No. 798,321. PATENTED AUG. 29, 1905.

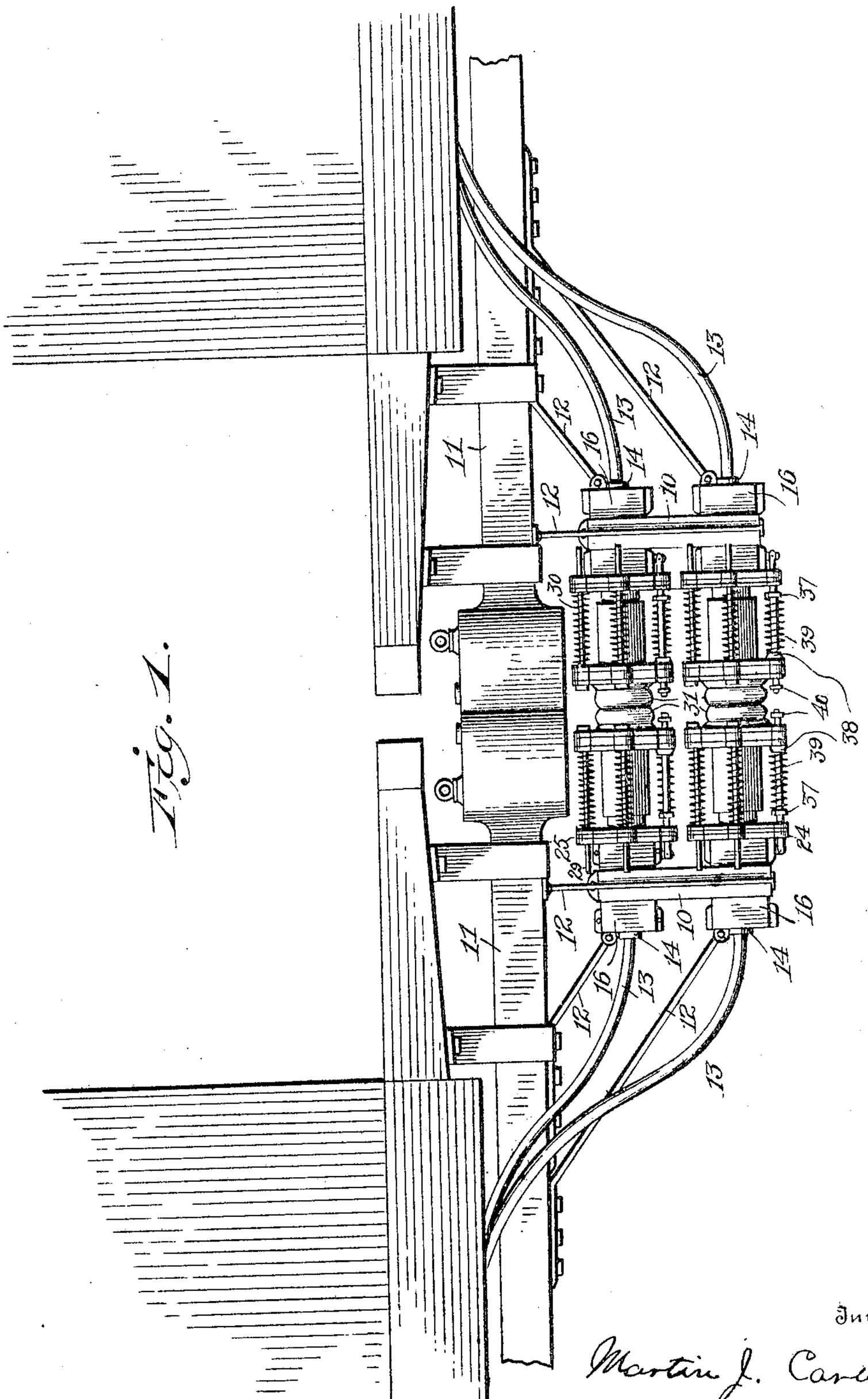
M. J. CARTER.

TRAIN PIPE COUPLING.

APPLICATION FILED JAN. 10, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

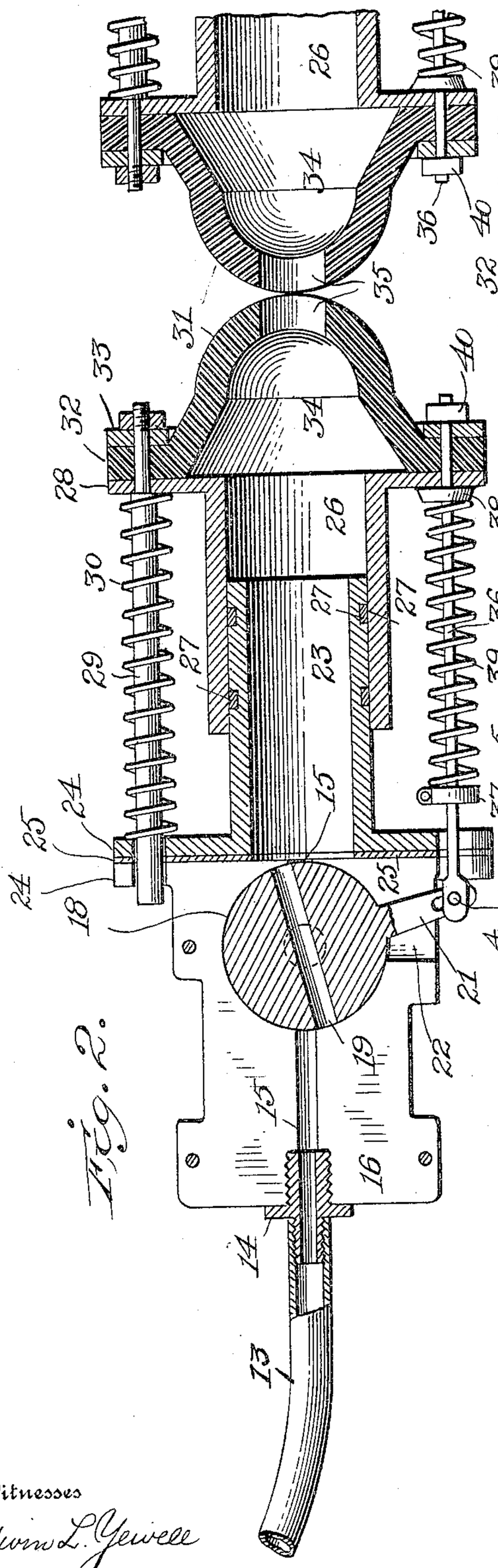

Fig. 2.

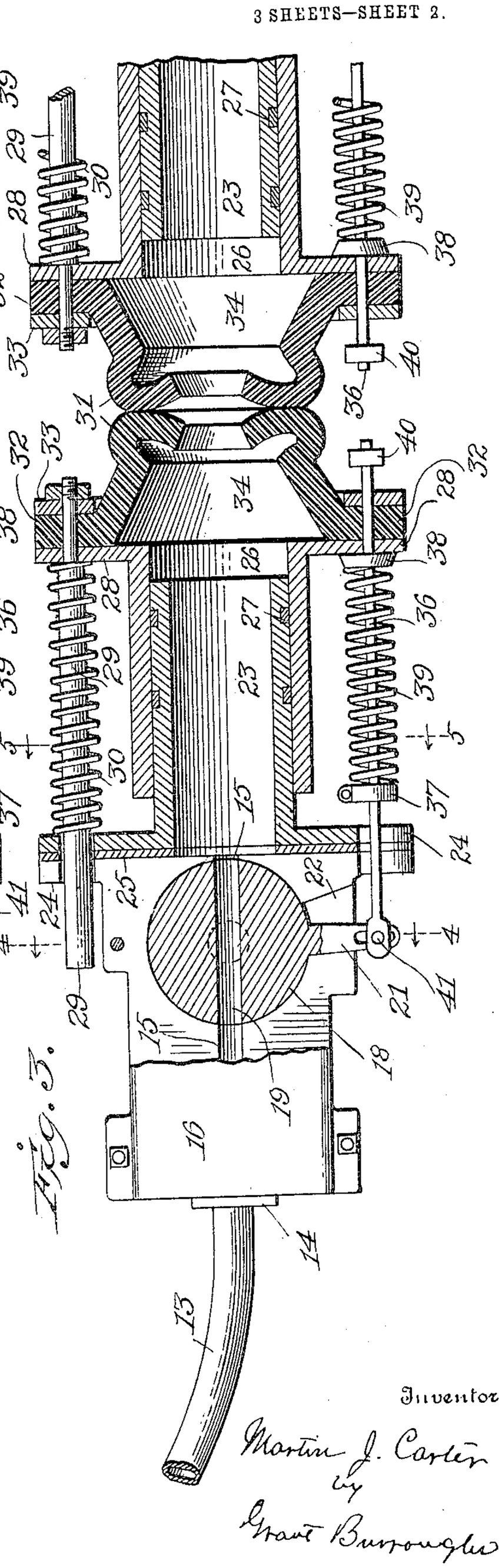

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 5.

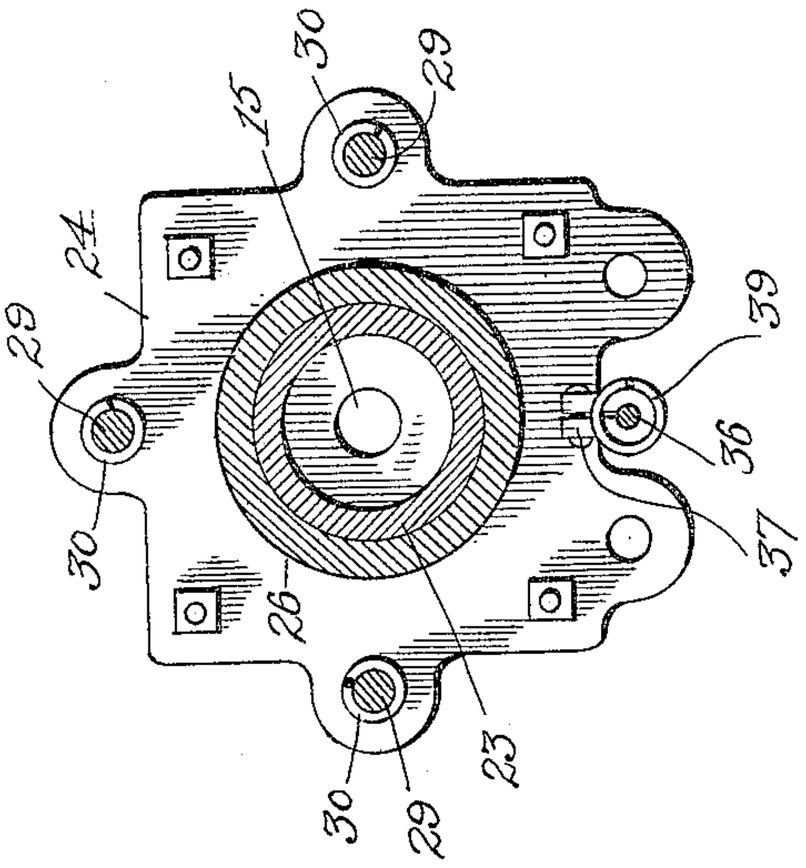
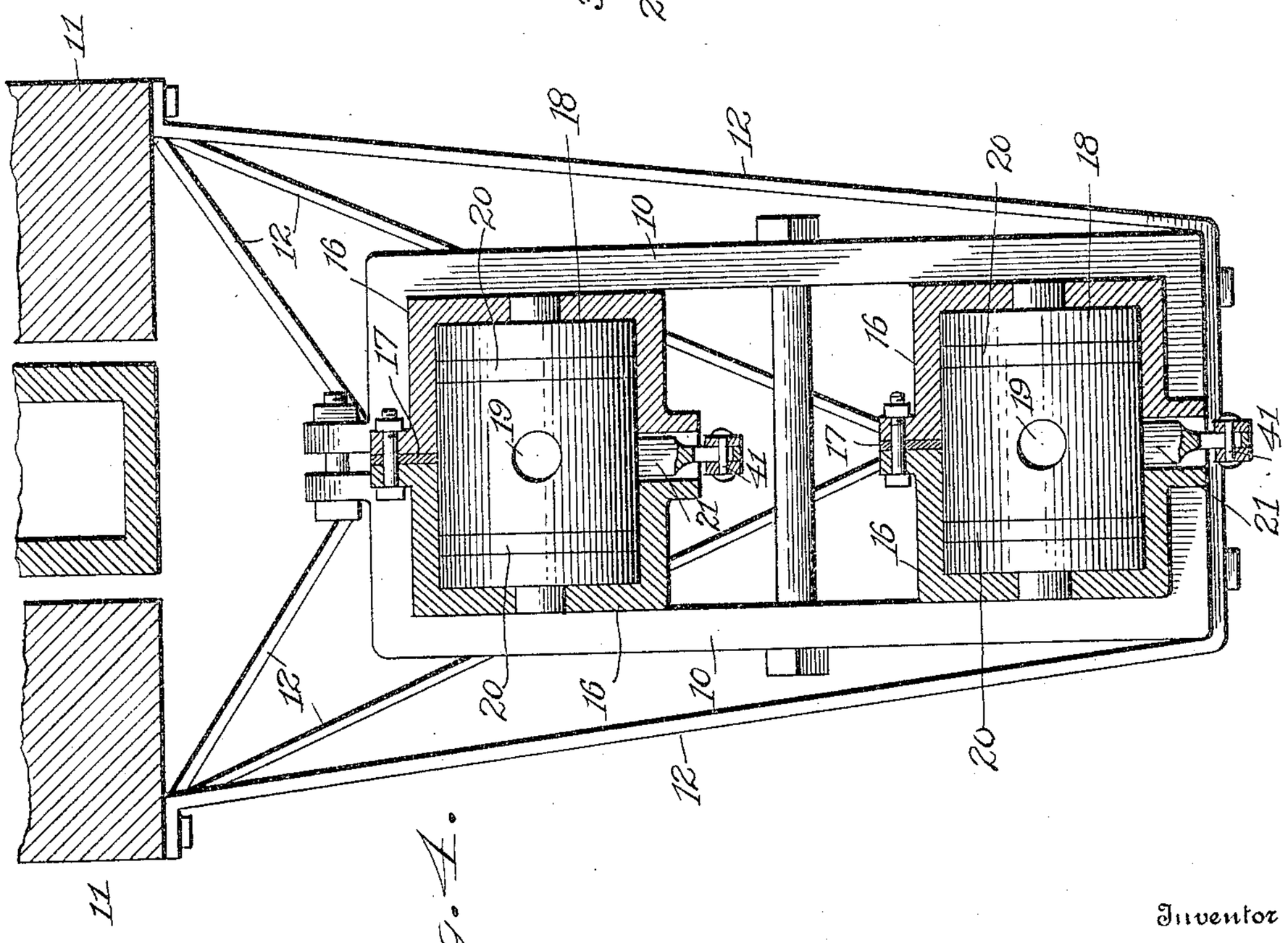


Fig. 4.



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UNITED STATES PATENT OFFICE.

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TRAIN-PIPE COUPLING.

No. 798,321. Specification of Letters Patent. Patented Aug. 29, 1905.

Application filed January 10, 1905. Serial No. 240,470.

To all whom it may concern:

Be it known that I, MARTIN J. CARTER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented new and useful Improvements in Train-Pipe Couplings, of which the following is a specification.

This invention relates to improvements in train-pipe couplings of that description which operate automatically to connect the fluid-pipes of cars when the latter are brought together for coupling purposes.

It has for its object the provision of mechanism which will insure the registration of the opposing coupling members when the latter are brought together and which will allow sufficient play to such members as to preserve the connections while the cars are under way.

It also has for its object the provision of a valve mechanism which will operate to open the passages connecting the fluid-pipes when the couplings are made and to close such passages when the connections are broken.

The invention consists in the novel construction, combination, and arrangement of parts such as will be hereinafter fully described, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the drawings, in which similar reference characters designate corresponding parts, Figure 1 is a side elevation of a coupling mechanism embodying the invention, showing the same mounted on the connected ends of two cars. Fig. 2 is an enlarged detail view showing a longitudinal section of one of the coupling members and part of the opposing member, the two being shown slightly separated. Fig. 3 is a similar view showing the two members in engagement. Fig. 4 is a transverse sectional view through the valve mechanism on the line 4 4 of Fig. 3. Fig. 5 is a detail sectional view of the line 5 5 of Fig. 3.

Only two sets of coupling members are shown, one for the steam-pipe and the other for the air-brake pipe, although a third might be added for the signal-pipe. Each set is mounted at the end of a car directly beneath the draw-head, so that it will be in a position to have as little movement sidewise as possible. It is carried by the bracket 10, secured to the frames 11 of the car by the braces and stays 12. As the several coupling members have a similar construction, a description of one will suffice for all.

The end of the fluid-pipe 13, Figs. 2 and 3, is connected by the coupling-piece 14 with the passage 15 in the casing 16. The latter comprises two longitudinal sections secured together by bolts passing through flanges at their adjacent edges. A packing 17, Fig. 4, is inserted between the adjacent faces of the two sections to form a tight joint between the same. The passage 15 is controlled by a valve mechanism consisting of the plug 18, journaled in the casing 16 in line with the said passage. In the plug is the port 19, adapted to register with the passage 15 when the valve is operated to open said passage. In the periphery of the plug are the packing-rings 20 on opposite sides of the port to prevent the escape of the fluid from the valve. The plug is provided with an arm 21, movable in the recess 22 of the casing 16 and projecting to the exterior of said casing. By means of this arm the plug can be turned to open or to close the passage 15. The sides of the recess 22 limit the play of the arm, and thereby control the rotation of the plug. The mechanism for moving the arm will be described farther on.

Secured to the forward end of the casing 16 is the inner cylinder 23 by bolts passing through the adjacent flanges 24. This cylinder communicates with the passage 15. Between the adjacent faces of the casing and inner cylinder is the packing 25 to form a tight joint between the two. Telescoping with the inner cylinder 23 is the outer cylinder 26. In the periphery of the inner cylinder are the packing-rings 27 to prevent leakage between the engaging surfaces of the telescoping members. Passing through the flange 24 of the inner cylinder and the flange 28 of the outer cylinder are the rods 29. These rods are fast in the flange 28 of the outer cylinder and have free movement in the flange 24 of the inner cylinder. On these rods and between the flanges 24 and 28 are the spiral springs 30, normally pressing the cylinders apart.

On the forward end of the outer cylinder 26 is the head 31, the flange 32 of the latter being clamped between the collar 33 and the flange 28 of said cylinder. This head is formed of compressible elastic material, such as rubber, and is substantially hemispherical

in shape. It has an internal chamber 34, that communicates with the interior of the telescopic cylinders and is provided with an opening 35, that leads from said chamber to the exterior of the head. The walls of the head have considerable thickness, so as to offer considerable resistance to compression and so as to readily assume their normal shape when the compression is removed.

Passing through the flanges 24 and 28 at opposite ends of the telescopic cylinders is the rod 36, free to reciprocate in said flanges. On this rod and between the flanges are the fixed collar 37 and the movable collar 38. Between the two collars is the spiral spring 39. The forward end of the rod projects beyond the flange 28, and on the same outside of the flange is the fixed collar 40. The rear end of the rod has a sliding pivoted connection 41 with the arm 21 on the plug of the valve mechanism. When the outer cylinder 26 is moved inwardly on the inner cylinder 23 against the action of the springs 30, the flange 28 engages with the collar 38, and as the movement of the cylinder progresses the collar is forced against the spring 39 and the latter in turn is forced against the collar 37, fixed on the rod, to move said rod inwardly. The rear end of the rod being pivoted to the arm 21, the latter will be moved to partly rotate the valve-plug 18. On the return movement of the cylinder the fixed collar 40 is engaged, and through the intervening mechanism the plug is rotated in the opposite direction.

The operation of the device is as follows: When two cars, or a car and a locomotive, come together for coupling purposes, the two opposing heads 31 are forced together against the resistance of the material composing the same. These two heads have considerable size, and their openings 35 are quite large as compared with the diameters of the fluid-pipes communicating with said heads. Consequently there need not be an accurate registration of the heads. Should they be out of line to some considerable extent, owing to their extensive bearing-surfaces, there would still be an operative engagement of the two. The two heads on coming together, owing to the elastic material of which they are composed, would be compressed, Fig. 3, and form a practically fluid-tight engagement. The pressure on the heads would also be partly taken up by the springs 30, which tend to press the heads toward each other. As each head is moved backward its cylinders 23 and 26 are telescoped against the action of the springs 30, which normally act to extend said cylinders. These cylinders form a telescopic connection between the chamber 34 in the head and the passage 15 leading from the fluid-pipe 13, so that the head can be moved relatively to the passage and at the same time have a fluid-tight communication with the same. When the two cylinders 23 and 26 are telescoped, the flange 28 engages with the loose collar 38 on the rod 36. This collar presses on the spring 39, and the latter bears against the fixed collar 37 on the rod. As the spring is compressed the rod is moved inwardly and through its connection with the arm 21 rotates the valve-plug 18. The rotation of the valve-plug is limited by the sides of the recess 22 engaging with the arm 21. When the arm contacts with the rear side of the recess, Fig. 3, any further rotation of the valve-plug will be prevented and the port 19 will be in position to open the passage 15 from the fluid-pipe 13 through to the interior of the telescopic cylinders to permit the flow of the fluid through the same. After the arm 21 reaches the limit of its movement any further movement of the collar 38 on the rod 36 will be taken up by the spring 39. In this way the valve mechanism of both coupling members are operated simultaneously with the engagement of the heads, so as to form a continuous communication from the fluid-pipe of one car to the fluid-pipe of the connected car. When the cars are uncoupled, the heads 31 disengage and resume their normal shapes, and the cylinders 23 and 26 are extended by the springs 30. As each of the cylinders 26 moves forward the spring 39 is released, and the clamp 33 engages with the collar 40 and carries the rod 36 with it. This movement of the rod through its connections with the arm 21 turns the plug-valve 18 to close the passage 15, and thereby interrupts the communication between the fluid-pipe 13 and the interior of the telescoping cylinders. This closing action of the valve mechanism is simultaneous with the disengagement of the heads 31. While the cars are under way, any relative movement of the fixed parts of opposing coupling members will be compensated for by the yielding of the heads 31 and the movements of the telescoping cylinders. A firm engagement of the heads will be insured by the continuous pressure of the material composing them and the pressure of the springs 30. The telescopic cylinders will insure during the relative movement of the parts a practically fluid-tight communication between the fluid-pipes of the connected cars.

It is to be observed that the chamber 34 of the head and the interior of the telescopic cylinders form a reservoir of considerable size for holding a supply of the fluid. Should there be a slight escape of fluid between the engaging faces of the heads, this loss will be compensated by the supply in the reservoir, so that the pressure in the fluid-pipes will be sufficient for operating purposes.

While the herein-described embodiment of the invention is the preferred one, yet it

can be departed from to a considerable extent without departing from the spirit and scope of the invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a train-pipe coupling, a head having its forward or engaging part of semiglobular shape and of comparatively large dimensions to present a bearing-surface of considerable area and formed of compressible elastic material and having an interior chamber and provided with a comparatively large opening leading from said chamber through the forward engaging part to the exterior of the head, a fluid-pipe communicating with said chamber, and means normally operating to press said head forward to register with and to be compressed against an opposing head.

2. In a train-pipe coupling, a head having its forward or engaging part of semiglobular shape and of comparatively large dimensions to present a bearing-surface of considerable area and formed of compressible elastic material and having an interior chamber and provided with a comparatively large opening leading from said chamber through the forward engaging part to the exterior of the head, telescopic cylinders communicating with said chamber, a fluid-pipe communicating with said cylinders, and means normally operating to press said head forward to register with and to be compressed against an opposing head.

3. In a train-pipe coupling, a head having its forward or engaging part of semiglobular shape and of comparatively large dimensions to present a bearing-surface of considerable area and formed of compressible elastic material and having an interior chamber and provided with a comparatively large opening leading from said chamber through the forward engaging part to the exterior of the head, telescopic cylinders communicating with said head, a spring normally operating to press said cylinders apart and to press said head forward to register with and to be compressed against an opposing head.

4. In a train-pipe coupling, a head having its forward or engaging part of semiglobular shape and of comparatively large dimensions to present a bearing-surface of considerable area and formed of compressible elastic material and having an interior chamber and provided with a comparatively large opening leading from said chamber through the forward engaging part to the exterior of the head, a fluid-pipe communicating with said chamber, a rotatable valve controlling the communication between said fluid-pipe and said chamber, means normally operating to press said head forward to register with and to be compressed against an opposing head, and mechanism for rotating said valve to open communication between the fluid-pipe and chamber when the head is compressed and to close the communication when the compression is removed from the head.

5. In a train-pipe coupling, head having its forward or engaging part of semiglobular shape and of comparatively large dimensions to present a bearing-surface of considerable area and formed of compressible elastic material and having an interior chamber and provided with a comparatively large opening leading from said chamber through the forward engaging part to the exterior of the head, a fluid-pipe communicating with said chamber, a valve controlling the communication between said fluid-pipe and said chamber, and mechanism operating said valve to open communication between the fluid-pipe and the chamber when the head is compressed and to close the communication when the compression is removed from the head.

6. In a train-pipe coupling, a head having its forward or engaging part semiglobular in shape and of comparatively large dimensions to present a bearing-surface of considerable area and formed of compressible elastic material and having an interior chamber and provided with a comparatively large opening leading from said chamber through the forward engaging part to the exterior of the head, telescopic cylinders communicating with said chamber, a spring normally extending said cylinders and pressing said head forward to register with and to be compressed against an opposing head, a fluid-pipe communicating with said cylinders, a rotatable valve controlling the communication between the fluid-pipe and cylinders, and mechanism for operating said valve to open communication between the fluid-pipe and cylinders during the compression of said head and while said cylinders are being pressed together and to close the communication when the compression is removed from the head and while the cylinders are extended by the action of said spring.

7. In a train-pipe coupling, a head having its forward or engaging part semiglobular in shape and of comparatively large dimensions to present a bearing-surface of considerable area and formed of compressible elastic material and having an interior chamber and provided with a comparatively large opening leading from said chamber through the forward engaging part to the exterior of the head, means normally operating to press said head forward to register with and to be compressed against an opposing head, telescopic cylinders communicating with said chamber, a fluid-pipe communicating with said cylinders, a rotatable valve controlling the communication between the fluid-pipe and cylinders, and mechanism for rotating

said valve to open communication between the fluid-pipe and cylinders when said head is compressed and to close the communication when the compression is removed.

8. In a train-pipe coupling, a head having its forward or engaging part of semiglobular shape and formed of compressible elastic material and having an interior chamber and provided with an opening leading from said chamber through the forward engaging part to the exterior of the head, a fluid-pipe communicating with said chamber, and means for pressing the forward part of said head into engagement with an opposing head.

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

MARTIN J. CARTER.

Witnesses:

GRANT BURROUGHS,

FRANCIS S. MAGUIRE.