Nov. 13, 1962 L. E. FURNISS 3,063,573

ATTACHMENTS FOR INTERLOCKING RAILWAY COUPLER

Filed Feb. 23, 1960 4 Sheets-Sheet 1

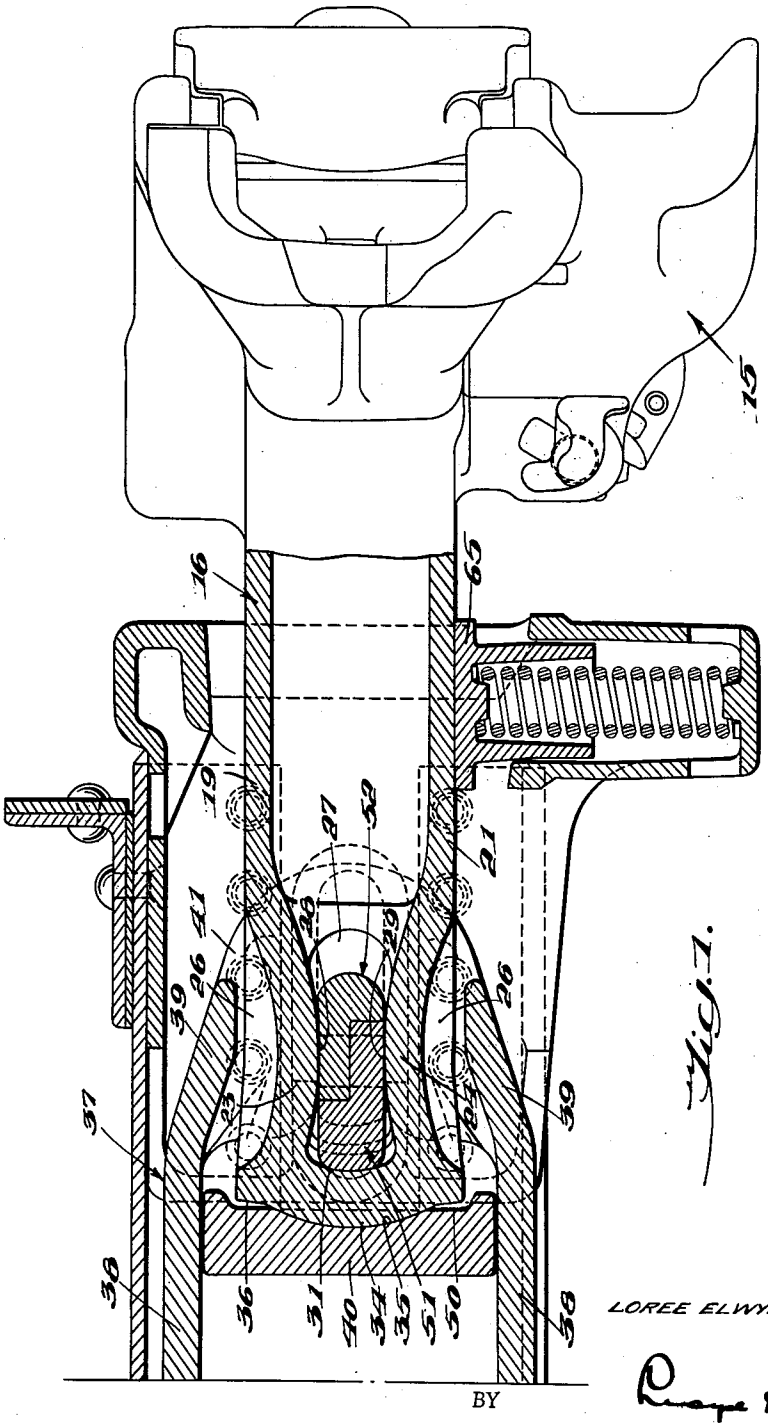


Fig. 1.

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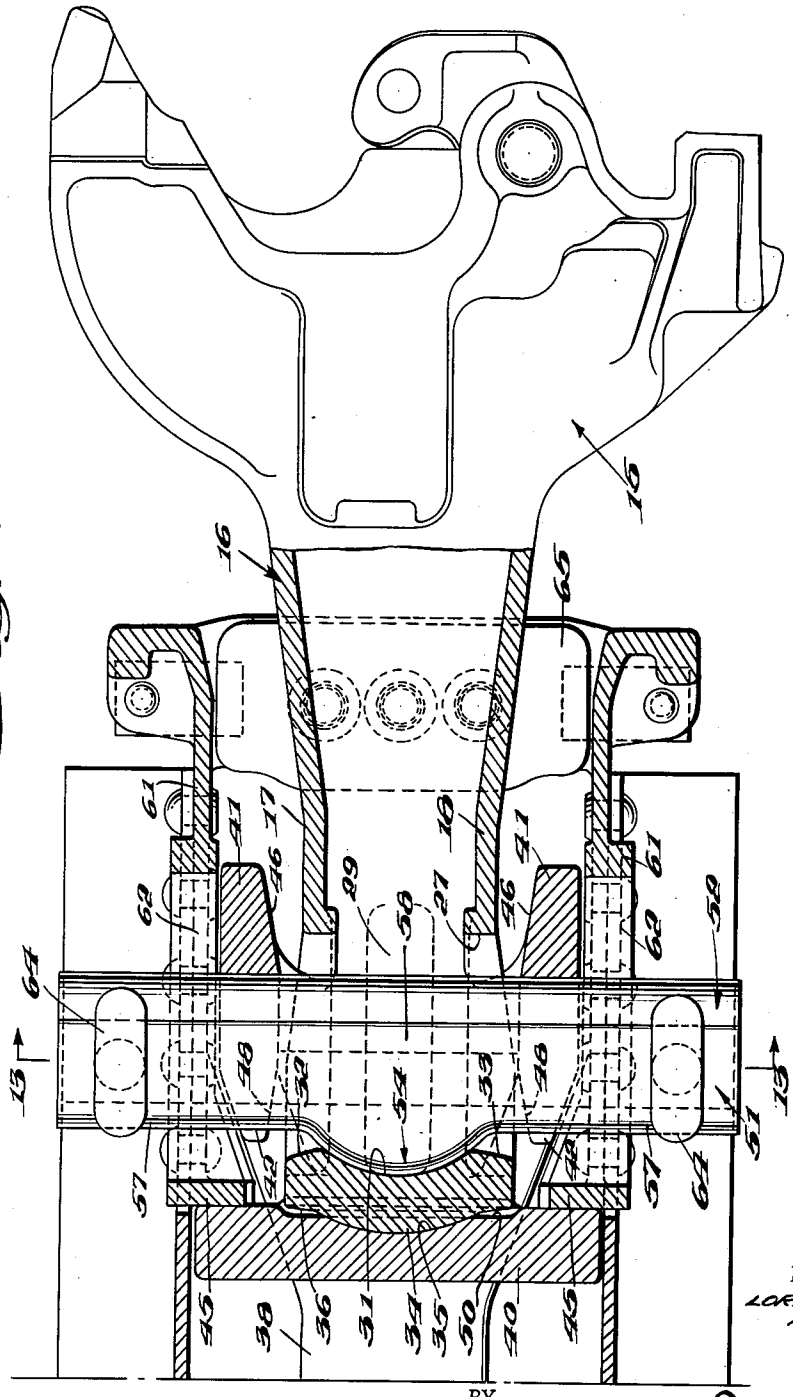
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ATTACHMENTS FOR INTERLOCKING RAILWAY COUPLER

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Fig. 2.



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Fig. 12.

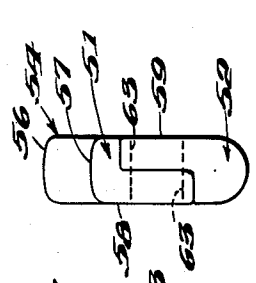


Fig. 13.

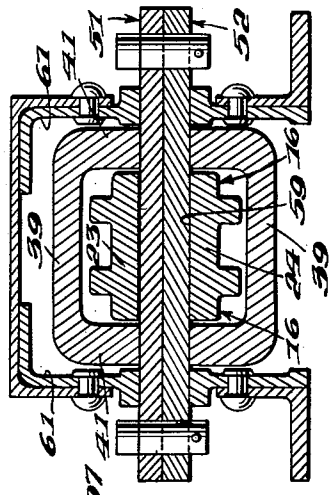


Fig. 5.

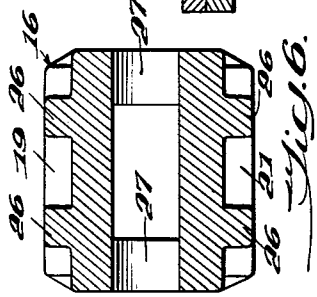


Fig. 6.

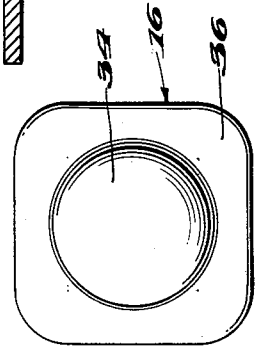


Fig. 11.

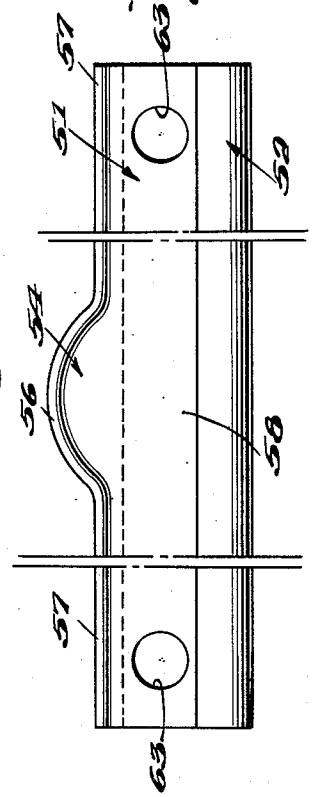


Fig. 3.

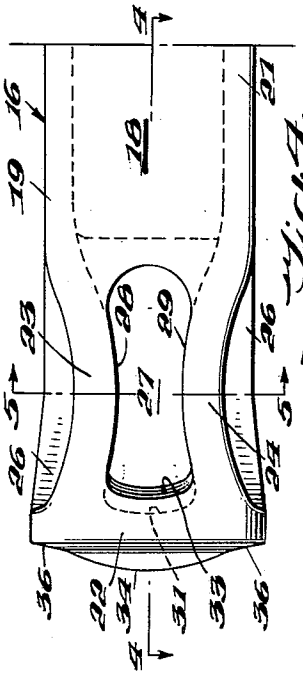
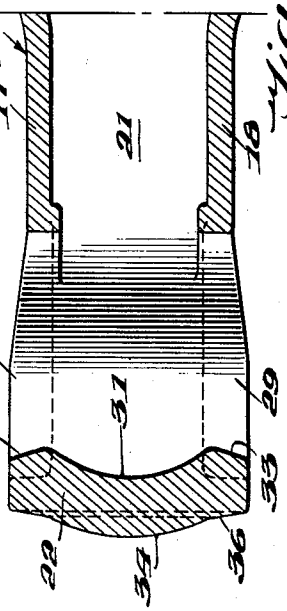


Fig. 4.



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Fig. 9.

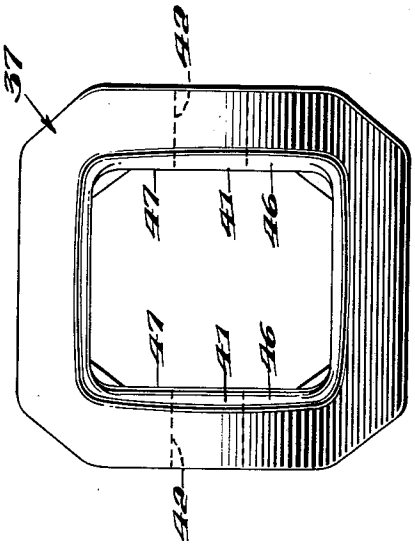


Fig. 10.

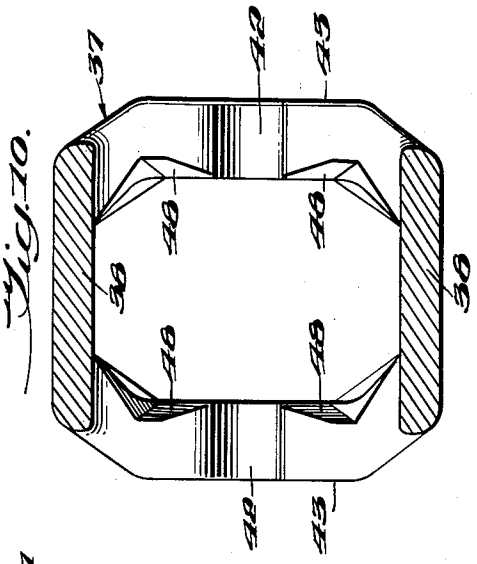


Fig. 7.

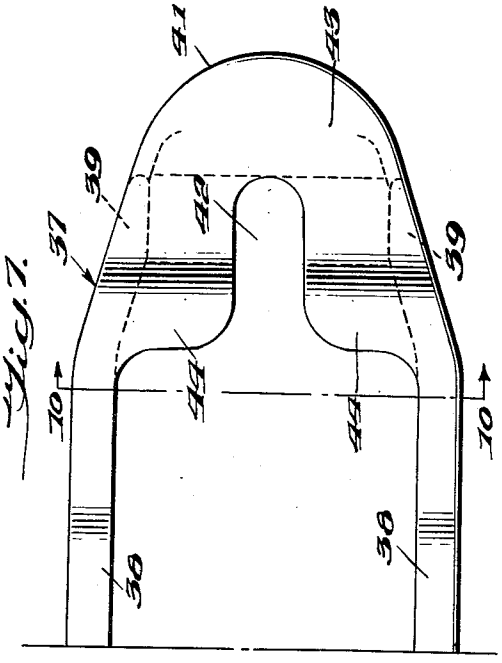
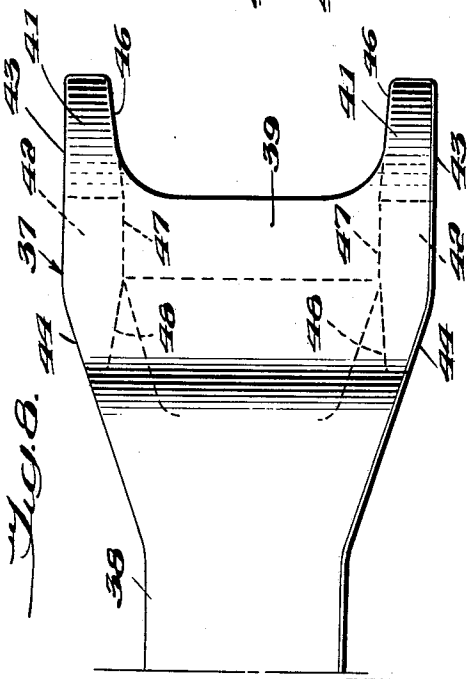


Fig. 8.



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United States Patent Office 3,063,573 Patented Nov. 13, 1962

3,063,573

ATTACHMENTS FOR INTERLOCKING RAILWAY COUPLER

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Filed Feb. 23, 1960, Ser. No. 10,242
10 Claims. (Cl. 213—67)

The present invention relates to railway couplers and more specifically pertains to a structural assembly connecting the stem of an interlocking type coupler with a yoke providing an organization which improves the operating characteristics of the draft appliance and avoids the disadvantages which have developed in existing attachments associated with the interlocking coupler employed for freight service.

An interlocking freight coupler and yoke application which has been a standard of the Association of American Railroads includes a vertically disposed pin connecting the yoke to the coupler stem. Such a draft rigging is designed to receive a filler plate secured to the sill structure and overlying the upper end of the yoke pin and arranged over the head of the yoke. In such an assembly the rear end of the coupler stem tends to move upwardly as a result of the weight of the coupler head and such movement urges the yoke against the filler plate so that there is attrition of this portion of the yoke and the filler plate. The extent of the wear at the head of the yoke and the wear on the filler plate cannot readily be detected without dismantling the draft appliance.

The existing draft rigging for the interlocking coupler for freight service exhibits a further disadvantage. While the head of the yoke is held up against the filler plate the pin connecting the yoke to the coupler stem tends to move downwardly so that its upper end is positioned below the top of the hole in the yoke when wear takes place between the head of the yoke and the filler plate or when the striker is not properly mounted in the sill structure or when the rear portion of the striker is lower than the correct position or when there is downward bending of the yoke pin supporting plate. Thus the pin connecting the yoke to the coupler stem is not maintained in position to have full contact with the yoke. In addition the area of contact between the upper portions of the coupler stem and the yoke of the standard interlocking coupler for freight service is so small that rapid wear takes place between these elements as a consequence of upward movement of the rear end of the stem. This area of contact cannot be materially increased with the existing design and detection of the wear is not possible without removing the coupler from the draft appliance.

The standard interlocking coupler for feight service and its draft attachments embodies further objectionable characteristics and there is a tendency due to the force of gravity for the pin bearing block to move downwardly out of contact with the inside of the pocket in the coupler stem under buffing conditions. The bearing block is then forced back up into position when a draft force is applied to the coupler. Such action of the pin bearing block in service causes rapid wear of the bottom rear portion of the bearing block and the cooperating surface of the coupler stem and the condition of these parts cannot be detected without removing the coupler.

An object of the present invention is to provide an assembly affording a connection between the stem of a railway coupler and a yoke therefor which eliminates the disadvantages which have developed in connection with existing equipment and to provide a yoke and crosskey connecting the forward portion of the yoke with the coupler stem providing an assembly which avoids need for a yoke pin and avoids the necessity of a filler plate over the head of the yoke and an assembly which avoids

the necessity of a supporting plate for a yoke pin but which allows for coupler swivel in all directions.

Another object of the invention is to provide a draft rigging for an interlocking type coupler and a connection of the stem with the yoke wherein the upward force exerted by the stem, due to the center of gravity of the coupler being forward of the carrier, is resisted by full width bearing of the key slot in the stem against the key which transmits the force to the top of the key slots in the striker to avoid wear on the yoke due to the upward force and any wearing of the key or the key slots in the striker or coupler can be observed without the necessity of removing parts of the attachment.

A further object of the invention is to provide a structure providing a connection between the stem of a railway coupler of the interlocking type and a yoke therefor which avoids a pin bearing block and a spring therefor and a combination which eliminates the necessity of a bored hole in the yoke.

Another object of the invention is to provide a draft rigging which eliminates yoke movement under the application of buffing forces to the coupler and which increases the cross sectional area of the coupler stem in the area of its connection with the yoke.

Another object of the invention is to provide a structural organization connecting the stem of a railway coupler of the interlocking type to a yoke wherein correct alignment of the coupler is dependent only on the correct application of the striker to the center sill structure to thereby avoid the necessity of proper mounting of a filler plate and proper location of the pin supporting plate along with the correct striker mounting to provide proper coupler alignment.

Other objects and features of the invention will be appreciated and will become apparent particularly to those skilled in the art pertaining to railway draft equipment as the present disclosure proceeds and upon consideration of the following detailed description taken in conjunction with the accompanying drawings wherein an embodiment of the invention is disclosed.

In the drawings:

FIG. 1 is a vertical sectional view of a railway coupler stem and attachments thereof exhibiting the invention taken on the center line of the draft rigging.

FIG. 2 is a horizontal sectional view of the structure shown in FIG. 1.

FIG. 3 is a side elevational view of the rear portion of the coupler stem.

FIG. 4 is a horizontal sectional view of the rear portion of the coupler stem taken on the line **4—4** of FIG. 3.

FIG. 5 is a transverse view of the coupler stem taken on the line **5—5** of FIG. 3.

FIG. 6 is an elevational view of the butt end of the coupler stem.

FIG. 7 is a side elevational view of the forward end portion of the yoke.

FIG. 8 is a plan view of a corresponding portion of the yoke.

FIG. 9 is an elevational view of the front end of the yoke.

FIG. 10 is a sectional view of the yoke taken on the line **10—10** of FIG. 7.

FIG. 11 is a plan view of the composite crosskey.

FIG. 12 is an end view of the assembled crosskey.

FIG. 13 is a transverse sectional view of the draft appliance taken on the line **13—13** of FIG. 1.

The invention pertains to a structural organization connecting an interlocking type coupler with a yoke therefor and the invention is directed to the construction and shape of the rear portion of the stem of the coupler and the forward portion of the yoke including a unique crosskey linking the yoke to the coupler stem so as to permit

angling of the coupler in any direction a predetermined amount while maintaining full bearing on the crosskey in pull and on the coupler stem butt in buff and to maintain the coupler stem on the center line of draft and to minimize wear in the draft rigging in areas which are not readily detectable.

Referring to the drawings there is shown at 15 a coupler head of the interlocking type which is of standard design for freight service. The coupler head 15 and the forward portion of the stem 16 are of conventional construction but the rear portion of the coupler stem embodies novel features. The structural characteristics of the rear portion of the coupler stem 16 are best shown in FIGS. 3 to 6 and the stem includes laterally spaced side walls 17 and and 18 joined by top and bottom walls 19 and 21. A generally transversely disposed wall 22 closes the rear end of the stem. The top wall 19 is arched downwardly forwardly of the end wall 22 as indicated at 23. The bottom wall 21 of the stem is arched upwardly forwardly of the end wall 22 as shown at 24. The top wall 19 in the arcuate area 23 and the bottom wall 21 in the curved area 24 are each reinforced by means of integral longitudinally extending substantially parallel ribs 26.

The rear portion of the coupler stem is provided with an elongated transversely disposed key slot 27. The under surface of the top wall 19 of the coupler stem 16 under the arcuate area 23 and in the vicinity of the key slot 27 has an under surface 28 which is of cylindrical shape viewed in elevation and the upper surface of the bottom wall 21 of the coupler stem 16 over the curved area 24 and in the vicinity of the key slot 27 has a similarly shaped shbstantially cylindrical surface 29. The arcuate confronting surfaces 28 and 29 are both convex and are generated about parallel vertically spaced horizontally disposed axes. The width of the coupler stem 16 at the rear end is increased in preceeding rearwardly from the forward end of the key slot 27 as will be apparent from a consideration of FIG. 4.

The transverse wall 22 closes the rear or inner end of the key slot 27 and a central forward facing surface 31 on the wall 22 is concave shaped and is formed substantially like a portion of a sphere. Laterally of the spherical surface 31 two surfaces 32 and 33 are provided which are straight as viewed in plan (FIGS. 2 and 4) to allow the coupler to swivel horizontally with respect to a crosskey and this feature will be apparent as the disclosure proceeds. The surfaces 32 and 33 when viewed in elevation are of concave arcuate shape and substantially cylindrical as shown in FIG. 3.

The end wall 22 of the coupler stem 16 carries a centrally disposed rearwardly directed projection 34 which has a convex surface shaped substantially like a portion of a sphere. The end wall 22 has a rear surface 36 surrounding the spherical projection 34. The surface 36 while being transversely disposed with respect to the center line of the coupler stem 16 is of conical shape and its vertex is located on the center line of the coupler stem 16. In one embodiment of the vertex of the cone about which the surface 36 is generated is disposed on the center line of the coupler stem forwardly of the rearmost portion of the spherical surface 34 by about one-half an inch. The conical surface 36 slopes forwardly of the coupler stem 16 in proceeding outwardly from the vertex in all radical directions. The forward face of the front follower 40 is provided with a concave cavity 35 of spherical shape (FIGS. 1 and 2) for receiving the spherical convex projection 34 on the butt end of the coupler stem 16. The follower 40 is provided with a flat forward face 50 around the perimeter of the spherical cavity 35 which is arranged at right angles to the center line of the draft rigging and the surface 50 is disposed forwardly of the rearmost portion of the spherical cavity 35. The flat forward face 50 of the follower is arranged for contact of the conical surface 36 of the rear wall of the stem after the coupler has been angled a predetermined amount in any direction.

A yoke to which the coupler stem 16 is adapted to be connected for angling in any direction is indicated at 37 and the forward portion is best shown in FIGS. 7 to 10. The rear portion of the yoke 37 is of conventional construction having a butt end (not shown) with yoke straps 38 extending forwardly therefrom. The front portion of the yoke is formed with hood portions 39 which are joined by two vertically disposed nose portions 41. The hood portions 39 may be formed integral with the yoke straps 38. Each nose portion 41 is provided with horizontal key recess 42 and each of the key recesses is open at the rear as shown in FIG. 7. The outside surfaces 43 of the yoke head are substantially parallel to a vertical plane along the center line of the yoke. The rear surfaces 44 of the yoke head converge inwardly in proceeding rearwardly of the nose portions as shown in FIG. 8 to allow for clearance with the front draft lug structures 45 of the striker. Inner surfaces 46 of the nose portions 41 diverge outwardly in proceeding forwardly of the key recess 42 to clear the side walls 17 and 18 of the coupler stem 16 when it is swivelled horizontally the maximum amount to either side of the center of the draft rigging. The surfaces 47 at the inner sides of the yoke head are parallel with the outer surfaces 43. The inner rear side surfaces 48 diverge outwardly in proceeding rearwardly so as to provide clearance for the sides of the coupler stem when it is swivelled horizontally.

A crosskey forms a part of the means for connecting the nose portions 41 of the yoke 37 to the coupler stem 16. The crosskey is best shown in FIGS. 11 and 12 and is formed of a rear part 51 and a front part 52. The front part 51 has flat surfaces which interfit complementary flat surfaces on the rear part 52 to form a composite key of generaly elliptical cross section throughout a major portion of its length. The rear part of the crosskey assembly carries a protuberance 54 (FIG. 11) at the midportion thereof which has a convex exterior surface 56 and which is shaped like a portion of a sphere. The rear edge of the crosskey at each side of the protuberance 54 is of cylindrical shape as indicated at 57. The top surface 58 and bottom surface 59 of the assembled crosskey have surfaces which are substantially flat and parallel. The crosskey is formed in two parts to facilitate mounting of the crosskey in the draft appliance. The striker side walls 61 are provided with slots 62 for accommodating the crosskey as shown in FIG. 2. Each part of the crosskey is provided with a pair of holes 63 which are aligned when the key is assembled as shown in FIG. 12. These holes receives the stems of retainers 64 when the draft appliance is assembled as shown in FIG. 2.

In assembling the coupler and the draft attachments therefor in the underframe of a railway vehicle the yoke 37 and the front follower 40 and the draft gear are arranged in the center sill structure. The coupler is then applied with the coupler stem 16 overlying the coupler carrier 65 and with the spherical projection 34 seated in the concave spherical cavity 35 in the forward face of the front follower 40. The rear part 51 of the crosskey is introduced endwise through one of the slots 62 in the striker casting 61 and such endwise movement is continued until the spherical protuberance 54 is in position forwardly of the spherical cavity 31 within the rear end of the coupler stem 16. The rear part of the crosskey is then moved bodily backwardly in the key slots. The front parts 52 of the crosskey is then inserted endwise through a slot 62 in the striker and through one of the recesses 42 in the yoke and the front part 52 of the key is free to move through the slot 27 in the rear end of the stem. The front part 52 of the crosskey is aligned with the rear part so that the stems of retainers 64 may be introduced through the holes 63 in the crosskey.

In the operation and when a pulling force is applied to the coupler stem 16 the spherical cavity 31 within the

coupler stem 16 applies such force to the spherical projection 54 on the crosskey and the pulling force is applied to the forward ends of the key recesses 42 in the nose portions 41 of the yoke 37. When a buffing force is applied to the coupler stem 16 it is applied onto the front follower 40 by the arcuate interengagement of the spherical projection 34 and the spherical cavity 35. The buffing force is then applied to the draft gear and transmitted onto the rear draft lugs (not shown) in a conventional manner. The yoke 37 is not moved rearwardly during buffing action because the key recesses 42 are open at the rear.

The coupler stem 16 is free to angle vertically from the neutral position shown in FIG. 1. The wall areas 23 and 24 which have arcuate confronting surfaces 28 and 29 permit swinging movements of the stem in the vertical direction with respect to the flat faces of the crosskey. Horizontal angling of the coupler stem 16 is permissible because of the arcuate spherical surface 56 on the projection 54 of the crosskey and its cooperation with the spherical cavity 31 within the butt end of the coupler stem 16. The angular surfaces 32 and 33 at the rear end of the key slot 27 in the coupler stem 16 provide clearance whereby these portions of the stem avoid engagement with the crosskey during horizontal angling of the coupler. The outwardly flared surface 46 on the nose portions 41 of the yoke and the outwardly flared surfaces 48 on the inner rear sides of the yoke 37 provides space for accommodating lateral movements of the coupler stem 16 during horizontal angling of the coupler in both directions from the center line of draft.

The crosskey functions to maintain the coupler stem on the center line of draft and it will be observed from a consideration of FIG. 13 that the arcuate surface of the coupler stem has full width bearing against the bottom surface 59 of the crosskey and that the top surface 58 of the crosskey has full width bearing against the two key slots 62 in the side walls 61 of the striker.

While the invention has been described with reference to specific structural features and with regard to one type of coupler stem and a yoke including a specific type of crosskey it will be appreciated that changes may be made in the various elements and in the overall assembly. Such modifications and others may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim and desire to secure by Letters Patent is:

1. A railway coupler and attachments therefor comprising, a coupler including a stem, said stem having a horizontally disposed key slot extending transversely therethrough, a concave forwardly facing spherical shaped surface within the coupler stem rearwardly of said slot, a center sill and striker structure including vertically disposed transversely spaced walls each having a slot therethrough, a yoke within said structure, vertically disposed nose portions on said yoke each having a recess therethrough, a horizontally disposed key extending through said key slot and through said recesses and through the slots in said walls, a convex substantially spherical shaped rearwardly projecting surface on said key cooperating with said concave surface within the coupler stem, said key having a substantially flat upper surface and a substantially flat under surface substantially parallel with the upper surface, and the upper and under surfaces of said key slot each having a convex shape confronting the associated surface of said key whereby the key supports the coupler stem and the yoke on said structure and the coupler stem may angle vertically and laterally relative to the yoke and said structure.

2. A railway coupler and attachments therefor comprising, a coupler including a stem, said stem having a horizontally disposed key slot extending transversely therethrough, a concave forwardly facing spherical shaped surface within the coupler stem rearwardly of said slot, a center sill and striker structure including vertically disposed transversely spaced walls each having a slot therethrough, a yoke within said structure, vertically disposed nose portions on said yoke each having a recess therethrough, a horizontally disposed key extending through said key slot and through said recesses and through the slots in said walls, a convex substantially spherical shaped rearwardly projecting surface on said key cooperating with said concave surface within the coupler stem, said key having a substantially flat upper surface and a substantially flat under surface substantially parallel with the upper surface, a downwardly facing convex surface defining the upper boundary of said key slot and an upwardly facing convex surface defining the lower boundary of said key slot both generated about a horizontally disposed axis extending transversely of said stem, and said upwardly facing surface extending throughout the width of said stem for engaging the under surface of said key.

3. A railway coupler and attachments therefor comprising, a coupler including a stem, said stem having a horizontally disposed key slot extending transversely therethrough, a concave forwardly facing spherical shaped surface within the coupler stem rearwardly of said slot, a center sill and striker structure having vertically disposed transversely spaced walls each having a slot therethrough, a yoke within said structure between said walls, vertically disposed nose portions on said yoke each having a recess therethrough, a horizontally disposed key extending through said key slot and through said recesses and through the slots in said walls, a convex substantially spherical shaped rearwardly projecting surface on the key cooperating with said concave surface within the coupler stem, said key having a substantially flat upper surface and a substantially flat under surface substantially parallel with the upper surface, the upper and under boundaries of said key slot each having a convex surface confronting the associated surface of said key, and each recess being open at the rear whereby the coupler stem may move rearwardly in buff without imparting rearward movement to said yoke.

4. A railway coupler and attachments therefor comprising, a coupler including a stem, said stem having a horizontally disposed key slot extending transversely therethrough, a concave forwardly facing spherical shaped surface within the coupler stem rearwardly of said slot, a center sill and striker structure including vertically disposed transversely spaced walls each having a slot therethrough, a yoke within said structure between said walls, vertically disposed nose portions on said yoke each having a recess therethrough, a horizontally disposed key extending through said key slot and through said recesses and through the slots in said walls, said key having a convex substantially spherical shaped rear projecting surface cooperating with said concave surface within the coupler stem, said key having a substantially flat upper surface and a substantially flat under surface substantially parallel with the upper surface, the upper and under boundaries of said key slot each having a convex surface confronting the associated surface of said key whereby the key supports the coupler stem and the yoke on said structure and the coupler stem may angle vertically relative to the yoke and said structure, and said nose portions forwardly and rearwardly of the associated recess flaring laterally outwardly to avoid engagement with sides of the coupler stem during horizontal angling of the coupler relative to the yoke and said structure.

5. A railway coupler comprising, a coupler head, a stem extending therefrom having a top and a bottom wall and an end wall, said stem having a horizontally disposed key slot therethrough of elongated dimensions measured longitudinally of the stem, a downwardly facing convex surface on the top wall and an upwardly facing convex surface on the bottom wall defining upper and lower surfaces within said slot, a forward facing concave spherical shaped surface on said end wall within the coupler stem defining a rear extremity of said slot, a

spherical shaped projection carried by said end wall, and a generally transverse rear surface on said end wall extending outwardly from the perimeter of the spherical projection.

6. A railway coupler according to claim 5 wherein the top and bottom walls adjacent said key slot are deformed inwardly.

7. A railway coupler according to claim 5 wherein the forward face of the end wall is relieved rearwardly in proceeding laterally outwardly from the perimeter of the concave spherical surface within said key slot.

8. A railway coupler comprising, a coupler head, a stem extending from said coupler head, horizontally spaced vertically disposed side walls on said stem having a horizontally disposed key slot therethrough elongated lengthwise of the stem, a top wall and a bottom wall on said stem extending between said side walls, a downwardly facing substantially cylindrical surface on said top wall generated about a horizontal axis disposed transversely of said stem and defining the upper surface within said slot, an upwardly facing substantially cylindrical surface on said bottom wall generated about a horizontal axis disposed transversely of said stem and defining the bottom surface within said slot, an end wall on said stem having a generally transverse rear surface, a substantially spherical shaped projection on said end wall projecting rearwardly beyond said rear surface, and a forward facing concave substantially spherical surface on said end wall within the coupler stem forming the rear limits of said slot.

9. A railway coupler according to claim 8 wherein the top and bottom walls adjacent the key slot are deformed inwardly of the stem, and ribs carried exteriorly of the top and bottom walls extending lengthwise of the stem in the vicinity of said key slot.

10. A yoke for a railway coupler comprising, vertically spaced yoke straps terminating in vertically spaced hood portions, horizontally spaced vertically extending nose portions connecting said hood portions, said nose portions each having a recess therein in substantially horizontal alignment, each recess being open and unobstructed at the rear of the associated nose portion, and inner face of said nose portions having outwardly flared surfaces in proceeding forwardly of the recesses and outwardly flared surfaces in proceeding towards rear extremities of said nose portions.

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