H. W. WOODWARD.

COUPLING.

APPLICATION FILED NOV. 26, 1917.

1,307,427.

Patented June 24, 1919.

6 SHEETS—SHEET 1.

Fig. 1

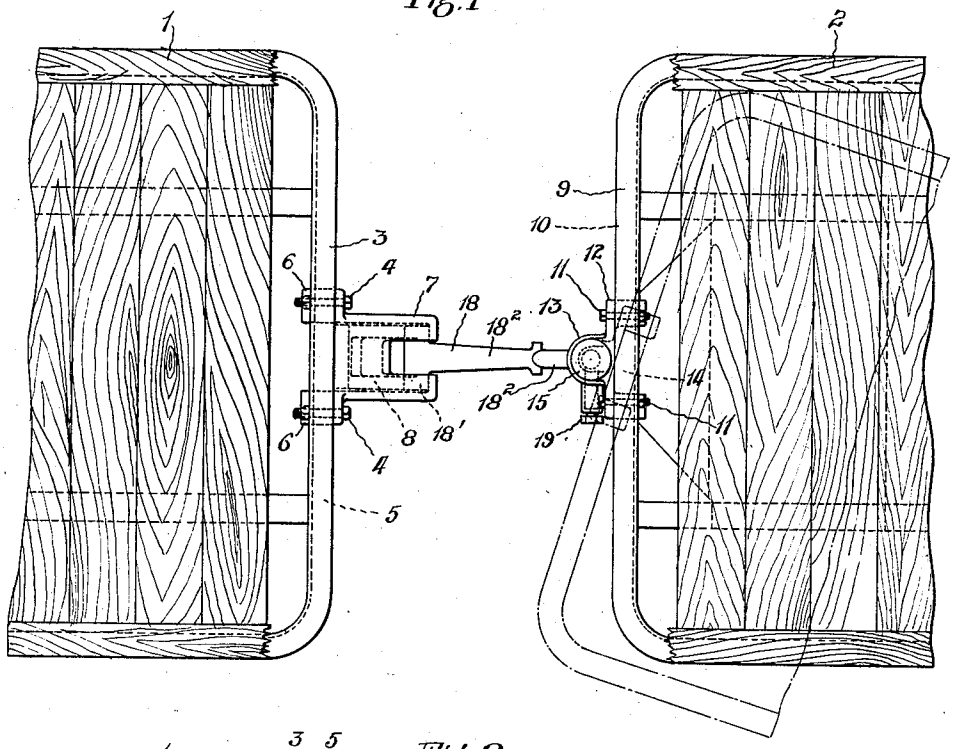
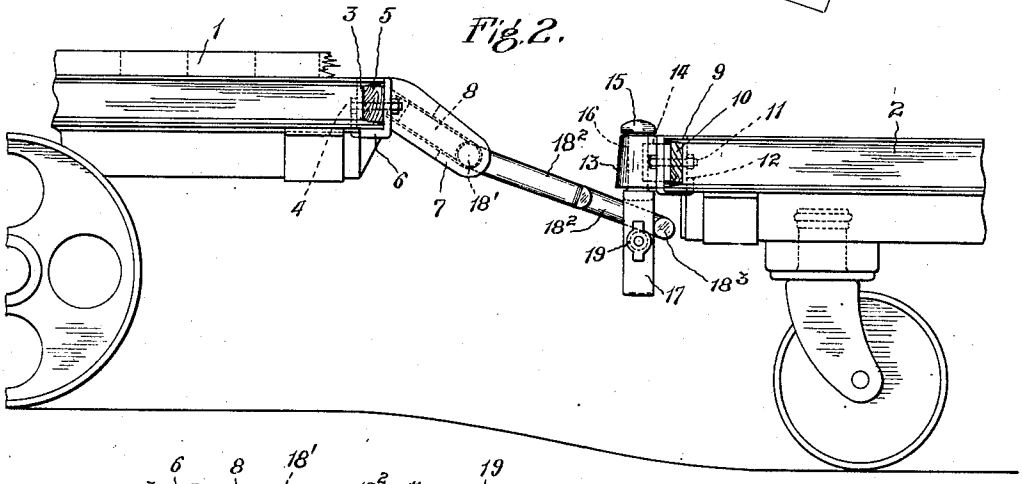


Fig. 2.



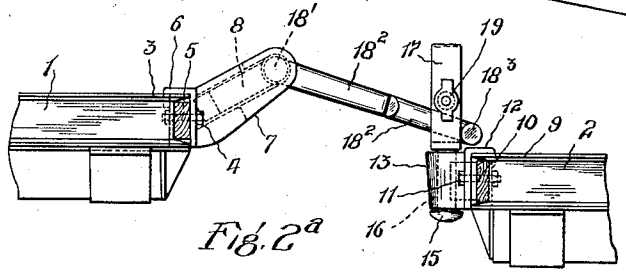


Fig. 2ª

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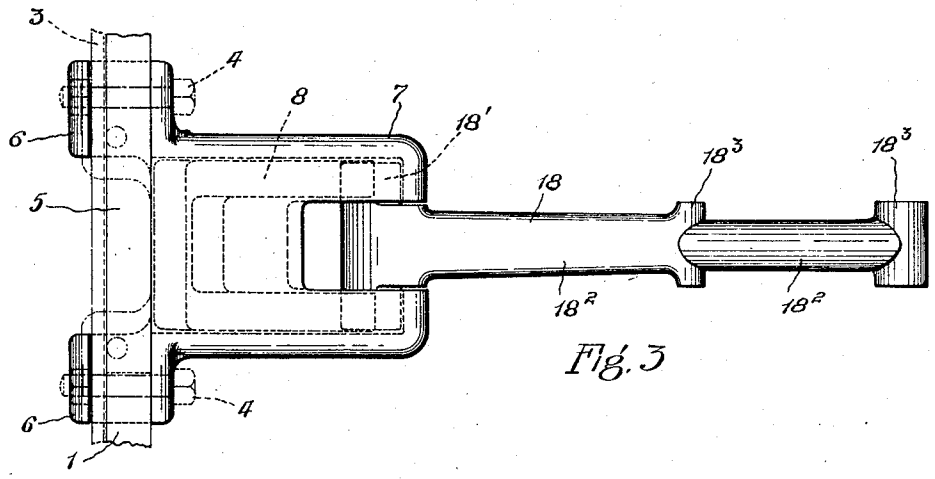


Fig. 3

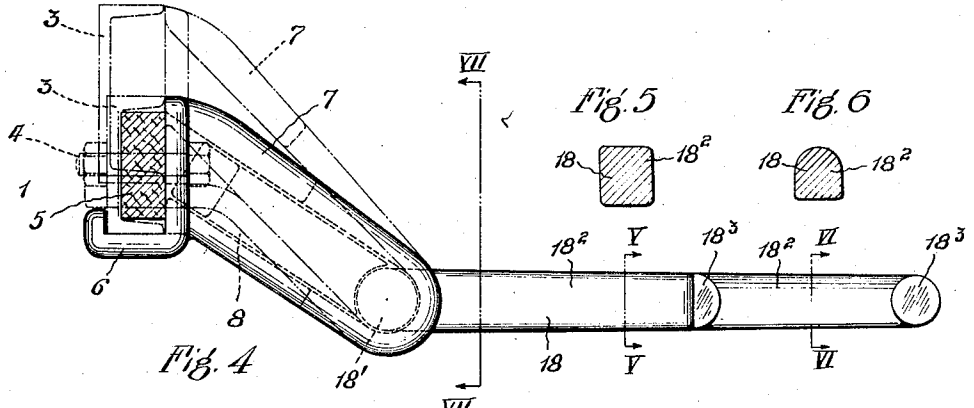


Fig. 4

Fig. 5

Fig. 6

Fig. 8

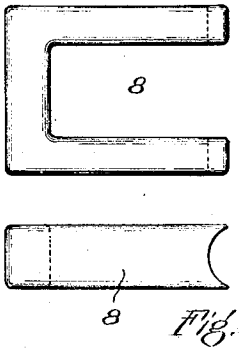


Fig. 9

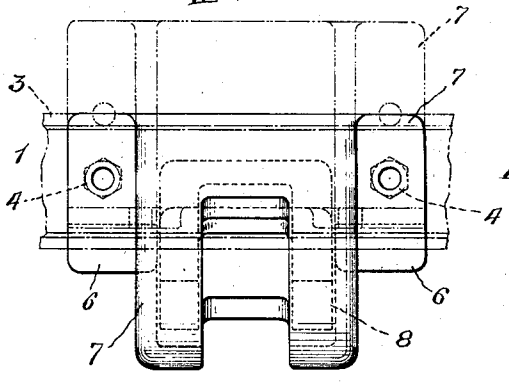


Fig. 7

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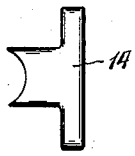
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6 SHEETS—SHEET 3.

Fig. 14



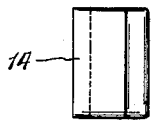
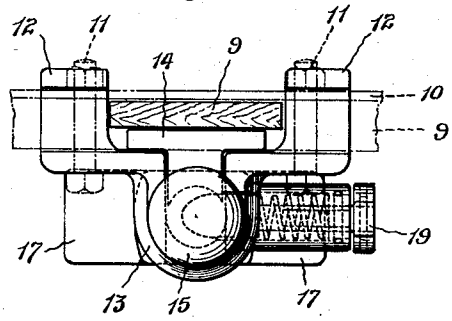


Fig. 15

Fig. 10



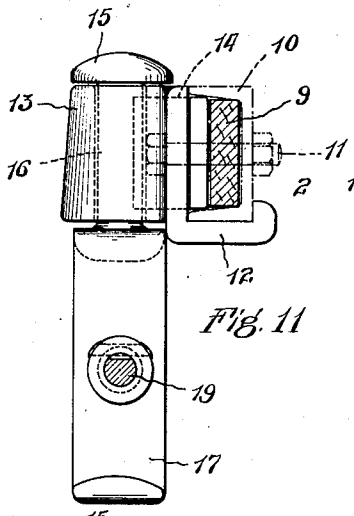


Fig. 11

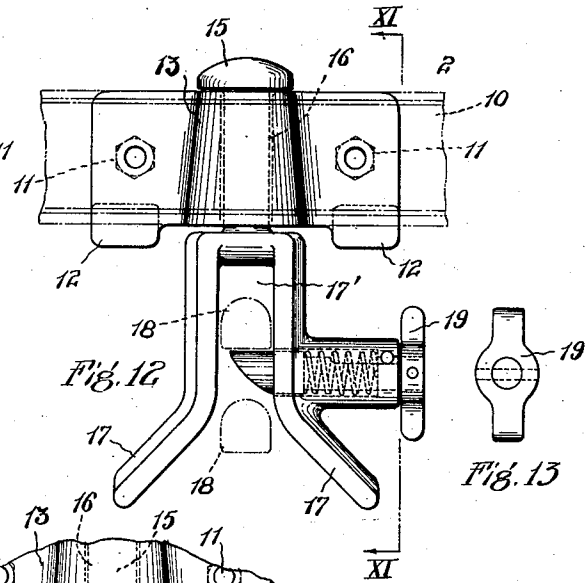


Fig. 12

Fig. 13

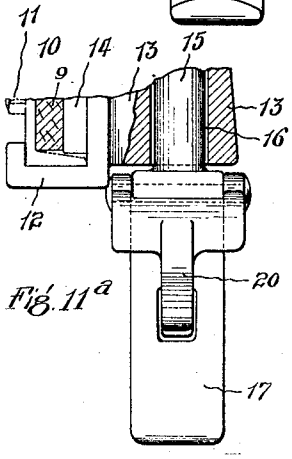


Fig. 11a

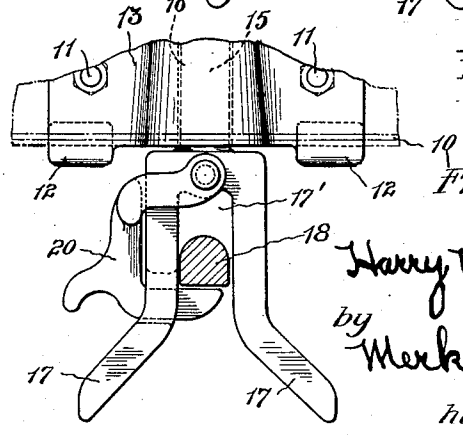


Fig. 12a

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6 SHEETS—SHEET 4.

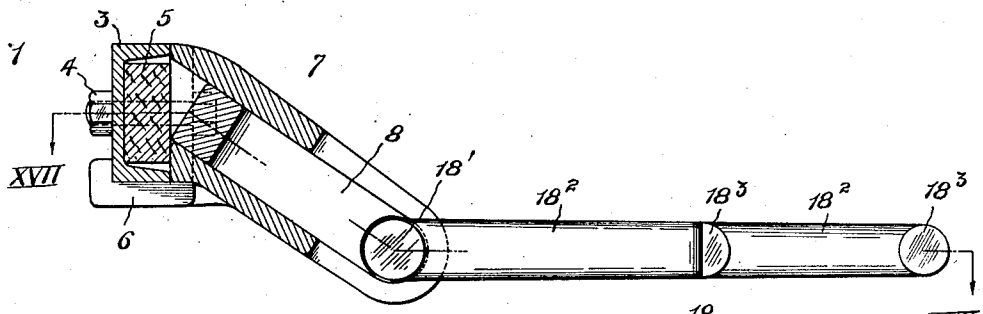


Fig. 16

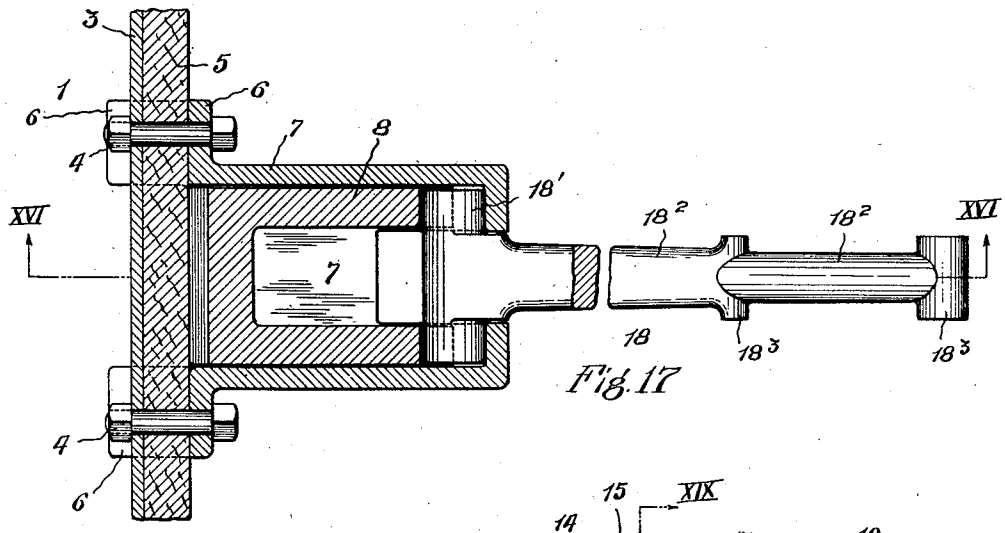


Fig. 17

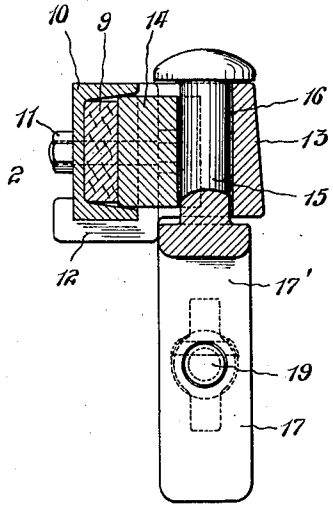


Fig. 19

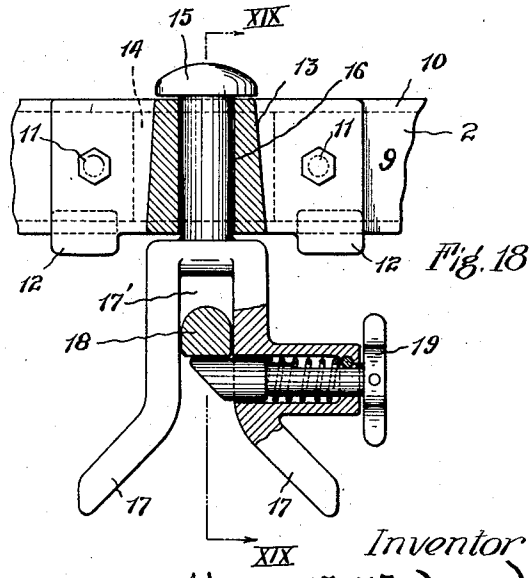


Fig. 18

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COUPLING.

APPLICATION FILED NOV. 26, 1917.

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6 SHEETS—SHEET 5.

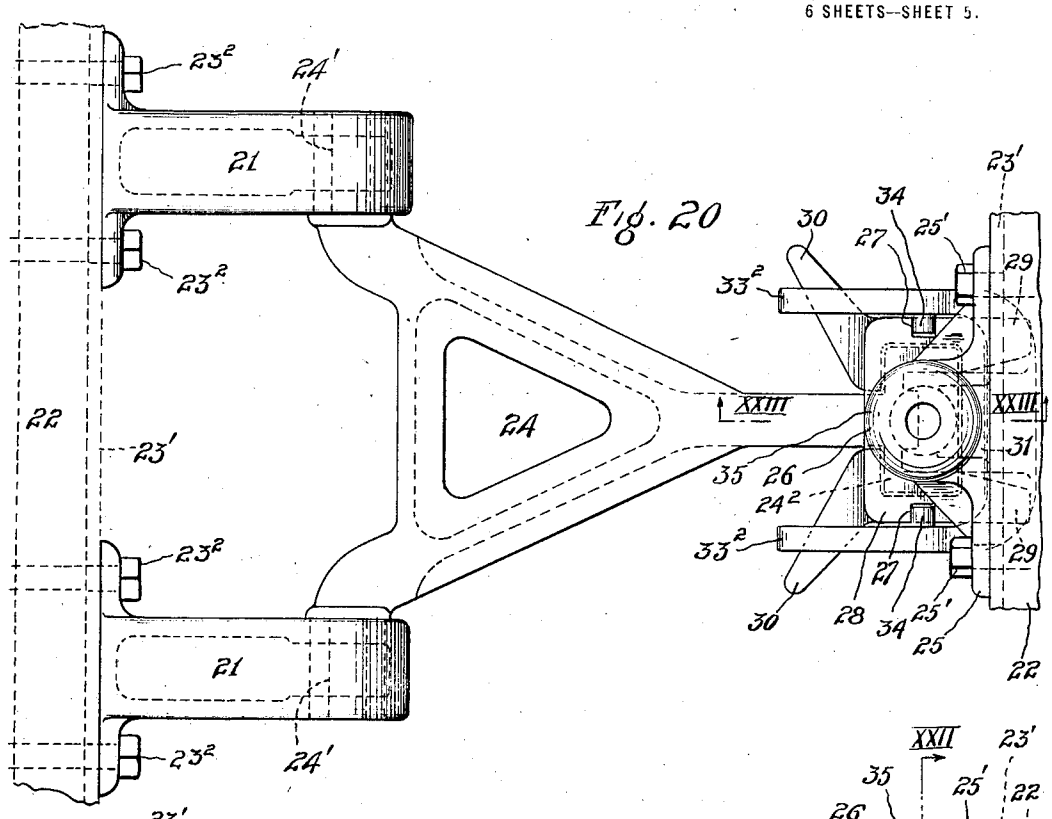


Fig. 20

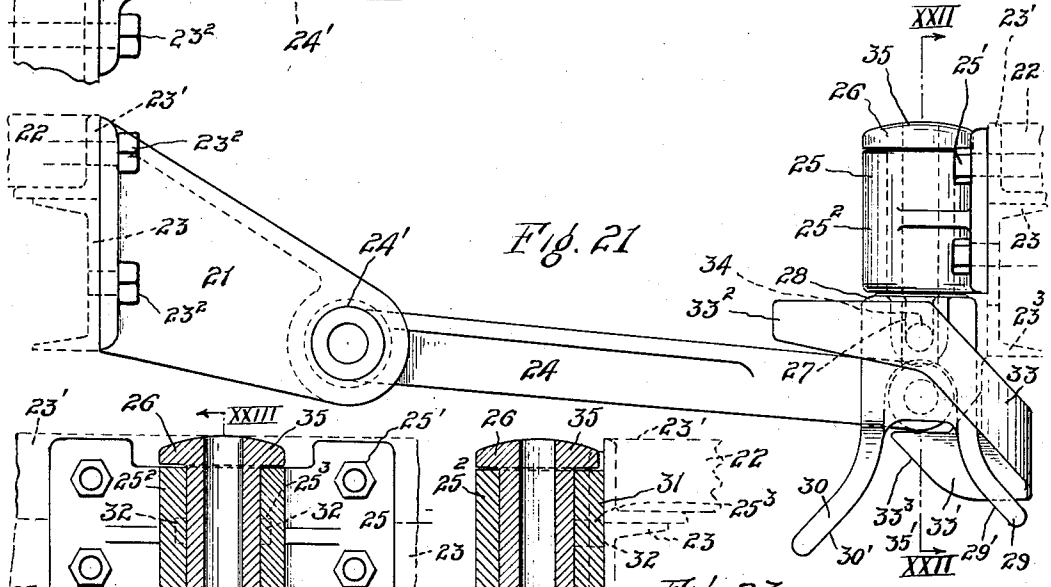


Fig. 21

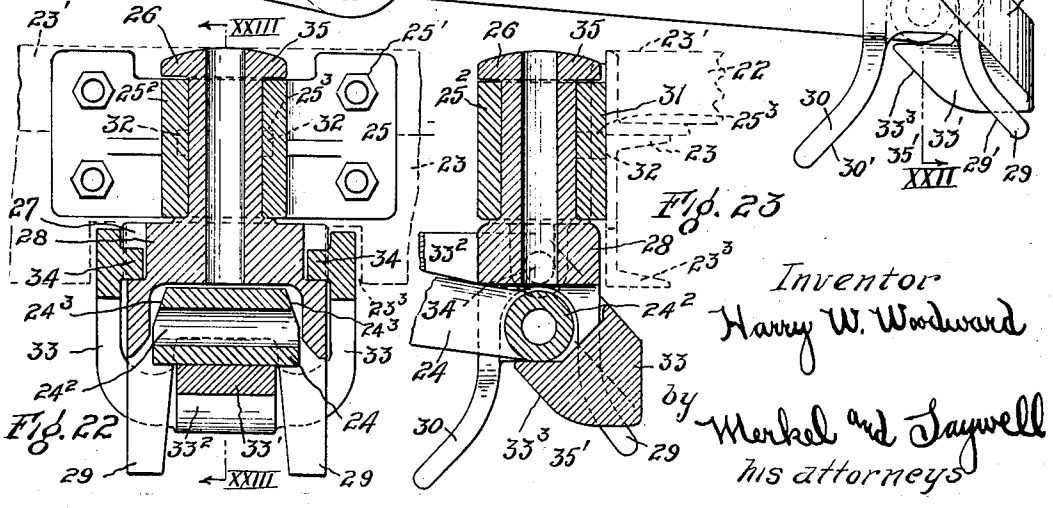


Fig. 22

Fig. 23

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6 SHEETS—SHEET 6.

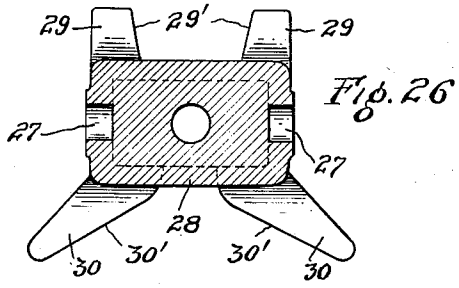


Fig. 26

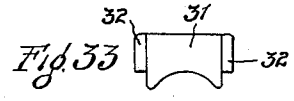


Fig. 33

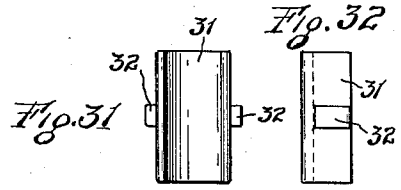


Fig. 31

Fig. 32

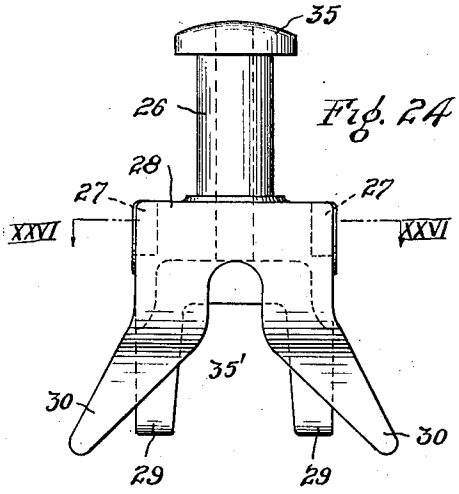


Fig. 24

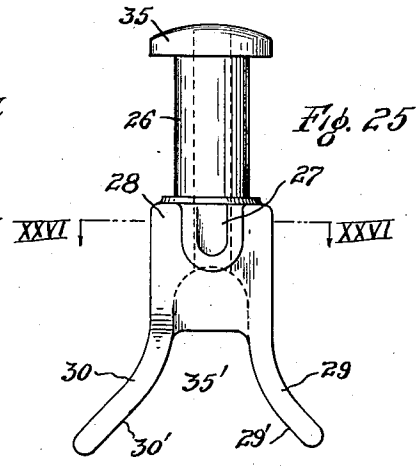


Fig. 25

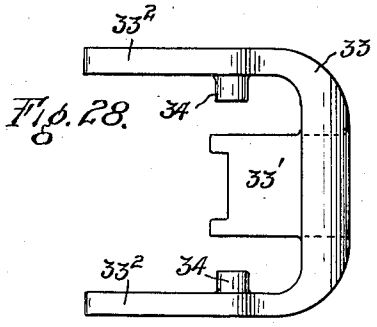


Fig. 28.

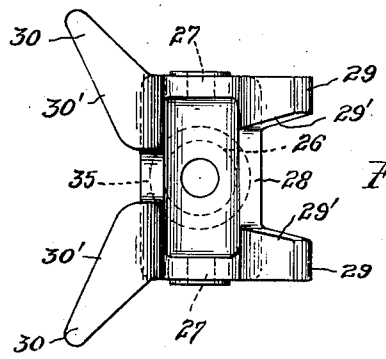


Fig. 27

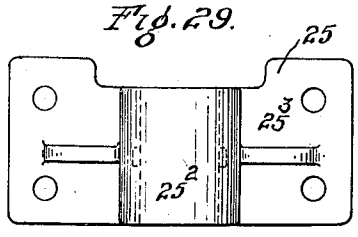


Fig. 29.

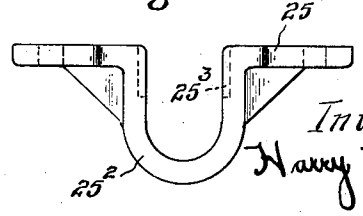


Fig. 30

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UNITED STATES PATENT OFFICE.

HARRY W. WOODWARD, OF CLEVELAND, OHIO.

COUPLING.

1,307,427. Specification of Letters Patent. Patented June 24, 1919.

Application filed November 26, 1917. Serial No. 204,083.

To all whom it may concern:

Be it known that I, HARRY W. WOODWARD, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented new and useful Improvements in Couplings, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to couplers and particularly to that class of such devices which are utilized for joining a tractor to a trailer or following truck or joining a train of trailers or followers together. In this class of conveyances the tractor and train are designed to run without tracks and the entire train is designed to trail closely in the path of the tractor. Said conveyances are particularly adaptable to the requirements of warehouse trucks. It is the object of my design to cause all the cars of a trackless train to run in substantially the same path. More particularly, my improvements relate to couplers of a design which permits of a free motion between the trucks about both a horizontal axis and a vertical axis and the two axes may or may not intersect. Specifically, the parts are so arranged that those which move relatively to each other about a horizontal axis are designed to be attached to the rear of a leading truck and those which are arranged to move relatively to each other about a vertical axis are attached to the front of a following or trailing truck. My improved coupler is further designed to permit the train to make very sharp turns in a horizontal plane and to ascend and descend very steep grades. The essential elements of my improved coupler consist in a coupler head or heads secured to one truck and providing a bearing or bearings within which a coupling bar is free to move about a horizontal axis, and a coupling jaw secured to another truck, removably secured to said coupling bar, and movable about a vertical axis.

The annexed drawings and the following description set forth in detail certain means embodying my invention, the disclosed means, however, constituting but one of various mechanical forms in which the principle of the invention may be employed.

In said annexed drawings:

Figure 1 represents a broken plan view of leading and trailing trucks connected up by means of one form of my improved coupler, a dotted line position of the trailing truck being shown, in which it is traveling in substantially the same horizontal plane but at an angle to the line of travel of the leading truck; Fig. 2 represents a broken side view of the parts shown in Fig. 1, the leading truck being disposed in a higher horizontal plane than the following truck, as when the train is climbing a grade; Fig. 2ª represents a fragmentary portion of the elements shown in Fig. 2 in a form of coupler in which the coupling bar is swung into place from above; Fig. 3 represents an enlarged plan view of the coupling elements shown in Fig. 1, as related to the leading truck; Fig. 4 represents a side elevation of the parts shown in Fig. 3, another arrangement thereof being shown in broken lines; Figs. 5 and 6 represent vertical sections taken in the planes indicated by the lines V—V; VI—VI, Fig. 4; Fig, 7 represents a front elevation taken from the plane indicated by the line VII—VII, Fig. 4, with the coupling bar removed; Figs. 8 and 9 represent, respectively, plan and end views of a filler block utilized in connection with the coupling elements shown in Figs. 3 and 4; Fig. 10 represents a plan view of the coupling elements shown in Figs. 1 and 2 utilized in connection with the trailing truck; Fig. 11 represents an end view and vertical section of the parts shown in Fig. 10, taken in the plane indicated by the lines XI—XI, Fig. 12; Fig. 11ª represents an end view and vertical section, taken from the side opposite to that in which Fig. 11 is taken, of a fragmentary portion of a modification; Fig. 12 represents a front elevation of the parts shown in Fig. 10; Fig. 12ª represents a front elevation of the modification shown in Fig. 11ª; Fig. 13 represents an end view of a spring-actuated latch or dog, hereinafter more fully described; Figs. 14 and 15 represent, respectively, a plan and an end elevation of a filler block utilized in connection with the coupling elements shown in Figs. 10 and 12 and attached to the trailing truck; Fig. 16 represents a vertical section of the elements shown in Fig. 4 in one arrangement only, said view being taken in the plane indicated by the lines XVI—XVI, Fig. 17; Fig. 17 represents a horizontal section taken in the plane indicated by the lines XVII—XVII,

Fig. 16; Fig. 18 represents a transverse vertical axial section of the elements shown in Fig. 12; Fig. 19 represents an end elevation and a vertical section, taken in the plane indicated by the lines XIX—XIX, Fig. 18; Fig. 20 represents a broken plan view of leading and trailing trucks connected up by a modified form of my improved coupler; Fig. 21 represents a broken side view of the parts shown in Fig. 20; Fig. 22 represents a transverse vertical central section, taken in the plane indicated by the line XXII—XXII, Fig. 21; Fig. 23 represents a longitudinal vertical section taken in the plane indicated by the line XXIII—XXIII, Fig. 22; Fig. 24 represents a front elevation of a coupler jaw forming an element of my modified coupler; Fig. 25 represents a side elevation thereof; Fig. 26 represents a horizontal section taken in the plane indicated by the line XXVI—XXVI, Fig. 25; Fig. 27 represents a bottom plan view of the parts shown in Fig. 25; Fig. 28 represents a plan view of a pivoted automatic latch forming an element of my modified coupler; Figs. 29 and 30 represent, respectively, a front elevation and a plan view of a member forming an element of my modified coupler and adapted to be attached to the front end of the trailing truck; Figs. 31, 32 and 33 represent, respectively, a front elevation, a side elevation and a plan view of a filler block forming an element of my modified coupler.

Referring to the annexed drawings, I have shown therein leading and following trucks 1 and 2, respectively, the same being adapted to be joined by a coupling bar 18, Figs. 1 to 19, inclusive, in the manner now to be fully described. A coupling head 7 and a coupler jaw 15 are provided for receiving, respectively, the two ends of the coupling bar 18, the coupling head 7 being adapted to receive the front end of said bar so that the latter may swivel in a horizontal plane, and the coupler jaw 15 being adapted to quickly receive and quickly release the other end of said coupling bar 18 for the making and breaking of the train as desired. Means are provided which are secured to the trailing truck and furnish a bearing surface in which said jaw 15 may swivel about a vertical axis, as hereinafter fully described. The coupler head 7 is provided with two lateral angular portions 6 adapted to receive a channel member 3 which surrounds the rear frame member 5 of the leading truck 1, bolts 4 being provided for joining securely together said portions 6, frame member 5 and channel member 3, as plainly shown in Figs. 1, 16 and 17. The coupling head 7 is formed with a horizontally disposed recess adapted to receive the journal end 18′ of the coupling bar 18 and a filler block 8, as plainly shown in Figs. 3, 8 and 17, said coupler head 7 and filler block 8 being provided with bearing surfaces coöperating with the journal surface of said coupling bar end 18′. The coupling bar 18 is provided with portions 18^2 of reduced cross-sectional areas intermediate its ends and enlarged holding portions 18^3 hereinafter more fully described. The reduced portions 18^2 may be of different cross-sectional forms, if desired, as plainly shown in Figs. 5 and 6.

A coupler member 13 is provided which is attached to the trailer 2 by means of bolts 11 which secure together lateral angular portions 12 of said coupler member 13 and a channel member 10 surrounding the front frame member 9 of said trailer 2. Said coupler member 13 is provided with a vertically disposed socket providing a bearing surface for the intermediate journal portion 16 of reduced cross-sectional area of the coupler jaw 15. Filler block 14 formed with a bearing surface is provided, as plainly shown in Figs. 10, 14 and 15, and said bearing surfaces of said coupler member 13 and said filler block 14 coöperate with the journal surface 16 of said coupler jaw 15. Said coupler jaw 15 is provided with a pair of outwardly bent depending members 17 forming between them a socket 17′ to receive the reduced intermediate portion 18^2 of the coupling bar 18, the same being retained therein by means of a spring-actuated latch or dog 19, as plainly shown in Fig. 18. It will be seen that the coupling bar 18 is readily released from the socket 17′ or is readily swung into place from below by pulling the latch 19 outwardly against the action of the spring. In Fig. 2^a is illustrated such a relation of the parts as to enable the attachment of the coupler bar 18 by swinging the same into place from above. In Figs. 11^a and 12^a are illustrated means for holding the coupler bar 18 consisting of a pivoted trip 20.

Referring in detail to the modified form of coupler shown in Figs. 20 to 33 inclusive, which form of coupler is in many respects a preferred one, there are indicated members 21 adapted to be attached to the frame member 23′ forming part of the rear end of the tractor or leading truck and to a channel member 23 by means of bolts 23^2, the frame 22 being supported within the angular member 23′ upon the channel 23. Said members 21 form a plurality of coupler heads provided with bearing surfaces within which journal portions 24′ of the coupling bar 24 can be rotatably supported upon a comparatively broad base. By this method of construction, shown plainly in Fig. 20, I am able to secure a coupler of much greater strength than the form shown in Figs. 1 and 3.

Referring in detail to this modified form

of coupler, as regards the parts thereof adapted to be attached to the front of the following truck, the same comprise a member 25 plainly shown in Figs. 29 and 30, adapted to be attached to frame member 23′ and channel 23 supporting the frame 22 by means of bolts 25′, similar to the construction hereinbefore described with reference to the rear of the tractor or leading truck. This channel member 23 provided for the front of the following truck is notched out in two places, one of which is indicated by the ordinal 23^3, Fig. 21, for a purpose hereinafter fully described. Said member 25 is provided with a U-shaped central portion 25^2, Fig. 30, and said portion is formed with a pair of oppositely disposed recesses 25^3, plainly shown in said figure, the purpose of which will be fully described hereinafter. The inner surface of said U-shaped portion 25^2 of the member 25 provides a bearing surface for an intermediate journal portion of a coupler jaw 26, plainly shown in Figs. 24 and 25. The journal portion of said jaw 26 extends upwardly from a rectangular body portion 28 to a retaining head 35 adapted to be supported upon the top of the portion 25^2 of the member 25. The two ends of the body member 28 are formed with recesses 27, the purpose of which will be described hereinafter. A filler block 31, of the construction plainly shown in Figs. 31, 32 and 33, having a pair of lateral lugs 32 adapted to slide within the recess 25^3 of the member 25, keeps the journal portion of the jaw 26 within the bearing member 25^2 and completes the bearing for said jaw 26. I have provided a latch 33 formed with outwardly extending arms 33^2 and with a pair of oppositely disposed inwardly extending trunnions 34 forming journal surfaces, the body of the latch disposed upon that side of the journals 34 opposite to the arms 33^2 and including the latch portion proper 33′, being considerably heavier than said arms 33^2. The trunnions 34 are adapted to coöperate with the bearing recess 27 of the body member 28 of the jaw 26 so that said latch 33 is pivotally supported by said jaw. The coupler jaw 26 is further provided with four outwardly inclined depending members 29 and 30, one pair 29 of which are disposed in substantially parallel relation in one direction, as seen in Fig. 24, and the other pair 30 of which diverge in the manner plainly shown in Figs. 24, 25 and 26. The inner walls of said depending members 29 and 30 are beveled, as indicated by 29′ and 30′. From this construction it is evident that whatever the disposition of the jaw 26 may be within the member 25, when it is desired to thrust the end member 24^2 of the coupling bar 24 within the recess 35′ formed intermediately the members 29 and 30, that the outwardly inclined and beveled condition of said members 29 and 30 will result in a quick and easy reception of the member 24^2 without any adjustment of the coupler jaw 26. Member 24^2 also is beveled, as indicated by 24^3, Fig. 22, to facilitate this action. The latch 33 is so constructed that the portion 33′ intersects the recess 35 and by reason of the outer and lower beveled surface 33^3 of the latch proper 33′, said latch 33 is easily swung upon the trunnions 34 to enable the member 24^2 readily and conveniently to pass the latch portion 33′, which by reason of its weight as compared with the arms 33^2 will swing back into place to retain the coupling bar 24 as soon as the member 24^2 thereof has passed said latch portion 33′.

From the accompanying drawings and the annexed description, it will be noted that I have provided a coupler so arranged that a free motion of its parts is permitted about a horizontal axis and also about a vertical axis; that said two axes may or may not intersect; that all the cars of a train will run in substantially the same path; that the coupler permits the train to make very sharp turns and to ascend and descend very steep grades; and that holding means for the coupler are provided which may be easily and conveniently operated in any relative position of the rear truck to connect the coupling parts and may be easily tripped to permit of a quick release, and yet are positive in holding the coupling bar in the coupling jaw in any relative positions of the leading and trailing trucks.

My improved design of coupler is particularly adapted to that type of warehouse truck which is designed for dual operation, either by hand or power, exemplified by that type of truck known as the Reynolds type

What I claim is:

1. In a coupler, the combination of supporting means adapted for attachment to a truck; a member forming a coupler jaw socket provided with means for attaching the same to a truck, said socket forming a bearing surface; a coupling bar, said first-mentioned means and said coupling bar being formed with coöperating surfaces enabling the relative pivotal movement thereof; a coupler jaw provided with a journal surface adapted to coöperate with the bearing surface formed in said member so as to permit the relative pivotal movement of said member and jaw in a plane transverse to the plane in which said first-mentioned means and said coupling bar are relatively pivotally connected, said coupler jaw being formed with a recess adapted to receive said coupling bar; and means for removably holding said coupling bar in said recess.

2. In a coupler, the combination of means adapted for attachment to a truck; a member forming a coupler jaw socket and provided with means for attaching the same to

a truck, said socket forming a vertically-disposed bearing surface, a coupling bar, said first-mentioned means and said coupling bar being formed with coöperating surfaces enabling the pivotal movement about a horizontal axis of said coupling bar; a coupler jaw provided with a journal surface adapted to coöperate with the bearing surface formed in said member so as to permit the pivotal movement of said jaw relatively to said member about a vertical axis, said coupler jaw being formed with a recess adapted to receive said coupler bar; and means for removably holding said coupling bar in said recess.

3. In a coupler, the combination with leading and trailing trucks; of coupling heads respectively supported thereby, a coupling bar adapted to be moved detachably to connect said heads and to be supported pivotally relatively thereto, and a swinging keeper for said coupling bar disposed in the path of the latter as it is moved to connect said coupling heads, said keeper being formed with a portion of comparatively great weight, whereby it automatically moves to a locking position when said bar has passed the same.

4. In a coupler, the combination with leading and trailing trucks; of coupling heads respectively supported thereby, a coupling bar adapted to be moved detachably to connect said heads and to be supported so as to have a pivotal movement relatively to one truck and a pivotal movement relatively to the other truck in a plane transverse to said first-mentioned pivotal movement, and a reciprocably movable keeper for said coupling bar disposed in the path of the latter as it is moved to connect said coupling heads said keeper being formed with means automatically moving the same to a locking position when said bar has passed said keeper.

5. In a coupler, the combination of leading and trailing trucks; of coupling heads respectively supported thereby, a coupling bar adapted to be moved detachably to connect said heads and to be supported so as to have a pivotal movement relatively to one truck and a pivotal movement relatively to the other truck in a plane transverse to said first-mentioned pivotal movement, and a reciprocably movable keeper for said coupling bar mounted upon one of said heads and disposed in the path of said bar as the latter is moved to connect said coupling heads, said keeper being formed with means automatically moving the same to a locking position when said bar has passed said keeper.

6. In a coupler, the combination of a coupler head provided with means for attaching the same to a truck, said head being formed with a plurality of recesses forming bearing surfaces; a member forming a coupler jaw socket and provided with means for attaching the same to a truck, said socket forming a bearing surface; a coupling bar provided with journal surfaces adapted to coöperate with said first-mentioned bearing surfaces; a coupler jaw provided with a journal surface adapted to coöperate with the bearing surface formed in said member, said coupler jaw being formed with a recess adapted to receive said coupling bar; and means for removably holding said coupling bar in said recess, said means being adapted to be displaced by the impact of said bar to permit the entrance of the latter to said recess and immediately automatically to be retrieved to hold said bar.

7. In a coupler, the combination with leading and trailing vehicles; of a coupling bar, means for supporting the same at one end upon one of said vehicles, a coupling head secured to the other vehicle and provided with means arranged to swivel in said head, said means being formed with a plurality of recesses having outwardly inclined walls and each adapted to receive said coupling bar, the directions of inclination of the walls of different recesses being in transverse planes, and means permitting the entrance by impact of said coupling bar to said recesses and adapted removably to hold the same therein.

8. In a coupler, the combination of supporting means adapted for attachment to a truck; a member forming a coupler jaw socket provided with means for attaching the same to a truck, said socket forming a bearing surface; a coupling bar, said first-mentioned means and said coupling bar being formed with coöperating surfaces enabling the relative pivotal movement thereof; a coupler jaw provided with a journal surface adapted to coöperate with the bearing surface formed in said member so as to permit the relative pivotal movement of said member and jaw in a plane transverse to the plane in which said first-mentioned means and said coupling bar are relatively pivotally connected, said coupler jaw being formed with a recess adapted to receive said coupling bar; and means for removably holding said coupling bar in said recess, said means being adapted to be displaced by the impact of said bar to permit the entrance of the latter to said recess and immediately automatically to be retrieved to hold said bar.

9. In a coupler, the combination of members adapted for attachment to the ends of cars and respectively provided with sockets; a coupling bar secured in the sockets of the members attached to one car so as to swivel in said sockets; means secured in the other socket so as to swivel therein and formed with a plurality of recesses having outwardly inclined walls and each adapted to

receive said coupling bar, the direction of inclination of the walls of different recesses being in transverse planes; and means for removably holding said coupling bar in said recesses.

10. In a coupler, the combination of members adapted for attachment to the ends of cars and respectively provided with sockets; a coupling bar secured in the sockets of the members attached to one car so as to swivel in said sockets; a coupler jaw secured in the other socket so as to swivel therein and formed with two oppositely disposed pairs of downwardly extending outwardly inclined beveled members forming recesses therebetween each adapted to receive said coupling bar, one pair of said members diverging from each other; and means for removably holding said coupling bar in said recesses.

11. In a coupler, the combination of means adapted to be attached to a truck and formed with horizontally-disposed bearing surfaces; a coupling bar formed with journal ends adapted to coöperate with said bearing surfaces; a member adapted to be attached to a truck and formed with a vertically-disposed socket providing a bearing surface; a coupler jaw provided with a portion intermediate its ends of reduced cross-sectional area and forming a journal surface adapted to coöperate with said second-mentioned bearing surface, said coupler jaw being formed with a plurality of recesses having inclined walls and each adapted to receive the other end of said coupling bar, the direction of inclination of the walls of different recesses being in transverse planes; and means for removably holding said coupling bar in said recesses.

12. In a coupler, the combination of means adapted to be attached to a truck and formed with horizontally-disposed bearing surfaces; a coupling bar formed with journal ends adapted to coöperate with said bearing surfaces; a member adapted to be attached to a truck and formed with a vertically-disposed socket providing a bearing surface; a coupler jaw provided with a portion intermediate its ends of reduced cross-sectional area forming a journal surface adapted to coöperate with said second-mentioned bearing surface, said coupler jaw being formed with a plurality of recesses having inclined walls and each adapted to receive the other end of said coupling bar, the direction of inclination of the walls of different recesses being in transverse planes; and a latch pivoted upon said coupler jaw and disposed in said recesses in the path of movement of said coupling bar.

13. In a coupler, the combination, with leading and trailing vehicles; of a coupling bar, means for attaching the same to one of said vehicles, a coupling jaw supported by the other vehicle and provided with a swinging keeper, said bar being formed with means adapted to interlock with said jaw, the movement of said keeper in the direction adapted not to interlock said bar and jaw being caused by the impact of said bar and keeper, the latter being formed with means automatically causing the same to move in the other direction to interlock said bar and jaw, and means permitting relative angular movement of said vehicles.

Signed by me this 23'' day of November, 1917.

HARRY W. WOODWARD.