Nov. 2, 1937. F. H. KAYLER 2,098,207

CAR COUPLER

Filed May 6, 1936 5 Sheets-Sheet 1

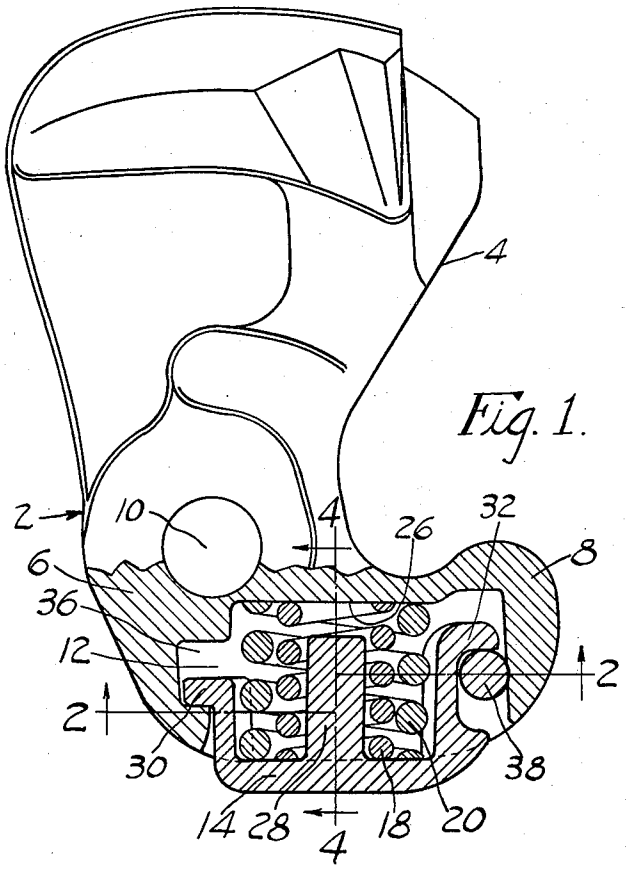


Fig. 1.

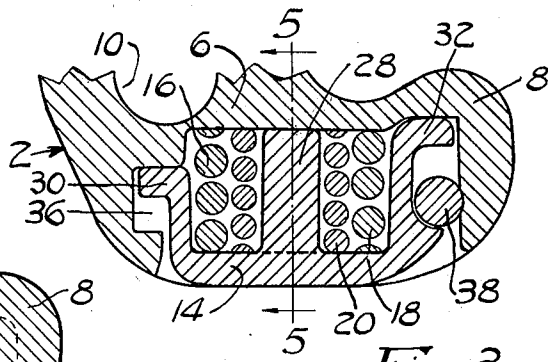


Fig. 3.

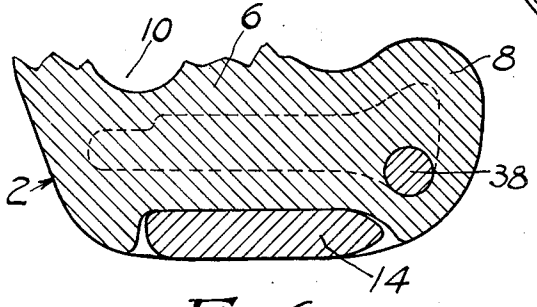


Fig. 6.

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CAR COUPLER

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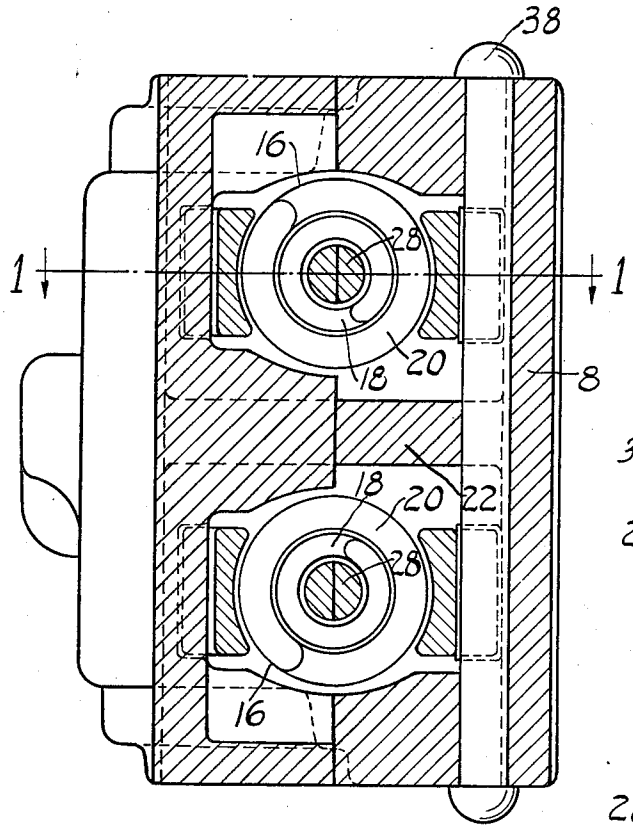


Fig. 2

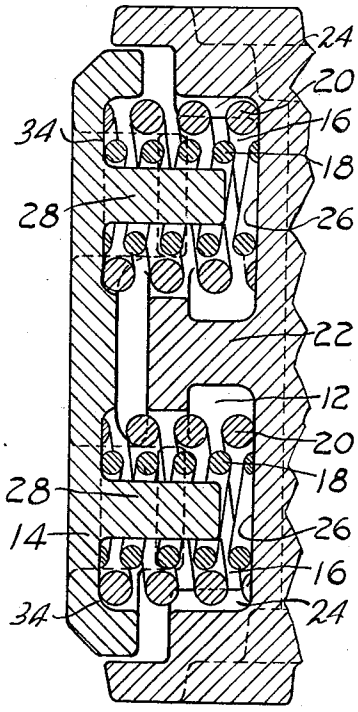


Fig. 4.

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CAR COUPLER

Filed May 6, 1936 5 Sheets-Sheet 3

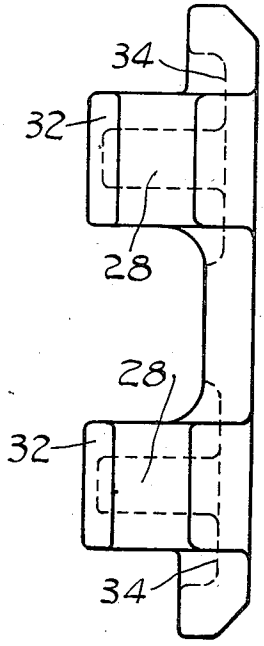


Fig. 10.

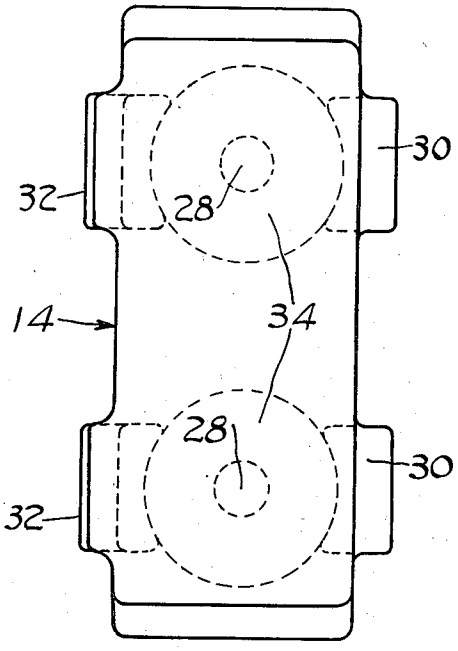


Fig. 7.

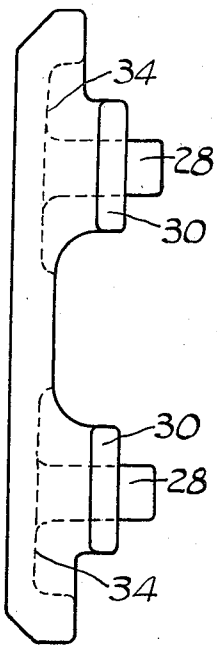


Fig. 9.

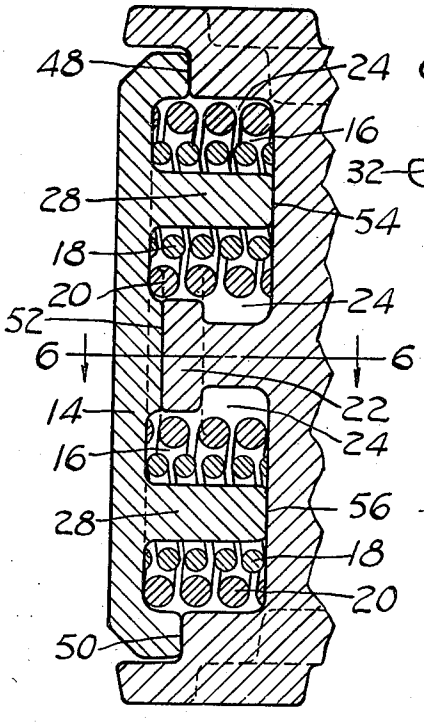


Fig. 5.

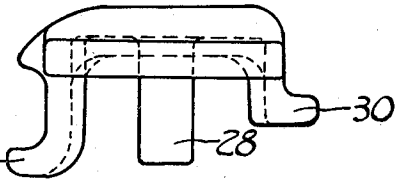


Fig. 8.

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CAR COUPLER

Filed May 6, 1936 5 Sheets-Sheet 4

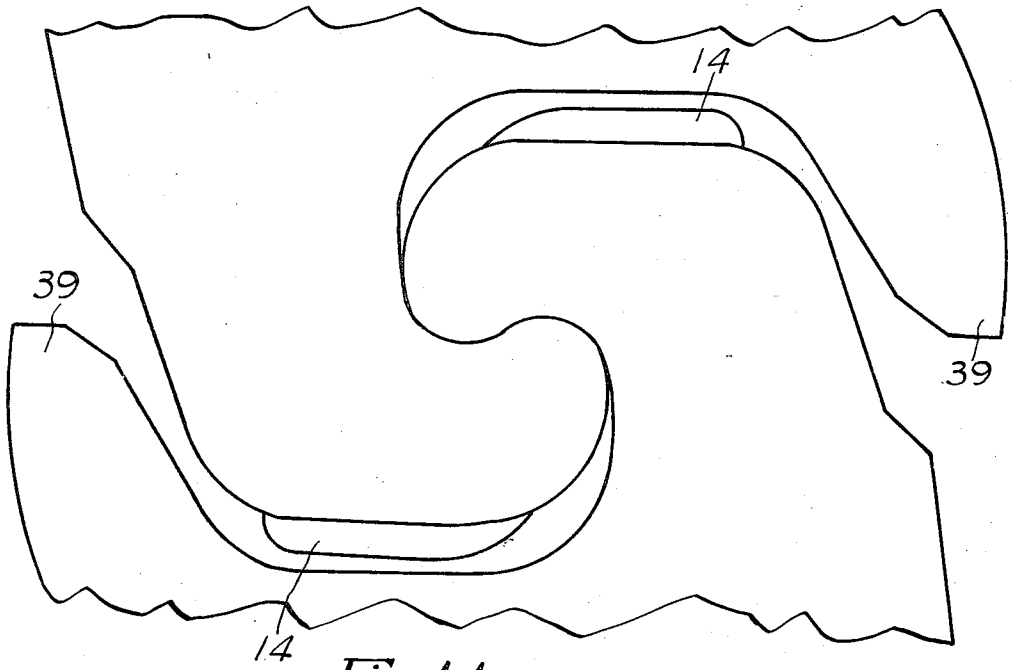


Fig. 11.

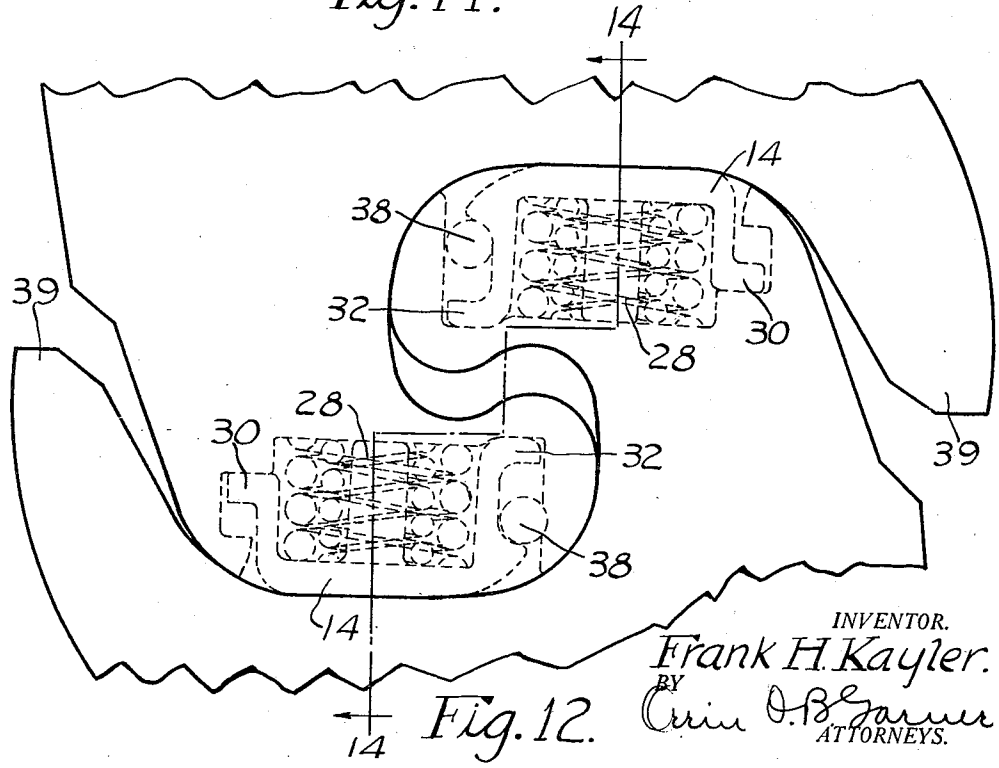


Fig. 12.

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CAR COUPLER

Filed May 6, 1936 5 Sheets-Sheet 5

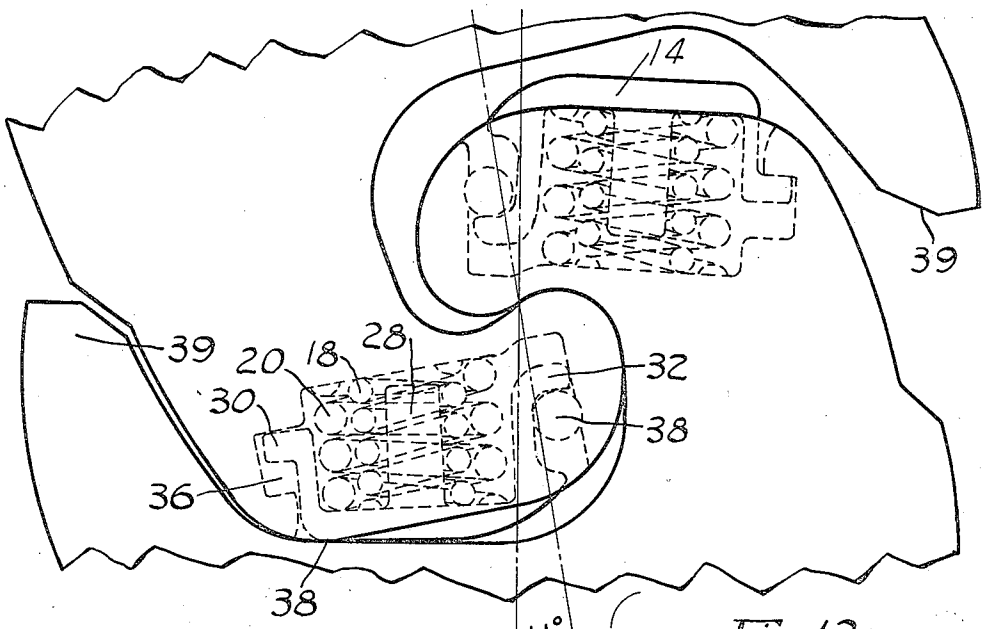


Fig. 13.

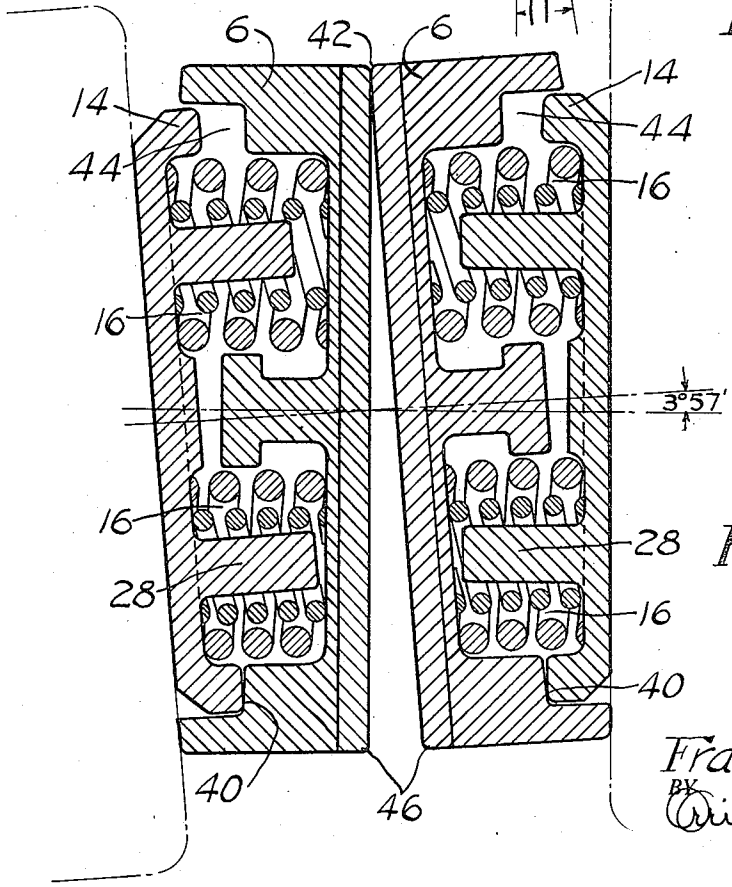


Fig. 14.

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Patented Nov. 2, 1937

2,098,207

UNITED STATES PATENT OFFICE

2,098,207

CAR COUPLER

Frank H. Kayler, Alliance, Ohio, assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application May 6, 1936, Serial No. 78,183

20 Claims. (Cl. 213—155)

The present invention relates to railway car couplers and is more particularly concerned with a design of knuckle for use with present standard car couplers which will eliminate a large portion of existing free slack.

At the present time it is recognized that a certain amount of free slack is desirable in trains as operated on American railroads in order to allow time for brake action and also in order to facilitate the starting of heavy trains; at the same time an excessive amount of free or uncontrolled slack is disadvantageous from a number of standpoints.

An object of the present invention is to reduce the amount of free slack which exists between couplers of present standard contours when in coupled position. This free slack is altogether uncontrolled and is due in part to the necessity of allowing a certain amount of slack in order to permit coupling and also to allow for lateral and vertical angling between coupled cars.

Another object of my invention is to provide a novel design of coupler knuckle which will reduce the free slack between couplers to a minimum consistent with satisfactory coupling. The present slack between two couplers having the present standard 10–A contour as between pull and buff positions is twenty-five thirty-seconds of an inch. A still further object of my invention is to reduce this free slack substantially one-half inch thus leaving between two such couplers in coupled position free slack of substantially nine thirty-seconds of an inch. This will greatly facilitate the handling of long trains.

In accordance with my invention the free slack thus eliminated is replaced by controlled slack of the same amount. In other words, coupler knuckles constructed in accordance with my invention will provide substantially one half inch of controlled slack.

Accordingly, it is an object of my invention to make possible the same movement of a locomotive in starting a train as at present while, at the same time, eliminating the larger portion of the slack existing commonly at present under running conditions; in other words, couplers provided with knuckles in accordance with my invention furnish the necessary slack for starting but most of this slack is, under running conditions, controlled slack such as is commonly found in draft gears, instead of free slack.

A still further object of my invention is to provide a knuckle for a car coupler which will substantially reduce free slack and, at the same time, will be equally applicable to all types of car couplers now acceptable in standard railway interchange.

Still another object of my invention is to provide a coupler knuckle which will eliminate a great portion of the free slack now existing between couplers in coupled position while, at the same time, permitting the same amount of horizontal and vertical angling as exists between couplers of the present standard when in coupled position.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings, which illustrate embodiments of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a top plan view partly in section of a car coupler knuckle embodying my invention, the section being taken substantially in the plane indicated by the line 1—1 of Figure 2, and the buffing plate being shown in pulling position;

Figure 2 is a vertical sectional view through the knuckle structure shown on Figure 1, the section being taken substantially in the plane indicated by the line 2—2 of Figure 1;

Figure 3 is a fragmentary view corresponding to Figure 1 except that the cushioned buffing plate is shown in buffing position;

Figure 4 is a fragmentary vertical sectional view of the knuckle structure shown in Figure 1, the section being taken substantially at right angles to the section shown in Figure 2 and substantially in the plane indicated by the line 4—4 of Figure 1;

Figure 5 is a vertical sectional view similar to that shown in Figure 4, the section being taken substantially in the plane indicated by the line 5—5 of Figure 3;

Figure 6 is a horizontal sectional view through the structure as shown in Figure 5, the section being taken substantially in the plane indicated by the line 6—6 of Figure 5;

Figure 7 is a front elevation of the buffing plate;

Figure 8 is a top elevation of the buffing plate;

Figure 9 is a side elevation of the buffing plate, the view being taken from the side remote from the knuckle nose;

Figure 10 is a side elevation of the buffing plate, the view being taken from the side adjacent the knuckle nose;

Figure 11 shows the present standard 10–A contour of two couplers in pulling position and

shows in outline the extended portion of a buffing plate of the type disclosed in my invention;

Figure 12 is a view similar to Figure 11 except that the knuckles are in buffing position, and the buffing plates and pockets therefor embodied in my invention are shown in outline;

Figure 13 shows a contour of two standard couplers embodying my invention with the couplers at eleven degrees lateral angle with respect to each other; and

Figure 14 is a fragmentary vertical section through two couplers of standard contour and embodying this invention, in coupled position and angled vertically three degrees and fifty-seven minutes with respect to each other, the section being taken substantially in the planes indicated by the line 14—14 of Figure 12.

Describing my invention in more detail the knuckle, generally designated 2, is of the general form shown in Patent No. 2,007,452, E. P. Kinne, July 9, 1935, and conforms generally to the structure and contour of the present standard E knuckle except for the improvement herein described.

The knuckle 2 has the usual tail portion 4 and the front portion, generally designated 6, the nose 8 and the pin hole 10 for the reception of the knuckle pin (not shown) which constitutes the attaching means for retaining the knuckle within the coupler head. The central portion of the buffing face of the knuckle is cored out to provide the cavity 12 within which may be received the separate buffing plate 14, the front face of which normally extends beyond the buffing face of the knuckle. The buffing plate 14 is normally maintained in the extended position (Figure 1) by nests of coil springs 16, each comprising the inner coil 18 and the outer coil 20. The reinforcing rib and bearing flange 22 (Figure 4) formed on the body of the knuckle divides the cavity 12 into similar top and bottom portions 24—24 within which are received the spring nests 16—16. One end of each spring is thus seated against the front wall 26 of the knuckle and the opposite end abuts against the inner face of the plate 14 which is provided with positioning means 28—28 to maintain the springs in their proper locations.

The buffing plate 14 is shown in detail in Figures 7 to 10, inclusive. It will be noted that the plate 14 is formed with the retaining lugs 30—30 on the side remote from the knuckle nose and retaining lugs 32—32 on the side adjacent the knuckle nose. Depressed portions 34—34 are provided for the reception of the nests of coil springs 16, already referred to, the springs being retained in place by the positioning means 28 centrally formed within the depressed portions 34.

In assembly the springs 18 and 20 are placed over the positioning means 28—28, the retaining lugs 30 are entered into the recesses 36 (Figure 1) and the plate is then forced in, compressing the springs until the retaining lugs 32—32 assume approximately the position shown in Figure 1, after which the retaining bolt 38 may be applied and riveted in position.

In buff, the upper and lower flanges of the buffing plate 14 will have bearing against the body of the knuckle as at 48 and 50 (Figure 5) and the central portion of the plate 14 will abut against the reinforcing rib and bearing flange 22 as at 52 (Figure 5). Additional bearing points are provided by the abutment of the spring positioning means 28 against the body of the knuckle as at 54 and 56 (Figure 5). It will be apparent that by the provision of the several abutments, the bearing plate will be protected from undue bearing stress and thereby have prolonged life.

The force required to compress the buffing plate 14 from its extended position (Figures 1 and 4) to its fully depressed position (Figures 3 and 5) will depend upon the character and capacity of the springs used in the spring nests 16. Tests which I have made, however, show that it is practical to obtain an initial spring capacity or resistance approximately equal to that secured in an equivalent travel of draft gears which have passed the present A. A. R. standard requirements; in other words, this device can be made as effective in controlling the first half-inch of travel between coupled cars as are present standard designs of draft gears.

Figures 11 and 12 show the present standard 10-A contour of couplers in coupled position with my invention applied thereto. The extreme portions of these contours as shown at 39—39 indicate the guard arms of the opposed coupler heads. Figure 11 shows the contours when the couplers are in pulling position and Figure 12 shows the contours when the couplers are in fully buffed position.

From a consideration of Figures 11 and 12, it will be apparent that when two knuckles embodying my invention are coupled together, the force required to retain them in maximum buff position (Figure 12) is twice as great as would be required if only one of the knuckles embodied my invention and the other was a standard knuckle. This is due to the fact that twice as many springs must be compressed when both knuckles embody my invention as when one of the knuckles is a knuckle of the present standard type. The amount of controlled slack, however, would be the same in both cases but the effective force controlling that slack would be twice as great when both knuckles embody my invention.

Figure 13 shows the contour of two couplers embodying my invention coupled together and angling laterally eleven degrees with respect to each other. The extreme portions of the contour as shown at 39—39 indicate the guard arms of the opposed coupler heads. In such lateral angling it is apparent that the buffing plate of only one coupler will be placed in compression at the point 38 and this compression will occur at one side only and, therefore, will require considerably less force than would be required to fully compress the buffing plate and bring it into bearing at all points. It will be observed that the buffing plate on the opposed knuckle is free of compression when the couplers are angled from each other in the direction shown. Angling in the opposite direction of course would bring the other buffing plate into bearing and free the one at present shown with one side under compression.

Figure 14 is a sectional view through two couplers embodying my invention and vertically angled three degrees and fifty-seven minutes with respect to each other, the section being taken substantially in the plane indicated by the line 14—14 of Figure 12. It will be observed that when the couplers are so angled, the buffing plates 14—14 will have bearing against the body of the associated knuckle at only one side as indicated at 40—40. The bodies of the opposed knuckles will having bearing against each other at 42. In this case the upper edges of the bearing plates 14 are in their extended position as shown at 44 while the lower edges of the knuckle bodies are spaced from each other as at 46—46. If the angling were in the opposite direction, bearing would of course

occur at the lower edges of the knuckles. Here, as in the case of lateral angling, the force required to compress the buffing plates is considerably less than would be required to bring them into fully buffed position.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A car coupler knuckle having a cavity formed on its front face, recesses formed in the rear portion of said cavity, a buffing plate mounted within said cavity, said buffing plate having retaining means received within said recesses, other retaining means formed at the opposite side of said plate for abutment against removable securing means mounted on said knuckle, and resilient means mounted under compression between said plate and said knuckle.

2. In a car coupler the combination of a pivoted knuckle, said knuckle having a buffing plate resiliently mounted on the front face thereof, integrally formed retaining means on said knuckle cooperating with integrally formed retaining means on one side of said plate, and integrally formed retaining means on the opposite side of said plate cooperating with removable means secured to said knuckle.

3. A car coupler knuckle having a cavity formed on its front face, recesses formed in the rear portion of said cavity, and a buffing plate mounted within said cavity, said buffing plate having on one side thereof retaining means received within said recesses, other retaining means formed at the opposite side of said plate for abutment against removable securing means mounted on said knuckle, said knuckle having a reinforcing flange formed within said cavity.

4. A car coupler knuckle having a cavity formed on its front face, recesses formed in the rear portion of said cavity, a buffing plate mounted within said cavity, said buffing plate having on one side thereof retaining means received within said recesses, other retaining means formed at the opposite side of said plate for abutment against removable securing means mounted on said knuckle, and resilient means between said plate and said knuckle.

5. A car coupler knuckle having a cavity formed on its front face, recesses formed in the rear portion of said cavity, a buffing plate mounted within said cavity, said buffing plate having on one side thereof retaining means received within said recesses, and other retaining means formed at the opposite side of said plate for abutment against removable securing means mounted on said knuckle.

6. In a car coupler the combination of a knuckle pivotally mounted therein, said knuckle having a cavity formed on its front face, a buffing plate removably seated within said cavity, resilient means under compression between said plate and said knuckle, removable securing means for retaining said plate within said cavity, and a reinforcing flange formed within said cavity and acting as a stop for said plate.

7. In a car coupler the combination of a knuckle pivoted therein, said knuckle having a cavity on its front face, a buffing plate removably secured within said cavity, positioning means formed on said plate and within said cavity, resilient means seated thereagainst, and said knuckle having a reinforcing flange formed within said cavity and acting as stop means for said plate.

8. In a car coupler the combination of a pivoted knuckle having a cavity on its front face, a buffing plate secured therein, and resilient means mounted between said plate and said knuckle, said resilient means being mounted under compression.

9. In a car coupler the combination of a pivoted knuckle, a cavity formed on the front face of said knuckle, said cavity having a retaining recess therein, a buffing plate positioned in said cavity, a retaining lug formed on said plate and receivable within said recess, resilient means between said plate and said knuckle, retaining means for said plate, and a bearing flange formed on said knuckle within said cavity limiting the inward movement of said plate.

10. In a car coupler a knuckle having a movable face, resilient means urging said buffing face outwardly of the normal contour of said knuckle when said knuckle is operating in pulling position, and permitting said face to retract to said normal contour when said knuckle is operating in buff position.

11. In a car coupler the combination of a knuckle pivotally mounted therein, said knuckle having a cavity formed on its front face, a buffing plate removably seated within said cavity, resilient means under compression between said plate and said knuckle, and removable securing means for retaining said plate within said cavity.

12. In a car coupler a pivoted knuckle having a movable buffing face, and resilient means mounted under compression between said buffing face and said knuckle and urging said face outwardly of the normal contour of said knuckle, said buffing face being retractable under buff to a position coinciding with said contour whereby the normal slack between two mated couplers is reduced.

13. In a car coupler the combination of a pivoted knuckle having a buffing plate secured therein, resilient means mounted under compression between said plate and said knuckle, and fixed and removable securing means for retaining said plate in position.

14. A car coupler having a knuckle with a resiliently mounted buffing face projecting beyond the normal contour of said knuckle and compressible within said knuckle to a position wherein its front face coincides with the said contour.

15. In a car coupler the combination of a pivoted knuckle having a buffing plate secured therein, and resilient means mounted under compression between said plate and said knuckle.

16. In a car coupler a pivoted knuckle having a resiliently mounted buffing face removably secured therein.

17. In a car coupler the combination of a knuckle pivoted therein, said knuckle having a removable buffing plate resiliently mounted therein.

18. In a car coupler a pivoted knuckle having a resilient buffing face.

19. In a car coupler the combination of a knuckle pivoted therein, and a buffing plate resiliently mounted in said knuckle.

20. In a car coupler the combination of a knuckle pivoted therein, a movable buffing plate mounted in said knuckle and resilient means between said plate and said knuckle.

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