No. 692,511. Patented Feb. 4, 1902.

J. E. FORSYTH.

TRAIN PIPE COUPLING.

(Application filed Nov. 18, 1901.)

(No Model.) 3 Sheets—Sheet 1.

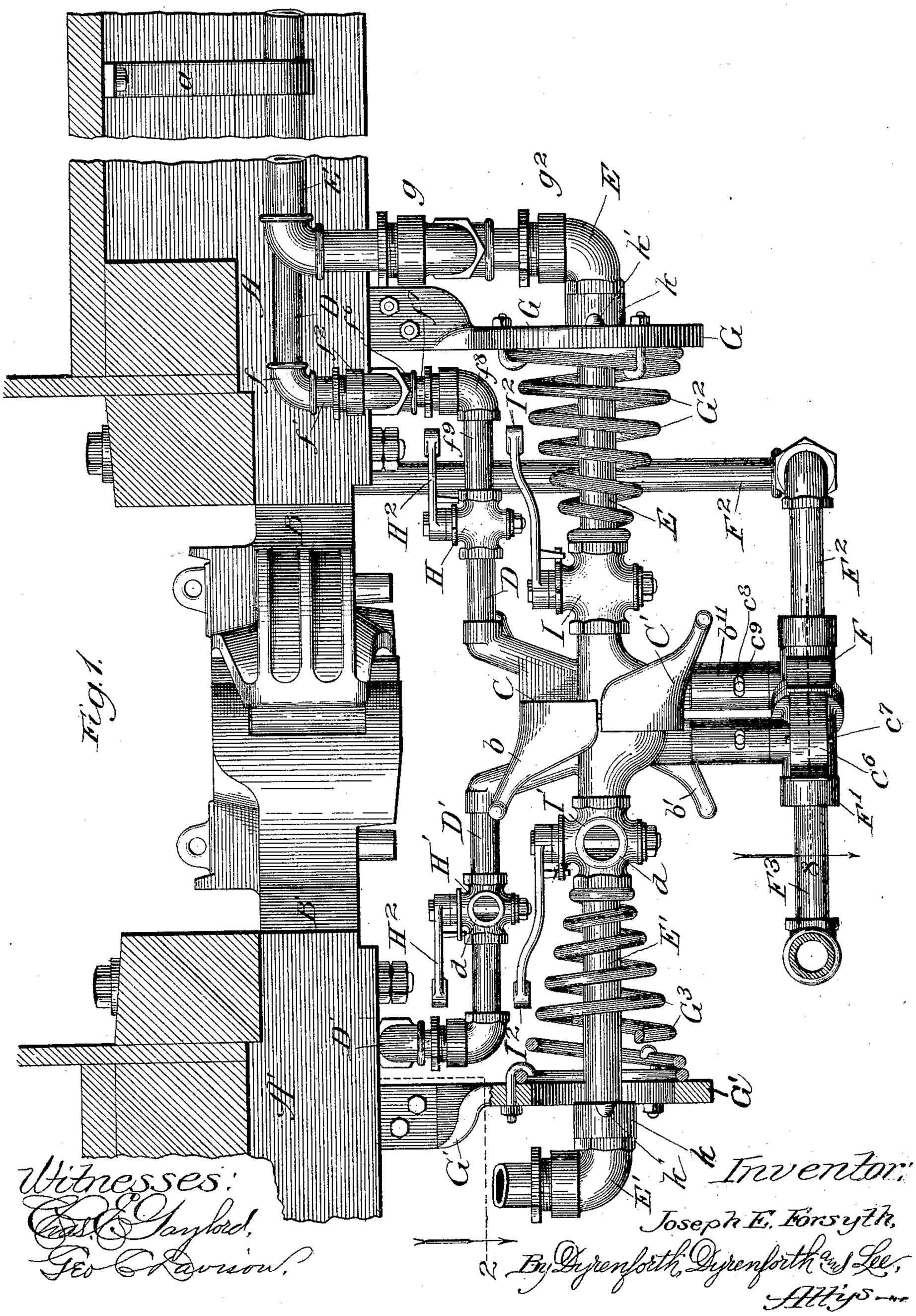

Fig. 1.

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Geo. C. Lawson.

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THE NORRIS PETERS CO., PHOTO-LITHO. WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

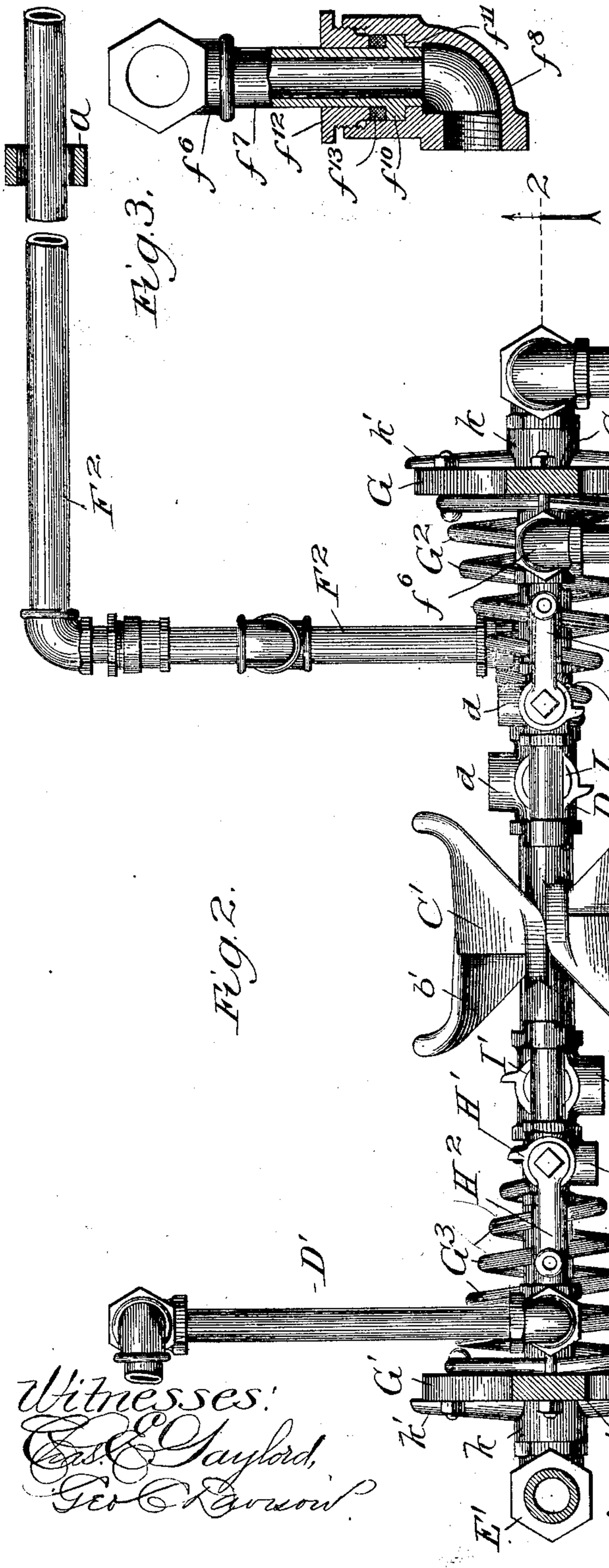

Fig. 3.

Fig. 2.

Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

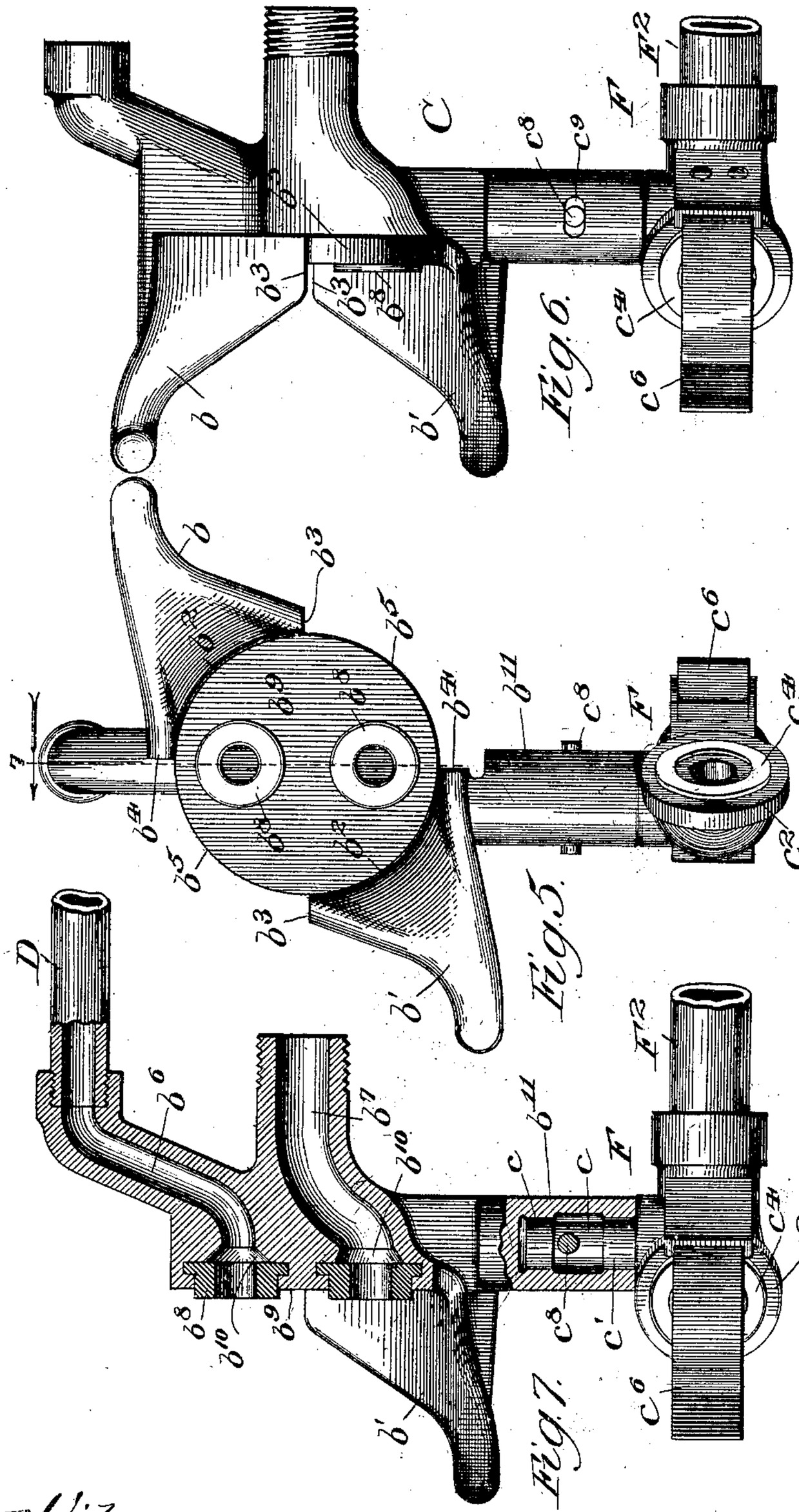

Fig. 5.

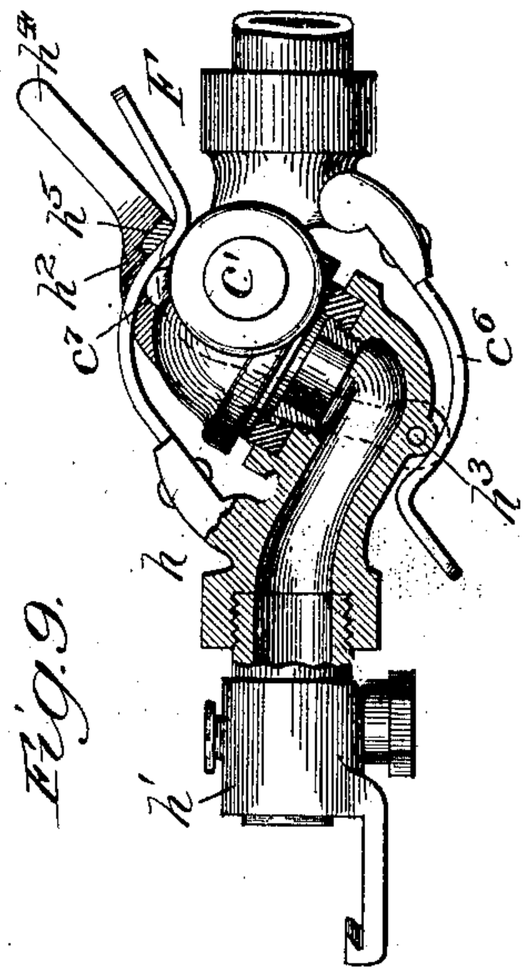

Fig. 9.

Fig. 7.

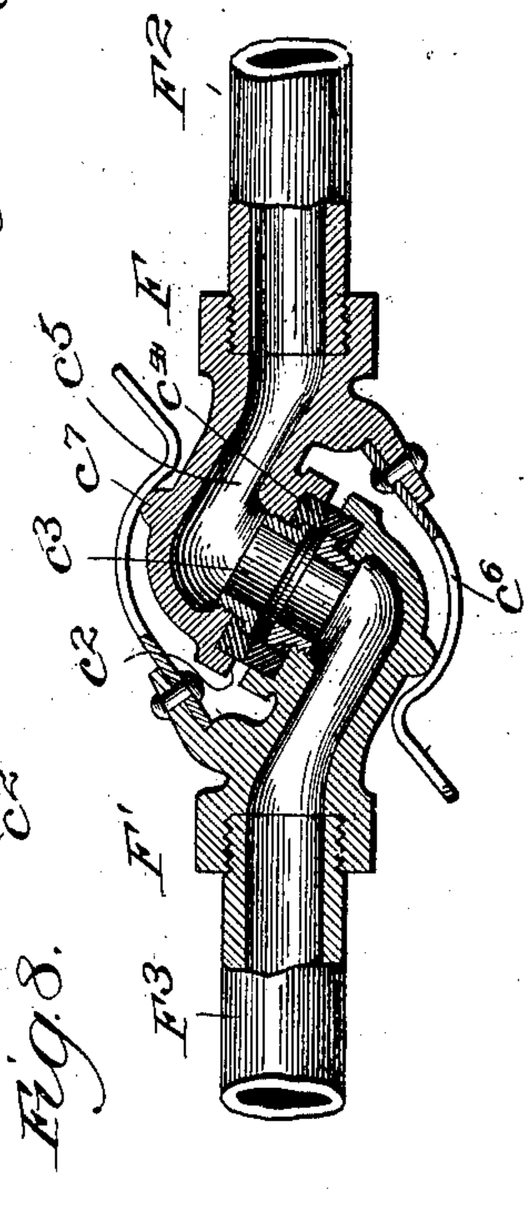

Fig. 8.

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UNITED STATES PATENT OFFICE.

JOSEPH E. FORSYTH, OF CHICAGO, ILLINOIS.

TRAIN-PIPE COUPLING.

SPECIFICATION forming part of Letters Patent No. 692,511, dated February 4, 1902.

Application filed November 18, 1901. Serial No. 82,650. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. FORSYTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Train-Pipe Couplings, of which the following is a specification.

This invention relates particularly to automatic train-pipe couplings; and the primary object is to provide an exceedingly simple construction of this nature well adapted for use in effecting simultaneous coupling of the air-brake, signal, and steam-pipes when two cars or an engine and car are coupled together.

In the construction shown no automatic valves are employed; but it is intended that any suitable means shall be employed for operating the valves without the necessity of going between the cars. In this construction each car is equipped at opposite ends with duplicate train-pipe-coupling members, each having the several orifices of its fluid-passages located in a central vertical plane and having interlocking surfaces with a fixed relation with reference to intersecting vertical and horizontal planes, so that companion coupling members interlock properly when two cars are brought together. Preferably the train-pipe-coupling members are suspended from the coupling-heads of the draw-bars of the cars and are yieldingly held in an advanced or extended position by means of springs, the connections of the fluid-passages of the coupling members with the train-pipes being through swivel-joints, which permit the necessary longitudinal movement of the coupling members while allowing the use of metal-pipe connections instead of hose-pipe connections. Preferably each coupling member is formed in two parts—namely, an integrally-formed head provided with a brake-pipe orifice and a signal-pipe orifice, and provided also with guide-prongs and interlocking surfaces, and a separately-formed detachable head provided with a steam-pipe orifice. Thus the steam-pipe head may be left off the coupling member during the summer months and carried by the coupling member during the winter months. In the preferred construction the signal-pipe and brake-pipe orifices open at a surface lying in a vertical transverse plane and the steam-pipe orifice opens at a surface lying in a vertical, diagonal, or oblique plane.

In the accompanying drawings, which illustrate the invention in its preferred form, Figure 1 represents portions of two cars and their couplings and shows the train-pipes equipped with the improved train-pipe coupling; Fig. 2, a broken plan view of the train-pipes and couplings, certain parts being removed; Fig. 3, a sectional view showing a swivel-joint employed in the connections between the coupling-heads and the train-pipes; Fig. 4, a broken plan view showing a coupling device for use in making the steam connection in an emergency where a car equipped with the improved train-pipe coupling is to be coupled to a car not so equipped; Figs. 5 and 6, front and side elevational views, respectively, of the improved coupling member employed; Fig. 7, a section taken, as indicated, at line 7 of Fig. 5; Fig. 8, a plan sectional view taken, as indicated, at line 8 of Fig. 1 and showing the steam-pipe connection; and Fig. 9, a detached view of the steam-pipe head employed joined to the emergency coupling device shown in Fig. 4, the latter being shown in plan section.

A A′ represent portions of the substructure of two cars; B B′, suitable draw-bars connecting the cars; C C′, companion train-pipe-coupling members; D D′, signal-pipes of the two cars; E E′, air-brake pipes of the two cars; F F′, detachable steam-pipe heads forming portions of or carried by the coupling members C C′; F^2 F^3, steam-pipes connected with the heads F F′, respectively; G G′, brackets depending from the draw-bars B B′, respectively, and provided with openings through which the pipes E E′ extend freely; G^2 G^3, coupling-member-supporting springs in the form of cone-frustums, said springs being connected at their larger ends with the brackets G G′ and receiving the pipes E E′, which the front ends of the springs embrace; H H′, three-way valves interposed in the pipes D D′, respectively, and supplied with operating-handles H^2, and I I′ three-way valves interposed in the course of the pipes E E′, respectively, and supplied with operating-arms I^2.

The signal and brake pipes of each car are

supported from the bottom of the car by hangers *a* at some distance from the ends of the car, said hangers permitting vertical and lateral movement of the train-pipes within limits. The steam-pipes ordinarily enter the cars near the ends thereof. All the train-pipes have suitable metallic connections with the coupling members. As clearly appears in Figs. 5 to 9, inclusive, each coupling member comprises a coupling-head provided with suitable guide-prongs, through which head the brake and signal pipes communicate, and a steam-pipe head having swivel connection with the prong-equipped head. As shown, the head C is provided with two diagonally opposite forwardly-projecting outwardly-flaring guide-prongs *b b'*, having at their bases inner concave or quarter-cylindrical surfaces b^2 and flanking or lateral surfaces b^3 b^4, lying, respectively, in substantially horizontal and vertical planes and separated by diagonally opposite convex or quarter-cylindrical surfaces b^5. The heads C C' are duplicates, and inasmuch as the prong-bases and the spaces between prong-bases are symmetrically placed with relation to central vertical and horizontal planes the prong-bases of each head will enter the spaces between the prong-bases of the other head when the coupling members are brought together, the convex surfaces b^5 of each coupling-head being received by the concave surfaces b^2 of the other coupling-head. The head C is provided in a central vertical longitudinal plane with signal and brake passages b^6 b^7, respectively, at the orifices of which are provided yielding or soft-rubber gaskets b^8, which are secured by suitable retaining-shoulders and which project beyond the flat transverse surface b^9 of the coupling-head. Back of the gaskets are provided annular recesses b^{10}, which serve to admit the air to the rear of the gaskets, thereby to project or extend the gaskets. The coupling-head C is provided with a hollow depending boss b^{11}, which receives the eccentric pivot or journal *c* of the head F. Said pivot *c* is provided with finished surfaces *c'* at its upper and lower portions, as shown. As clearly appears from Fig. 8, the head F is provided with an oblique surface c^2, whereat is secured, by means of a threaded externally-flanged ring c^3, an internally-flanged packing-ring c^4, said packing-ring being at the orifice of a steam-passage c^5, with which the head F is provided. Opposed to the inclined surface c^2 is a yielding prong c^6, space being preserved between said inclined surface and said prong for receiving a companion steam-head. On the opposite side of the head F is a lug c^7, upon which the corresponding spring of the companion steam-pipe head F' bears. The head F' is a duplicate of the head F and need not be described in detail. The stub or journal *c* is provided with a transverse perforation which receives a pin c^8, the ends of which work within slots c^9, with which the boss b^{11} is provided. Thus the head F is permitted to swing laterally independently within limits, while at the same time it is held in the advanced position by the spring G^2 acting through the medium of the head C.

It will be understood that the coupling members are so disposed that the horns of each member have the same position with relation to the ends of the car whereat they are located—that is, if the horn *b* of the coupling member at one end of a car, viewed by a person standing in front of the car, projects upwardly and to the right the corresponding horn of the coupling member at the other end of the car will have the same relative position when viewed from a corresponding position at the opposite end of the car. When any two ends of any two cars come together, therefore, the horns of companion coupling members are properly located to guide the members together and cause them to interlock. The gaskets project far enough beyond the flat surrounding faces of the coupling members to cause the companion gaskets to be firmly pressed together when the cars are coupled, the coupling members being somewhat retracted at such time against the action of their springs. By employing coupling members of the kind described, each equipped with two diagonally opposite horns located and spaced as herein described, the members may be considerably out of alinement as the cars approach each other and still be guided together properly. This is of particular advantage in effecting a coupling where the cars are at a sharp curve of the track. After the coupling members have been properly guided together and have become firmly interlocked practically all yielding takes place in the flexible pipes and their joints. By having the meeting surfaces of the steam-pipe heads lie in vertical oblique planes—that is, vertical planes inclined to vertical longitudinal planes—the steam-pipe heads act as entering wedges, thereby reducing the stiffness of the springs required for holding the coupling members together with sufficient pressure. The swivel connections at the steam-pipe heads give increased flexibility, so far as lateral movement is concerned, without detracting from the pressure which can be transmitted from steam-pipe head to steam-pipe head. After a coupling has been effected the valves H H' and I I' and the steam-valve (not shown) may be turned to place the train-pipes in communication through the coupling members. Prior to uncoupling the cars the valves are turned to produce dead-heads for their respective pipes. If desired, the brake and signal pipes may be connected through suitable branch pipes (not shown) connected with the valves H H' and I I' at points *d*. The valves may then be turned to admit pressure through said branch pipes, serving at the same time to close the air-passages through the coupling-heads of the automatic device.

To permit the necessary movement of the coupling members relative to the cars, each

train-pipe is provided in its course near the coupling members to which it is attached with a series of swivel-joints disposed in different planes, giving practically the resultant effect of a universal joint. Thus the pipe D has a fixed elbow f with a downturned end connected with a short pipe-section f', having swivel connection with the upturned end of an elbow f^2, the inturned end of which is connected with a pipe-section f^3, having swivel connection at a joint f^4 with a pipe-section f^5, the inner end of which is equipped with a fixed elbow f^6, the downturned end of which connects with a short pipe-section f^7, having swivel connection with the upturned end of an elbow f^8 on the end of a pipe-section f^9, in the course of which the valve H is located. The essential construction for the swivel-joints is shown in Fig. 3, which illustrates, for instance, the elbow f^8, the short pipe-section f^7, having swivel connection therewith, and the elbow f^6, connected with the upper end of the pipe-section f^7. The pipe-section f^7 is provided near its lower end with a collar f^{10}, which enters the enlarged opening of the adjacent end of the elbow f^8 and abuts against a shoulder f^{11}. The extremity of the enlarged opening of the elbow is internally threaded to receive an externally-threaded annular gland or nut f^{12}, which fits upon the pipe-section f^7 and serves to compress a packing-ring f^{13}, interposed between the inner face of said nut and the adjacent shoulder of the collar f^{10}. The pipe E is provided similarly with swivel-joints $g\,g'\,g^2$. The pipes D′ E′ are similarly equipped, and it will thus be seen that each of the pipes mentioned has a portion corresponding to the portion f^3 f^4 f^5 of the pipe D, which swings in a horizontal plane, permitting the coupling member to advance or recede. The steam-pipes F^2 F^3 are similarly provided with metallic swivel-joints, permitting the necessary movement of the coupling members.

The emergency coupling device (shown in Figs. 4 and 9) comprises a member h, corresponding to a steam-pipe head of the automatic train-pipe coupling and adapted to engage a companion member of the automatic coupling and a member h', of the ordinary form, suitable for connection with the usual steam-hose coupling with which cars are ordinarily equipped. The member h is equipped with a yoke h^2, pivoted at h^3 and having a handle h^4. As will be observed from Fig. 9, said yoke serves to lock the member h to the companion member of the automatic coupling when thrown to the position illustrated in said figure. When in this position, the web h^5 of said yoke serves to engage the spring of the member h and lock the same in the rear of the lug c^7. Any suitable branch connections may be joined to the valves of the brake and signal pipes at the point d to permit a coupling to be effected with a car not equipped with the improved train-pipe coupling.

In practice the springs G^2 G^3 are placed under some tension when the cars are equipped and are held under tension by means of collars k in the rear of the brackets G G′ and provided with arms k', which engage the rings of the brackets through which the brake-pipes loosely pass. When the cars are coupled, the collars k move out of contact with the brackets as the pipes which carry them are retracted.

The construction described is for the purpose intended one of great simplicity, and in operation the coupling members have a direct end-to-end pressure (so far as the soft-rubber gaskets are concerned) when the companion gaskets come into contact with each other, thereby avoiding danger of the gaskets becoming dislodged or injured. The yielding gaskets lie in a transverse plane and are supplied with fluid-pressure for increasing the efficiency of the joints. By disposing the steam-gaskets in oblique planes, the coupling members being guided together in the manner before described, it is impossible for the edges of the gaskets to catch upon each other. Moreover, the wedging effect secured by this arrangement enables an efficient steam-joint to be effected without the necessity of employing unduly stiff springs for pressing the coupling members together. The train-pipes back of the swivel-joints with which they are provided possess a certain flexibility, of which advantage is taken by making the loops or hangers which connect the ends of the train-pipes with the car-body of suitable form to permit both vertical and lateral movement. The construction is such that after the coupling members become interlocked there is little yielding thereat, the necessary yielding taking place in the pipes themselves and in the swivel-joints thereof. The steam-gaskets are of a comparatively hard composition now well known in the art, which becomes softer and more yielding after being heated by the steam. The steam connections are not close enough to the air connections to injure the soft-rubber gaskets, but serve rather in cold weather to increase the efficiency of the same by preventing them from becoming too cold. The conical springs serve both to support the coupling members and to hold them in the advance position and readily permit the necessary vertical and lateral movements of the coupling members.

Changes in minor details of construction within the spirit of the invention may be made by those skilled in the art. Hence no undue limitation is to be understood from the foregoing detailed description.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic train-pipe coupling, a coupling member comprising a perforated pipe-head having two diagonally opposite convex flanking surfaces, and two diagonally opposite forwardly divergent inclined prongs branching from said pipe-head and having at

their bases concave surfaces for receiving the convex surfaces of a companion coupling member and having also at their bases flanking or lateral surfaces for engaging similar surfaces of a companion coupling member, the flanking surface of each prong-base lying, respectively, in substantially horizontal and vertical planes.

2. In an automatic train-pipe coupling, the combination of a yieldingly-held coupling member provided with a perforated pipe-head having two diagonally opposite convex flanking surfaces, two diagonally opposite forwardly divergent prongs branching from said pipe-head and having at their bases concave surfaces for receiving the convex surfaces of a companion coupling member, and having at their bases lateral or flanking surfaces for engaging similar surfaces of a companion coupling member, the flanking surfaces of each prong-base lying, respectively, in substantially horizontal and vertical planes, and a yielding air-projected gasket at the orifice of said pipe-head, substantially as and for the purpose set forth.

3. In an automatic train-pipe coupling, a yieldingly-held coupling-head provided with an air-passage and with suitable guide-prongs and interlocking surfaces, the orifice of said passage lying in a central vertical longitudinal plane with reference to the car, and a detachable steam-pipe head carried by said coupling member so as to be automatically connected with the corresponding head of a companion coupling member during coupling of the cars, said steam-pipe head having an orifice lying in vertical alinement with said first-named orifice.

4. In an automatic train-pipe coupling, a coupling-head provided with signal and brake passages having orifices lying in a central vertical longitudinal plane with reference to the car, said head being provided with guide-prongs and interlocking surfaces, and a detachable steam-pipe head operatively carried by said first-named head and forming a portion of the coupling member, said steam-pipe head having an orifice opening in a vertical diagonal plane.

5. In an automatic train-pipe coupling, a yieldingly-held coupling-head provided with guide-prongs and interlocking surfaces and supplied with an air-passage having an orifice equipped with a transverse air-expanded gasket and a steam-pipe head operatively carried by said first-named head and having a gasket lying in a vertical diagonal plane.

6. In an automatic train-pipe coupling, a yieldingly-held coupling-head provided with guide-prongs and interlocking surfaces and supplied with an air-passage having an orifice equipped with a transverse soft gasket, and a steam-pipe head operatively carried by said first-named head and having a hard gasket lying in a vertical diagonal plane and provided with a prong for engaging the companion steam-pipe head.

7. In an automatic train-pipe coupling, a yieldingly-held coupling-head provided with guide-prongs and interlocking surfaces, and supplied with an air-passage having an orifice equipped with a gasket, and a steam-pipe head operatively carried by said first-named head and independently movable with relation to said first-named head, said steam-pipe head having a gasket-equipped orifice in vertical alinement with said first-named orifice.

8. In an automatic train-pipe coupling, a yieldingly-held coupling-head provided with guide-prongs and interlocking surfaces and supplied with a fluid-passage having a gasket-equipped orifice, and a steam-pipe head operatively carried by said first-named head and capable of movement with relation to said first-named head about a vertical axis.

9. In an automatic train-pipe coupling, a yieldingly-held coupling-head provided with guide-prongs and interlocking surfaces and supplied with a fluid-passage having a gasket-equipped orifice, and a steam-pipe head operatively carried by said first-named head and having swivel connection therewith.

10. In an automatic train-pipe coupling, a yieldingly-held coupling-head provided with guide-prongs and interlocking surfaces and supplied with a fluid-passage having a gasket-equipped orifice, and a steam-pipe head having swivel connection with said first-named head and equipped with a gasket lying in a vertical oblique plane, the orifices of said heads being in vertical alinement.

11. In an automatic train-pipe coupling, a coupling member comprising a perforated pipe-head having two diagonally opposite convex flanking surfaces and two diagonally opposite forwardly-diverging inclined prongs branching from said pipe-head and having at their bases concave surfaces for receiving the convex surfaces of a companion coupling member, and having also at their bases flanking or lateral surfaces for engaging similar surfaces of a companion coupling member, the flanking surfaces of each prong-base lying, respectively, in substantially vertical and horizontal planes, said coupling-head being provided with brake and signal passages having orifices equipped with transverse gaskets, and a steam-pipe head operatively carried by said first-named head and capable of a turning movement with relation thereto, said steam-pipe head having a steam-passage with its orifice equipped with a gasket lying in a vertical oblique plane, substantially as and for the purpose set forth.

12. In an automatic train-pipe coupling, a coupling member comprising a head having two diagonally opposite flanking surfaces and two diagonally opposite forwardly-diverging inclined prongs branching from said head and having at their bases concave surfaces for receiving the convex surfaces of a companion coupling member and having also at their bases flanking or lateral surfaces for engaging similar surfaces of a companion

coupling member, the flanking surfaces of each prong-base lying respectively in substantially horizontal and vertical planes, and two fluid-passages in said head having orifices equipped with yielding gaskets lying in a transverse plane and within an imaginary cylinder passing through said convex and concave surfaces.

13. In a train-pipe coupling, the combination of a yieldingly-supported steam-pipe head having a passage whose orifice is equipped with a gasket lying in an oblique plane, and having a yielding prong opposed to said gasket, and an emergency coupling device comprising a member having an obliquely-disposed gasket and a prong for connecting with said steam-pipe head, and a member serving to connect with a corresponding member of another car, substantially as and for the purpose set forth.

14. In a train-pipe coupling, a yieldingly-held coupling-head, comprising a central perforated pipe-head, two diagonally opposite convex flanking surfaces, two diagonally opposite forwardly-projecting inclined prongs branching from said pipe-head and having at their bases concave surfaces for receiving the convex surfaces of a companion coupling-head, and having, also, lateral surfaces for engaging similar surfaces of a companion coupling member, the flanking surfaces of each prong-base lying, respectively, in substantially horizontal and vertical planes, and a second pipe-head attached to said first-named head and having a passage whose orifice lies in the vertical plane of the orifice of said first-named pipe-head, substantially as described.

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In presence of—
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