

No. 740,749.

PATENTED OCT. 6, 1903.

J. E. FORSYTH.  
TRAIN PIPE COUPLING.  
APPLICATION FILED JAN. 27, 1903.

NO MODEL.

5 SHEETS—SHEET 1.

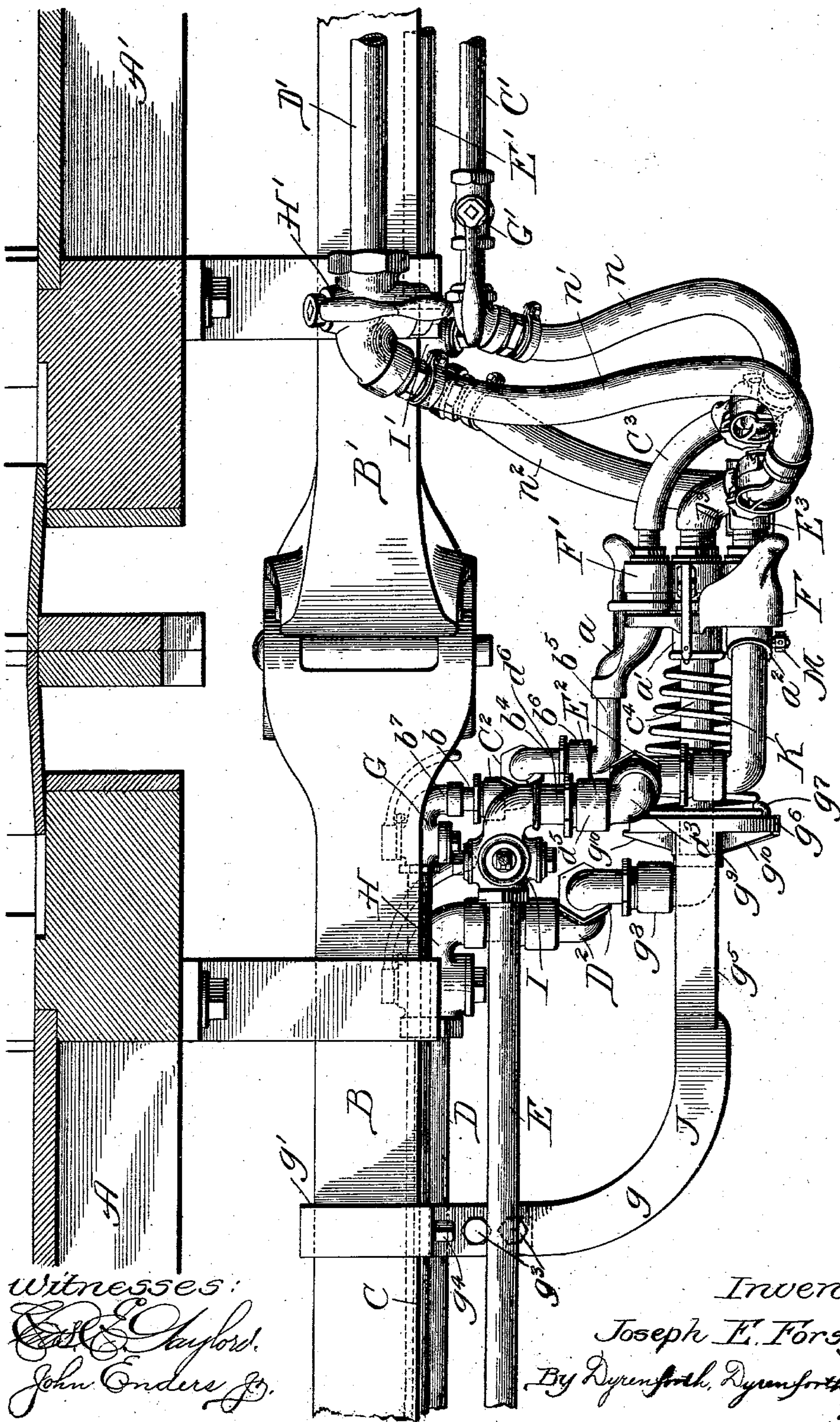


Fig. 1.

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Joseph E. Forsyth,  
By Dymenforth, Dymenforth & Lee  
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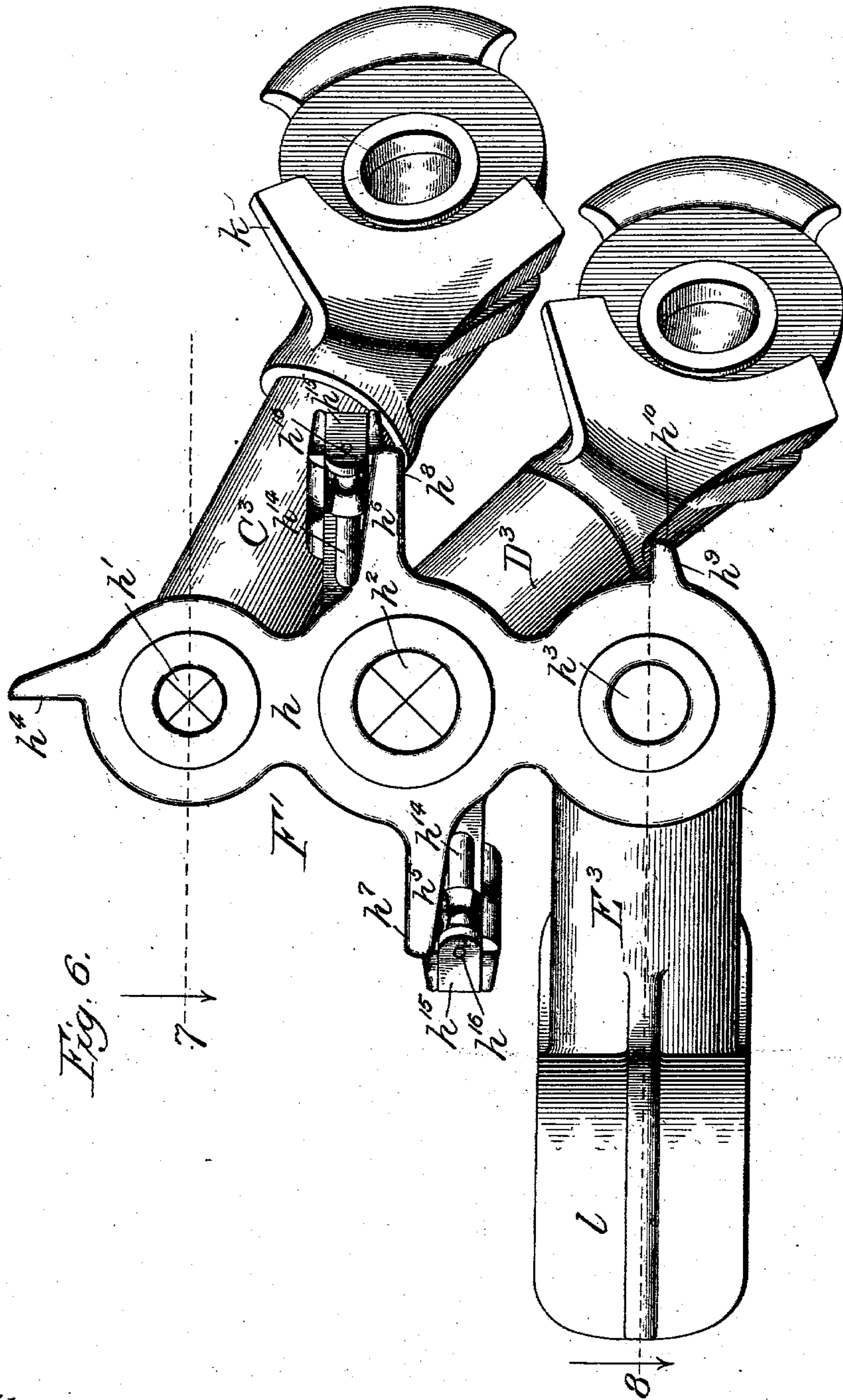




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NO MODEL.

5 SHEETS—SHEET 4.



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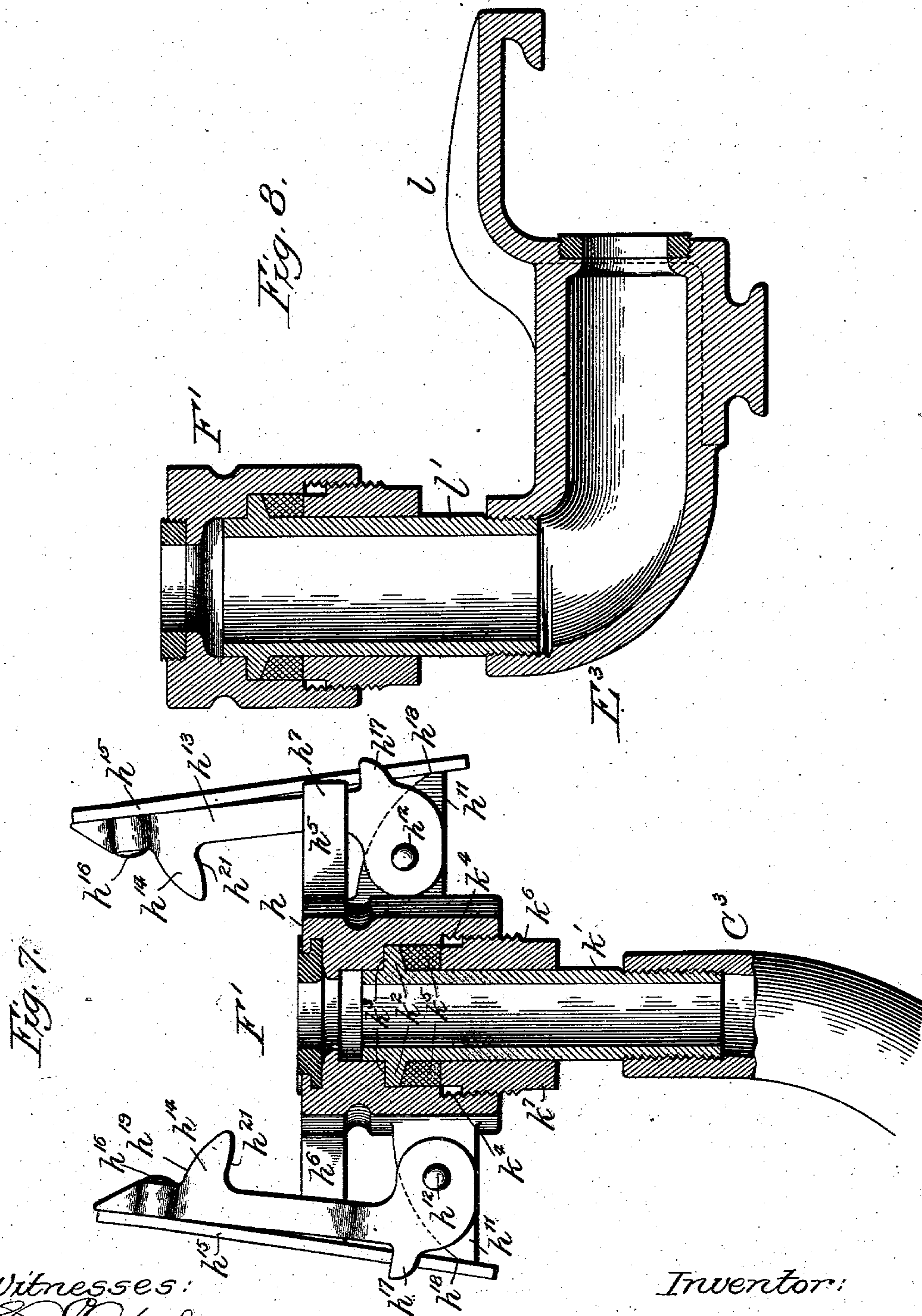
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NO MODEL.

5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

JOSEPH E. FORSYTH, OF CHICAGO, ILLINOIS.

## TRAIN-PIPE COUPLING.

SPECIFICATION forming part of Letters Patent No. 740,749, dated October 6, 1903.

Application filed January 27, 1903. Serial No. 140,799. (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.

My invention relates particularly to train-pipe couplings of the character described in my Patent No. 692,511, granted February 4, 1902.

My primary object is to provide improvements in the general construction and arrangement of parts of automatic train-pipe couplings of this character and an improved emergency coupling device adapted to be used in connection with the improved automatic coupling in case it is desired to couple a car equipped with the automatic coupling to one not so equipped.

My improvements are illustrated in the accompanying drawings, in which—

Figure 1 represents a broken sectional view of the substructure of two cars, one of which is equipped with my improved automatic train-pipe coupling and the other of which is equipped with my improved emergency coupling-head; Fig. 2, a transverse sectional view showing the improved automatic coupling in end elevation; Fig. 3, an enlarged broken section of one portion of the transversely-extending pipe-section shown at the left-hand portion of Fig. 2; Fig. 4, a similar section of the other end of said pipe-section and the adjacent pipe-sections; Fig. 5, a plan view showing the emergency coupling-head connected with the automatic coupling-head; Fig. 6, a view in end elevation of the emergency coupling-head; Fig. 7, a sectional view taken as indicated at line 7 of Fig. 6; and Fig. 8 a sectional view taken as indicated at line 8 of Fig. 6.

A description of the preferred construction follows.

A A' represent portions of the substructure of two cars; B B', draw-bars of the usual construction with which said cars are equipped; C C', signal-pipes connected with the cars and extending longitudinally thereof in the usual manner; D D', brake-pipes connected with the cars in the usual manner; E E', steam-pipes connected with the cars in

the usual manner; F, a coupling-head comprising a part of the improved automatic train-pipe coupling; F', an improved emergency train-pipe coupling-head; G G', manually-operated valves with which the signal-pipes are equipped; H H', manually-operated valves with which the brake-pipes are equipped; I I', manually-operated valves with which the steam-pipes are equipped; J, a bracket connected with the draw-bar B and serving to support the coupling-head F; C<sup>2</sup>, swivel-connected pipe-sections joining the pipe C with the coupling-head F; D<sup>2</sup>, swivel-connected pipe-sections joining the pipe D with the head F'; E<sup>2</sup>, swivel-connected pipe-sections joining the pipe E with the head F; C<sup>3</sup>, a metallic pipe-section having swivel connection with the coupling-head F' at the signal-passage thereof; D<sup>3</sup>, a metallic pipe-section having swivel connection with the coupling-head F' at the brake-pipe passage thereof; E<sup>3</sup>, a metallic pipe-section having swivel connection with the head F' at the steam-passage thereof, and K a conical coil-spring securely connected at its large end with the bracket J and having its small end closely encircling the longitudinal member of the pipe-sections D<sup>2</sup> at the coupling-head F and serving to center and support said coupling-head. The coupling-head F is provided with longitudinal internally-threaded apertured bosses *a a' a''*, corresponding, respectively, with the signal, brake, and steam-passages of the coupling-head. The connection C<sup>2</sup> between the valve G of the pipe C and the boss *a* comprises a short vertical pipe-section *b*, a transversely-extending horizontal pipe-section *b'*, having an upturned end *b<sup>2</sup>*, swivelly connected with the section *b* and having an enlarged opposite end *b<sup>3</sup>*, an elbow *b<sup>4</sup>*, having swivel connection at one end with the extremity *b<sup>3</sup>* of the pipe-section *b'*, and a pipe-section *b<sup>5</sup>*, having screw connection with the boss *a* and an enlarged upturned opposite end *b<sup>6</sup>*, swivelly connected with the adjacent end of the pipe-section *b<sup>4</sup>*. The valve G has a downturned internally-threaded end *b<sup>7</sup>*, into which the pipe-section *b* is firmly secured. The construction of the connections D<sup>2</sup> is similar to that just described, providing vertically-disposed swivel-joints *c c'*, respectively, and a horizontally-disposed



swivel-joint  $c^3$ . The transversely-extending pipe-section  $c^3$  is therefore permitted to swing in a horizontal plane, and the longitudinally-extending section  $c^4$  is permitted to move  
 5 longitudinally with relation to the pipe D. The connections  $E^2$  comprise a horizontally-disposed obliquely-extending section  $d$ , having one extremity screwed into the boss  $a^2$  of the coupling-head F and the other extremity  
 10 provided with an upturned enlarged end  $d^1$ , an elbow  $d^2$ , having swivel connection at one end with the end  $d^1$  of the section  $d$ , a transversely-extending horizontally-disposed section  $d^3$ , having an enlarged end  $d^4$  swivelly  
 15 connected with the adjacent end of the elbow  $d^2$  and having at its opposite extremity an upturned enlarged end  $d^5$ , a vertically-disposed section  $d^6$ , having swivel connection at its lower end with the part  $d^5$  and its upper  
 20 end screwed into the downturned end  $d^7$  of the valve I.

Figs. 3 and 4 show details of the swivel-joints in the pipe-sections  $E^2$ . The part  $d^5$  of the member  $d^3$  is provided with an internal  
 25 shoulder  $d^8$ , against which bears an annular collar  $d^9$ , formed integrally with the adjacent end of the pipe-section  $d^6$ . Outside the collar  $d^9$  is a packing-ring  $d^{10}$ , compressed by an annular nut  $d^{11}$ , which is externally threaded  
 30 and screwed into the internally-threaded part  $d^5$ . Similarly the extremity  $d^4$  has an internal shoulder  $d^{12}$ , and the adjacent end of the section  $d^2$  is provided externally with an integrally-formed collar  $d^{13}$ , against which fits  
 35 a packing-ring  $d^{14}$ , compressed by a nut  $d^{15}$ . The connection at  $d^1$  is similar except that the flange  $d^{16}$ , corresponding with the flange  $d^{13}$ , is threaded upon the extremity of the elbow  $d^2$ . The end portions of the elbow  $d^2$  are  
 40 larger than the curved portion, enabling the nut  $d^{15}$  to slip readily over the curved portion of the elbow and still fit snugly upon the end portion of the elbow. In assembling the parts the nut  $d^{15}$  and the corresponding nut  
 45 at the opposite end of the elbow are put in place before the flange  $d^{16}$  is secured upon the elbow.

The details of the swivel-joints in the connections  $C^2$   $D^2$  correspond with the details already given in the connections  $E^2$ . Thus the pipe-section  $d^3$  corresponds with the sections  $b^1$   $c^3$  of the connections  $C^2$   $D^2$ , respectively. The end  $d^5$  of the section  $d^3$  corresponds with the ends  $b^2$   $c$  of the sections mentioned, and the end  $d^4$  corresponds with the ends  $b^3$   $c^2$  of said sections.

The coupling-head F has an oval-shaped flat face  $f$ , whereat gasket-equipped orifices  $f^1$   $f^2$   $f^3$  of the signal, brake, and steam passages are located, two diagonally opposite forwardly and outwardly curved guide-prongs  $f^4$   $f^5$ , branching from the lateral surfaces of the coupling-head and having at the inner sides of their bases concave surfaces  $f^6$  and  
 60 having lateral shoulders  $f^7$  lying in a central horizontal plane and lateral shoulders  $f^8$  lying in a vertical plane, and said head also has

diagonally opposite convex edge surfaces  $f^9$ , corresponding with the spaces between the shoulders  $f^7$   $f^8$ . Said coupling-head is further provided with a perforation  $f^{10}$ , which serves to lighten the casting and also permits circulation of air between the steam-passage and the brake-passage. The orifices of the coupling-head are in vertical alinement, and the shoulders  $f^8$  are practically in vertical alinement with the centers of said orifices, while the shoulders  $f^7$  are practically in transverse alinement with the center of the orifice  $f^2$ . As thus described the diagonally opposite quarters of the coupling-head have convex surfaces, and the other two diagonally opposite quarters have concave surfaces at the bases of the guide-prongs. When two of the improved automatic coupling-heads are brought face to face, therefore, the prong-bases of each coupling-head will enter the spaces between the prong-bases of the other coupling-head and each concave surface will receive a corresponding convex surface of the companion coupling-head. The gaskets of the orifices  $f^1$   $f^2$  are of soft rubber and the gasket at the orifice  $f^3$  is of hard composition, adapted to use in connection with steam. The general operation of the automatic coupling is similar to the operation described in the above-mentioned patent and need not be described in detail in the present application.

The bracket J comprises a curved shank  $g$ , two clamping members  $g^1$   $g^2$ , Figs. 1 and 2, the former of which is formed integrally with the shank and the two members of which are connected by bolts  $g^3$ , a set-screw  $g^4$ , which serves to tighten the clamp upon the draw-bar, a horizontally-disposed yoke  $g^5$ , carried by the lower end of the shank  $g$ , and a vertically-disposed ring  $g^6$ , formed integrally with the front extremity of the yoke. The rear or base end of the spring  $k$  is secured to the ring  $g^6$  by eyebolts  $g^7$ . The pipe-section  $c^4$  passes through the center of the ring  $g^6$  and has its rear end secured into an elbow  $g^8$ , forming one of the sections of the connections  $D^2$ . The forwardly-turned end of this elbow bears against a sleeve or ring  $g^9$ , loosely mounted on the rear end of the pipe-section  $c^4$  and equipped with fingers  $g^{10}$ , lying in a vertical plane and bearing against the rear surface of the ring  $g^6$ . Under compression or extension of the spring K the pipe-section  $c^4$  is free to move longitudinally, the ring  $g^6$  serving as a stop limiting the forward movement. The fingers  $g^{10}$  permit lateral movement of the pipe-section  $g^8$  in any direction during coupling, in which movement the fingers slip upon the rear surface of the ring  $g^6$ . The spring serves to keep the pipe-section normally centered, thus holding the coupling-head F yieldingly in its proper place.

As shown in Figs. 6 and 7, the emergency coupling-head F' has a flat face  $h$  and is provided with gasket-equipped orifices  $h^1$   $h^2$   $h^3$ , communicating with the pipe-sections  $C^3$   $D^3$   $E^3$  and corresponding with the orifices  $f^1$   $f^2$



$f^3$ . The head  $F'$  is provided at its upper portion with a lug having a shoulder  $h^4$  lying in a vertical plane and serving to engage the upper shoulder  $f^3$  of the head  $F$ . It is further provided with laterally-projecting lugs  $h^5 h^6$ , located near the central portion of the head and provided with shoulders  $h^7 h^8$ , respectively, which serve to engage the shoulders  $f^7$  of the head  $F$ . There is further provided near the base of the emergency coupling-head a lug  $h^9$ , having a rounded extremity  $h^{10}$ , serving to engage the lower concave surface  $f^6$  at the base of the lower prong  $f^5$  of the head  $F$ . Adjacent to and somewhat in the rear of the lugs  $h^5 h^6$  are provided lugs  $h^{11}$ , to which are secured by pivots  $h^{12}$  latching-prongs  $h^{13}$ , provided with inturned hooks  $h^{14}$ . To the free extremities of the prongs  $h^{13}$  are secured springs  $h^{15}$ , attached to the prong extremities by rivets  $h^{16}$  and having their rear portions passing between lugs  $h^{17}$  on the prong-bases and bearing against the extremities  $h^{18}$  of the lugs  $h^{11}$ . The lugs  $h^{14}$  are located at a sufficient distance in front of the flat face  $h$  to permit the head  $F$  to enter and be secured in the manner shown in Fig. 5. The surfaces of the lugs  $h^{14}$ , which are away from the surface  $h$  of the head, are beveled, as shown at  $h^{19}$ , so that the prongs will open automatically as the coupling-head  $F'$  is pressed into engagement with the head  $F$ . The head  $F$  is provided with shoulders  $h^{20}$ , Fig. 5, which are engaged by the surfaces  $h^{21}$  of the lugs  $h^{14}$ . The pipe-section  $C^3$  is curved, as shown, and provided at its free extremity with a coupling member  $k$  of the ordinary form of hand-coupling for hose connections and adapted to be connected with the hand-coupling of a hose on a car not equipped with the automatic coupling-head. The inner end of the pipe-section is screwed onto a short pipe-section  $k'$ , Fig. 7. The inner end of the pipe-section  $k'$  is provided externally with a flange  $k^2$ , which bears against a shoulder  $k^3$ , forming the bottom of a socket or gland  $k^4$ , with which the head  $F'$  is provided at its rear face. Against the flange  $k^2$  is confined a packing-ring  $k^5$ , which is compressed by an annular nut  $k^6$ , fitting closely upon the pipe-section  $k'$  and having threaded connection at its external portion with the internal portion of the part  $k^4$ . The nut  $k^6$  is flangeless and has a wrench-receiving portion  $k^7$ . This permits the nut to be screwed in to any desired extent. The equipment of the pipe-section  $D^3$  and the connection thereof with the head  $F'$  are similar to that just described in connection with the pipe-section  $C^3$ . The pipe-section  $E^3$ , Figs. 6 and 8, is really an elbow equipped at one end with a coupling member  $l$ , such as is used ordinarily upon steam hose connections and adapted for coupling with the ordinary steam hose connection with a car not equipped with the automatic coupling. The inner end of the elbow  $E^3$  is firmly connected with a short pipe-section  $l'$ , which is swivelly connected with the head  $F'$ , as shown in Fig.

8. The detail of this connection is similar to the detail shown in Fig. 7, so that it is unnecessary to describe it further.

Fig. 7 shows the construction of the gaskets at the orifices of the air-passages of both the automatic coupling-head and the emergency coupling-head, and Fig. 8 shows a detail of the gasket employed at the steam-passages of both the automatic coupling-head and the emergency coupling-head.

The valves  $G G' H H'$  are single-passage valves and are equipped with short handles, by means of which the valves may be turned to close the ends of the air-pipes or to open the same and to put them into communication with the coupling-heads. The valve  $E$  is a single-passage valve and is equipped with a laterally-extending operating-stem  $m$ , which extends to near the side of the car.

Assuming two cars equipped with the automatic train-pipe couplings to be brought together, the prongs of each coupling-head will enter the spaces between the prongs of the companion coupling-head and the coupling-heads will be firmly locked together, so as to be practically free from rotation and all other movement with relation to each other, practically all the movement necessary to compensate for the movement of the cars with relation to each other taking place at the swivel-joints of the pipes. The construction described permits of the automatic coupling-heads being joined to the train-pipes with the fewest possible joints, assuming the necessary provision to be made for the movement of the coupling-heads.

When it is desired to couple a car equipped with the improved automatic coupling-head with a car not so equipped, the emergency coupling-head is brought into use. To apply the same, it is only necessary to present the face of the emergency-head to the face of the automatic coupling-head and press the two together, whereupon the jaws or spring-held prongs of the emergency-head open automatically to receive the automatic coupling-head and close upon the same to hold the heads firmly together. The connection thus established is very similar to the connection established between two automatic coupling-heads, it being borne in mind that the necessity for the clamping-jaws  $h^{13}$  arises from the fact that it is not expedient to employ spring-pressure to press the coupling-heads together. After the emergency-head is joined to the automatic coupling-head the metallic pipe-sections of the emergency-head may be readily connected with the hose connections  $n n' n^2$  of the old style by means of the hand-couplings referred to. When these connections are made, it will be observed that the swivel connections of the metallic pipe-sections of the emergency-head permit the hand-couplings to drop under their own weight, so that they will remain firmly connected, as is the case where the usual hose connections are employed upon two cars. In practice a drip



will be provided for the steam-passage of the coupling-head F. M represents such a drip applied to the lug  $a^2$  of the coupling-head, and it will be understood that this drip may be of any approved construction.

It will be understood that changes in details of construction and arrangement within the spirit of my invention may be made. Hence no undue limitation should be understood from the foregoing detailed description, which has been given for clearness of understanding only.

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

1. In an automatic train-pipe coupling, the combination of three or more train-pipes having flexible connections at their end portions, and a coupling-head having a flat transverse oval-shaped face and three or more vertically-aligned orifices opening thereat, two diagonally opposite forwardly and outwardly inclined prongs branching from said head and having at their bases concave surfaces conforming to the oval outline of said head, said head having two diagonally opposite convex flanking-surfaces corresponding to the outline of said oval-shaped face and said prongs having at their bases lateral shoulders lying in vertical and horizontal planes and separated by said convex surfaces, for the purpose set forth.

2. In an automatic train-pipe coupling, the combination with a yieldingly-supported coupling-head provided with suitable guide-prongs and a train-pipe suitably connected with the car, of flexible connections joining said pipe with said coupling-head comprising a transversely-extending horizontally-disposed section having an integrally-formed end portion turned at substantially right angles to the pipe-section, a pipe-section lying in a vertical plane and swivelly joined to said turned-end portion, an elbow having swivel connection at one end with the other end of said first-named pipe-section, thereby affording a swivel-joint lying in a horizontal plane, and an additional vertically-disposed pipe-section swivelly joined to the free end of said elbow, thereby affording a second vertically-disposed swivel-joint, for the purpose set forth.

3. In an automatic train-pipe coupling, the combination with a yieldingly-supported coupling-head equipped with suitable guide-prongs, and a train-pipe suitably connected with a car, of a horizontally-disposed longitudinally-extending pipe-section attached to said coupling-head and having an upturned rear end, an elbow having swivel connection at one end with said upturned end, a horizontally-disposed transversely-extending pipe-section having swivel connection at one end with the free end of said elbow and provided at its opposite end with an upturned extremity, and a vertically-disposed pipe-section having swivel connection with said last-named up-

turned end and connected with said train-pipe, for the purpose set forth.

4. In an automatic train-pipe coupling, the combination with a yieldingly-supported coupling-head and a train-pipe suitably connected with a car, of flexible metallic connections between said coupling-head and train-pipe, comprising a rearwardly-extending pipe-section connected with said coupling-head and having an enlarged upturned end, an elbow provided externally near its ends with flanges, annular nuts upon the end portions of said elbow, suitable packing-rings, a horizontally-disposed transversely-extending pipe-section having an enlarged end receiving the adjacent extremity of said elbow and having its opposite end upturned and of enlarged diameter, a vertically-disposed pipe-section connected at one end with said train-pipe and provided at the other end with an external flange, and a packing-ring and externally-threaded nut upon said last-named pipe-section, for the purpose set forth.

5. In an automatic train-pipe coupling, the combination with a yieldingly-supported coupling-head equipped with suitable guide-prongs and having vertically-aligned air and steam passages, and an air-pipe and steam-pipe located at opposite sides of the central portion of the substructure of the car, of a pipe-section connected at its front end with said coupling-head at the air-passage thereof and having an upturned integrally-formed rear end, an elbow having swiveled connection at one end with said upturned end, a transversely-extending horizontally-disposed pipe-section having swiveled connection with the free end of said elbow and having at its opposite extremity an upturned end, a vertically-disposed pipe-section swivelly connected with said last-named upturned end and suitably joined to the air-pipe of the car, a horizontally-disposed diagonally-extending pipe-section connected with said coupling-head at the steam-passage thereof and having an integrally-formed upturned rear end, an elbow swivelly connected at one end with said last-named upturned end, a transversely-extending pipe-section swivelly connected with the free end of said last-named elbow and having at its opposite end an upturned extremity, and an additional vertically-disposed pipe-section swivelly connected with the adjacent upturned end of said last-named pipe-section and suitably connected with the steam-pipe of the car, for the purpose set forth.

6. In a train-pipe coupling, an elbow having one end portion equipped with an integrally-formed external flange and the other end portion equipped with a flange threaded thereon, annular nuts upon the end portions of said elbow between said flanges, packing-rings between said nuts and flanges, and pipe-sections having shoulders affording bearings for said flanges and having threaded connections with said nuts, for the purpose set forth.



7. An emergency coupling member, comprising a suitable head having a plurality of vertically-aligned fluid-passages, and means for removably securing said head to the head  
5 of an automatic coupling, for the purpose set forth.

8. An emergency coupling member, comprising a suitable head, a metallic pipe-section swivelly connected therewith, and a pipe-  
10 coupling attached to the free end of said pipe-section, for the purpose set forth.

9. An emergency coupling member, comprising a head provided with a flat face adapted to engage the transverse flat face of  
15 the automatic coupling-head, and having gasket-equipped vertically-aligned orifices, and a plurality of pipe-sections connected with said first-named head and equipped with pipe-couplings, for the purpose set forth.

20 10. An emergency coupling member, comprising a suitable head having a flat front surface and provided with forwardly-projecting spring-held jaws, said head having a plurality of vertically-aligned orifices, and pipe-  
25 sections connected with the rear portion of said head, for the purpose set forth.

11. An emergency coupling member, comprising a suitable head equipped with laterally-projecting lugs serving to engage shoulders on the automatic coupling-head, to prevent relative rotation, forwardly-projecting  
30 spring-held jaws, and metallic pipe-sections swivelly connected with the rear portion of said head, for the purpose set forth.

35 12. An emergency coupling member, comprising a head having vertically-aligned orifices, forwardly-projecting spring-held clamping-jaws and lateral shoulder serving to engage corresponding shoulders of an automatic  
40 coupling-head, for the purpose set forth.

13. An emergency coupling member, comprising a head having a flat front face and vertically-aligned gasket-equipped orifices, two lateral lugs located respectively above  
45 and below the center of the center orifice, two opposed forwardly-projecting yielding clamping-jaws located respectively above and below the center of the central orifice, and pipe-sections connected with the rear portion of  
50 said head, for the purpose set forth.

14. An emergency coupling member for the purpose set forth, comprising a suitable head having vertically-aligned orifices and provided at opposite sides with an upturned shoulder  
55 and a downturned shoulder adapted to engage, respectively, beneath and above corresponding shoulders of an automatic coupling-head and provided also at one end portion with a shoulder adapted to engage a vertical  
60 shoulder of the automatic coupling-head, and means for securing the emergency coupling-

head to the automatic coupling-head, for the purpose set forth.

15. An emergency coupling member, comprising a suitable head provided with vertically-aligned gasket-equipped orifices, means  
65 for securing said head to an automatic coupling-head, and three pipe-sections connected with the rear portion of said emergency-head, two of said pipe-sections equipped with an  
70 air-pipe hand-coupling and the other of said sections equipped with a steam-pipe hand-coupling, for the purpose set forth.

16. An emergency coupling member, comprising a head having a flat front face and  
75 vertically-aligned gasket-equipped orifices opening thereat, laterally-extending shoulder-engaging lugs projecting from said head, a lug having a curved extremity adapted to bear against the concave surface of an auto-  
80 matic coupling-head, and forwardly-projecting yielding clamping-jaws connected with said head, for the purpose set forth.

17. An emergency coupling member, comprising a suitable head, pipe-sections con-  
85 nected therewith at the rear portion thereof, laterally-projecting lugs, clamping-jaws pivotally connected with said lugs, said lugs having shoulders serving as bearings for springs, and springs connected with said jaws  
90 near the free ends thereof and bearing against said lugs, for the purpose set forth.

18. In an automatic coupling, the combination with a suitable prong-equipped coupling-head, a rearwardly-extending pipe-section  
95 connected with said head and a conical spring having its front end closely encircling said pipe-section, of a supporting-bracket for said spring comprising a curved shank equipped at its front portion with a yoke bearing  
100 an integrally-formed vertically-disposed ring to which the rear end of said spring is attached, and means for clampingly securing the upper extremity of said bracket to the draw-bar of a car, for the purpose set forth.  
105

19. In a flexible metallic connection for train-pipes, an elbow having enlarged end portions equipped externally with flanges, one of said flanges having screw connection  
110 with the elbow, annular nuts fitting closely upon the end portions of the elbow and having external threads, packing-rings confined between said nuts and said flanges, and pipe-sections having internal shoulders affording bearings for the said flanges and equipped at  
115 their extremities with internal threads receiving said nuts, for the purpose set forth.

JOSEPH E. FORSYTH.

In presence of—

WALTER WINBERG,  
L. HEISLAR.