ARTICULATING SYSTEM FOR A CENTRAL BUFFER COUPLING

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References Cited
UNITED STATES PATENTS
2,826,155 3/1958 Larsson............................. 105/4 R
3,399,631 9/1968 Weber............................. 213/75 R

ABSTRACT
An articulating system for a central buffer coupling, especially rail vehicles, in which that end portion of the coupling rod which will be adjacent the respective vehicle forms a dish-shaped widened portion which is clamped in between preloaded resilient means, e.g. blocks of elastic material such as rubber material, which are arranged in a housing to be connected to the respective vehicle while a safety bolt preferably extends with play through the dish-shaped portion and the resilient means not only urge the coupling rod to its horizontal and vertical central position, but also absorb push and pull forces. The dish-shaped portion is on the outside confined by an annular rib projecting from the dish-shaped portion to opposite directions, while the dish-shaped portion has perforations with plates of elastic material therein.

8 Claims, 4 Drawing Figures
ARTICULATING SYSTEM FOR A CENTRAL BUFFER COUPLING

The present invention relates to an articulating system for a central buffer coupling, especially for rail vehicles, in which that end of the coupling rod which is to be adjacent the vehicle has a dish-shaped widened portion which is clamped between preloaded spring means, especially blocks of elastic material such as rubber material. These blocks are arranged in a housing to be connected to the vehicle while, if desired, a safety bolt may be provided which extends through the dish-shaped portion of the coupling rod, and while the spring means not only urge the coupling to occupy its horizontal and vertical central position, but also the buffer system of the coupling.

With heretofore known systems of the type referred to above, with which the coupling end portion adjacent the vehicle is widened in a dish-shaped manner, this dish-shaped portion is located horizontally and is clamped between an upper and lower rubber block in such a way that in particular in vertical direction the coupling is placed into central position and that the pull and push forces can be absorbed by the rubber blocks. Since these pull and push forces may become relatively high, the necessary preload of the rubber blocks is determined from the start in order to be sure that the dish-shaped portion will, even with the maximum occurring push and pull forces be held by frictional connection. Simultaneously, however, the coupling had to be turnable about the longitudinal axis of the coupling and, more specifically, in both directions while a turning angle of $\pm 4^\circ$ was permissible. For this turning or pivoting movement it was necessary with the required preloading pressure of the rubber blocks that the same moment which was required for the horizontal height position of the uncoupled coupling be absorbed also with the wobbling or rolling movements occurring in the coupled condition. This force requirement was far too high in many instances. On the other hand, however, it could not be reduced because under such circumstances there would no longer be assured the necessary safety for the transfer of the push and pull forces and the free support of the coupling head. For the transmission of these forces, the rubber or elastic material had to be so stiff and hard that too high forces had to be employed for the pivoting about the longitudinal axis of the coupling.

It is, therefore, an object of the present invention with the same hardness of the rubber block or blocks of elastic material to find a possibility of turning at lower forces than was necessary heretofore, the coupling about the longitudinal axis of the coupling.

The property of the rubber could not be changed because otherwise it was not possible to transmit the necessary pull and pull forces.

The above object 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 is a vertical section through the articulating system according to the invention, said section extending through the axis of the coupling.

FIG. 2 is a cross section taken along the line II—II of FIG. 1.

FIG. 3 is a top view of a dish-shaped widened portion at the end of the coupling rod.

The articulating system according to the present invention is characterized primarily in that the dish-shaped portion of the coupling rod which is clamped between preloaded springs is, toward the outside, confined by an annular rib which projects beyond oppositely located surfaces of the dish-shaped portion on both sides thereof while perforations are provided in the surface of said dish-shaped portion in which perforations there are located plates of elastic material.

Advantageously, the said perforations are at least approximately symmetrically arranged on both sides of the longitudinal axis of the coupling rod.

Expediently, the dish-shaped portion is provided with a central opening which is bordered by a rib protruding on both sides of and beyond the surface of the dish-shaped portion.

Referring now to the drawings in detail, the arrangement illustrated in FIGS. 1 and 2 shows a structure according to which that end of the coupling rod which is intended to be adjacent the respective vehicle is, through the intervention of a connecting member 11, connected to the rim of a horizontally located dish-shaped portion (FIG. 3). Above and below the dish-shaped portion 12 there are respectively arranged rubber blocks in the form of a ring 13, 14 respectively, which are preloaded and clamped between the pertaining plates 15 and the dish-shaped portion 12. Due to this preloading of the rubber blocks 13 and 14, a frictional connection is maintained between the dish-shaped portion 12 and the rubber blocks 13, 14. The plates 15 are turnable about a vertical axis in the housing 16 while simultaneously a vertical bolt 17 provided in housing 16 forms the axle of rotation of the plates 15. By means of the plates 15, the central return of the coupling in the horizontal plane is carried out for which purpose special devices are provided, for instance, of the type disclosed in German Pat. No. 1,122,568. The bolt 17 extends through the dish-shaped portion 12, and more specifically, a central opening 18 thereof, however, without touching the dish-shaped portion 12, which means that the bolt 17 does not serve as a pivot for the dish-shaped portion 12, but merely serves as safety in cases where, due to excessive forces, the dish-shaped portion 12 is pulled out of the rubber blocks. Such pulling out will be prevented by the bolt 17. In addition thereto, the bolt 17 also holds together the two side walls 16 so that these side walls cannot be pressed apart by the preload of the rubber blocks 13 and 14. A rubber buffer 20 is arranged at the rear wall 19 of the housing 16 whereby the pull movement of the dish-shaped portion 12 toward the rear is limited by abutment against the buffer 20.

The dish-shaped portion 12 has, according to FIGS. 3 and 4, a circular contour which is confined toward the outside by an annular rib 22 which projects beyond the surface 21 of the dish-shaped portion 12. In the center of the dish-shaped portion 12 there is provided a longitudinal perforation 23 which extends in the longitudinal direction of the longitudinal direction of the longitudinal axis of the coupling which coincides with the section line IV—IV and the parallel sides 24 of which are spaced from each other by a distance which is only slightly greater than the diameter of the adjacent portion of bolt 17. This central opening 23 is likewise confined by a rib 25 which projects on both sides from
the surface of the dish-shaped portion. This rib 25 is approximately circular so that the rib within the region of the flattened portion of the central opening 23 is doubled. The ring surface 21 located between the ribs 22 and 25 represents the dish-shaped portion which is in contact with the rubber rings. This surface 21 is formed to about 50 percent or less by the perforations 26 which are located on both sides of the longitudinal axis of the coupling which axis coincides with the section line IV—IV. The perforations 26 have an approximately kidney shape and extend in particular at the outer rim up to rib 22. Within the region of the perforations 26 (FIG. 4), the rib 22 has flattened portions 27, the lowest point of which is located approximately in the center of the perforations 26. The height of this lowest point amounts to approximately 50 percent of the height of rib 22.

According to FIG. 1, the rubber rings 13, 14 are, toward the plates 15, made so wide that they fill the flanged rim portions 28 of the plates 15. Toward the dish-shaped portion 12, the rubber rings 13 and 14 are so designed that they completely fill the space between the inner rib 25 and the outer rib 22. Due to the preloading of the rubber rings 13, 14, these rings are firmly seated against the respective horizontal confining surfaces of the rims 28 and ribs 22, 25. The preload of the rubber rings 13, 14 is selected so great that the coupling rod anchored in the connecting member 11 will be able to hold the coupling head arranged at the front end of the coupling rod always at the same height.

According to FIG. 2, the perforations 26 in the dish-shaped portion 12 are filled by rubber plates 29, the size of which, corresponds to the perforations 26 while the thickness of said rubber plates 29 corresponds to the thickness of the dish-shaped portion 12. In this way, the rubber rings 13, 14 cannot relax within the region of the perforations 26 even though the preload does not act here upon the dish-shaped portion 12. According to FIG. 2, the inner wall of the opening 18 within the region of the parallel straight sections is slightly angled off toward the outside so that a movement about the longitudinal coupling axis 30, according to FIG. 1, will be easily possible even though the distance from the bolt 17 is relatively small.

The preload of the rubber rings 13, 14 brings about that the non-illustrated coupling head will always be at the same level as the pull rod. If the coupling head is, according to FIG. 1, pivoted upwardly or downwardly, it will be appreciated that with the pivot movement in upward direction on the front side, ring 13 and on the back side, ring 14 will be compressed whereby the return force will be generated. When the deflecting force ceases, therefore the coupling head will again be returned to the originally set center position. Similar conditions prevail when pull and push forces occur, in which instance the dish-shaped portion is displaced in the direction of the longitudinal coupling axis 30, and more specifically, when pressure occurs, until the rib 22 abuts the buffer 20, whereas when pulling forces occur, the bolt 17 will limit the movement when the inner rib 25 engages the bolt 17. During the movement of the dish-shaped portion 12 in these directions, frictional contact is maintained between the rubber rings 13 and 14 so that the rubber rings will be deformed in such a way that a return force is generated. When the pull or push force ceases, the deforming force will return the coupling through the dish-shaped portion 12 to its normal position.

When pivoting or turning the coupling about the longitudinal axis 30 of the coupling, only that part of the surface 21 of the dish-shaped portion 12 can be effective for generating a return force, which is located between the perforations 26, because at the perforations 26 no deformation of the rubber rings 13, 14 occurs. While here still a certain squeeze occurs, this squeeze is taken care of by the depression 27 of rib 22 due to the fact that at this point the deformed rubber can move beyond the rib 22 without thereby causing very high returning forces. This arrangement thus brings about that the forces which are necessary for pivoting the coupling about its axis 30 can be considerably lower, for instance, may be reduced to one quarter of those occurring with the dish-shaped portion without perforation, while, however, simultaneously there exists the possibility of absorbing the full push and pull forces. The articulation will thus, while maintaining the characteristic lines of all parameters be made softer in one single region, namely, within the region of the pivoting or turning about the longitudinal coupling axis 30.

The housing 16 is expediently so designed that it can be inclined to various degrees relative to the vehicle frame whereby the adjustment of the height of the coupling head above the rail will be possible without changing the preload of the rubber rings 13, 14.

The dish-shaped portion 12 need, of course, not always have a horizontal position, but may also occupy a vertical position. In such an instance, a few other structural changes are to be effected which, however, cause no difficulty whatsoever. The dish-shaped portion need not be circular, but may also have other contours and will, of course, be selected as it best suits the respective purpose. Due to the magnitude of the perforations, the magnitude of the returning force about the longitudinal axis 30 can be varied and adapted to the requirements of the practice.

As will be evident from the above, the advantage of the articulating system according to the invention is seen primarily in the fact that with the same line of characteristic for the transfer of the pull and push forces a considerably greater wobbling or rolling softness about the longitudinal coupling axis 30 will be realized. This means that due to the new construction according to the invention, the return moment about the longitudinal axis 30 is considerably reduced without affecting the vertical returning force and the returning force which extends parallel to the longitudinal axis of the vehicle. All characteristic lines for these parameters have remained the same, while merely the characteristic line for the return force during a tilting or turning about the longitudinal axis 30 has been considerably reduced.

It is, of course, to be understood that the present invention is, by no means, limited to the specific showing in the drawings, but also comprises any modifications within the scope of the appended claims.

What we claim is:

1. An articulating system for a central buffer coupling, especially for rail vehicles, which includes: housing means for connection to a vehicle, a coupling rod having one end portion thereof provided with a dish-shaped widened portion arranged in said housing means, preloaded resilient means clamped between
said housing means and said dish-shaped widened portion and clamping the latter therebetween, annular rib means peripherally connected to said dish-shaped portion and projecting therefrom in opposite directions in the axial direction of said dish-shaped portion, said dish-shaped portion being provided with perforations and plate means of elastic material provided in said perforations.

2. An arrangement according to claim 1, in which said preloaded resilient means are formed by blocks of rubber material.

3. An arrangement according to claim 1, which includes safety bolt means secured in said housing means extending with play through said dish-shaped portion of said coupling rod.

4. An arrangement according to claim 1, in which said perforations at a maximum, cover an area of 50 percent of the surface of said dish-shaped portion.

5. An arrangement according to claim 1, in which said perforations are at least approximately symmetrically arranged on both sides of the longitudinal axis of said coupling rod.

6. An arrangement according to claim 1, in which said annular rib means is lower within the region of said perforations than within the remaining region of said dish-shaped portion of said coupling rod.

7. An arrangement according to claim 1, in which said dish-shaped portion has a central passage therethrough, and rib means surrounding said passage and projecting in opposite direction from said dish-shaped portion.

8. An arrangement according to claim 7, which includes safety bolt means secured in said housing means and passing through said central passage, and in which said central passage is partially defined by side walls spaced from each other by a distance only slightly greater than the diameter of the adjacent portion of said safety bolt means.