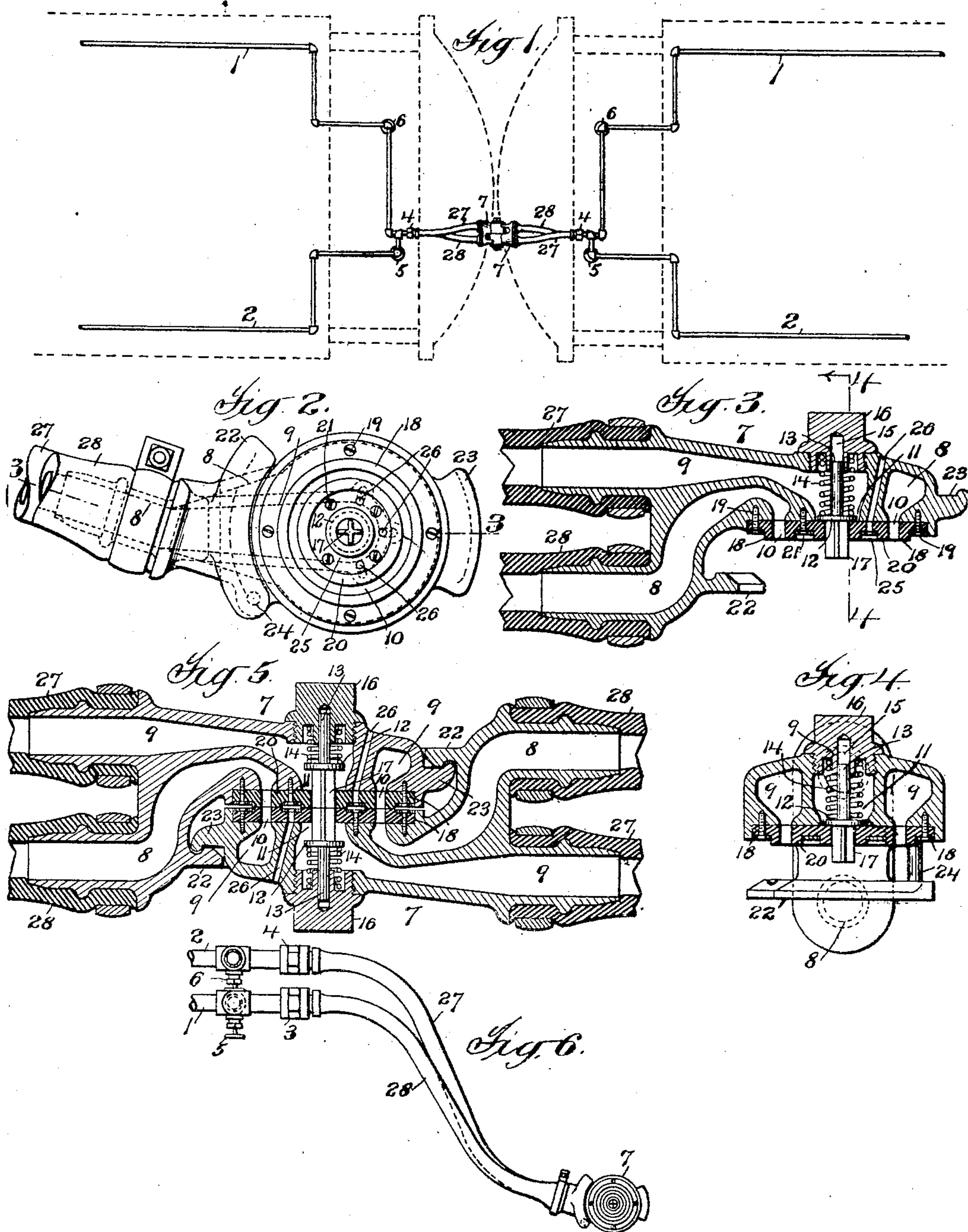


H. H. WILLIAMS.
COUPLING DEVICE.

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UNITED STATES PATENT OFFICE.

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COUPLING DEVICE.

No. 803,643.

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To all whom it may concern:

Be it known that I, HERBERT H. WILLIAMS, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Coupling Devices, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in coupling devices for the pipes of systems intended to transmit fluid-pressure.

In fluid-pressure systems now ordinarily in use on railway-trains it is customary to employ a plurality of pipe-lines extending through the train. Referring more particularly to air-brake systems for electrically-operated trains, it is customary to employ two pipe-lines, one of said pipe-lines being known as the "reservoir-line" and being connected at various points to the reservoirs which contain air under pressure carried by the cars and the other of which is known as the "train-line," the purpose of this line being to control the operation of the brakes. These lines are usually connected by means of the engineer's valve, by the operation of which the flow of air from the reservoir-line into the train-line is controlled.

Referring more particularly to railway-trains in which steam is employed as the motive power, it is customary to employ two pipe-lines, one of which transmits the power for controlling the brakes and the other of which is known as the "signal-line," through which the conductor is enabled to communicate with the engineer. As heretofore constructed these lines are entirely independent throughout the train and independent coupling devices are employed for each line between the cars. It follows, therefore, that when a train is made up it is necessary not only to couple the cars, but also for the trainmen to couple up each of the pipe-lines. This coupling operation, therefore, so far as the pipes are concerned, requires additional time and, furthermore, requires the maintenance of sets of coupling fixtures for each pipe-line.

It is one of the objects of the present invention to provide a couple device for pressure systems which shall be common to all the pipe-lines running through the train, so that said pipe-lines may be connected by a single coupling operation and the necessity for additional sets of coupling-fixtures obviated.

A further object of the invention is to pro-

vide a coupling device which shall be common to all the pipe-lines extending throughout the train and which shall be so arranged that it may be quickly and readily coupled and which is of such a construction that the swaying of the train in rounding curves shall not tend to separate the parts of the coupling device.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter described and then particularly pointed out in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a diagrammatic plan view illustrating the application of the improved coupling device to two sets of train-pipes. Fig. 2 is a plan view of the coupling-face of one part of the coupling device. 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. 3. Fig. 5 is a vertical section through the parts of the coupling device with both coupling-heads locked in position, and Fig. 6 is a detail view illustrating the connection of one of the coupling-heads with the train-pipes.

In the accompanying drawings, which represent a concrete embodiment of the invention, the improved coupling device is shown as applied to an air-brake pressure system. The ends of two adjacent cars are indicated by dotted lines in Fig. 1, and these cars are shown as provided with train-pipes (marked 1) and reservoir-pipes, (marked 2.) The train-line terminates in a suitable nipple, union, or other suitable connecting device 3 and the reservoir-line terminates in a similar union, nipple, or other suitable connecting device 4. These pipes are or may be provided with the usual cut-out valves 5 and 6.

The coupling device may be widely varied in form and construction. As shown, it comprises two coupling-heads 7, which may be and preferably are castings. These coupling-heads are provided with a plurality of conduits, one for each pipe-line extending through the train. In the construction shown since two pipe-lines are employed two conduits (marked 8 and 9) are shown, the conduit 8 connecting with the train-line and the conduit 9 connecting with the reservoir-line. These conduits terminate in suitable ports, which may be arranged in any suitable manner, so that when the coupling-heads are in position,

as will be hereinafter described, the ports for corresponding lines will be brought into register. As shown, the ports are concentric, the port for the conduit 8 being marked 10 and being annular in form, and the port for the conduit 9 being marked 11 and lying within the annulus formed by the port 10.

Since in air-pressure systems it is desired to always maintain the pressure in the reservoir-line, whether the cars are coupled or uncoupled, the port 11 of the conduit 9, which is connected with the reservoir-line, is provided with a suitable cut-off valve. In the preferred form of the construction this cut-off valve will be automatic in its operation. As shown, this cut-off valve consists of a valve-plate 12, having the usual stem 13, which is surrounded by a spring 14, said spring tending to force the valve against its seat. The stem of the valve plays in an opening 15 in a screw-plug 16, by removing which it is possible to remove the valve. The valve is provided with a projection 17, which extends through the valve-opening, the purpose of which will be hereinafter described.

Suitable means are preferably provided for insuring a tight joint between the corresponding ports of the coupling-heads when the same are in coupled position. While this may be accomplished in any desired manner, in the preferred form of the construction packing will be employed for this purpose. As shown, this packing consists of a ring or washer 18, which is held in position by suitable screws 19 or in any other desired manner, and forms the packing for the outer edge of the port 10. The packing for the inner edge of the port 10 and for the port 11 is formed by a perforated washer 20, which is secured in position by screws 21 or in any other desired manner, the diameter of this washer being such that its outer circumference is substantially coincident with the inner edge of the port 10. The perforation in the washer is substantially coincident with the opening in the port 11; but, as shown, the edge of the washer extends slightly over the edge of the port, so as to form a seat for the valve-plate 12.

The two coupling-heads are arranged to be detachably connected in any desired manner. As shown, this is accomplished by providing each of the heads with cam projections 22 and 23, the projections 23 being arranged to underlie the projections 22. In the operation of coupling the two heads are brought together and the projections 23 are forced under the projections 22 by an axial movement of the two parts of the coupling, the meeting faces of the heads being by this operation brought into close contact and the frictional contact between the projections serving to hold the heads in locked position with relation to each other. As the two heads are brought together the projections 11 of each cut-off valve come in contact with each other

and the valves are forced from their seats, thus establishing communication between the ports. In order to limit the amount of the actual coupling movement, and thus prevent the cam projections from being carried by each other, each of the heads is provided with a suitable stop-pin 24, with which the projection 23 on the other head will come into contact.

It may happen, because of wear or for other reasons, that a slight leakage will occur from the ports. To prevent this leakage from the reservoir-line passing into the train-line, suitable leakage-ports are preferably provided. These leakage-ports may be constructed and arranged in any suitable or desired manner. As shown, the washer 20 is provided with a groove 25, and this groove is tapped by a leakage-port 26, which extends through the head and communicates with the atmosphere. Should, therefore, there be any leakage from the reservoir-port, it will pass off through the port 26 and will not pass into the train-line.

It is desirable to so support the coupling-heads that the sway of the train as it passes around curves will not tend to uncouple them. To accomplish this, the heads may be supported in various positions and by various means. In the preferred form of the construction the coupling-heads will be connected to the train-line by means of flexible pipes. As shown, two flexible pipes 27 and 28 are employed for this purpose, the pipe 27 forming the connection between the conduit 9 and the reservoir-line and the pipe 28 forming the connection between the conduit 8 and the train-line. These flexible pipes support the heads and allow them to swing as required by the movement of the train. It is further desirable to so arrange the flexible pipes that the coupling operation may be readily and easily effected and that the sway of the train will not kink or buckle either of the pipes. Where the unions or nipples and the projections of the train-pipes which carry them are of the same length, as they usually will be—that is, where they terminate in a vertical plane which is transverse to the car—the flexible pipes will be made of different lengths and will be arranged so that the points of connection between the pipes and the unions will be substantially superposed—i. e., they will lie in different horizontal planes—and the points of connection of the pipes with the head will lie in different vertical planes, which planes cut the car. In the construction shown the pipe 27 is longer than the pipe 28, and the unions which these pipes join are superposed. The pipe 28 is led directly to the nipple in which the conduit 8 terminates. The pipe 27, however, is led from a position above the pipe 28 at its point of junction with the union 3, which connects with the conduit 9, to a position at one side of the nipple, which connects with the conduit 8. The lead in position of this pipe is well shown in the diagram Fig.

1. With this construction it is obvious that the pipes will bend readily vertically when it is desired to couple the heads, and it will also be seen that the sidewise swaying which takes place as the train rounds curves will cause the pipes to bend equally and will therefore not kink or tend to break either of them.

While this invention is particularly adapted for use in connection with train-lines for air-pressure systems such as have been referred to, it is obvious that it may be applied to any air-pressure system in which it is desired to couple a plurality of pipes. Furthermore, while the mechanical construction which has been described is regarded as particularly adapted for the purposes of the invention, it is obvious that the invention may be embodied in constructions which differ widely in mechanical details. The invention is not, therefore, to be limited to the specific use described nor to the specific construction which has been hereinbefore set forth.

What is claimed is—

1. A coupling device for pressure systems comprising a pair of coupling-heads each of said heads having independent conduits which terminate in concentric ports, and means for detachably connecting the heads of each pair with the corresponding ports in register, substantially as described.

2. A coupling device for pressure systems comprising a pair of coupling-heads each of said heads having independent conduits which terminate in concentric ports, packing surrounding said ports, and means for detachably connecting the heads of each pair with the corresponding ports in register, substantially as described.

3. A coupling device for pressure systems comprising a pair of coupling-heads said heads having independent conduits which terminate in concentric ports, suitable packing surrounding the ports, cut-off valves in corresponding ports of each head, means for detachably connecting the heads with corresponding ports in register, means whereby the valves are opened when the heads are connected, and means for closing the valves when the heads are disconnected, substantially as described.

4. A coupling device for pressure systems comprising a pair of coupling-heads said heads having independent conduits which terminate in concentric ports, suitable packing surrounding the ports, cut-off valves in the inner ports of each head, means for detachably connecting the heads with corresponding ports in register, means whereby the valves are opened when the heads are connected, and means for closing the valves when the heads are disconnected, substantially as described.

5. A coupling device for pressure systems comprising a pair of coupling-heads each of said heads having a conduit terminating in an annular port, and a second conduit terminating in a port which is located within the an-

nular port, means for detachably securing the heads together with corresponding ports in register, and means for securing a tight joint between the ports, substantially as described.

6. A coupling device for pressure systems comprising a pair of coupling-heads each of said heads having a conduit terminating in an annular port, and a second conduit terminating in a port which is located within the annular port, an automatically-operating cut-off valve located in said second port, means for detachably connecting the heads with corresponding ports in register, and means for securing a tight joint between the ports, substantially as described.

7. A coupling device for pressure systems comprising a pair of coupling-heads, independent conduits in each head said conduits terminating in suitable ports, means for detachably connecting the heads with corresponding ports in register, and suitable leakage-ports whereby the leakage from one conduit is prevented from entering another conduit, substantially as described.

8. A coupling device for pressure systems comprising a pair of coupling-heads, independent conduits in each head said conduits terminating in suitable ports, means for detachably connecting the heads with corresponding ports in register, and leakage-ports tapping the space between corresponding ports, substantially as described.

9. A coupling device for pressure systems comprising a pair of heads, independent conduits in each of said heads, said conduits terminating in suitable ports, means for detachably connecting the heads with corresponding ports in register, means for insuring a tight joint between the ports, and suitable leakage-ports whereby the leakage from one conduit is prevented from entering another conduit, substantially as described.

10. In a pressure system for railway-train service, the combination with a plurality of pipe-lines parts of which are carried by each of the cars, of a coupling-head having independent conduits one for each pipe-line said conduits terminating in suitable concentric ports, flexible connections between the conduits and the pipes, means made operative by an axial movement for detachably connecting corresponding heads on adjacent cars with corresponding ports in register, said flexible connections being constructed to sustain the heads in position with the coupling-axis at an angle to the line of movement of the train, substantially as described.

11. In a pressure system for railway-train service, the combination with a plurality of pipe-lines parts of the lines being carried by the several cars of the train, of a coupling-head common to said pipe-lines, said head having an independent conduit for each line-pipe, each conduit terminating in a suitable port, said ports being concentric and means

for detachably connecting the coupling-heads of adjacent cars so that corresponding ports are in register and so that the meeting faces of the heads lie in substantially vertical planes, substantially as described.

12. In a pressure system for railway-train service, the combination with a plurality of pipe-lines parts of the lines being carried by the several cars of the train, of a coupling-head common to said pipe-lines, said head having an independent conduit for each line-pipe, each conduit terminating in a suitable port, said ports being concentric means for detachably connecting the coupling-heads of adjacent cars so that corresponding ports are in register and so that the meeting faces of the heads lie in substantially vertical planes, and flexible connections between the line-pipes and the conduits, substantially as described.

13. In a pressure system for railway-train service, the combination with a plurality of pipe-lines, parts of the lines being carried by each of the cars, of a coupling-head common to the line-pipes of each car said heads having an independent conduit for each line-pipe, each conduit terminating in a suitable port, said ports being concentric flexible connections between the line-pipes and said conduits, said connections being arranged to sustain the coupling-faces of the heads of adjacent cars in substantially vertical position, and means for detachably securing the heads of adjacent cars together, substantially as described.

14. In a pressure system for railway-train service, the combination with a plurality of pipe-lines, parts of said lines being carried by each car, of a coupling-head which is common to the line-pipes of each car said head having independent conduits one for each line-pipe said conduits terminating in suitable ports, said ports being concentric flexible pipes connecting the line-pipes with the conduits in the heads, said pipes being arranged to support the heads in such position that when the heads of adjacent cars are coupled the sway of the train will not tend to uncouple them, and means for detachably connecting the heads of adjacent cars together, substantially as described.

15. In a pressure system for railway-train service, the combination with a plurality of pipe-lines, parts of said lines being carried by each car, of a coupling-head having independent conduits one for each line-pipe said conduits terminating in suitable ports, flexible pipes connecting the line-pipes with the conduits in the heads said flexible pipes being of different lengths, and means for detachably connecting the heads of adjacent cars, with corresponding ports in register, substantially as described.

16. In a pressure system for railway-train service, the combination with a plurality of pipe-lines parts of said lines being carried by

each car, of a coupling-head having an independent conduit for each line-pipe said conduits terminating in suitable ports, flexible pipes connecting the pipes on the car with the conduits, said flexible pipes having their points of connection with the train-pipes lying in different horizontal planes and their points of connection with the head lying in different vertical planes cutting the car, and means for detachably connecting the heads of adjacent cars with corresponding ports in register, substantially as described.

17. In a pressure system for railway-train service, the combination with a plurality of pipe-lines parts of said lines being carried by each car, of a coupling-head having an independent conduit for each line-pipe said conduits terminating in suitable ports, flexible pipes of different lengths connecting the pipes on the car with the conduits, said flexible pipes having their points of connection with the train-pipes lying in different horizontal planes and their points of connection with the head lying in different vertical planes cutting the car, and means for detachably connecting the heads of adjacent cars with corresponding ports in register, substantially as described.

18. In a pressure system for railway-train service, the combination with a plurality of pipe-lines parts of said lines being carried by each car, of a coupling-head having independent conduits, one for each line-pipe said conduits terminating in suitable ports, flexible pipes connecting the pipes on the car with the conduits, said flexible pipes at their points of connection with the train-pipes being substantially superposed and at their points of connection with the head being substantially side by side, and means for detachably connecting the heads of adjacent cars with corresponding ports in register, substantially as described.

19. In a pressure system for railway-train service, the combination with a plurality of pipe-lines parts of said lines being carried by each car, of a coupling-head having independent conduits one for each line-pipe said conduits terminating in suitable ports, flexible pipes of different lengths connecting the pipes on the car with the conduits said flexible pipes at their points of connection with the train-pipes being substantially superposed and at their points of connection with the head being substantially side by side, and means for detachably connecting the heads of adjacent cars with corresponding ports in register, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HERBERT H. WILLIAMS.

Witnesses:

FRED. W. BUTT,
W. J. MURRAY.