L. J. BORDO.

FLEXIBLE METALLIC TRAIN PIPE CONNECTION.

APPLICATION FILED SEPT. 22, 1910.

1,106,918. Patented Aug. 11, 1914.

2 SHEETS—SHEET 1.

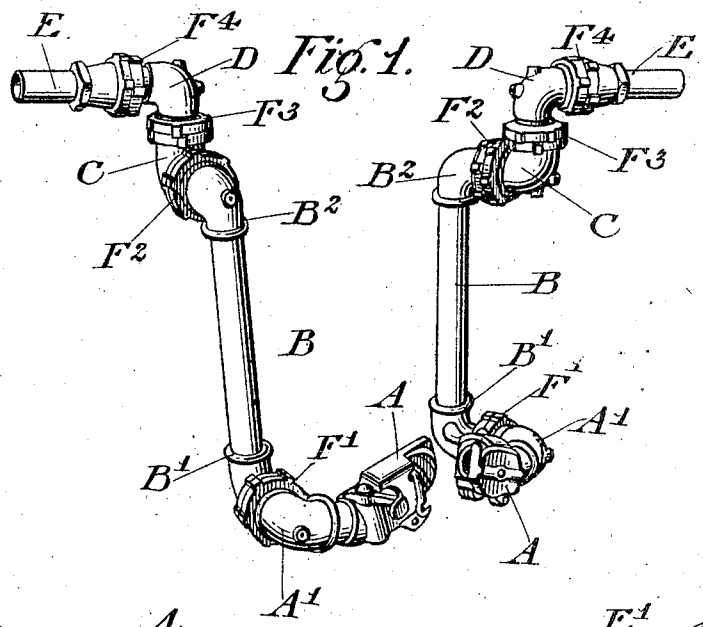


Fig. 1.

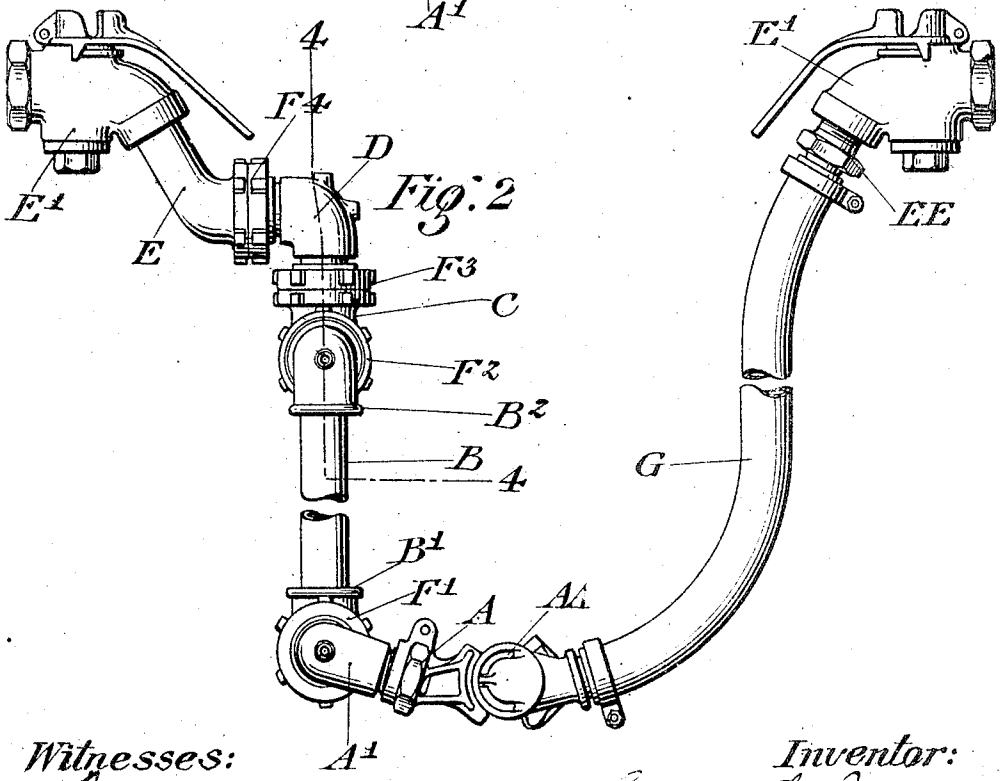


Fig. 2.

Witnesses:

David Williams

Inventor:

Lambert J. Bordo

by Francis J. Chamberlin

his attorney

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2 SHEETS—SHEET 2.

Fig. 3.

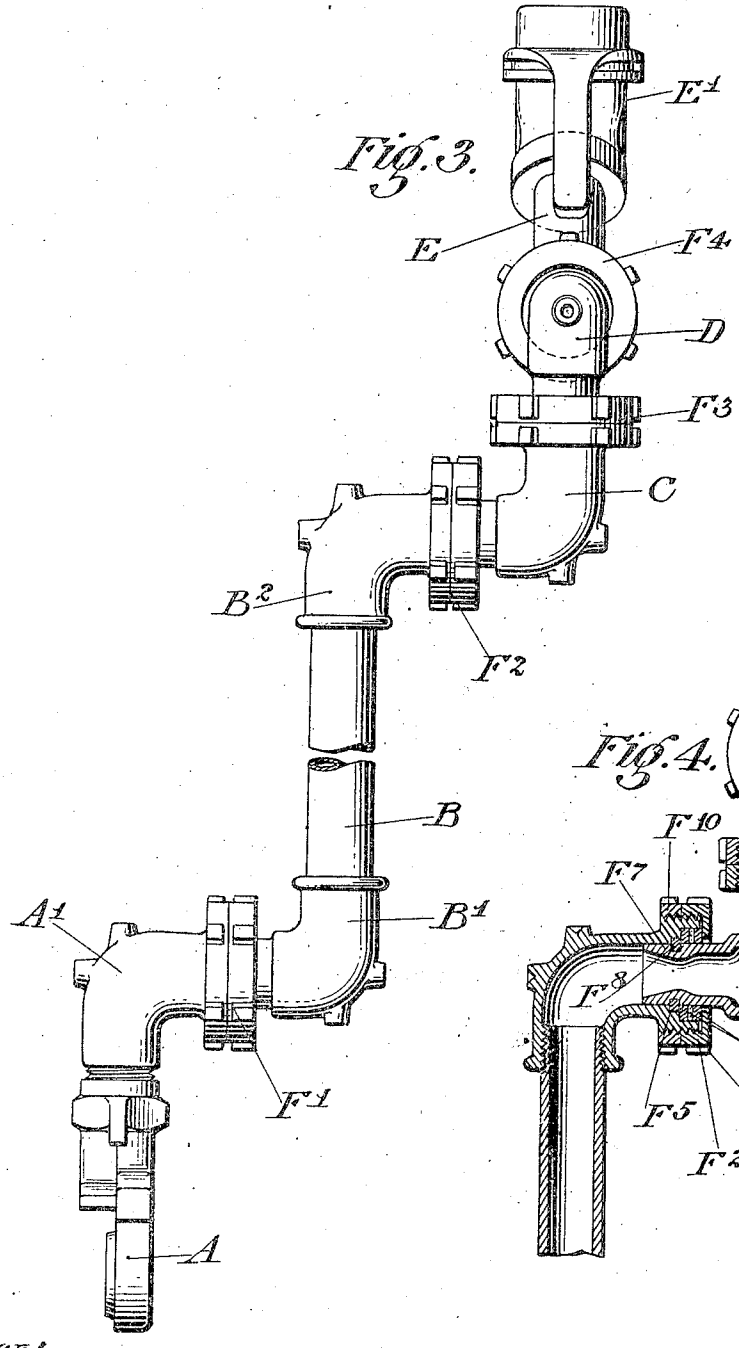
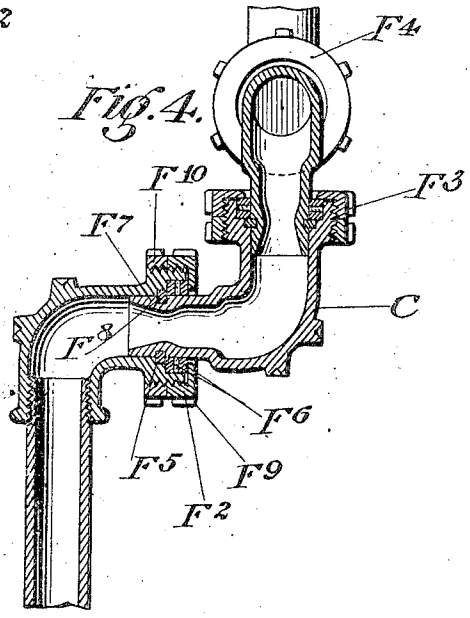


Fig. 4.



Witnesses:

David G. Williamson

Inventor:

Laurence J. Bordo

by Francis B. Sumner

his attorney

UNITED STATES PATENT OFFICE.

LAMBERT J. BORDO, OF PHILADELPHIA, PENNSYLVANIA.

FLEXIBLE METALLIC TRAIN-PIPE CONNECTION.

1,106,918. Specification of Letters Patent. Patented Aug. 11, 1914.

Application filed September 22, 1910. Serial No. 583,163.

To all whom it may concern:

Be it known that I, LAMBERT J. BORDO, a citizen of the United States of America, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Flexible Metallic Train-Pipe Connections, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention relates to flexible metallic pipe connections and the object of the invention is to provide a connection of this character suitable for use as a railway train pipe connection, and which embodies a snap coupling part, and is of such flexibility that it can be readily and safely used in place of and interchangeably with the standard train pipe hose connections now in general use.

The invention consists in certain features of construction and arrangement, pointed out in the appended claims, and one embodiment is fully illustrated and described in the accompanying drawings and descriptive matter to which reference should be had for a full understanding of the invention and the advantages thereof.

Of the drawings: Figure 1 is a perspective view of two similar train pipe connections constructed in accordance with my invention, the two connections being uncoupled but generally in the relative positions to permit them to be coupled together by the snap coupling parts attached thereto. Fig. 2 is an elevation showing one of my improved train pipe connections coupled to a train pipe hose connection of standard form. Fig. 3 is an end elevation of my improved train pipe connection as shown in Figs. 1 and 2, and Fig. 4 is a section taken parallel to the plane of the paper with respect to Fig. 3, of a portion of the apparatus shown in that figure.

In the drawings, A represents the snap coupling part of my improved connection. The part A is pivotally connected by a joint F^1 to the lower end of a swinging pipe section B. The upper end of the pipe section B is pivotally connected by a joint F^2 to the lower end of an elbow pipe section C and the upper end of the section C is pivotally connected by a joint F^3 to the lower end of an elbow pipe section D. The other end of the pipe section D is pivotally connected by a joint F^4 to a pipe section E. The pipe section E is rigid with and may be the end of the train pipe of the car to which the connection is attached. In the preferred construction illustrated, however, the pipe section E is adapted to be secured in the usual valve E^1 at the end of train pipe E^2 proper, in the same manner in which the metallic end connection EE of the standard hose connection is secured into the valve E^1 as shown at the right hand of Fig. 2. With this particular arrangement, the complete hose connection formed of parts A, B, C, D, and E, as above described may be used interchangeably with the standard hose connection, which as shown in Fig. 2 comprise, snap coupling part AA, flexible hose section G and a metallic end connection EE. The various joints, F, F^1, F^2, F^3 and F^4, may be, and as shown, are identical in construction. In the form shown, at each joint, one of the pipe sections connected is formed with a socket portion F^5, receiving packing washers F^6 which surrounds the cylindrical portion F^7 and the other pipe section connected by the joint. The inner end of the portion F^7 has a bearing in the other pipe section at the inner end of the recess F^5 and is grooved to receive a packing ring F^8 which abuts against the bottom of the recess F^5 at one end and is engaged at the other end by the adjacent packing ring F^6. The packing rings F^6 are retained in place and the two pipe sections jointed together are secured against movement in the direction of the axis of the joint by means of the cap member F^9 threaded on to the pipe section in which the recess F^5 is secured.

F^{10} represents a lock nut for preventing the cap F^9 from working loose.

With a joint construction of this character the tightness of the joint does not depend on the amount of internal pressure, and the bearing surfaces are at all times protected so that the joint is very durable.

In the arrangement described, it will be observed that the axis of the joint F^3 is at right angles to the axes of the joints F^2 and F^4. The axis of the joint F^4 is stationary, of course, with respect to the train pipe and in the preferred form illustrated is parallel to the longitudinal axis of the car to which

the connection is applied. With this arrangement of the joint F^4, the axis of the joint F^3 is, generally speaking, vertical, and the axis of the joint F^2 is, generally speaking, horizontal and transverse to the axis of the joint F^4, though of course, these axes shift somewhat in operation as the connection adjusts itself to different relative positions of the train pipe section connected thereby. The axis of the joint F^1 as shown is parallel to the axis of the joint F^2. In the particular construction shown the swinging pipe section BB is formed of a body of pipe threaded into the ends of elbows B^1 and B^2 which enter into and form parts of joints F^1 and F^2 respectively. Preferably the elbows B^1 and B^2 and C are all arranged to act together in laterally displacing the coupling part A from the train pipe. One advantage of this displacement of the coupling part is that it facilitates the coupling and uncoupling operations. The coupling part A, so far as its coupling characteristics are concerned may be identical with any standard or suitable coupling part used in train pipe connections. In the construction shown, the coupling part A comprises a coupling part proper which is threaded on to one end of an elbow part A^1 the other end of which forms a part of the joint F^1.

A train pipe connection must have a very large degree of flexibility to accommodate the different relative movements of the ends of the train pipes connected together. The relative movements between ends of adjacent and connected train pipes involve many components: the axes of the connected train pipes have angular movements comprising components in planes parallel and transverse to the general direction of the train pipes, furthermore, the connected ends of the train pipes have a relative movement of approach and recession with components both parallel and transverse to the general direction of the train pipes. I have found by extended and long continued tests and experiments that the arrangement shown, with joints F^2, F^3 and F^4 in proximity to each other and with the axis of one of the joints at right angles to the axes of the other two and with the coupling parts jointed to the lower end of the elongated swinging pipe section B, will give the train pipe connection as a whole flexibility necessary to permit a ready coupling and uncoupling of the snap coupling parts, and to avoid rupturing or unduly straining the joints in the use of the apparatus; have found also that the necessary flexibility and ease in coupling cannot be obtained with the same number of joints except by following the arrangement disclosed herein.

Because of the inherently longer life and greater strength and safety of the metallic connection, the desirability of using train pipe connections formed of jointed metallic pipes in lieu of the standard rubber hose connections has long been recognized, and I am aware that various jointed metallic pipe constructions have been proposed from time to time, but so far as I am aware the construction described herein is the first and only jointed metallic train pipe connection embodying a snap coupling part and adapted to be interchangeably used with standard train pipe hose connections which has ever gone into successful practical use.

My improved train pipe connection can obviously be used for connecting train pipes through which air, gas, steam, water or other fluid is conveyed.

It will be apparent to those skilled in the art that some changes in the form of the apparatus disclosed may be made without departing from the spirit of my invention.

Having now described my invention, what I claim as new, and wish to secure by Letters Patent, is:

1. An interchangeable jointed train pipe connection comprising a pipe section adapted to be directly connected to the train pipe, an elbow pipe jointed at one end to said section, a second elbow pipe to one end of which the second end of the first mentioned elbow pipe is jointed, a swinging pipe section jointed at its upper end to the second end of said second elbow pipe and a snap coupling jointed to the lower end of the swinging pipe section, the axis of the joint connecting the two elbows being transverse to the axes of the joints at the opposite ends of the elbows, and the axis of the joint between said pipe connection and first mentioned elbow pipe being parallel to the train pipe.

2. An interchangeable train pipe connection comprising a bent pipe section E adapted to have one end secured to the usual valve at the end of the train pipe and the other end extending parallel to the axis of the train pipe, an elbow having one end jointed to the end of the first mentioned section and its other end depending downward, a second elbow having one end extending upward and jointed to the downwardly extending end of the first elbow, a swinging pipe section laterally jointed at its upper end to the second end of the second elbow and a snap coupling part laterally jointed to the lower end of the swinging pipe connection.

3. An interchangeable train pipe connection comprising a bent pipe section E adapted to have one end secured to the usual valve at the end of the train pipe and the other end extending parallel to the axis of the train pipe, an elbow having one end jointed to the end of the first mentioned section and its other end depending downward, a second elbow having one end extend-

ing upward and jointed to the downwardly extending end of the first elbow, a swinging pipe section laterally jointed at its upper end to the second end of the second elbow and a snap coupling part laterally jointed to the lower end of the swinging pipe connection, the snap coupling part and said second elbow being located at opposite sides of said swinging pipe section.

LAMBERT J. BORDO.

Witnesses:
ARNOLD KATZ,
JOHN E. HUBBELL.