The invention relates to railway vehicles and particularly to a retractable coupling device adapted for use on the forward end of a locomotive.

In modern locomotives, it is desirable to use a draft gear to relieve buffing and pulling forces on the retractable coupler at the forward end of the locomotive, and make the frame forwardly of the locomotive as short as possible, so that the weight carried by the leading truck is not appreciably greater than the weight carried by the trailing truck of the locomotive. In one type of locomotive, a draft gear and draft gear yoke are mounted on the locomotive frame and a counter-balanced vertically retractable coupler is pivoted at the forward end of the draft gear yoke. The counter-balance requires considerable space and necessitates elongating the locomotive frame forwardly of the leading truck.

In another arrangement, as shown in Patent No. 2,529,205, issued September 14, 1913, to William J. Metzger, the coupler, the draft gear, the draft gear yoke and the draft gear followers are mounted in a member which swings in a vertical plane relative to the frame on spaced pins, under single shearing forces, supported by the locomotive frame. With this arrangement, buffing and pulling forces are transmitted from the coupler through the draft gear yoke, the draft gear, the draft gear followers, the swinging member and pins to the locomotive frame. Although the pins may withstand the pulling forces satisfactorily, the buffing forces are usually much greater than the pulling forces. The pins may subject the draft gear yoke to such forces. Opposing faces of draft gear rear follower 9 and blocks 4 are curved substantially through an elongated aperture in the draft gear yoke so as not to interfere with longitudinal movement of the draft gear yoke when the coupler is subjected to draft and pulling forces.

Other objects will be apparent to those skilled in the art from the following description and accompanying drawings, in which—

Figure 1 is a horizontal section taken approximately on the line 1—1 of Figure 2 and shows the forward end of a railway locomotive provided with a coupling structure constructed according to the invention.

Figures 2 and 3 are longitudinal vertical sections taken approximately on the lines 2—2 and 3—3, respectively, of Figure 1.

Figures 4, 5, and 6 are transverse vertical sections taken approximately on the lines 4—4, 5—5, 6—6, respectively, of Figure 1.

Coupling structure constructed according to the invention is shown in the drawings as embodied in the forward end of a diesel electric locomotive. Framing 1 has spaced portions 2 connected at their forward ends by a transverse tie element 2a. Portions 2 extend forwardly of leading truck 3 which includes a wheel and axle assembly 4. The forward end of framing 1 mounts a pilot 5 having a coupler recess 6. A member 7 is positioned between frame portions 2 forwardly of leading truck 3 and swings on a horizontal pin 8 extending from one frame portion to the other.

Coupling structure is mounted on member 7 and includes draft gear followers 9, a draft gear spring 10, a draft gear yoke 11 and a coupler 12 swingable about a vertical pin 13 on the draft gear yoke. Draft gear yoke 11 is slotted transversely at 11a to receive pin 12 to provide for lengthwise movement of the draft gear yoke in transmitting buffing and pulling forces from the coupler to the draft gear. The coupling structure swings with member 7 between non-functioning position (shown in dot-dash lines in Figure 2), in which the coupler is received within the pilot, and functioning position (shown in solid lines in Figure 2), in which the coupler extends forwardly of the pilot. When the coupling structure is in functioning position, the draft gear follower 9 at the rear end of member 7 opposes a pair of blocks 14 riveted to a transverse vertical web 16a on framing 1 to form draft gear stops so that buffing forces are transmitted directly from the draft gear follower to the framing and without subjecting pin 8 to such forces. Opposing faces of draft gear rear follower 9 and blocks 14 are curved substantially
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in a radius about the axis of pin 8 to facilitate movement of member 7 between functioning and non-functioning positions (see Figure 3). Web 14a is apertured at 14b to receive draft gear yoke 11 when buffing forces move the yoke and coupler rearwardly on member 7.

The center of gravity of member 7 and the associated coupling structure preferably is rearwardly of pin 8 so that the member and coupling structure tend to swing to functioning position. A crank and reel assembly 15 is rotatable on brackets 16 rigid with frame 1. A cable 17 is secured at one end to the crank and reel assembly 15 and passes over a pulley 16 rotatable on pilot 5. The other end of cable 17 is secured to an upstanding lug 18 on member 7. Member 7 may be moved to non-functioning position by rotating crank and reel assembly 15 in a direction to wind the cable thereon and the member swings by gravity to functioning position when the crank and reel assembly is rotated in the opposite direction to unwind the cable.

A locking pin 20 extends through openings 21 in each frame portion and into an aperture 22 in member 7 and holds member 7 in functioning position. A locking pin 23 extends through an opening 24 in a lug 25 on each frame portion 2 and into aperture 22 and holds member 7 in non-functioning position. A wear plate 26 is mounted on each frame portion 2 and seats the rear end of member 7 when the member is in functioning position. The height of wear plate 25 may be adjusted so that pin 20 holds member 7 securely against the wear plate when the member is in functioning position.

The coupling structure described above requires only a relatively short space on the frame so that the frame forwardly of the leading truck may be relatively short and so that the weight carried by the leading truck is not appreciably greater than the weight carried by the trailing truck of the locomotive. Also the coupling structure transmits buffing forces from the coupler to the draft gear yoke, draft gear, and draft gear follower directly to the frame without subjecting pin 8 to the buffing forces. The pin is subjected to double shearing forces so that the pin readily withstands pulling forces which are transmitted from the coupler to the draft gear yoke, draft gear, draft gear follower, member 7, pin 8 and to the frame.

The details of construction may be varied substantially without departing from the spirit of the invention, and the exclusive use of those modifications coming within the scope of the claims is contemplated.

What is claimed is:

1. In a railway vehicle front end structure including a frame provided with a draft gear stop, a member swingable on said frame about a horizontal pivot, coupling structure supported by said member and including a draft gear, a draft gear follower, a draft gear yoke movable longitudinally of the member, and a coupler, said coupling structure being movable, with the swinging of said member, between functioning and non-functioning positions, and said draft gear follower, when in the swinging position, is to transmit buffing forces from the coupler to the frame without subjecting the pivot to said forces.

2. Front end structure as described in claim 1 including locking elements spaced from the member pivot to hold the member in functioning and non-functioning positions.

3. Front end structure as described in claim 1 including mechanism for swinging the member and associated coupling structure rearwardly between functioning and non-functioning positions.

4. Front end structure as described in claim 1 in which the center of gravity of the member and associated coupling structure is rearwardly of the member pivot and the member tends to swing to functioning position, the structural member including a crank and reel assembly rotatable on the frame, and a cable fastened to the member rearwardly of the member pivot and to said assembly so that when said assembly is rotated in one direction to wind the cable, the member swings to non-functioning position, and when the assembly is rotated in the opposite direction to unwind the cable, the member swings by gravity to functioning position.

5. In a railway vehicle front end structure including a frame and a coupler assembly including a draft gear stop, a member swingable on said assembly about a horizontal pivot extending transversely of the assembly, coupling structure mounted on said member and including a draft gear, draft gear yoke, draft gear follower, and a coupler movable with said member between functioning and non-functioning position, in which the coupler is received within the assembly, and coupling structure extending forwardly of the assembly and said draft gear follower opposes said stop so that buffing forces are transmitted from the coupler through the draft gear yoke, draft gear and draft gear follower directly to the assembly and without subjecting the pivot to said forces.

6. In a railway vehicle coupling structure, a frame including transversely spaced forwardly extending portions, a member positioned between said portions, an elongated pin extending transversely of the frame from one portion to the other and mounting said member for vertical swinging movement relative to said frame, and coupling structure including a coupler and a draft gear mounted on said member and movable relative to the same and swingable with said member between functioning and non-functioning positions, said draft gear including a spring with followers and a yoke, there being stops on the frame engageable by the followers when said coupler and draft gear are in functioning position.

7. In a railway vehicle front end structure including a frame, a member swingable on said frame about a horizontal pivot, coupling structure supported by said member and including a draft gear, a draft gear yoke and a coupler, and coupling structure being movable relative to said member and movable with said member about said pivot between functioning and non-functioning positions, an element on said frame opposing said draft gear follower when in functioning position, there being opposing faces on said follower and said element curved substantially in a radius about the member pivot axis to facilitate movement of said member between said positions.

8. Front end structure as described in claim 7 in which the draft gear projects rearwardly of the opposing said stop so that the follower projects laterally of the yoke and the yoke extends rearwardly beyond the follower and the frame is recessed adjacent the follower opposing element to accommodate the yoke extension when the yoke, draft gear and coupler are in functioning position and as the yoke swings about the pivot to non-functioning position.
9. In a railway vehicle front end structure including a frame provided with a draft gear stop, a member swingable on said frame about a horizontal pivot, coupling structure supported by said member and including a draft gear, a draft gear follower, a draft gear yoke and a coupler, said coupling structure being movable relative to said member and movable with said member between functioning and non-functioning positions, said draft gear follower, when in functioning position, opposing said stop and transmitting buffing forces from the coupler to the frame through said stop without subjecting the pivot to said forces, a crank and reel assembly rotatable on the frame, and a cable fastened to the member spaced from the member pivot and to said assembly so that when said assembly is rotated in one direction, the member swings to non-functioning position, and when said assembly is rotated in the opposite direction, the member swings to functioning position.

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