Aug. 13, 1957 E. A. LARSSON 2,802,580

CAR COUPLERS

Filed Jan. 16, 1953

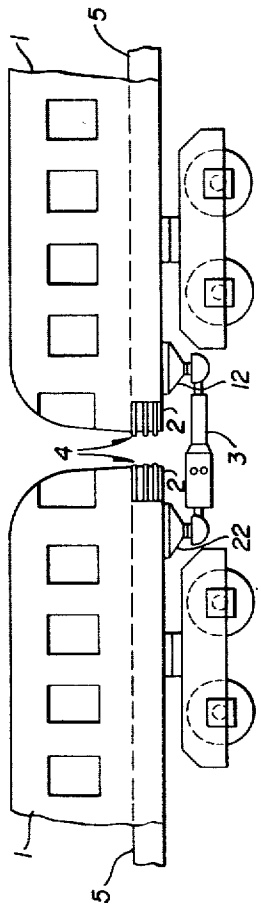


FIG. 1

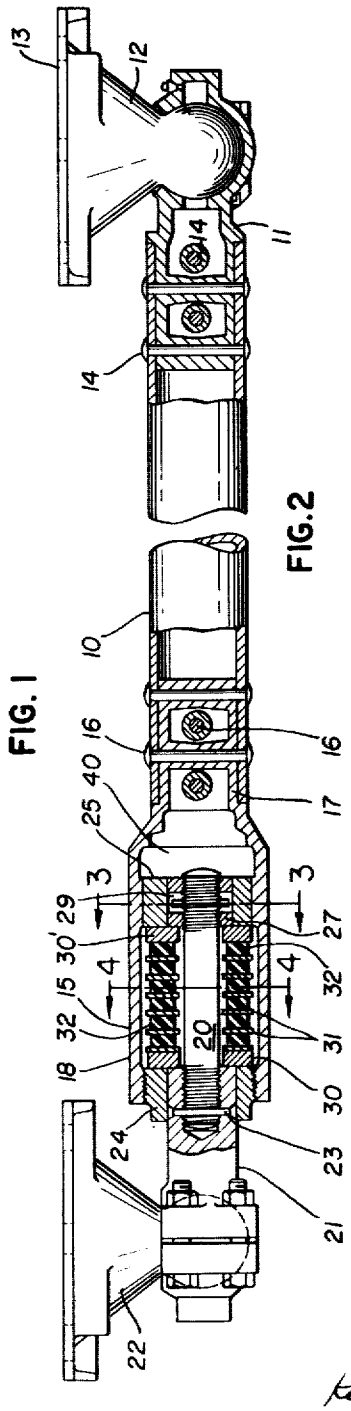


FIG. 2

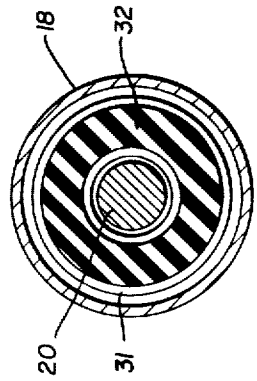


FIG. 4

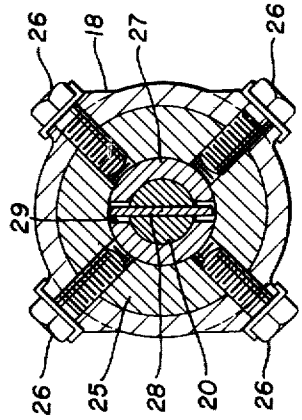


FIG. 3

INVENTOR.
ERNST A. LARSSON
BY
Kenneth W. Miller
ATTORNEY

United States Patent Office 2,802,580 Patented Aug. 13, 1957

2,802,580

CAR COUPLERS

Ernst A. Larsson, Mansfield, Ohio; Madonna L. Larson, administratrix of said Ernst A. Larsson, deceased, assignor to The Ohio Brass Company, Mansfield, Ohio, a corporation of New Jersey

Application January 16, 1953, Serial No. 331,639

19 Claims. (Cl. 213—45)

This invention relates to car couplers and has particular reference to couplers which are subjected to excessive draft and buffing forces.

One object of this invention is to provide a car coupler of predetermined capacity which will absorb the buffing and draft forces between cars in a train under normal operation.

Another object is to provide a car coupler which will permit the anti-climbing devices between adjacent coupled cars to function and prevent the cars from telescoping under abnormal buffing forces.

Another object is to provide a car coupler of predetermined capacity which will maintain the bumpers of the coupled cars spaced a predetermined distance apart but which will permit the bumpers to engage when a buffing force applied to the coupler exceeds a predetermined value.

A further object is to provide a car coupler equipped with safety means and which under abnormal operating conditions, as in case of a collision under high speeds and when the buffing forces upon the coupler exceed a predetermined amount, will function to permit the car bumpers to engage and if the bumpers are provided with anti-climbers the cars will be prevented from telescoping.

Still another object is to provide a car coupler with means which will shear when the buffing force applied to the coupler exceeds a predetermined amount, thereby permitting the coupler to shorten a sufficient amount and the anti-climbers on the car bumpers to interlock.

Other objects will be evident as the description of the invention proceeds and as disclosed in the accompanying drawing.

In the drawing—

Fig. 1 is a side view of a portion of two coupled cars disclosing the car coupler, and the anti-climbers which will engage only in case of excessive buffing forces.

Fig. 2 is a side view of a car coupler in partial section incorporating therein the improvements over the prior art.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a section on the line 4—4 of Fig. 2.

In Fig. 1 are a pair of coupled cars 1 with bumpers 2 spaced a predetermined distance apart by car coupler 3 and each bumper provided with anti-climbing plates 4 which interlock when they engage under abnormal conditions to prevent the cars telescoping.

Each car is equipped with supporting sills 5 which extend from end to end of each car and to the ends of which the bumper is secured.

In Fig. 2, the coupler is provided with a tubular member 10. To one end of the member 10 is a fitting 11 provided with an anchor 12 of the ball type which provides sufficient universal movement between the car coupler and the car body to which the anchor is attached by the flange 13. The tubular member 10 and fitting 11 are secured together by bolts 14.

To the other end of the tubular member 10 is secured to draft gear housing 15 by means of bolts 16. The

housing 15 has a reduced portion 17 insertable into the end of the tubular member 10 and an enlarged chamber 18 which contains the draft gear and safety mechanism.

The buff and draft gear comprises a stem portion 20 which is secured by threads to an enlarged portion 21 which is provided with a fitting for securing the member to an anchor 22 like or similar to the anchor 12 and for the same purpose. The parts 20 and 21 are secured against relative rotation by the pin 23 and the parts are supported central of the chamber 18 by the threaded and adjustable collar 24 relative to which the stem 20 and fitting 21 have longitudinal movement depending upon the amount of buff and draft force.

Spaced from the collar or bearing member 24 is a releasable collar or bearing member 25 which is secured to the wall of the chamber 18 by bolts or pins 26 (Fig. 3) which are sufficiently strong to withstand the predetermined buff forces to which the coupler is normally subjected, but which will shear when the buff force exceeds the predetermined strength of the bolts or pins 26.

Threadably secured to the inner end of the stem 20 is a nut 27 which is prevented from rotating relative to the stud by the pin 28 which is inserted through a longitudinal slot 29 (Fig. 2) in the nut 27 and through a hole in the end of the stem after the nut 27 has been adjusted on the stem (Fig. 2). Note that the left hand faces of the releasable collar 25 and of the nut 27 are flush and that nut 27 may slide relative to said collar.

Means controlling the normal length of the coupler or the normal spacing between the anchorages 12 and 22 and which means is subject to the buff and draft forces is contained in the chamber 18 and comprises a pair of spaced collars 30 and 30' which normally rest against the collars 24 and 25 respectively, and engage fitting 21 and nut 27, respectively. Interposed between the collars 30 and 30' are a plurality of alternately positioned metal plates 31 and elastic draft gear elements 32 of rubber-like material.

The several draft gear elements which are subject to, and control the buff and draft forces to meet certain predetermined requirements of capacity and movement of the anchor elements 12 and 22 from their normal spacing, are made to certain specifications.

Take for instance a coupler designed to resist a predetermined maximum buff and draft force of 80,000 pounds and draft and buff movement of 2½ inches each; the elastic spring elements 32 are subjected to compression both by buff and draft forces. The rubber-like elements 32 would be made to ASTM standard specification RS725ABF by which the element 32 would be 6" outside and 3" inside diameter and ⅞" thick and each element 32 would be vulcanized to a steel plate 31 about ¼" thick, the two elements concentric of each other and each pair constituting a "spring unit." The rubber-like element 32 would be molded of synthetic rubber having a tensile strength of 2,500 p. s. i., a hardness of 70+ or −5 durometer and a quality represented by the term ABF, a standard with the manufacturers of rubber products.

When the element 32 of such spring-unit is compressed to 7/16", its resistance to such compression will be approximately 80,000 pounds and it will require six such units (Fig. 2) so compressed in order to secure a 2½ inch movement of the coupler parts from a normal position under either a maximum buff or a maximum draft force.

In assembling the device shown in Fig. 2 with the units described above, the release member 25 is secured in position (Fig. 3). The stem 20 and the member 21 are then assembled; the threaded collar 24 and the members 30, 30', spring-units (31, 32) and pin 28 are then assembled on the stem 20 as shown in Fig. 2 under 2,000

to 5,000 pounds pressure secured by the nut **27**, enough at least to seat and stabilize the assembled elements.

This assembled unit is then placed in the chamber **18** of the gear housing **15** and the collar **24** secured in place. Some initial adjustment as to compression upon the elements may be made, if desired, by adjustment of the collar **24**.

The entire assembly, including the members **30** and **30'**, the plates **31**, and the elastic elements **32**, is designated herein as a draft means or draft mechanism.

The anchors **12** and **22** are the last to be secured in position.

A car coupler constructed for 80,000 pounds capacity and 2½ inch movement in either direction is given above only as an example and other requirements may be met by other gear units.

In the above example the bolts or pins **26** are designed to withstand the 80,000 pounds or such other pressure under buff as required but when this predetermined force is exceeded, the pins **26** will shear. This will happen only under a buff force as draft forces are against the collar **24**.

When the members **26** shear under a buff force the pressure against the emergency release member **25** will cause it to move into the clear space **40** whereby the over-all length of the coupler will be decreased from its normal length by the amount of the length of the space **40**. This space may be made whatsoever is required, but must be enough to permit the anti-climbing members **4** to engage.

When an excessive buff force is applied to the pins **26** the time between the shearing of the pins **26** and the engagement of the anti-climbing members **4** will be almost if not instantaneous which will practically insure anti-telescoping; that is, prevent one car body climbing up onto and along the adjacent car body.

The elements **10** and **15** may be formed from a single tubular member by upsetting and expanding one end thereof to form the enlarged chamber **18**.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

1. A draft apparatus comprising, an elongated body member, means at one end to secure the body member to a car, means longitudinally movable relative to the body member at the other end of the body member and means to secure the longitudinally movable means to a coupled car, deformable draft means interposed between the longitudinally movable means and the body member to transmit draft and buffing forces between the said movable means and the body member, and means to permit the draft apparatus to shorten under a buff force exceeding a predetermined value comprising a member at the buffing end of the draft means carried by the body member and shearable means securing the buffing end member to the body member.

2. In a transportation system comprising a train of two or more cars and a track on which the cars operate and couplers connecting the adjacent ends of each pair of coupled cars and the said adjacent ends each equipped with anti-climbing plates each plate to cooperate with the other plate to prevent telescoping, the couplers each comprising two longitudinally movable parts with yieldable draft means disposed between the parts, the combination with the said means of emergency release means to break and to permit the said separation between two coupled cars to decrease sufficiently under an excess buff force to permit the anti-climber plates to engage and prevent telescoping and comprising two members carried by one of the parts for holding the draft means at the ends thereof and means detachably securing the one of the said two members at the buffing end of the draft means toward said one part so as to be freed from the part upon the application of an excess buff force.

3. A car coupler comprising, an elongated tubular body of circular cross-section, a first separately formed means

secured to one end of the body for attaching the said one end of the body to a car, a second separately formed means secured to the other end of the body member and having an enlarged hollow portion projecting beyond the end of the body member, the enlarged hollow portion having a circular cross-section, an adjustable collar threadably secured to the outer end of the said second separately formed means, a separately formed longitudinally slidable means having one end slidably mounted in the adjustable collar member and separately formed means at the other end for attaching the slidably mounted means to a coupled car, a separately formed elongated stem threadably secured to the slidably mounted end of the aforesaid separately formed longitudinally slidable means and projecting inwardly of said enlarged hollow portion, a releaseable collar positioned within the enlarged hollow portion and secured to the wall thereof by shearable means, a nut secured to the extreme inner end of the stem to support the stud end within the releaseable collar and permit a sliding movement of the stem and nut relative to the releaseable collar, yieldable buff and draft means mounted on the stem between the releaseable collar and the adjustable collar, the buff and draft means composed of alternate discs of rubber-like material and metal for yieldably holding the parts of the coupler associated with the said enlarged hollow portion normally in a predetermined relation but permit the relative longitudinal position of the said first separately formed means and said separately formed longitudinally slidable means to change from said normal predetermined relation a predetermined amount under buff and draft forces and said shearable means being adapted to shear and permit the releaseable means to move from its original position when the buff force exceeds said predetermined amount thereby decreasing the length between the said first separately formed means and said separately formed longitudinally slidable means under a buff force.

4. A car coupler comprising, an elongated body member, fixed means at one end of the body member to attach the coupler end to a car, longitudinally movable means associated with the other end of the body member and having means to attach the movable means to a coupled car, yieldable draft means of elastic material for transmitting draft and buffing forces between the longitudinally movable means and the elongated member and means on the longitudinally movable means engaging the draft means at each end thereof, fixed means secured to the elongated member toward the end of the elongated member for receiving draft forces, a releaseable means secured to the elongated body member spaced from the fixed means against which the yieldable draft means normally abuts for receiving buff forces, and shear means securing the releaseable means in fixed relation to the elongated member, the said securing means adapted to resist pressure thereon due to the buff force to which the coupler is subjected up to a predetermined value above which the said securing means will shear thereby releasing the resistance of the releaseable means to said buffing force.

5. A draft apparatus comprising two elongated members, a fitting at the outer end of each of the members for attaching the member to an anchor on a car, means for supporting the second elongated member with respect to the first member for sliding longitudinal movement relative thereto comprising a bearing member fixed to the first member at the inner end thereof and a second, separately formed, bearing member spaced from the first bearing member with an open part outward from the second bearing member for receiving the inner end of the second elongated member, a yieldable draft mechanism disposed between the said two bearing members, means on the second elongated member engaged with the draft mechanism at the ends thereof for transmitting buff and draft forces from each of the elongated members through the draft mechanism to the other of the elongated mem-

bers, and shear means extending transversely between the outer elongated member and the second bearing member for normally holding the second bearing member with respect to the first elongated member and for shearing only upon the application of a buffing force of greater than a predetermined amount to cause the second bearing member to be released and permit the second elongated member to move toward the first elongated member a distance greater than that normally afforded by the compression of the draft mechanism.

6. A draft apparatus comprising two elongated members with the inner end of the second member received in an enlarged tubular portion at the inner end of the first member, a fitting at the outer end of each of the members for attaching the member to an anchor on a car, means for supporting the second elongated member in the enlarged portion of the first member for sliding longitudinal movement relative thereto comprising a first annular bearing member fixed to the first member at the end thereof and a second, separately formed, annular bearing member within the enlarged portion and spaced from the first bearing member toward the outer end of the first elongated member with an open part outwardly therefrom for receiving the inner end of the second elongated member, a yieldable draft mechanism disposed between the said two bearing members with a part of the second elongated member extending coaxially through the draft mechanism and radially enlarged means engaged with the draft mechanism for transmitting draft and buff forces from each of the elongated members to the other through the draft mechanism and the bearing members, and means including a transversely disposed shear member extending inwardly from the enlarged tubular portion to hold the second bearing member in buff and for shearing only upon application of a buffing force of greater than the strength of the shear member to cause the second bearing member to be released and permit the second elongated member to telescope into the first elongated member.

7. The invention in accordance with claim 6 in which the said shear members extend radially through the first elongated member and into the second bearing member.

8. The invention in accordance with claim 6 in which the means on the second elongated member engaged with the draft mechanism at each end thereof is constituted by a reduced inner end portion of the second elongated member to form a shoulder with the enlarged portion of the member, and a collar secured to the reduced portion at the end thereof, the enlarged portion of the second elongated member being received in the first annular bearing member and the collar being received in the second bearing member.

9. A draft apparatus for vehicles comprising two elongated members with the inner end of the second member received in an enlarged open portion at the inner end of the first member, a fitting at the outer end of each of the members for attaching the member to an anchor on a car, means for supporting the second elongated member in the enlarged portion of the first member for sliding longitudinal movement relative thereto comprising a first annular bearing member fixed to the first member at the end thereof with the second elongated member received therein, and a second annular bearing member within the enlarged portion and spaced from the first bearing member with an open part outwardly from the second bearing member for receiving the inner end of the second elongated member, a yieldably draft mechanism compressed between the said two bearing members, a reduced stem part at the inner end of the second elongated member passing through the draft mechanism and the second elongated member abutting the draft mechanism at one end of the mechanism, a collar secured to the stem part, received in the second bearing member and engaged with the draft mechanism at the remaining end thereof, and a shear member extending radially through the first elongated member into the second bearing member for receiving the buffing forces transmitted from the second elongated member through the draft mechanism and for shearing only upon the application of a buffing force of greater than the strength of the shear member to cause the second bearing member to be released and permit the second elongated member to telescope into the first elongated member.

10. A releasable mechanism for a draft appliance comprising an outer member having an internal axial opening, a second member disposed within the outer member and means for supporting the second member for sliding longitudinal movement relative to the first member comprising a first bearing member fixed to the outer member and a second bearing member spaced from the first bearing member, means including a shear member extending transversely between the outer member and the second bearing member for normally holding the second bearing member with respect to the outer member, a draft mechanism disposed between the two bearing members and abutting means on the second member engaging the draft mechanism at each end thereof for transmitting forces between the two members in either direction, and the shear member being adapted to release the second bearing member when the force tending to move the two members together exceeds the shear strength of the shear member.

11. A releaseable mechanism for a draft appliance comprising an elongated generally cylindrical outer member having an internal axial opening, a second elongated member disposed within the outer member and having an enlarged portion and a reduced stem part at the inner end of the second member, means for supporting the second member for sliding longitudinal movement within the first member comprising a first bearing member fixed to the outer member and having the enlarged portion of the second member received therein and a second, separately formed, bearing member within the outer member spaced from the first bearing member with an open part in the outer member beyond the second bearing member for receiving the adjacent end of the second elongated member, a collar fixed to the stem part and carried in the second bearing member, means including a shear member extending transversely between the outer cylindrical member and the second bearing member for normally holding the second bearing member with respect to the outer member, a draft mechanism compressively received between the enlarged portion of the second elongated member and the collar and disposed between and engageable with the bearing members for transmitting forces between the two members in either direction and the shear member being adapted to release the second bearing member when the force tending to move the two members together exceeds the shear strength of the shear member.

12. The invention in accordance with claim 11 the said draft mechanism being generally cylindrical in shape and disposed about the reduced portion of the first member.

13. In a railway train, in combination, two cars, an anchor at the rear end of the lead car and an anchor at the front end of the following car, and an elongated member attached to each of the anchors with universal bearing means interposed between each of the elongated members and the associated anchor, a yieldable draft means interposed between the said two elongated members and means on each of the elongated members engaged with end of the draft means for transmitting draft and buffiing forces between the two elongated members and shear means for holding the engaging means on at least one of the elongated members and permitting the elongated means to come together in response to excessive buffing forces.

14. In a railway train, in combination, two cars, and draft apparatus attached to the rear end of the lead car and to the front end of the following car, the said draft apparatus comprising two longitudinally directed mem-

bers having the opposed ends thereof carried by the cars and bearing means for supporting the adjacent ends of the two members each from the other and permitting relative longitudinal movement of the members, a draft mechanism interposed between the said two members for transmitting draft and buffing forces from one member to the other and separate means carried by one of the members abutting the draft mechanism, and means comprising a shear member extending transversely between the carrying member and the separate means securing the abutting means to the said carrying member for transmitting buffing forces from the abutting member to the carrying member and releasing the abutting means upon the application of an excessive buffing force whereby the ends of the two cars may come together to absorb the excessive buffing force.

15. In a railway train, in combination, two cars and draft apparatus attached to the rear end of the lead car and to the front end of the following car, the said draft apparatus comprising two longitudinally directed members having the opposed ends thereof carried by the cars and bearing means for supporting the adjacent ends of the two members each from the other and permitting relative longitudinal movement of the members, a draft mechanism interposed between the said two members for transmitting draft and buffing forces from one member to the other and means carried by the member associated with the following car abutting the draft mechansm, and means comprising a shear member extending transversely between the carrying member and the abutting means securing the abutting means to the said carrying member for transmitting buffing forces from the abuting member to the carrying member and releasing the abutting member upon the application of an excessive buffing force whereby the ends of the two cars may come together to absorb the excessive buffing force.

16. In a railway train, in combination, two cars, and an anchor at the rear end of the lead car and an anchor at the front end of the following car and a draft apparatus extending between the two anchors with universal bearing means interposed between the coupling apparatus and the anchors, the said draft apparatus comprising first and second elongated members, means supporting the second elongated member for longitudinal movement relative to the first elongated member and comprising a first bearing member fixed to the first elongated member adjacent the end thereof and a second bearing member spaced from the first bearing member, the second elongated member being received in the said bearing members a draft mechanism disposed between the said two bearing members and means on the second elongated member abutting the draft mechanism at each end thereof, and shearable means affixing the second bearing member to the first elongated member for receiving buffing forces transmitted from the second elongated member through the draft mechanism and for releasing the draft mechanism and the second elongated member only upon the application of a buffing force of greater than a predetermined amount will shear the said shearable means and permit the ends of the two cars to come together.

17. The invention in accordance with claim 8 in which the second elongated member is formed as a solid cylindrical bar slidably received in the first bearing member and the bar extending coaxially through the draft mechanism comprises a separately formed stem of lesser diameter than the bar and threaded into an opening at the end of the bar, and a collar is threaded on the end of the stem and slidably received in the second bearing member.

18. The invention in accordance with claim 17 in which the first bearing member is threaded in the enlarged tubular part of the first elongated member to facilitate assembly of the apparatus.

19. In a railway train, in combination, two cars and draft apparatus attached to the rear end of the lead car and to the front end of the following car, the said draft apparatus comprising two longitudinally directed members having the opposed ends thereof carried between the cars and bearing means for supporting the adjacent ends of the two members each from the other and permitting relative longitudinal movement of the members, a draft mechanism disposed generally coaxially of the said two members with abutting means on each of the members at each end of the draft mechanism for transmitting draft and buffing forces from one member to the other, one of the said abutting means at a buffing end of the said draft mechanism comprising a member separately formed from the carrying member with means comprising a shear member extending transversely between the carrying member and the separate member for securing the last named abutting means to the said carrying member and releasing the abutting means only upon the application of an excessive buffing force, whereby the ends of the two cars may come together, and anticlimber plates on each of the cars at the adjoining ends thereof to prevent telescoping of the cars as they come together.

References Cited in the file of this patent

UNITED STATES PATENTS

881,075	Hosking	Mar. 3, 1908
1,020,445	Potter	Mar. 19, 1912
1,412,737	Hart	Apr. 11, 1922
1,414,207	Reed	Apr. 25, 1922
1,497,329	Goodall	June 10, 1924
1,546,710	Bowditch	July 21, 1925
2,113,542	Dean	Apr. 5, 1938
2,250,425	Van Dorn	July 22, 1941
2,256,493	Ragsdale et al.	Sept. 23, 1941
2,463,366	Evans	Mar. 1, 1949
2,602,553	Flowers	July 8, 1952
2,665,128	Guffy	Jan. 5, 1954

FOREIGN PATENTS

316,351	Great Britain	July 29, 1929