 7.

FIG. 9 is a section taken along the line IX—IX of FIG. 7.

According to the present invention it is suggested to provide that end of the one clutch member which serves for supporting the same with at least one central recess located in the longitudinal direction of the shank whereby resilient legs are formed.

Furthermore, in conformity with the invention, the mounting chamber is at least on two oppositely located sides confined by plane surfaces which extend conically toward the center of the respective car, while the supporting parts provided on the leg ends are so formed or provided with surfaces that the said one clutch member is, by holding extensions, mounted in horizontal position in said chamber and is adapted when resiliently compressing the two legs to be pivoted in horizontal as well as in vertical direction.

According to a preferred embodiment of the invention, the holding extensions are formed by two resilient legs separated from each other by an intermediate recess. These legs are provided with supporting members laterally protruding beyond said legs in the direction of spring of said legs.

According to a particularly advantageous design of the present invention, the rectangular passage provided at the front end of the mounting chamber for the holding extensions forms a closed rectangle, and the supporting members on the leg ends are so dimensioned that the holding extensions are adapted to be sprung in through said opening on the end face into said mounting chamber.

Referring now to the drawings in detail, it will be noted that the clutch member proper comprises a member which, when seen from the top, has a hook-shaped contour and comprises a long transverse web 1, a longitudinal web 2 extending in the longitudinal direction of the vehicle and adjacent to said web 1, and a clutch nose 3 transverse to and adjacent said longitudinal web 2. The hook-shaped profile member furthermore comprises a confining web 4 located on the rear side of the end of said clutch nose 3, and a disengaging pivot 5 extending downwardly and provided on the transverse web. Adjacent said clutch hook 1-5 and toward the rear thereof there is provided a holding member which comprises a shank of a rectangular cross section and a supporting member provided on the end of said shank.

According to the invention, this shank comprises two substantially parallel resilient legs 6 of rectangular cross section which are separated from each other by a relatively wide recess 7 therebetween. This recess 7 may likewise be of rectangular cross section and as shown in FIG. 3 may flare in the direction toward the end of the shank. The recess 7 extends also over the supporting member which is provided at the end of the resilient legs and as shown in the drawing includes one hook-shaped extension 8, each protruding laterally beyond the leg 6 at the end thereof in the spring direction of said legs. These supporting members or hook-shaped extensions 8 are delimited by a surface 9 facing toward the clutch hook. The said surfaces 9 are located in a plane parallel to the transverse web 1. The lateral confinement of said extensions 8 form surfaces 10 which are inclined in a roof-shaped manner

and which taper in the direction toward the center of the railway car. The resilient legs 6 including the extensions 8 are with the embodiment of FIGS. 1-6 confined by parallel plane surfaces on their top and bottom side, and at their rear ends are confined by surfaces 11 which are located in a plane transverse to the longitudinal axis of the vehicle.

The clutch hook according to the present invention is, together with its holding member formed of one piece of well resilient synthetic material which can also be polished, for instance, a material known under the trade name Mipolan, sold by Dynamit A.G. of Troisdorf, Federal Republic of Germany, and consisting primarily of polyvinyl-chloride.

For purposes of mounting or holding said clutch hook, there is provided a structural member 12 which preferably likewise consists of synthetic material and preferably either forms a part of a bogie or the car body. This structural member 12 has an extension 13 which is reinforced in height and in which in conformity with FIGS. 1-6 there is provided a downwardly open prismatic recess 14. This recess 14 is toward the rear, i.e., toward the center of the vehicle confined by a vertical plane surface 15 and is in upward direction confined by a horizontal plane surface 16 and at both sides is confined by vertical plane surfaces 17.

The two surfaces 17 taper toward the center of the vehicle. The end face end of the extension 13 has a closed rectangular passage 18 which is confined toward both sides by vertical cutting-edgelike edges 19 (FIG. 4). Adjacent the lower horizontal confining edge of the passage 18 at the end face, there is provided toward the front a lower extension 20 which limits in downward direction the pivoting movement of the clutch hook. Adjacent the cutting-edgelike vertical edges 19 and also adjacent the edge 21 confining from above the passage, there are provided surfaces 22 and 23, which are so located as to form a funnel with each other.

With the embodiment illustrated in FIGS. 1 to 6, the two resilient legs 6 are adapted by means of their extensions 8 to deflect in horizontal direction. The height of the legs 6 and of the extensions 8 is so selected that, as is particularly evident from FIGS. 1, 4 and 5, the rectangular passage 18 is in vertical direction only slightly greater than said height. From FIG. 3 it will be seen that the spacing between the surfaces 10 which are provided on the hook-shaped extensions 8 somewhat parallel to the confining surfaces 17 of the chamber and somewhat greater than the distance between said surfaces 17 when the holding extension of the coupling hook has not yet been introduced into the supporting chamber. On the other hand, the two resilient legs 6 and the extensions 8 are so designed that when strongly pressing the legs toward each other, the extensions 8 which serve as supporting member are returned to their normal position through said opening 18 into the chamber. This may be effected either by introducing said extensions 8 through the opening 18 in a position offset by 90° and by subsequent rotation by 90° or by a direct introduction of the compressed legs 6 or extensions 8. After the extensions 8 have been introduced into the mounting chamber, the coupling hook will occupy its normal horizontal position shown in FIGS. 1 and 2. In this position, the conically tapering surfaces 10 of the extension 8 engage the conically tapering inner surface 17 of said chamber under the pressure of the legs 6 somewhat pressed toward each other while the surfaces 9 of the extensions 8 rest against the vertical edges 19 which laterally confine the passage 18.

As will be particularly clearly seen from FIGS. 5 and 6, the clutch hook is adapted under the influence of higher forces to pivot upwardly as well as toward both sides from the central position shown in FIGS. 1 and 2, while the two supporting members or extensions 8 will in the prismatic chamber 14 illustrate the position shown in FIGS. 5 and 6. In this connection, the two legs 6 will, above all, in view of the conical lateral confining surface 17, be compressed further. In view of this spring effect, the clutch hook has the tendency to return to its normal position when said deviating forces subside.

Advantageously, all adjacent surfaces and edges which slide on each other and pertain to the leg end and the said chamber, especially the surfaces 17 of said chamber and the surfaces 10 and the adjacent edges of the extensions 8 are very smooth so that low frictional forces will occur and that the pivoting of the clutch hook from its central position and the automatic return pivot movement to said starting position will be greatly facilitated.

The embodiment illustrated in FIGS. 7-9 differs from that of FIGS. 1-6 in that the holding extension means for the clutch hook consist of two legs 6' which are resilient in vertical direction and which have adjacent thereto the upwardly and downwardly extending supporting parts or extensions 8'. Generally, these resilient legs 6' and the extensions 8' may be designed precisely in the same manner as described in connection with the embodiment of FIGS. 1-6. Also with the embodiment of FIGS. 7-9, the structural member 12' which preferably forms a part of a bogie or of a car body is provided with an extension 13' reinforced as to its height inasmuch as there is provided a recess 24 of prismatic structure which extends from the left-hand side to the right-hand side of the drawing. That passage 25 which is provided at the end face and is intended for both resilient legs 6' is also in this instance toward both sides formed by cutting-edge-shaped edges 19' followed by the outwardly widening surfaces 22'. The operation of this mounting is substantially similar to that of the preceding embodiment. Also, in this instance, the holding part of the coupling hook which holding part comprises the resilient legs 6' and the extensions 8' are adapted to be sprung into the prismatic chamber through the intervention of the closed rectangular opening 25 while the outer surface 10' of the extensions 8' engages the plane surfaces 17' which taper toward the center of the vehicle. The clutch hook may also in this instance be pivoted in horizontal and vertical direction while after this deviating force has subsided, the clutch hook will return to its illustrated horizontal position. In this connection, the undercut surfaces 26 and 27 and at the upper and lower confinement of the passage permit a pivoting movement of the clutch hook in upward direction whereas the corresponding surfaces, namely, the vertical surface 28 and the horizontal surface 29 will make it difficult to pivot the clutch hook in downward direction.

As will be evident from the above, the present invention has the following outstanding advantages. In view of the fact that the resilient legs will take over the function of the heretofore necessary pressure spring, such pressure spring is no longer necessary and may be omitted. In view of the provided spring in of the holding member into the mounting chamber, it is no longer necessary to close openings or gaps provided therefor. This, in turn, represents a considerable saving in manufacturing costs. Moreover, the clutch according to the invention can be easily assembled, and if the clutch should have worn or become damaged after a certain time of operation it can easily be replaced by a new one.

The mounting of one clutch member in conformity with the present invention does not result in any reduction of its function which means that the clutch hook can be pivoted upwardly as well as toward both sides and thus will create a spring effect in the longitudinal direction of a vehicle when two vehicles hit each other in the longitudinal direction thereof.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawing, but also comprises any modifications within the scope of the appended claims. Thus, the clutch hooks may have a different shape and may for purposes of engagement and disengagement of the clutch be also pivotable in horizontal direction. Instead of the two resilient legs there may also be provided three or more of such legs with corresponding mounting extensions, however, such design would not have any essential advantage over a two-leg design.

What is claimed is:

1. A coupling arrangement adapted for utilization at a vehicle end of toy and model rail vehicles including a vehicle fixed bearing chamber portion with a prismatic chamber forming means extending transverse to vehicle longitudinal axis and having a squared passage means longitudinally emerging from the bearing chamber portion and merging into the chamber-forming means, the passage means having somewhat smaller measurements than the chamber-forming means, the improvement therewith which comprises a coupling hook means with a coupling nose triangular in cross section extending away from said bearing chamber portion and having an outwardly located cutting portion, a downwardly directed disengaging pivot means and a holding portion integral with said coupling hook means, said coupling hook means including spaced-apart legs and a support portion at leg ends such that measurements thereof correspond to measurements of said chamber-forming means and said passage means in the bearing chamber portion, said support portion being pivotable and engageable inside said chamber-forming means, said prismatic chamber-forming means being defined by at least two planar walls progressively approaching each other at an acute angle toward vehicle middle, measurements of said prismatic chamber-forming means in vehicle longitudinal direction corresponding substantially in size to corresponding measurement of said support portion at leg ending, said legs with said supporting portion forming dual resilient means, said supporting portion being provided with level surfaces extending at an incline relative to vehicle middle; spacing of said legs thereof in unstressed condition being greater than spacing of chamber walls such that said coupling hook means under stress of said legs resiliently engage said prismatic chamber mating wall surfaces thereby securing said coupling hook means in a middle position thereof; said coupling hook means however during coupling and decoupling of paired vehicles so equipped being subjected to further stress of said resilient legs allowing rotation about a horizontal axis; during curve travel there being still further stress upon said resilient legs to result in pivotable movement about a vertical axis of the vehicles coupled to each other.

2. A coupling arrangement according to claim 1, in which

planar boundary surfaces extending toward vehicle center for the chamber portion and corresponding to planar boundary surfaces of both support portion halves at ending thereof have resilient legs and a middle recess between said legs located in vertical direction.

3. A coupling arrangement according to claim 1, in which planar boundary surfaces extending toward vehicle center for the chamber portion and corresponding to planar boundary surfaces of both support portion halves at ending thereof have resilient legs and a middle recess between said legs located in horizontal direction.

4. A coupling arrangement according to claim 1, in which squared facial through passage means for holding engagement at least in part being defined by knife-type edges connect with surfaces widening in funnel shape outwardly from the vehicle.

5. A coupling arrangement according to claim 2, in which lower boundary of facial through passage means has provided therewith an extension extending outwardly in direction toward coupling hook means and adapted to limit pivotal movement of coupling hook means downwardly out of middle position thereof.

6. A coupling arrangement according to claim 3, in which upper and lower boundaries of squared through passage means edges are formed by surfaces extending at acute angle toward each other, whereby position of surfaces with respect to coupling hook means is so selected that said coupling hook means can be pivoted upwardly and the position of the surfaces is so selected that downward pivoting of the coupling hook means is impossible from middle position thereof.

7. A coupling arrangement according to claim 1, in which squared facial through passage means at bearing chamber location forms an uninterrupted right angle for holding engagement and measurements of support portion halves relative to corresponding measurements of said through passage means are so selected that the same are less in magnitude for pressed together resilient legs than corresponding measurements of through passage means such that holding engagement by way of said facial passage means can be set abruptly into the bearing chamber portion.

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