No. 847,288. PATENTED MAR. 12, 1907.

J. E. MARBLE.

AUTOMATIC STEAM AND AIR PIPE COUPLING.

APPLICATION FILED JAN. 2, 1907.

4 SHEETS—SHEET 1.

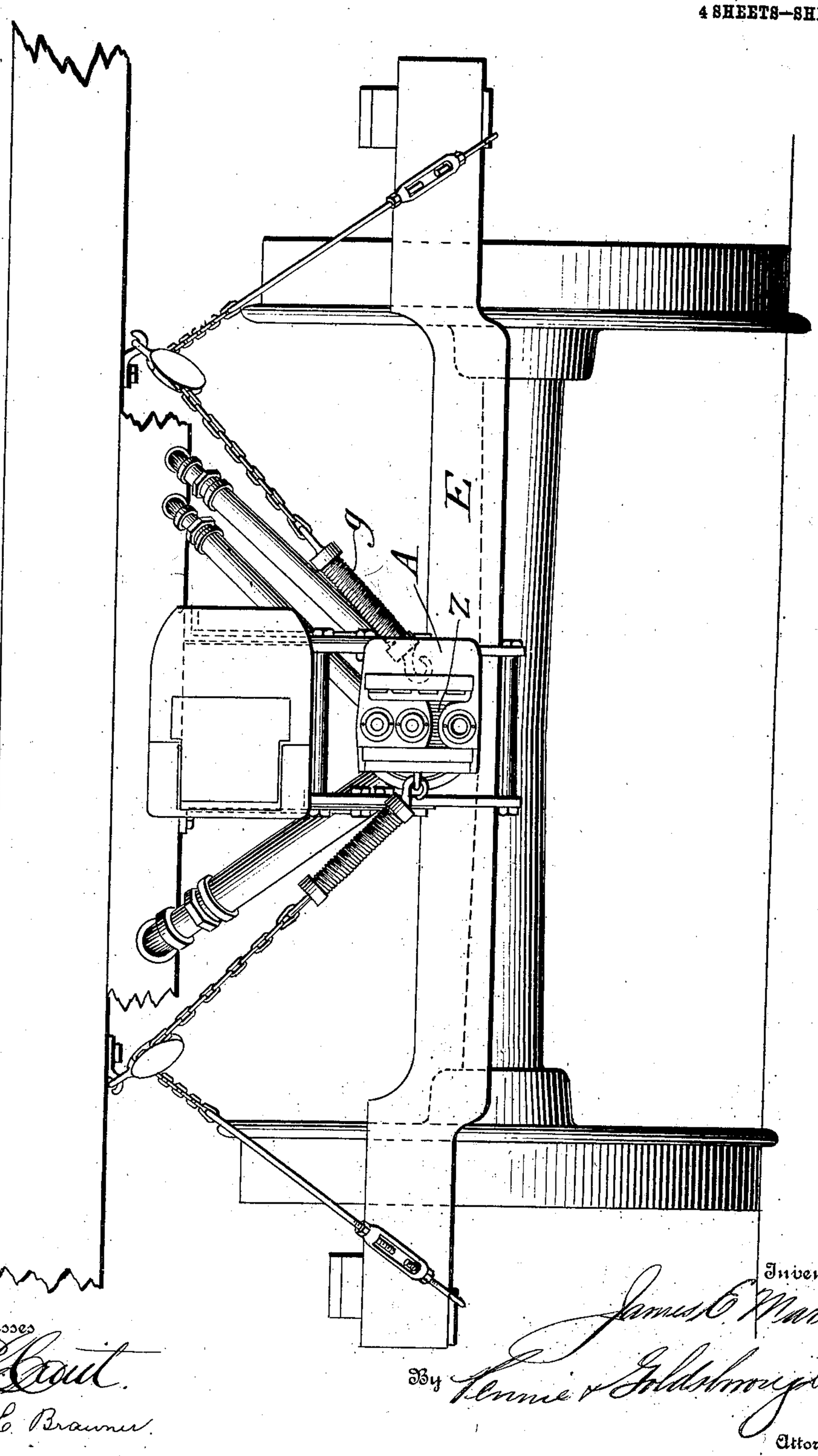


Fig. 1.

Witnesses
C. Coult.
M. C. Brauer.

Inventor
James E. Marble
By Fennie & Goldsborough
Attorneys.

No. 847,288. PATENTED MAR. 12, 1907.

J. E. MARBLE.

AUTOMATIC STEAM AND AIR PIPE COUPLING.

APPLICATION FILED JAN. 2, 1907.

4 SHEETS—SHEET 2.

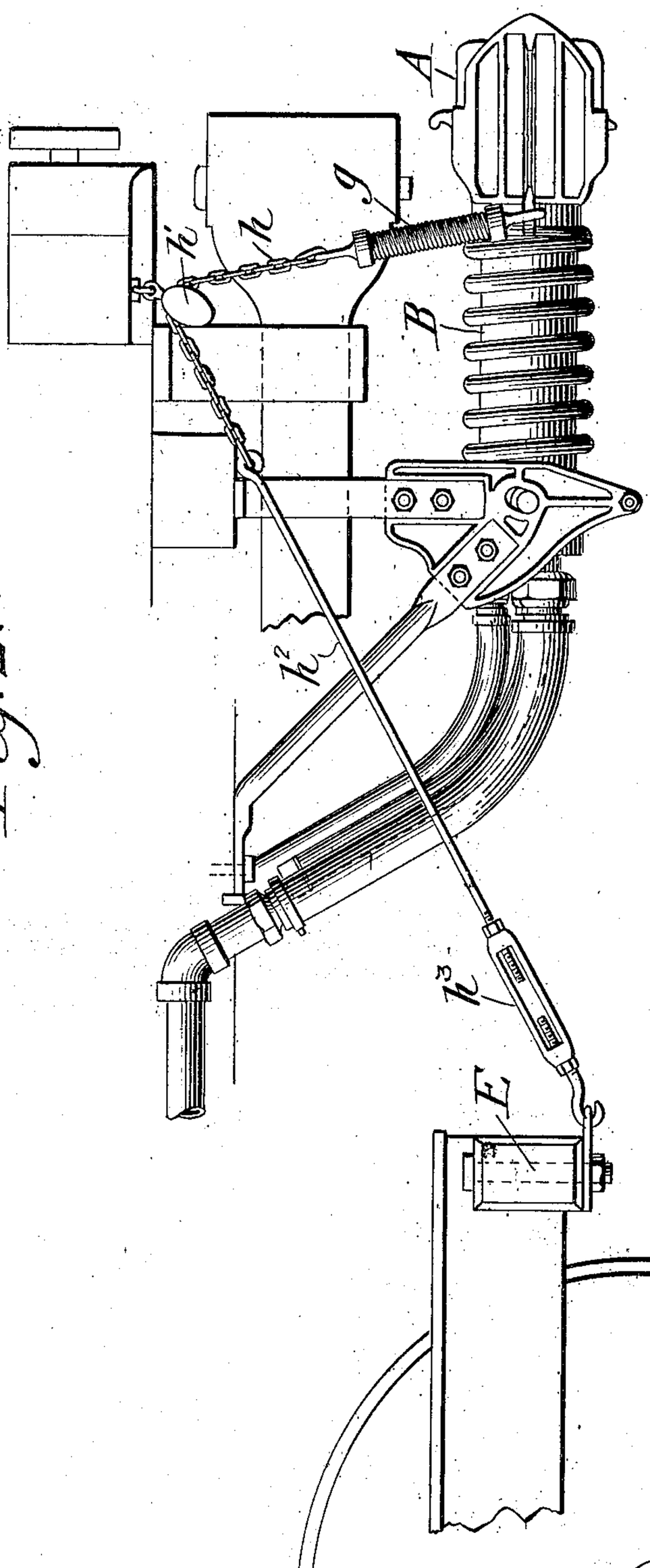


Fig. 2.

Witnesses
C. Coast.
M. E. Brainer.

Inventor
James E. Marble
By Fennie & Goldsborough
Attorneys

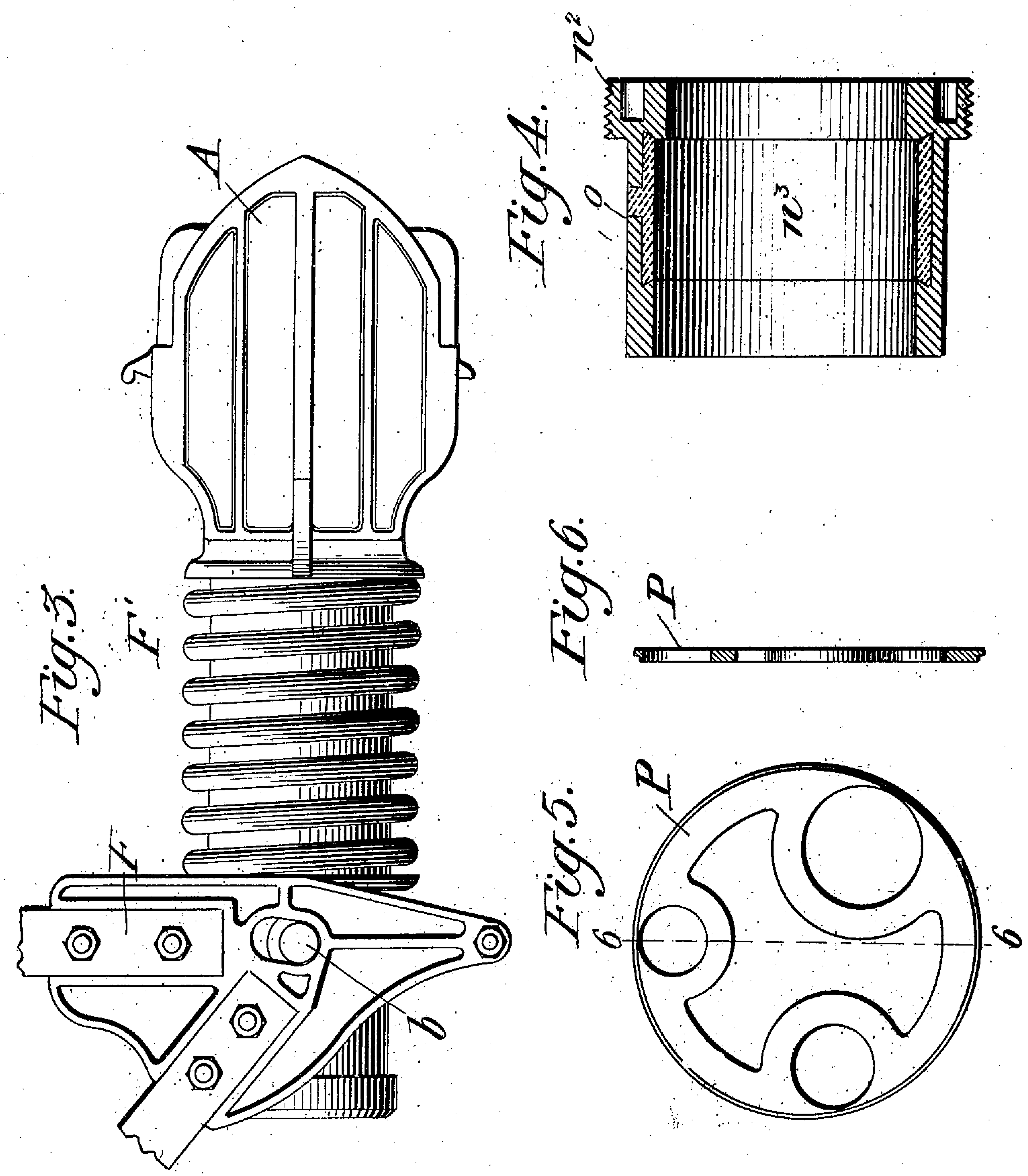
No. 847,288. PATENTED MAR. 12, 1907.

J. E. MARBLE.

AUTOMATIC STEAM AND AIR PIPE COUPLING.

APPLICATION FILED JAN. 2, 1907.

4 SHEETS—SHEET 3.



Witnesses
[illegible]
M. E. Brauner

Inventor
James E. Marble,
By Pennie & Goldsborough
Attorney

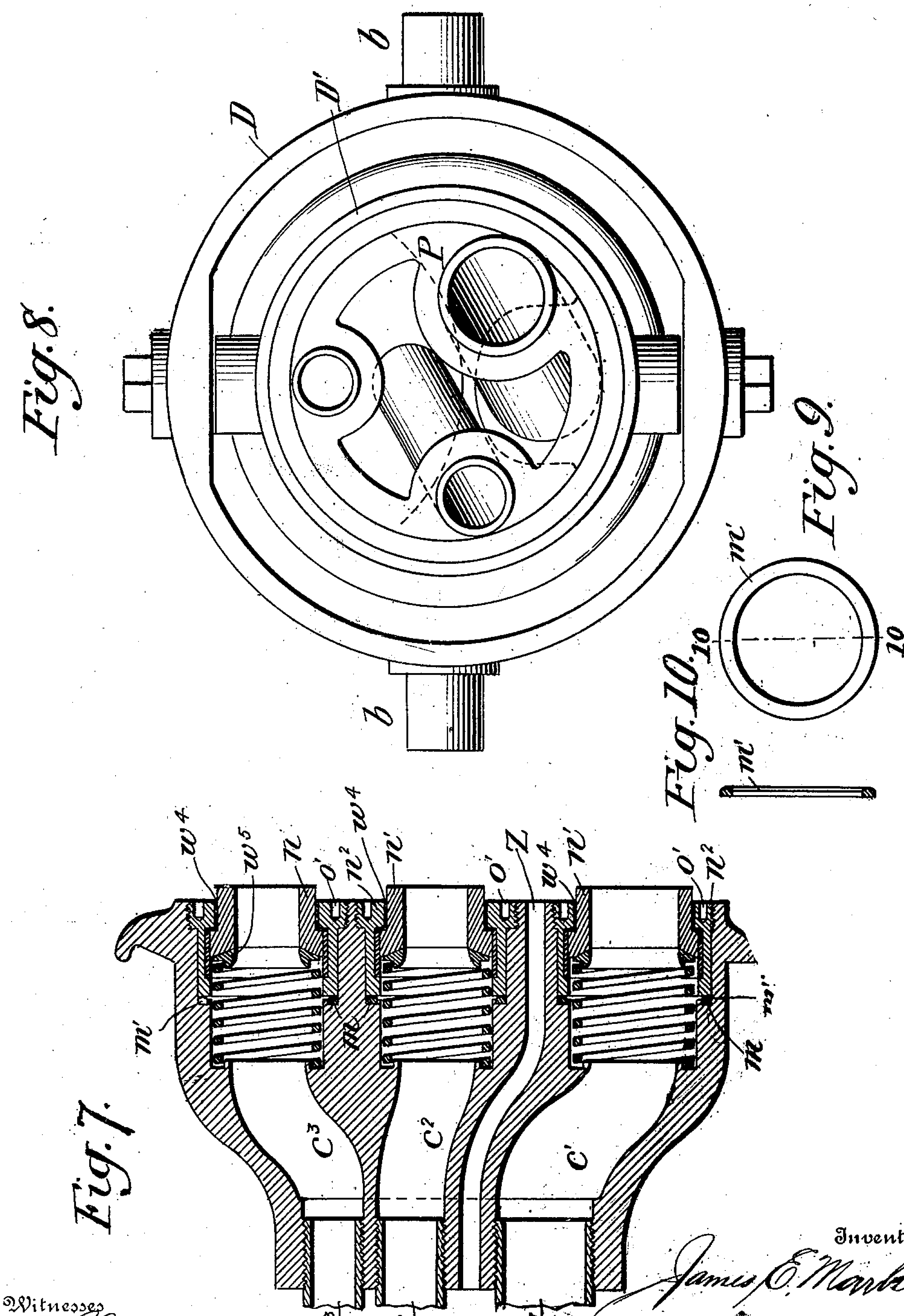
No. 847,288 PATENTED MAR. 12, 1907.

J. E. MARBLE.

AUTOMATIC STEAM AND AIR PIPE COUPLING.

APPLICATION FILED JAN. 2, 1907.

4 SHEETS—SHEET 4.



Witnesses

M. E. Brauner

Inventor

James E. Marble

By Rennie & Goldsborough

Attorneys

UNITED STATES PATENT OFFICE.

JAMES E. MARBLE, OF ALBANY, NEW YORK, ASSIGNOR OF ONE-THIRD TO JOHN J. LAYDEN, OF ALBANY, NEW YORK.

AUTOMATIC STEAM AND AIR PIPE COUPLING.

No. 847,288. Specification of Letters Patent. Patented March 12, 1907.

Application filed January 2, 1907. Serial No. 350,459.

To all whom it may concern:

Be it known that I, JAMES E. MARBLE, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Automatic Steam and Air Pipe Couplers; and I do hereby declare the following to be a full, clear, and exact description of the invention; such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in the construction and suspension of automatic couplers for connecting the fluid-conducting pipes of railway-trains—as, for instance, the pipes employed for conducting steam and compressed air to the several cars.

The practical construction herein illustrated is particularly applicable to a train-pipe system having a steam-conduit adapted to supply the usual heating-coils of the train and having separate air-conduits for the brake-cylinders and signals, respectively; but it will be understood that the features of novelty claimed are not restricted to any particular train-pipe system, but are intended for employment wherever they may be separately or collectively used to advantage.

In the accompanying drawings, Figure 1 represents in front elevation the end parts of a passenger-car and its forward truck provided with draft-gear of any suitable type and showing my improved train-pipe coupler suspended from the truck and car-body in a novel manner. Fig. 2 represents a side elevation of the same parts. Fig. 3 is a detail side elevation of the coupler-head and supporting-cheeks on an enlarged scale. Fig. 4 is a detail view of an improved bushing adapted to carry the contact-gasket in the forward face of the coupler. Fig. 5 is a front elevation of the rear end plate of the coupler, and Fig. 6 is a section of the same on the line 6 6 of Fig. 5. Fig. 7 is a vertical central section of the coupler-head on an enlarged scale. Fig. 8 is an elevation of the rear head of the coupler, showing the supporting-rings and trunnions forming a universal joint. Fig. 9 is a front elevation of a ring adapted to form a seat for the rear end of the bushing in the coupler-head, and Fig. 10 is a section of the same on the line 10 10 of Fig. 9.

Similar letters of reference indicate similar parts throughout the several views.

The coupler here referred to is of the same general nature as the couplers disclosed in my prior patents, Nos. 491,291, 592,521, 592,522, and 592,523.

The coupling members on adjacent cars are designed to be homologous counterparts of each other and are suspended in like manner. Each is provided with a coupling-head A, cored out to form passages with which the steam and air pipes register, as shown in Fig. 7, and a protecting tube or casing B, secured to the under side of the car-body by a gimbal or universal joint consisting of two concentric rings D and D′, (see Fig. 8,) one of which is journaled to swing in a horizontal plane within the other, the outer one being journaled to swing in a vertical plane. Three pipes e', e^2, and e^3, forming parts of the steam connections, the air-brake connections, and the air-signal connections, respectively, are screwed into the inner ends of the cored openings c', c^2, and c^3 of the coupler-head, as shown in Fig. 7, and they extend through the protecting-casing B and through the end plate P in the rear end of the coupler, as shown in Fig. 8. Here they make connection with the flexible connecting-tubes, as shown in Figs. 1 and 2. The front end of the coupler-head is provided with guide-flanges to insure a proper registering of the couplers, and the cored openings in the coupler-head terminate at the forward part in the cylindrical chambers of different diameters, as illustrated in Fig. 7. Within these cylindrical chambers are fitted the bushings n^2, of bronze or similar non-corrodible material, within which are supported the contact-nipples n'. The general character of these parts is similar to that disclosed in my earlier patents referred to and will be readily understood from an inspection of the drawings. It has heretofore been customary, as illustrated in those patents, to suspend the automatic coupler directly beneath the draft-rigging by means of stiff springs secured to the couplers by turnbuckles and hung directly from the under side of the car-body. These springs have sufficient flexibility to allow the movement of the coupler-heads and supports in both a vertical and horizontal plane as they turn on their universal bearings when they

are brought into registering position. I have found, however, that this mode of suspension is not entirely satisfactory when the long cars of modern construction are coupled on or carried around curves. My improved construction for suspending the couplers is illustrated in Figs. 1 and 2, from which it will be observed that instead of hanging the suspending-springs from beneath the car-body directly the connection is extended back to the end piece E of the truck-frame. In the particular construction shown the springs *g* are fastened at their lower ends to the sides of the coupler-head and at their upper ends are connected to flexible connectors comprising chains *h*, which pass over sheaves *h'*, secured to the under side of the car-body, and are attached at their other ends to rods extending backward toward the forward end piece of the truck-frame and secured thereto by the turnbuckles h^3. By this construction the direction of the coupler follows that of the truck rather than that of the car-body, and juxtaposed ends of the couplers on abutting cars are brought more exactly into alinement on curves. So far as I am aware it is broadly new to provide means for suspending the coupler members from the car-body by means of a universal joint and at the same time to so connect them with the truck-frame that they follow the direction of the truck rather than that of the car-body, and I desire my broad claims upon the means for obtaining this characteristic function to receive a correspondingly-broad interpretation. In the earlier construction of these couplers the trunnions *b* of the outer ring D of the gimbal or universal joint have been mounted in elongated bearings or slots in a hanger composed of the cheek-pieces F, depending from the under side of the car-body, the purpose of these elongated bearings being to allow a limited tilting of the coupler on curves, as is fully explained in my Patent No. 592,522. I have found, however, that there is a tendency for the couplers to stick in the upper ends of the bearings instead of returning to the lower ends, thus detracting from the exact registration of the couplers when two cars are brought together. To avoid this, I give to the slots supporting the trunnions *b* a rearward inclination from the top to bottom, as illustrated in Fig. 3, so that the trunnions may be forced to the lower end of the bearings by the spring F', which is interposed between the coupler-head and the universal joint.

In the earlier forms of my coupler, as illustrated particularly in Patent No. 592,523, an opening has been cored out through the coupler-head between the steam-pipe, which is lowermost of the three pipes, and the two air-pipes above it, the object of this opening being to allow the free circulation of air to afford a heat insulation and prevent the heat of the steam-pipe from affecting the nipples of the air-pipes. In my present construction I provide an enlarged opening Z, as indicated in Figs. 1, 7, and 8, and instead of supporting the rear ends of the steam and air pipes by a solid plate closing the rear end of the protecting-casing B, as has heretofore been customary, I use an open plate or skeleton P, as shown in Figs. 5, 6, and 8, thus allowing a blowing of the air through the opening in the coupler-head and the protecting-casing as the cars move.

In order to secure a tight connection of the train-pipes where they contact with one another at the ends of two abutting cars, I have heretofore provided gaskets *n'*, moving in bushings n^2 in the coupler-head, and in order to prevent leakage around the gaskets within the bushings I have provided the expanders w^5 between the inner beveled end of the gaskets and their springs w^6, and in order to prevent the catching of the gasket in the reduced opening in the bushing when the gasket is expanded by pressure against the corresponding gasket on the abutting car I have covered the reduced portion of the gasket with a shell or cap w^4, of metal, as fully described in my Patent No. 592,523. I find, however, that there is a tendency for the enlarged portion of the gasket under the action of the expander to stick even in the bushing made of non-corrodible material and that the forcing of the gasket to its forward position by its spring is thereby prevented. To overcome this difficulty, I have resorted to a construction which is illustrated in Figs. 4 and 7 and which comprises a ring n^3, of some anti-friction material, such as lead or Babbitt metal, which is cast into the inner face of the bushing n^2 through the hole *o*, provided for that purpose, and this bushing should preferably be of sufficient extent to cover the entire range of movement of the gasket *n'*.

In order to make a tight joint between the inner end of the bushing n^2 and the shoulder in the head at the rear end of the enlarged portion of the cylindrical chamber, I have heretofore placed between that shoulder and the inner end of the bushing an annular ring of a relatively soft material, such as lead or soft copper; but I find that under the pressure of the gasket when it is screwed into place the inner edge of this ring tends to project into the path of movement of the spring w^6, thus preventing a proper functioning of all the parts, and, moreover, when the gasket is removed the annular ring drops out of place. In order to overcome these difficulties, I provide an annular countersunk recess *m* in the shoulder referred to, and into this recess I force an annular ring *m'* (see Figs. 9 and 10) of a relatively soft material, such as copper or lead, and having a beveled outer face, so that the bushing n^2 when it is screwed

into place contacts with the highest point of the bevel and makes a tight joint therewith, and at the same time the recess in the shoulder prevents the projection of the soft annular ring into the path of the spring and also holds the ring in place when the bushing is removed.

In the construction of the bushings n^3 it has heretofore been customary to make the bushings of the steam-pipe and the air-brake pipe of the same diameter, and the bushing of the air signal-pipe has been made of smaller diameter. When it is desired to remove these bushings, the two prongs of a forked wrench are inserted in the recesses o' to turn and unscrew the bushings, and for this purpose it has been necessary to use different wrenches or the two ends of a double-ended wrench to remove the three bushings. It will be understood that the train-pipes for the different fluids have been of different sizes, thus necessitating the different sizes of gaskets, and the size of the bushing has heretofore been regulated by the size of the gasket. In the present construction I provide each bushing with the retaining-shoulder to hold the gasket in the manner which has heretofore been practiced, and I make the internal diameter of each bushing accommodate the desired size of gasket; but in order to make it possible to use a single wrench on the three bushings I make the diameters of the forward ends of the three bushings the same and space the recesses o' the same distance apart in all three cases. In order to avoid waste of the bronze or other material of which the bushing is made, I preferably cut away the bushing as it extends back into the coupler-head in the case of the air-pipe connections, as illustrated in Fig. 7.

What I claim is—

1. In a railway-vehicle, the combination with a coupler, of a support therefor depending from the under side of the vehicle-body and including a universal joint, and connections between the coupler and the vehicle-truck, whereby the coupler follows the direction of the truck rather than that of the vehicle-body, substantially as described.

2. In a railway-vehicle, the combination with a coupler, of a support therefor depending from the under side of the vehicle-body and including a universal joint, and connections extending from the forward end of the coupler to the forward end piece of the vehicle-truck frame, whereby the coupler follows the direction of the truck rather than that of the vehicle-body, substantially as described.

3. In a railway-vehicle, the combination with a coupler, of a support therefor depending from the under side of the vehicle-body and including a universal joint, flexible connectors secured at one end to the forward end of the coupler, hangers depending from the vehicle-body through which the flexible connectors freely pass, and connections between the other ends of the flexible connectors and the vehicle-truck frame, whereby the coupler follows the direction of the truck rather than that of the vehicle-body, substantially as described.

4. In a railway-vehicle, the combination, with a coupler, of a support therefor depending from the under side of the vehicle-body and including a universal joint, flexible connectors secured at one end to the coupler-head, sheaves depending from the vehicle-body through which the flexible connectors freely pass, connections between the other ends of the flexible connecters and the forward end piece of the vehicle-truck frame, and springs interposed in the flexible connectors between the coupler-head and the sheaves, whereby the coupler-head follows the direction of the truck rather than that of the vehicle-body, substantially as described.

5. The combination with a coupler, of a hanger provided with a gimbal supporting said coupler, said gimbal being loosely journaled in elongated bearings, and yielding means tending to positively force the trunnions of said gimbal to the lower extremities of said bearings, substantially as described.

6. The combination with a coupler, of a hanger provided with a gimbal supporting said coupler, said gimbal being loosely journaled in elongated bearings inclined rearwardly from top to bottom, and a spring interposed between the coupler-head and the gimbal to yieldingly force the trunnions of said gimbal to the lower extremities of the bearings, substantially as described.

7. A coupler for train-pipes provided with a head having ports or channels, air and steam pipes connected to said ports and channels, an incasing tube for the pipes, an opening in said head cored out between the steam-port and the adjacent air-port, and an open or skeleton head in the rear end of the incasing tube supporting said pipes, substantially as described.

8. A coupler-head fluid-outlet port, having therein a shouldered bushing, a corresponding shouldered spring-seated hollow gasket of elastic material fitting within the bushing, and a ring of antifriction material on the inner surface of said bushing in position to contact with said gasket during its movement substantially as described.

9 A coupler head fluid-outlet port having therein a shouldered bushing, a corresponding shouldered spring-seated hollow gasket of elastic material fitting within the bushing, and a lining of antifriction material for said bushing extending throughout the range of movement of said gasket, substantially as described.

10. A coupler-head fluid-outlet port having therein a shouldered bushing, a corresponding shouldered spring-seated hollow

gasket of elastic material fitting within the bushing, a lining of antifriction material for said bushing extending throughout the range of movement of said gasket, and an expander between the gasket and its spring, substantially as described.

11. A coupler-head for train-pipes having therein a port terminating in an enlarged cylindrical chamber, a bushing engaging the inner periphery of said chamber, an annular ring set into the rear wall of said chamber and having a beveled face engaging the rear end of the bushing, substantially as described.

12. A coupler-head for train-pipes having therein a port terminating in a cylindrical chamber having an enlarged portion at its forward end, a shouldered bushing in said enlarged portion, a gasket in said bushing, a spring on which the gasket is seated and having a range of movement within the reduced portion of the cylindrical chamber and the bushing, an annular countersunk recess in the shoulder between the reduced and enlarged portions of the cylindrical chamber, and an annular ring set in said recess and engaging the inner end of the bushing, substantially as described.

13. A coupler-head for train-pipes having therein a port terminating in a cylindrical chamber having an enlarged portion at its forward end, a shouldered bushing in said enlarged portion, a gasket in said bushing, an expander engaging the rear end of said gasket, a spring between the expander and the rear end of the cylindrical chamber, an annular countersunk recess in the shoulder between the reduced and enlarged portions of the cylindrical chamber, and an annular ring set in said recess and having a beveled outer face engaging the inner end of the bushing, substantially as described.

14. A coupler-head for train-pipes having therein separate ports for the steam, air-brake, and air-signal, connections, bushings in said ports having the same external diameter at the face of the coupler-head, and equally-spaced wrench-engaging recesses in all of said bushings, the internal diameters of the several bushings differing with respect to one another to accommodate different-sized contact-gaskets, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES E. MARBLE.

Witnesses:
JAMES J. PARREN,
SARA R. MARA.