

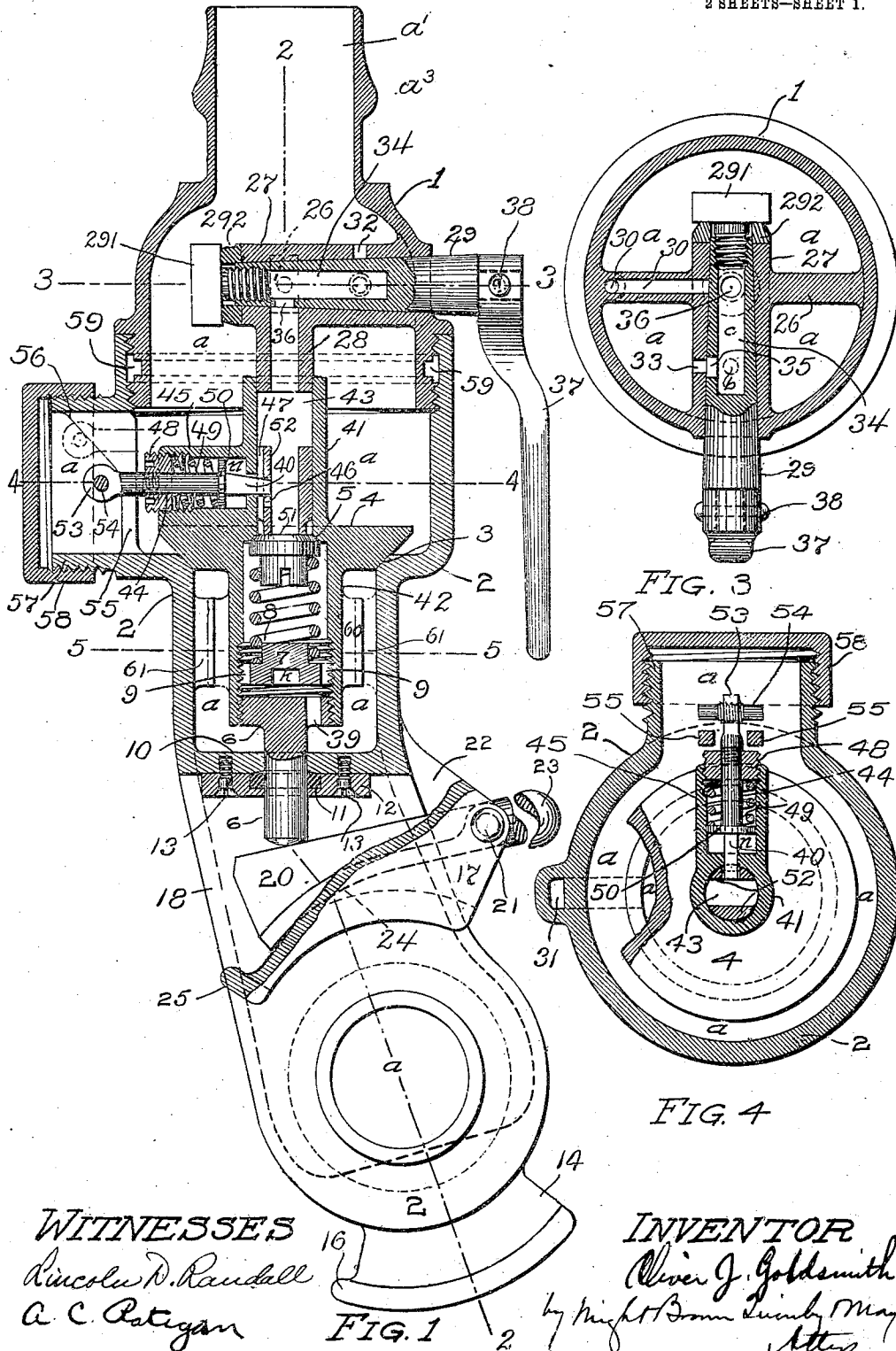
No. 855,242.

PATENTED MAY 28, 1907.

O. J. GOLDSMITH.
COUPLING FOR AIR BRAKE HOSE.

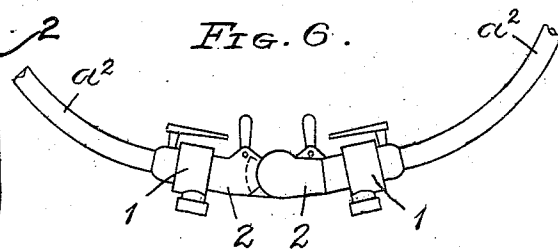
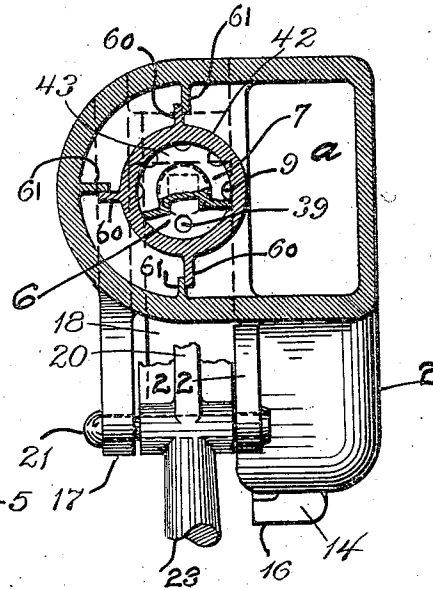
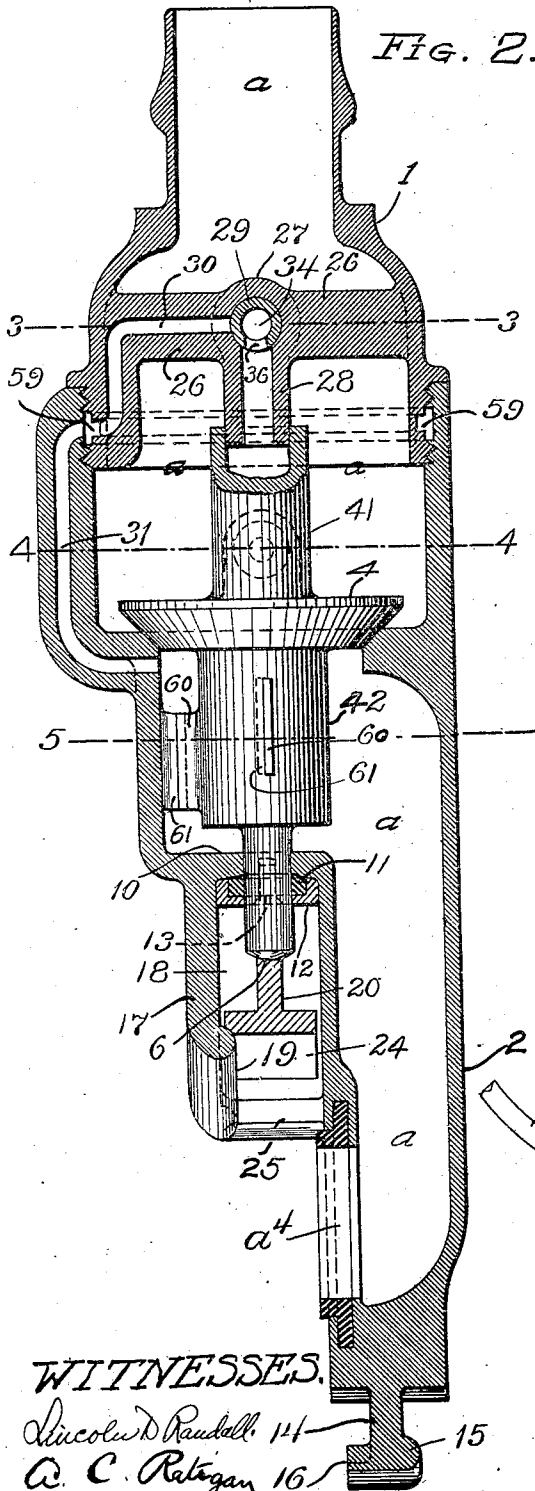
APPLICATION FILED MAY 28, 1906.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.



WITNESSES.

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UNITED STATES PATENT OFFICE.

OLIVER J. GOLDSMITH, OF PORTSMOUTH, NEW HAMPSHIRE.

COUPLING FOR AIR-BRAKE HOSE.

No. 855,242

Specification of Letters Patent.

Patented May 28, 1907.

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To all whom it may concern:

Be it known that I, OLIVER J. GOLDSMITH, of Portsmouth, in the county of Rockingham and State of New Hampshire, have invented certain new and useful Improvements in Couplings for Air-Brake Hose, of which the following is a specification.

The present invention relates to couplings adapted to be applied to the flexible air-conducting hose of cars and engines equipped with automatic air-brake systems.

The object to be accomplished by the invention is the three-fold one of causing the brakes to be automatically set upon the loose section of a train in case the train should break apart, to cause a gradual instead of sudden setting of the brakes in such a case, so as to avoid discomfort and possible injury to the passengers, as well as injury to the rolling stock by an abrupt stoppage, and to save a large proportion of the air contained under pressure in the tanks of the cars.

Automatic air-brake mechanisms have been constructed so that in case a train should break apart, the brakes on one or both of the sections would be set to bring them to a standstill. A form of mechanism has also been devised to apply the brakes on the rear section without setting them upon the forward section to which the engine is connected, this being done to avoid danger of a collision in case the separated rear section is heavier than the forward section. In this event, the forward section having less momentum would stop sooner than the rear section, and the latter coming up would crash into the rear of the standing front section and cause an accident. This mechanism, however, is designed without any provision for causing a gradual application of the brakes, but on the contrary, it is so arranged that the brakes will be set with the full power immediately upon disconnection of the train hose when the train breaks a part. As a high pressure of air is carried, it will be understood that the sudden application of the full pressure to the brake mechanism causes an extremely abrupt stop, which in cases where the momentum is considerable, is accompanied by danger.

By my present invention I have produced a device by which the objection above noted and others in the former types of air-brake mechanism are avoided.

The principles of the invention and the details of a practical device in which it may be

embodied are hereinafter described and claimed, and are illustrated in the accompanying drawings, in which,—

Figure 1 represents a longitudinal section of the device. Fig. 2 represents a section on line 2—2 of Fig. 1. Figs. 3, 4 and 5 represent cross-sections taken respectively on lines 3—3, 4—4 and 5—5 of Figs. 1 and 2. Fig. 6 is a fragmentary view representing the manner in which the invention is applied on a train.

The same reference characters indicate the same parts in all the figures.

The coupling comprises a main body consisting of two parts 1 and 2 screwed together to make a casing through which extends a passage *a*. The portion 1 of the coupling has a tubular stem *a'* adapted to be inserted in the end of an air hose *a²* and having an external rib *a³* for retaining it in the hose. At the other end of the coupling is formed in one side a lateral orifice *a⁴* which is adapted to register with the corresponding orifice of a similar coupling to form a continuous passage through the two couplings in the usual manner.

On the inside of the member 2 surrounding the passage *a* is an annular valve-seat 3 with which a valve 4 is adapted to co-operate. The valve is movable longitudinally of the coupling, and when moved away from the end having the opening *a⁴*, is separated from its seat and leaves the passage *a* unobstructed. When moved in the other direction, it closes the passage. Thus the valve is adapted to close when the coupling of one car is disconnected from the next, and there is an unbalanced air pressure on the side of the valve adjacent the hose.

The valve 4 is provided with tubular stems 41 and 42 extending from opposite sides, and is perforated between the stems, having an internal passage or opening 43 extending through it. Surrounding a portion of this passage is a valve seat 5 with which co-operates a valve 51 having guides 52 fitting the interior of the valve-stem 41. A spring 8 bears against the valve 51 and tends to hold it seated, and is itself held up against the valve by an abutment 7 screwed into the valve stem 42 which is internally threaded for that purpose. The abutment 7 is provided with a number of openings 9 so that it will not close up wholly the passage-way through valve 4. The valves 4 and 51 open in opposite directions so that if an unbal-

anced pressure of air is allowed to act upon both valves from the same direction, it will close valve 4 and attempt to open valve 51, and therefore escape through the passage 43, this attempt, however, being resisted by spring 8.

Screwed into the end of the tubular valve stem 42 is a plug having a stem 6, which latter projects through a wall 10 of the coupling. Leakage of air around the stem 6 is prevented by means of a soft packing 11 which surrounds the stem and is held in place by a plate 12 secured to the partition 10 by screws 13.

Projecting from the extreme end of the coupling body is a flange 14 which has on one side a rib 15 and on the other a rib having a bearing surface 16. Projecting from the partition 10 is a plate 17 separated from the body of the casing by a space 18. On the end of the plate 17 is a rib 19 which is located at the same distance from the center of the opening a^4 as is the rib 15, but on the opposite side thereof. These ribs are concentric with the opening and are substantially the same as similar parts formed on air-brake hose couplings now used. They are provided to hold two couplings together with their openings a^4 adjacent each other. The valve stem 6 projects into the space 18 and in said space also is an arm 20 which is pivoted to a bolt 21 mounted in the plate 17 and in a flange 22 formed upon the body of the coupling. This arm has connected to it a handle 23 by which it may be manually operated, and is formed on its side farthest removed from the stem 6 with a curved cam surface 24 which extends far enough to be engaged by the outer circumference of flange 14 of the opposite or conjugate part of the coupling when the parts are coupled together, and when so engaged, to bear upon the end of stem 6.

The couplings are attached together with a rotary movement and are so arranged that the ribs 15 and 19 have enough engagement to hold them together before the flange 14 engages the arm 20. Continued rotation, however, to bring the end of the flange against a toe 25, which is the final position when the couplings are connected, causes the flange to bear against the cam surface of the arm 20 and swing the latter so it bears against valve stem 6. This causes the valve stem to be forced inward and the valve 4 to be lifted from its seat, so that free course of the air is permitted.

Within the part 1 of the coupling casing there is formed a bridge 26 which supports two tubular members 27 and 28. The former of these tubular members extends to the outer wall of the casing and forms a valve chamber within which is set a tapered plug valve 29, and the second tubular member projects downward and enters telescopically the stem 41 of valve 4. One arm of the

bridge 26 is cored out to form a passage 30 which extends along the side of the member 1 and opens into a passage 31 in the wall of the member 2. The wall of the valve chamber 27 has two orifices or ports 32 33 through which air can enter from the passage a ; and through which it may flow either into the passage 30 or the internal passage of the tube 28. The valve 29 has a longitudinal passage 34 and two ports 35 and 36. The former of these is in the same plane as the ports 32 and 33, while the latter is in the plane of the passage 30 and axis of tube 28. When the valve, which has an operating handle 37 secured to it by a set-screw 38, is turned longitudinally of the coupling, as shown in the drawings, ports 33 and 35 are in register, while port 36 opens into tube 28. Thereby air is enabled to flow from the passage a into passage 43 and press against the reducing valve 51. Upon turning the handle to the left into a position crosswise of the coupling, the port 35 comes into register with 32 and port 36 uncovers passage 30. Thereby air is enabled to flow through passages 30 and 31.

It will be seen that the passages 30 and 31 constitute a by-pass through which air may be allowed to flow past the valve 4 when the latter is closed from the high-pressure side to the low-pressure side of the valve. When the train hose is uncoupled the full service pressure of air is on the valve 4, holding it shut, and would have to be overcome by the brakeman in coupling the hose together if the by-pass and auxiliary valve 29 were not provided. By means of this valve and by-pass, however, the brakeman is enabled as soon as the couplings have been partly connected to equalize the pressure on both sides of valve 4, so that the resistance to connecting the couplings made by the valve 4, stem 6 and arm 20 is overcome. In connecting the couplings together, the brakeman lays them against each other and turns them until the ribs 15 and 19 engage, and further turning is stopped by the resistance of arm 20. He then turns the handle 37 from the position shown into the crosswise position, and completes the rotary motion by which the couplings are secured, this also opening valve 4. He then returns the handle 37 to longitudinal position. The passage a is now open for free course of air through the air-brake system, and also there is an air pressure on both sides of valve 51 through passages 33, 35, 34 36 and 43 on the one side, and ports 9 and 39 on the other.

In order to hold valve 51 closed when the coupling is disconnected, I may make use of a lock which is shown as a pin 40 on a bolt 44 sliding into a chamber 45 formed on the valve 4, the end of the bolt projecting through an opening in the side of valve stem 41. One of the guides 52 of valve 51 has an opening 46

into which the bolt is adapted to project when the valve is seated, and thereby to hold it closed. On the outside of the same guide 52 is a groove 47 which receives the end of the bolt when the latter is retracted, whereby the valve is prevented from rotating. In the end of the chamber 45 is screwed a nut 48 which fits the bolt 44 and forms an abutment for a spring 49, the other end of which bears against a head or flange 50 on the bolt. This flange fits closely in the chamber so as to displace the air when moved, and so retard the projecting of the bolt.

The outer end of the bolt 53 has screwed into it a pin 54, the ends of which project across two bars 55 which have cam surfaces 56. When the valve 4 is opened, it causes the pin ends 54 to engage against the inclined surfaces 56 and to retract the bolt 40, leaving valve 51 held against its seat only by spring 8. The casing 2 has a lateral opening through which the parts last described may be inserted, this opening being surrounded by a threaded boss 57 which is tightly closed by a cap 58 screwed upon it.

It will be noted that the members 1 and 2 of the coupling casing are screwed together, and in order that the passages 30 and 31 may not be closed, in case they are not alined when the shoulders of the casing members bring up against each other, I form these members with annular recesses which together form a groove 59 into which both the passages 30 and 31 open.

Rotation of valve 4 is prevented by wings or blades 60 formed upon its tubular stem 42 which interfere with blades 61 on the inside of the coupling casing when rotation of the valve is attempted.

The manner in which my device acts when a train breaks apart is as follows: As the interlocking parts of each pair of couplings are so made as to separate without breaking or tearing the hose, the disconnection of the air-brake system occurs between the couplings. Thus the only escape for the air contained in the car reservoirs is through the passage *a* and external orifice *a'*. Immediately the disconnection occurs, there is an unbalanced pressure on the inward side of valve 4 which causes it to shut instantly so as to prevent rapid outflow of air. As, however, the bolt 40 was retracted previously and the auxiliary valve 29 was placed so as to admit air to the passage 43, the valve 51 is acted upon by the air at full pressure, which is opposed only by the spring 8. Bolt 40 is prevented from locking immediately by the air in chamber 45 which must be displaced by the flange 50. This causes a very slow projecting of the bolt and allows the reducing valve 51 to open in case the air pressure is greater than that of spring 8. The ordinary service pressure carried in railroad trains is about seventy pounds, and the spring 8 will have a resist-

ance of about fifty pounds, or some other amount which is considerably less than that of the air, so that the reducing valve will instantly open when escape of air between valve 4 and seat 3 is prevented. It will be seen that the closing of valve 4 shuts off the greater volume of air but allows a gradual escape through the small passages described of air at an effective pressure of about twenty pounds. The effective pressure and rapidity of flow may be adjusted so as to cause the brakes of the rear section to be applied gradually in the same way as under ordinary running conditions, and thereby sudden shocks and jars are avoided. At the same time the entire loss of air carried by the cars is prevented, since the reducing valve will close and be locked as soon as the air pressure has diminished to equal that of spring 8, and thus the amount of time and work necessary to supply the unnecessarily lost air which would be occasioned if it were all allowed to escape, is avoided. By this construction and manner of operation, I overcome the objections inherent in automatic brake-setting mechanisms now known.

Furthermore, all danger of a heavier rear section of train overtaking and crashing into the lighter forward section is avoided, for the reason that the escape of air through the reducing valve and passages is so gradual as not to exceed the delivery of the air compressor on the engine, and thereby in spite of the leakage, the pressure in the system may be maintained sufficiently high to prevent setting of the brakes until after the forward section has run beyond any possible danger of being overtaken by the rear section. This construction and arrangement allows the air pressure to be restored to the full amount without requiring a train hand to get off the train and either couple up the end of a hanging hose to the support, or shut off the valve. By allowing the air to escape gradually until the pressure has diminished by about twenty pounds, that is, until it is no greater than that of spring 8, the valve 51 can be permitted to close, and when once closed, the bolt 40 will slip through the slot 46^a, being pressed by the spring 49, and will lock the valve 51 shut. Thereafter the pressure may be raised to its normal amount and the valve will be held closed by its lock, thereby avoiding the necessity of having a brakeman get off the train to close the outlet from the hose or coupling. By proper manipulation, this may be caused to take place while the train is in motion, and without causing the brakes to be set, whereas, with the previous forms of coupling no such result is possible.

I claim:—

1. An air-brake hose coupling for trains, comprising a main body having an air passage, automatic means for first partially

closing the passage upon disconnection of the coupling, to retard escape of air from the brake system, and subsequently wholly closing the passage after escape of sufficient air to cause setting of the brakes, and automatic securing means therefor, whereby the pressure in the system may be subsequently raised without loss of air.

2. An air-brake hose coupling for trains, comprising a main body having an air passage, a valve for checking, without wholly preventing, escape of the air in the hose when the pressure therein is greater than that at the outlet of the passage, means for stopping further escape of air when the pressure thereof has been reduced, and automatic means for preventing displacement of said means when the escape is stopped, whereby the pressure may be again raised without loss of air.

3. An air-pipe coupling, comprising a body having a passage, a valve actuatable to partially close such passage by pressure of the air in the pipe, a reducing valve operable by the same air pressure to permit a limited outflow of the air, opposing means for closing said reducing valve to stop entirely the flow of air, and means automatically operative when said reducing valve is closed to prevent opening thereof.

4. An air-pipe coupling, comprising a body having a passage, a main valve adapted to obstruct said passage, an escape vent, a reducing valve for covering said escape vent, and a lock for securing said reducing valve when closed.

5. A coupling for air-brake hose including a main valve adapted to close when the coupling is disconnected, a reducing valve arranged to permit a retarded escape of air when the main valve is closed and to prevent further escape when the pressure is reduced to a predetermined degree, and a lock automatically operative to secure the reducing valve in escape-preventing position.

6. An air-pipe coupling comprising a body having a locking member for engagement with a complemental coupling, and a main air-passage; an arm pivoted adjacent the locking member, having rotary motion only; and a valve adapted to close said main passage when the coupling is disconnected and provided with a stem projecting into position to be acted on and retracted by said arm when the latter is turned through pressure of the locking member of the complemental coupling when two couplings are interlocked.

7. An air-pipe coupling comprising a body having a locking member for engagement with a complemental coupling, and a main air-passage; a main valve adapted to close said main passage when the coupling is disconnected, the coupling having an escape passage to permit outflow of air; and a re-

ducing valve opening oppositely to the main valve, automatically operative to close the escape passage when the pressure has been reduced, and the main valve being provided with a stem projecting into position to be acted on and retracted by the locking member of the complemental coupling when two couplings are interlocked.

8. An air-pipe coupling, comprising a body having a main air passage, and a by-pass opening into the main body at separated points, a main valve arranged to seat intermediate the by-pass openings and to be unseated by the connection of two complemental couplings, and an auxiliary valve controlling one of the by-pass openings for permitting and preventing flow of air between the portions of the passage separated by the valve, whereby the pressure may be equalized on both sides of the valve to permit connection of the couplings.

9. An air-pipe coupling, comprising a body having a main air passage, a main valve arranged to set and obstruct said passage and having a projection arranged for actuation by a complemental coupling upon connection thereof to unseat the valve, the coupling body having also a by-pass opening into the main passage, and an auxiliary valve governing the by-pass adapted to permit flow of air from the high-pressure to the low-pressure side of the valve to balance the latter, whereby the valve may be readily opened by the connection of the complemental couplings.

10. The combination with the pipes of an air-brake system, of a pair of couplings having passages with registering external openings, locking projections on the couplings for connecting them together, a valve in each passage arranged to be closed and held by pressure of air therein tending to flow out of the opening, and having a stem operated by the locking projection of the other coupling to open the valve, and an auxiliary valve in each coupling for equalizing the pressure in the passage on opposite sides of the first-named valves.

11. The combination with the pipes of an air-brake system, of a pair of couplings having passages with registering external openings, and each having a locking projection and a recess for receiving the locking projection of the other coupling, a valve in each coupling having a stem projecting into the recess and arranged to close the passage under an excess of pressure, movable longitudinally of the coupling and increasing the amount of projection of its stem in closing, and an arm pivoted to each coupling in the recess thereof arranged to bear on the valve stem and having a cam surface engaged by the projection of the other coupling when the same are connected, for causing the arm to swing upon its pivot to open the valve.

12. A coupling comprising a body having a longitudinal passage, a main valve arranged to shut off the passage and prevent flow of fluid therethrough, being held closed by excess pressure on one side thereof, and having an opening, a reducing valve over said opening arranged to open and close oppositely to the main valve; the casing having auxiliary passages, one of them leading around the main valve for equalizing when open the pressure on both sides thereof, the other leading to the reducing valve, and both adapted to receive a supply of fluid from the main passage; and a valve governing the fluid supply to both passages.

13. A coupling comprising a body having a longitudinal passage, a main valve arranged to shut off the passage and prevent flow of fluid therethrough, being held closed by excess pressure on one side thereof, and having an opening, a reducing valve over said opening arranged to open and close oppositely to the main valve; the casing having auxiliary passages, one of them leading around the main valve for equalizing when open the pressure on both sides thereof, the other leading to the reducing valve, and both opening into a single valve chamber; and an auxiliary valve in said chamber having ports, whereby to admit fluid to either passage exclusively or to shut it off from both, according to the position of such valve.

14. A pressure pipe coupling having a longitudinal passage, a main valve having an escape opening through it adapted to seat across the passage to check flow of air therethrough, a reducing valve mounted on the main valve to cover the opening in the latter, means tending to hold said reducing valve against its seat, and a positive lock for securing the same when seated.

15. A pressure pipe coupling having a longitudinal passage, a main valve having an escape opening through it adapted to seat across the passage to check flow of air therethrough, a reducing valve mounted on the main valve to cover the opening in the latter, a lock for holding the reducing valve in place when seated, and means for withdrawing the lock when the main valve is opened.

16. A pressure pipe coupling having a main passage extending through it, a main valve adapted to seat across said main passage, leaving an escape vent open, a reducing valve adapted to close the escape vent independently of the main valve, a positive lock for securing the reducing valve when closed, means tending to bring the lock into operative valve-seating position, and a check for retarding the action of said lock-operating means.

17. A pressure pipe coupling having a main passage extending through it, a main valve adapted to seat across said main passage, leaving an escape vent open, a reducing valve adapted to close the escape vent independently of the main valve, a positive lock for securing the reducing valve when closed, means for rendering the lock inoperative when the main valve is open, means normally tending to bring the lock into operative valve-seating position, and a check for retarding the action of said lock-operating means, whereby the lock is restrained sufficiently to permit opening of the reducing valve after the main valve is closed.

In testimony whereof I have affixed my signature, in presence of two witnesses.

OLIVER J. GOLDSMITH.

Witnesses:

LINCOLN D. RANDALL,
SAMUEL W. EMERY, Jr.