

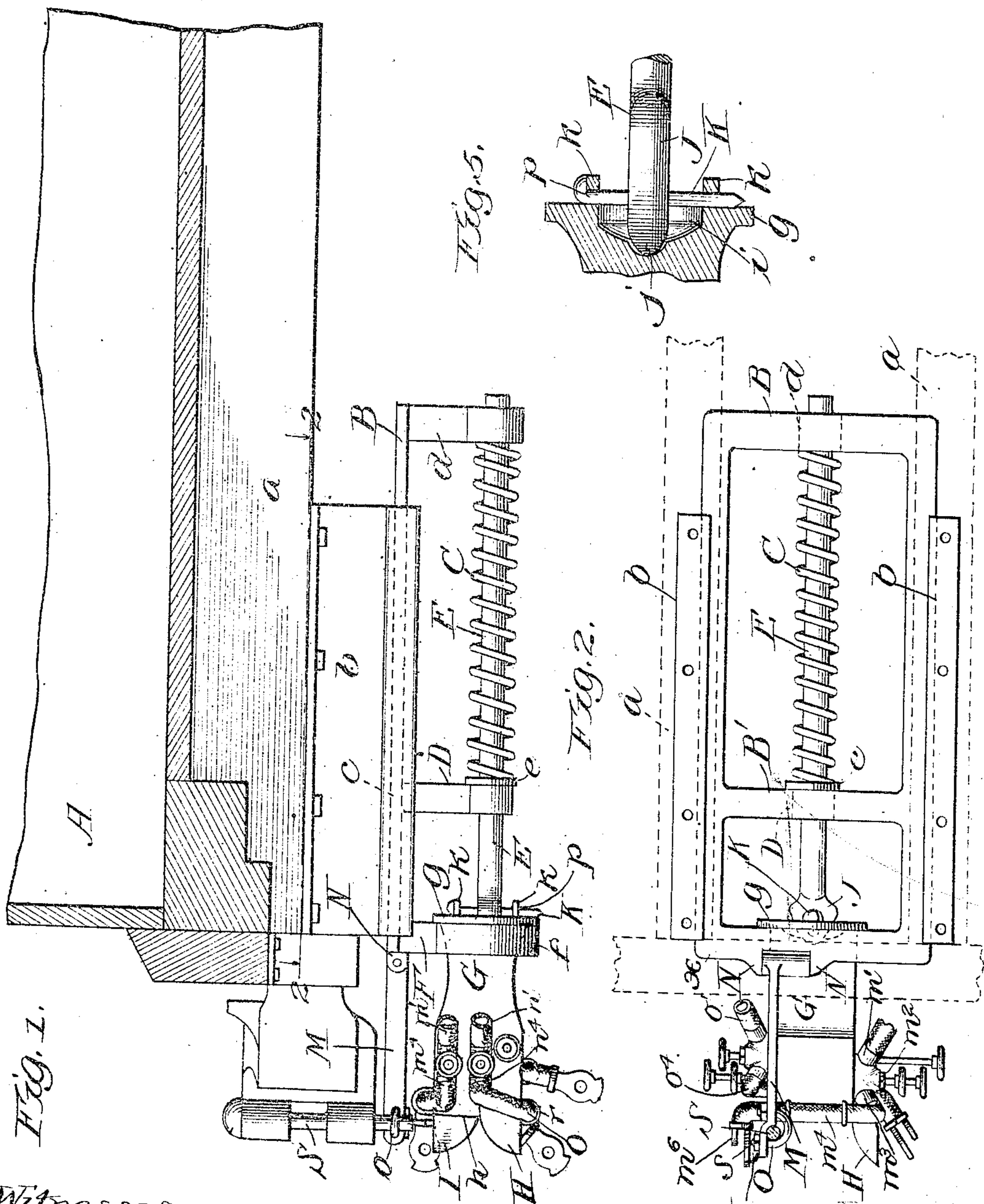
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AUTOMATIC AIR BRAKE COUPLING FOR RAILWAY CARS.

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Witnesses:

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# UNITED STATES PATENT OFFICE.

FRANK H. RUTHERFORD, OF CHICAGO, ILLINOIS.

## AUTOMATIC AIR-BRAKE COUPLING FOR RAILWAY-CARS.

No. 848,701.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed June 13, 1906. Serial No. 321,547.

*To all whom it may concern:*

Be it known that I, FRANK H. RUTHERFORD, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Air-Brake Couplers for Railway-Cars, of which the following is a clear, full, and exact description.

The object of my invention is to provide an automatic coupling for the air-brake, the air-signal, and the steam-heating systems of railway-trains in which the forward portion of the body of the coupling is removably jointed to the rear portion of the structure and is kept by the forward pressure of the latter in a horizontal position and is otherwise so constructed as to provide a simple yet practicable coupling that operatively engages its companion coupling on the next car even though the same is in an offset position, will accommodate itself to the line of draft of the cars when rounding a curve, and will move with the car-coupler during the operation of the same under normal conditions, but can be released therefrom to permit of the repair of the car-coupler or of its own elements or can be wrenched free of the same should the car-coupler be torn from its rigging. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my invention, showing it attached to the broken-away end portion of a car. Fig. 2 is a plan view of the same, taken on dotted line 2 2, Fig. 1. Fig. 3 is a side elevation of two of my improved couplers in engagement. Fig. 4 is an end view of one of said couplers attached to the broken end portion of a car. Fig. 5 is a detail view of the jointed connection between the forward and rear portions of the coupler. Fig. 6 is a detail view of the means for connecting the carriage of the coupling and the car-coupler. Fig. 7 is a horizontal section of a portion of the coupler-head, taken on dotted line 7 7, Fig. 4, and drawn to a larger scale. Fig. 8 is a side elevation similar to Fig. 1, showing a modified form of my invention. Fig. 9 is a plan view of said modified form. Fig. 10 is a perspective view of a portion of said modification.

Referring to the drawings, A represents the end-portion of a car to which my im-

provements are applied. This car is provided with the usual center-sills *a a*, between which the draw-bar of the car-coupler and cooperating draft-rigging (preferably of the Janney type) are operatively secured.

Secured to and depending down from the center sills *a a* are longitudinally-disposed parallel guide-frames *b* for the reciprocal carrier-frame B of my invention, which latter will be hereinafter more fully described. These guide-frames have vertical webs, the upper edges of which are provided with outwardly-projecting flanges through which the bolts pass that secure the guide-frames to the center sills. The lower portion of the guide-frames are pressed or otherwise formed into such shape as to provide their inner surfaces with longitudinal grooves or guideways *c*, in which the longitudinal edges of said carrier-frame B can move longitudinally. This carrier-frame preferably consists of an open rectangular structure, which mediate its ends is provided with a suitable cross-bar B'. The cross-bar forming the rear end of the carrier-frame and the cross-bar B' thereof are each provided with hangers D and *d* at about their centers of length, and these hangers are each provided with guide-bearings in their lower end, in which the longitudinally-disposed buffer-bar E has longitudinal movement. This buffer-bar is normally kept at the limit of its forward movement by means of a coil-spring C, which surrounds bar E and has its rear end engaging the hanger *d* and its forward end engaging a collar *e*, securely fastened to bar E.

The transverse bar *x*, constituting the forward end of the carrier-frame, is provided with a drop-frame F, the lower portion of which is formed into an annulus *f*, the opening in which is preferably circular and is of such diameter as to permit of the passage therethrough in a forwardly direction of the body G of the coupler until the circumferential flange *g* of the rear end thereof bears against the rear margins of the said opening.

The forward portion of the coupler G is preferably rectangular in cross-section and has the engaging face *h* thereof perfectly free and in a vertically transverse plane, which latter when the coupler is in its normal position will be at right angles to the line of draft of the car. This forward rectangular portion of the coupling is provided on one side



thereof above the center of height of its face with a forwardly-projecting lug I, the side of which nearest said face is beveled outwardly and the under side of which is beveled upwardly, so that its forward extremity will be reduced at a point, and said head is provided on the opposite side below the center of height of the face of the coupler with a forwardly-projecting lug H, the side of which nearest said face is beveled outwardly and the upper side of which is beveled downwardly, so that the forward extremity of said lug will be pointed. These lugs, when two of my improved couplers oppose and engage each other, will direct the engaging faces of the couplers together, so that the openings in said faces will communicate, as will hereinafter be fully explained. The rear portion of the coupler is reduced in cross-section in front of flange *g*, substantially as shown in the drawings, so as to permit of the movement of said body in any direction to a limited extent without binding.

The body of the coupler is kept in a horizontal position, as shown in Fig. 1 of the drawings, by the engagement with the rear end thereof of the buffer-bar E. To facilitate this engagement, the rear end of the coupler is dished or provided with a concavity *i*, which at its center is provided with a socket *j*, into which the forward end of said buffer-bar is normally seated. This forward end of the buffer-bar is provided with a head J, preferably corresponding in shape to that of an arrow-head and provided with a vertical opening therethrough, the sides of which are preferably parallel with the outer edges of said head.

Above and below the buffer-bar lugs *k k* project rearwardly from the coupler near the edges of the concavity *i*, and these lugs are provided with vertical openings therethrough down through which a pin K is passed, which latter extends through the opening *p* in the head of the buffer-bar and prevents the accidental disengagement of the buffer-bar from the coupler. This engagement of the buffer-bar with the rear end of the coupler prevents its of the coupler moving at an angle to the line of draft in any direction and during the engagement of two opposing couplers keeps said couplers firmly pressing together.

It is desired to have my improved automatic coupler connected with the car-coupler, although this is not absolutely necessary. In order to accomplish this connection, I provide an arm M, the rear end of which is pivotally connected to lugs N, projecting from the transverse bar forming the front end of the carrier-frame, and has its forward end provided with a U-shaped clip O, which is passed around the lower end of the pivotal pin S, connecting the jaw of the car-coupler to the head thereof. This pin S extends down below the draw-bar and is clipped to

the forward end of the arm M by the clip O, whose ends extend through suitable perforations in said arm and are secured by nuts thereon, substantially as shown. The head of the coupler is preferably rectangular in cross-section and is provided with three longitudinally-disposed passages therein, *m*, *n*, and *o*. The upper passage *m* extends back from the engaging face of the coupler a suitable distance and is deflected obliquely to and communicates with the bore of a short stub *m'*, extending obliquely from the left-hand side of the head. This stub has made integral therewith, at a point where it leaves the side of said head, a cylindrical casing for a two-way valve *m<sup>2</sup>*, the transverse orifice through which connects the bore of the stub *m'* and the passage *m* when in one position and when turned at right angles thereto cuts out said passage *m* and connects the stub *m'* with the bore of a stub *m<sup>3</sup>*, projecting transversely therefrom, to which the end of a flexible emergency hose *m<sup>4</sup>* is suitably secured. A suitable coupling *m<sup>5</sup>* is secured to the end of the emergency hose *m<sup>4</sup>*. The spindle *m<sup>5</sup>* of the valve *m<sup>2</sup>* extends transversely through the head and has its extended ends provided with suitable knobs or hand-wheels for turning it.

The middle passage *n* extends from the engaging face of the coupling back to and communicates with the bore of a stub *n'*, projecting obliquely to the rear from the left-hand side of the coupler-head, and at the point where said stub *n'* leaves said head it has made integral therewith a transversely-extended cylindrical casing *n<sup>2</sup>* for a two-way valve, a spindle *n<sup>3</sup>* of which extends transversely through the coupler-head and has its ends extended on both sides thereof and provided with hand-wheels for turning the same. Projecting transversely from said casing is a short stub *n<sup>4</sup>*, the bore of which, when the two-way valve is turned to close passage *n*, communicates with the bore of stub *n'* and connects the emergency hose and coupling *N'* and said last-mentioned stub. The lower passage *o* extends to the rear from the engaging face of the coupler in the opposite direction to the uppermost passage, and it also communicates with the bore of a stub *o'*, projecting obliquely to the rear from the vertical side of the coupler in a plane below stub *m'*. At the point where this stub *o'* leaves the head it is provided with an integral transverse casing *o<sup>2</sup>* for a two-way valve, the transverse spindle *o<sup>3</sup>* of which extends through the head and has its extended ends provided with hand-wheels for its manipulation. The casing for the spindle of the two-way valve used in connection with the lower passage is provided with a stub *o<sup>4</sup>*, projecting downwardly therefrom, to which the flexible emergency hose O is attached. The emergency coupling for both the middle and lower



passage preferably extends downward under the coupler and are preferably held against the under side, whereas the emergency coupler of the upper passage is held against the upper side of the head by suitable clips *r r*.

The object of so constructing the passages is to dispose of the two-way valves for establishing communication between the emergency couplers and the line-pipes of the systems with which the oblique rearwardly-extending stubs connect, so that they will not interfere with each other and can be easily manipulated by the operator without difficulty.

The passages *m n o* constitute the means for establishing, through the head of the coupler, communication between the line-pipe of the system of one car and the line-pipes of the system of another car, and when the couplers for any reason become impaired or inoperative or when a car with another style of coupler is engaged communication can then be established between the line-pipes of the systems of the two engaging cars through the emergency couplers simply by turning the two-way valves in such position as to close said passages and open the bores of the emergency hose and the oblique rearwardly-extending stubs.

The mouths of the passages *m, n, and o* are arched and elongated transversely in a curve corresponding in curvature to the arc of a suitable circle. The object in thus arching the mouths of these passages is to permit of the insertion thereon of suitable gaskets *g*, which are seated in rabbeted edges in said mouths and by being arched to conform and correspond to the shape of said mouths will not collapse, as otherwise they might be liable to do.

In Figs. 8, 9, and 10 of the drawings I show a modified form of my invention, which consists in making the body of the coupler, extending to the rear of the head 2, of two parallel longitudinal members 3 3, the webs of which are vertical and extend back from head 2, so that the length of the entire coupler (head and body) exceeds that shown in the first seven figures of the drawings slightly. These members 3 3 extend back through a drop-frame 4, which depends from a cross-frame 5 of carrier B, located between the front end of the carrier and the hanger B' thereof, and the rear ends of said members are connected by a circular plate 6 of greater diameter than the opening 7 in said drop-frame 4, and its marginal portions serve the same purpose as the flanges *g* of the coupler G. The parallel members 3 3 of the coupler are separated a slight distance, and the opening 7 has a vertical post 8 connecting its upper and lower margins mediate its vertical side margins, which passes up between members 3 3 and assists in pivoting the coupler.

The rear face of plate 6 is constructed simi-

lar to the rear end of coupler G, and it is engaged by and connected to plunger E in the same manner thereas.

What I claim as new is—

1. An automatic coupler for air-brakes comprising a longitudinally-movable coupler-head having a limited swiveled movement oblique to the line of draft, and a longitudinally-reciprocal plunger normally pressing forward against the rear end of the said coupler-head.

2. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler movable longitudinally independently of the car-coupler in which the forward movement of said coupler-head is limited, and a longitudinally-reciprocal plunger normally engaging and pressing forward against the rear end of said coupler-head.

3. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler in which the forward movement of said coupler-head is limited, and a longitudinally-reciprocal plunger normally engaging and pressing forward against the rear end of said coupler-head at a point back of said supporting-frame.

4. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head which is capable of a limited movement oblique to the line of draft and having a transverse flange on its rear end, a hanging supporting-frame having an opening therein through which said head is inserted until the flanged end thereof engages said supporting-frame, and a longitudinally-reciprocal plunger normally pressing forward against the rear end of said coupler-head.

5. An automatic coupler for air-brakes comprising a longitudinally-movable coupler-head having a limited swiveled movement oblique to the line of draft, and a longitudinally-reciprocal plunger having its forward end removably connected to and normally pressing forward against the rear end of the said coupler-head.

6. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler in which the forward movement of said coupler-head is limited, and a longitudinally-reciprocal plunger having its forward end removably connected to and normally engaging and pressing forward against the rear end of said coupler-head.

7. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame



for said coupler in which the forward movement of said coupler-head is limited, and a longitudinally-reciprocal plunger having its forward end removably connected to and normally engaging and pressing forward against the rear end of said coupler-head at a point back of said supporting-frame.

8. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head which is capable of a limited movement oblique to the line of draft and having a transverse flange on its rear end, a hanging supporting-frame having an opening therein through which said head is inserted until the flanged end thereof engages said supporting-frame, and a longitudinally-reciprocal plunger having its forward end removably connected to and normally pressing forward against the rear end of said coupler-head.

9. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited swiveled movement oblique to its line of draft, a longitudinally-reciprocal plunger engaging the rear end of said coupler-head and a spring normally pressing said plunger forward against said coupler.

10. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler movable longitudinally independently of the car-coupler in which the forward movement of said coupler-head is limited, a longitudinally-reciprocal plunger normally engaging and pressing forward against the rear end of said coupler-head, and a spring normally thrusting said plunger forward.

11. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler in which the forward movement of said coupler-head is limited, a longitudinally-reciprocal plunger normally engaging and pressing forward against the rear end of said coupler-head at a point back of said supporting-frame, and a spring normally thrusting said plunger forward.

12. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head which is capable of a limited movement oblique to the line of draft and having a transverse flange on its rear end, a hanging supporting-frame having an opening therein through which said head is inserted until the flanged end thereof engages said supporting-frame, a longitudinally-reciprocal plunger normally pressing forward against the rear end of said coupler-head and a spring normally thrusting said plunger forward.

13. An automatic coupler for air-brakes comprising a longitudinally-movable coupler-head having a limited swiveled move-

ment oblique to the line of draft, a longitudinally-reciprocal plunger having its forward end removably connected to and normally pressing forward against the rear end of the said coupler-head, and a spring normally thrusting said plunger forward.

14. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler in which the forward movement of said coupler-head is limited, a longitudinally-reciprocal plunger having its forward end removably connected to and normally engaging and pressing forward against the rear end of said coupler-head and a spring normally thrusting said plunger forward.

15. An automatic coupler for air-brakes comprising a longitudinally-movable coupler-head having a limited movement oblique to the line of draft, a longitudinally-reciprocal plunger normally pressing forward against the rear end of the said coupler-head and a longitudinally-reciprocal carrier tied to the car-coupler by which said coupler-body and plunger are sustained.

16. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler in which the forward movement of said coupler-head is limited, a longitudinally-reciprocal plunger normally engaging and pressing forward against the rear end of said coupler-head and a longitudinally-reciprocal carrier removably tied to the car-coupler of the car which sustains said coupler-body, hanging supporting-frame and plunger.

17. An automatic coupler for air-brakes comprising a longitudinally-movable coupler-head having a limited movement oblique to the line of draft, a longitudinally-reciprocal plunger having its forward end removably connected to and normally pressing forward against the rear end of the said coupler-head, and a longitudinally-reciprocal carrier suitably tied to the car-coupler by which said coupler-body and plunger are sustained.

18. An automatic coupler for air-brakes comprising a longitudinally-yielding coupler-head having a limited movement oblique to the line of draft, a hanging supporting-frame for said coupler in which the forward movement of said coupler-head is limited, a longitudinally-reciprocal plunger normally engaging and pressing forward against the rear end of said coupler-head, a spring normally thrusting said plunger forward and a longitudinally-reciprocal carrier suitably tied to the car-coupler by which said coupler-body and plunger are sustained.

19. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rear-



wardly from the engaging face thereof and having a laterally-elongated arched mouth.

20. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly from the engaging face thereof and having a laterally-elongated arched mouth and a gasket inserted in and conforming to the shape of said mouth.

21. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly from the engaging face thereof and having a laterally-elongated curved mouth both the upper and lower edges of which conform to the arc of a circle.

22. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly from the engaging face thereof and having a laterally-elongated curved mouth both the upper and lower edges of which conform to the arc of a circle and a gasket seated in and conforming in shape to the edges of said mouth.

23. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly from the engaging face thereof and having a laterally-elongated curved mouth both the upper and lower rabbeted edges of which conform to the arc of a circle and a gasket seated in and conforming in shape to the rabbeted edges of said mouth.

24. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly and obliquely from the engaging face thereof, a stub projecting from the longitudinal side of said coupler with the bore of which said passage connects, and the bore of an emergency-passage communicating with said stub at an angle to the axis of said passage and a valve at the point of intersection of said emergency-passage.

25. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly and obliquely from the engaging face to the longitudinal side of the same, an emergency-passage tapping said first-mentioned passage at a suitable angle, and a suitable two-way valve at the point of intersection of said passages.

26. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly and obliquely from the engaging face to the longitudinal side of the same, an emergency-passage tapping said first-mentioned passage at a suitable angle, and a suitable two-way valve at the point of intersection of said passages whose axis is transverse to said coupler-head.

27. An automatic coupler for air-brakes comprising a coupler-head having a longitudinally-disposed passage extending rearwardly and obliquely from the engaging face to the longitudinal side of the same, an emergency-passage tapping said first-mentioned passage at a suitable angle, a suitable two-way valve at the point of intersection of said passages whose axis is transverse to said coupler-head and a spindle therefor extending transversely through said body and having means on its extremity for turning it.

28. An automatic coupler for air-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages extending rearwardly from the engaging face thereof and having laterally-elongated arched mouths.

29. An automatic coupler for air-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages extending rearwardly from the engaging face thereof and having laterally-elongated arched mouths and a gasket inserted in and conforming to the shape of each mouth.

30. An automatic coupler for air-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages extending rearwardly from the engaging face thereof and having laterally-elongated curved mouths both the upper and lower edges of which conform to the arc of a circle.

31. An automatic coupler for air-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages, the mouths of which in the engaging face of the coupler are arranged one above the other, and are elongated laterally and conform in curvature to the arc of a circle.

32. An automatic coupler for car-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages arranged one above the other and extending rearwardly and obliquely from the engaging face of the coupler, some of which passages are deflected to one side and some to the other.

33. An automatic coupler for car-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages arranged one above the other and extending rearwardly and obliquely from the engaging face of the coupler, some of which passages are deflected to one side and some to the other, emergency-passages extending at an angle into said first-mentioned passages, and transverse valves intersecting the point of intersection of said passages.

34. An automatic coupler for car-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages arranged one above the other and extending rearwardly and obliquely from the engaging face of the coupler, some of which passages are deflected to one side and some to the other,



emergency-passages extending at an angle into said first-mentioned passages and transverse valves intersecting the points of intersection of said passages and spindles extending transversely through said coupler-head beyond the sides thereof and means for turning said spindles.

35. An automatic coupler for car-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages of unequal length arranged one above the other and extending rearwardly and obliquely from the engaging face of the coupler, some of which passages are deflected to one side and some to the other.

36. An automatic coupler for car-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages of unequal length arranged one above the other and extending rearwardly and obliquely from the engaging face of the coupler, some of which passages are deflected to one side and some to the other, emergency-passages extending at an angle into said first-mentioned

passages and transverse valves intersecting the point of intersection of said passages.

37. An automatic coupler for car-brakes comprising a coupler-head having a plurality of longitudinally-disposed passages of unequal length arranged one above the other and extending rearwardly and obliquely from the engaging face of the coupler, some of which passages are deflected to one side and some to the other, emergency-passages extending at an angle into said first-mentioned passages and transverse valves intersecting the points of intersection of said passages and spindles extending transversely through said coupler-head and beyond the sides thereof and means for turning said spindles.

In testimony whereof I have hereunto set my hand and seal this 8th day of June, A. D. 1906.

FRANK H. RUTHERFORD. [L. s.]

Witnesses:

FRANK D. THOMASON,  
E. K. LUNDY.