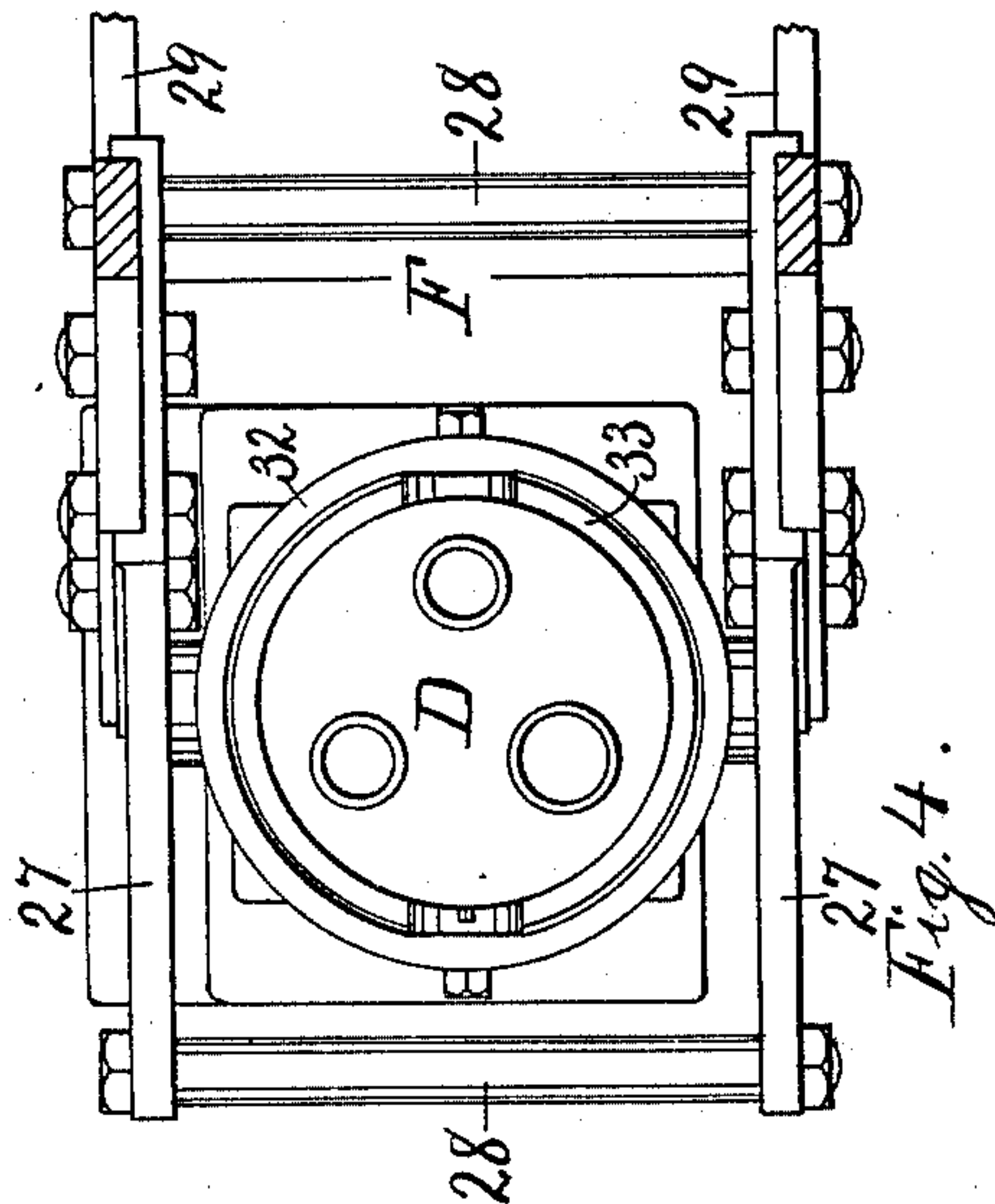


2 Sheets—Sheet 1.

AUTOMATIC COUPLING FOR STEAM AND AIR PIPES FOR RAILWAY CARS.
No. 592,521. Patented Oct. 26, 1897.



Attorney.

(No Model.)

2 Sheets—Sheet 2.

J. E. MARBLE.

AUTOMATIC COUPLING FOR STEAM AND AIR PIPES FOR RAILWAY CARS
No. 592,521

Patented Oct. 26, 1897.

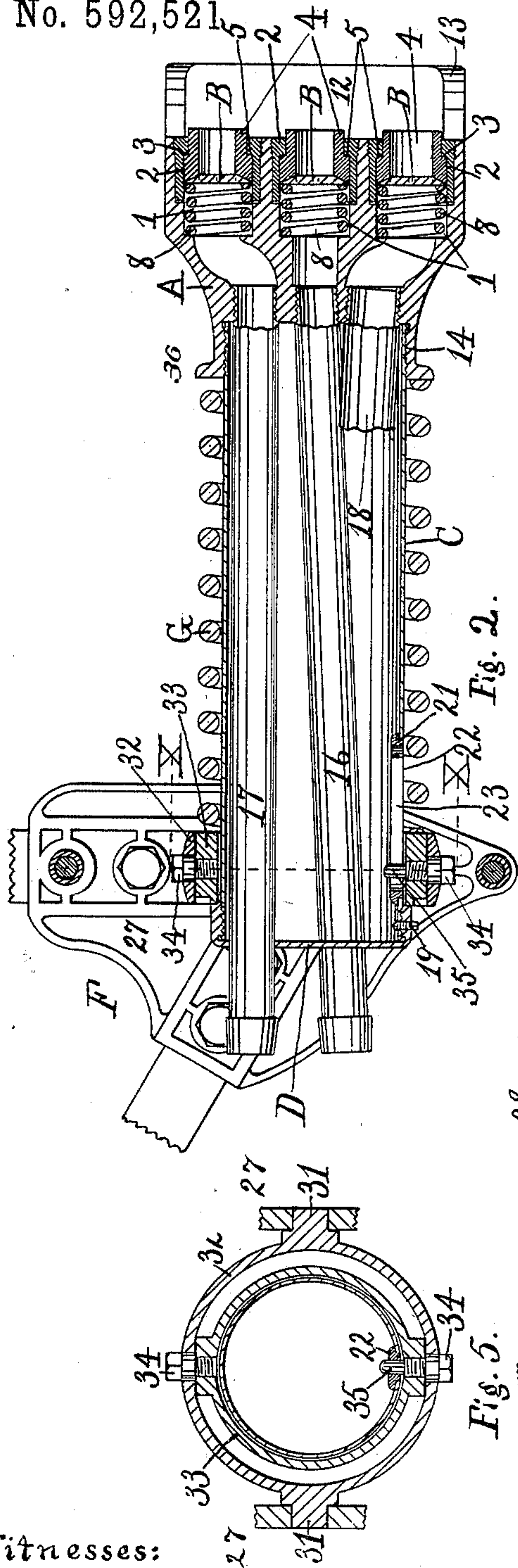


Fig. 2.

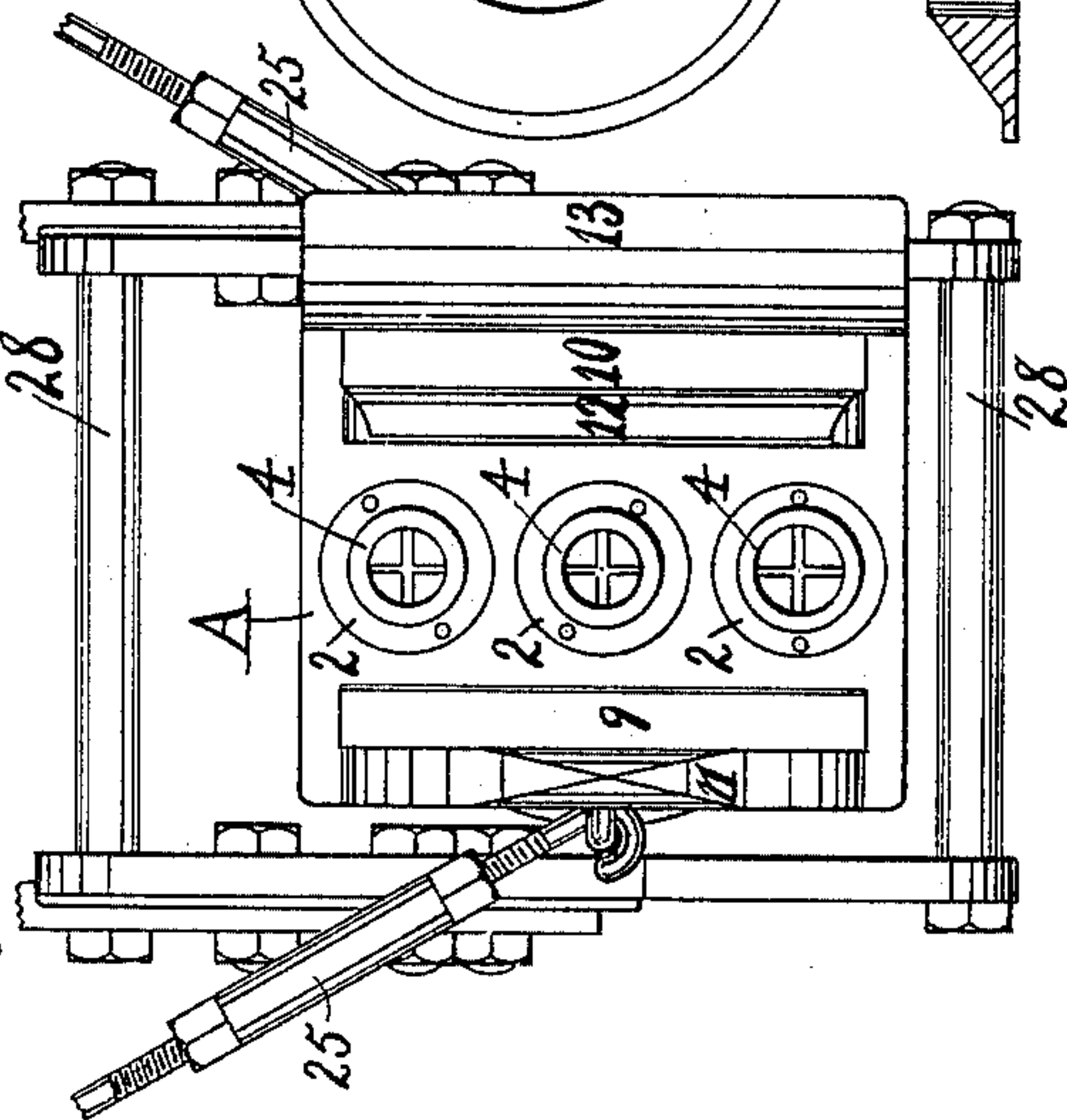


Fig. 3.

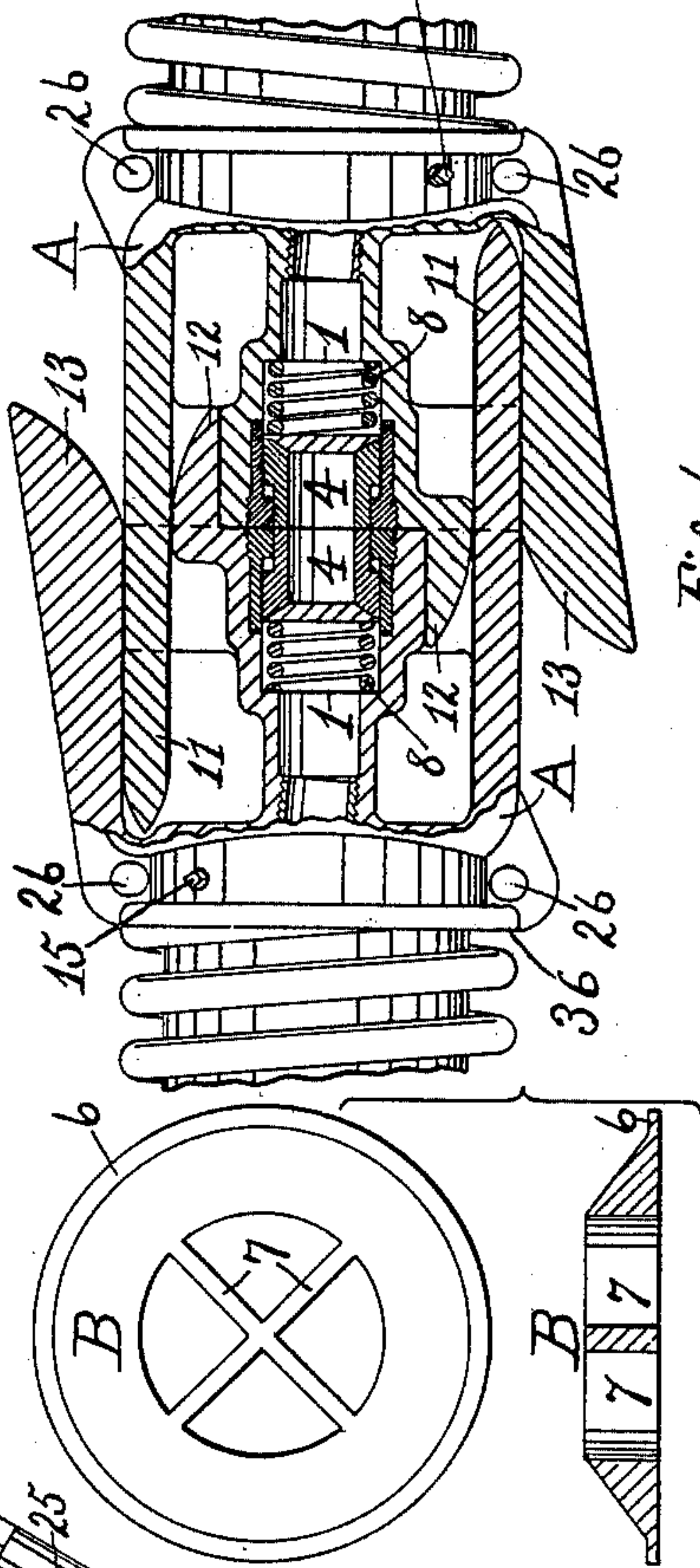


Fig. 6.

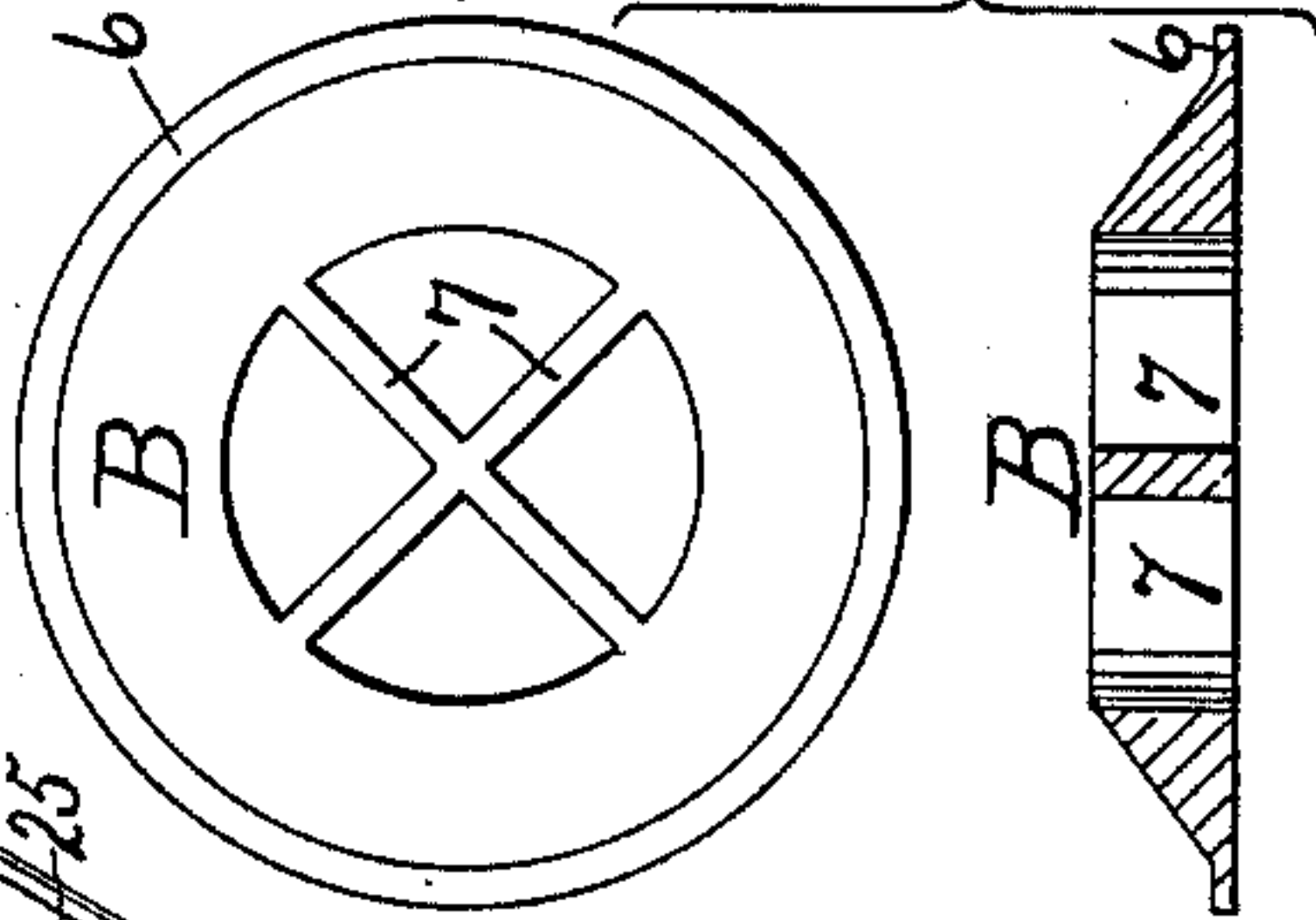


Fig. 7.

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UNITED STATES PATENT OFFICE.

JAMES E. MARBLE, OF ALBANY, NEW YORK.

AUTOMATIC COUPLING FOR STEAM AND AIR PIPES FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 592,521, dated October 26, 1897.

Application filed September 1, 1894. Serial No. 521,956. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. MARBLE, of Albany, in the county of Albany and State of New York, have invented new and useful
5 Improvements in Automatic Couplers for Connecting Steam and Air Pipes for Railway-Cars, of which the following is a specification.

This invention relates to certain improvements in the construction of mechanism for
10 automatically coupling the steam and air pipes of railway-cars by a simultaneous operation of coupling the cars together in the formation of a train of such cars; and said invention consists of the improvements, herein
15 described, on similar inventions, for which Letters Patent of the United States have heretofore been granted to me as follows: No. 491,291, dated February 7, 1893, and No. 498,520, dated May 30, 1893; and the object
20 of my present invention is to simplify the construction, increase its durability, and render its operation more effective. This object I attain by the mechanism illustrated in the accompanying drawings, which are herein
25 referred to and form part of this specification, and in which—

Figure 1 is a side elevation of a pair of my couplers as when connected together by the operation of coupling the cars to which the
30 couplers are attached. Fig. 2 is a longitudinal section of one of my couplings with the internal pipes shown partially in side elevation. Fig. 3 is a front end elevation of the same with the supports from the bottom of the car broken off. Fig. 4 is a rear end elevation of the same. Fig. 5 is a transverse
35 section at the line X X of the tubular casing and the universal joint by which the inner end of my coupler is carried. Fig. 6 is a longitudinal section of the heads of a pair of my couplers connected together, and Fig. 7
40 an enlarged plan view and transverse section of an expander for a tubular joint-piece for forming steam and air tight joints between
45 the pipes of my couplers.

In my former couplers, made in accordance with the patents hereinbefore referred to, one end of the spring which forced the coupler outwardly bore against an abutting plate

which bore against the longitudinal arms of 50
a bracket provided for carrying the inner end of the coupler, and by reason of a lateral swaying movement of the coupler when the cars are passing over curves in the tracks said abutting plate is subjected to an exceed- 55
ing friction and a consequent wear that is destructive to it.

As represented in the drawings, A designates the head of my coupler, made substantially in the form shown and described in 60
Letters Patent No. 498,520, hereinbefore referred to, excepting in some of the details of the same. In the outer end of said head there is formed a series of circular chambers 1, which are arranged on a vertical line, so 65
that when two of said heads are connected together in the operation of coupling the cars to which they are attached the chambers of both heads will be in correspondence. Each of said chambers has a removable sleeve 2 70
secured therein, and to avoid the formation of rust or other corrosion that might interfere with the operation of my coupler said sleeves are preferably made of bronze or other non-corrodible metal and are of sufficient length 75
to extend nearly to the inner end of said chambers. The outer end of each sleeve should be finished to lie on the same plane as the outer end of the head A, and near the outer end of the bore of each sleeve a circum- 80
ferential shoulder 3 is formed for a purpose that will be shortly explained. A tubular joint-piece 4, of hard rubber or other material suitable for forming a steam or air tight joint with a like joint-piece, is fitted to slide tele- 85
scopically in each of said sleeves and in such manner that all the movements of said joint-piece will be made exclusively in the sleeve 2, thereby avoiding a liability of interference with a proper action of the joint-piece by rea- 90
son of an accumulation of rust or other corrosion in the chambers 1. Each joint-piece has a circumferential shoulder 5 formed on its periphery. Said shoulder by taking against the shoulder 3 of the sleeve limits the out- 95
ward movement of the joint-piece and secures a uniform protrusion of the several joint-pieces from the head A, as shown in Fig. 2.

The inner end of each joint-piece 4 is preferably made cup-shaped around the bore of the latter, and is then provided with a flat bearing that surrounds the cup-shaped depression, thereby avoiding the formation of a sharp edge on the inner end of said joint-piece. This shape is given to the inner end of the joint-piece for the purpose of forming a seat for a correspondingly-shaped expander B, which bears against the end of said joint-piece and by expanding the latter diametrically causes it to form a tight joint with the bore of the sleeve 2, in which it is contained.

The expander B, which is annular in form, has a flat circumferential flange 6 around its outer edge, so as to avoid the formation of sharp edges at the inner end of the joint-piece, and for the purpose of excluding stones and other harmful substances from the pipes of my coupler the central opening of said expander is provided with arms 7 or other guards that will permit steam or air to pass freely therethrough, but will prevent the introduction of stones or other obstructions into the pipes.

Each chamber 1 contains a spring 8, which is arranged to bear against the corresponding joint-piece 4 and force the latter outwardly, and thereby the conjoining ends of the several joint-pieces will be retained in close contact while the cars are coupled together by means of a car-coupler commonly used for that purpose, one of which is indicated by dotted lines in Fig. 1, but my device is not confined to the form of car-coupler. The only essential feature required of the latter to obtain a satisfactory result with my coupler is that it should retain the cars in close contact with each other.

In the outer end of the head A mortises 9 and 10 are formed in a vertical direction near the opposite edges of said head, and on a vertical plane conforming to the outer side of the mortise 9 a pointed guide-tongue 11 is formed for the purpose of entering the mortise 10 of a conjoining head in the operation of coupling the cars together, and thereby the several joint-pieces 4 will be brought into position to insure an exact correspondence of the openings of the joint-pieces of one head with like openings of the conjoining head.

At opposite edges of the mortise 10 oppositely and outwardly curved tongues 12 and 13 are arranged to form a Y-shaped throat that leads into the mortise 10. The tongues 12 and 13 are considerably shorter than the tongue 11, as shown in Fig. 6, so that if in the operation of coupling the cars the heads A are not in exactly opposite positions side-wise the tongues 11 will strike the convex surface of the guide-tongues—either 12 or 13, according to circumstances—and the two heads will swing into a position where the tongues 11 will enter the mortises 10 of the conjoining heads. If in the operation of coupling the cars the heads A do not lie on the

same level, the pointed end of the tongue 11 will move said heads to the same level.

The inner end of each head A is provided with a recess 14 to receive one end of a tubular casing C, which is secured therein by screw-threads or other suitable means, and a tap-bolt 15 is preferably inserted in said casing for preventing an accidental disconnection of said casing from the head A. The casing C forms an inclosure for a series of pipes, of which a pipe 16 forms a part of a system of pipes for conveying compressed air to the air-brakes of the train, a pipe 17, which conveys compressed air to the signal-whistle of the train, and a pipe 18, which is preferably made of greater caliber than the others and is usually placed below the others in the head A, form part of a system of pipes for conveying steam through the train for supplying the steam by which the cars are warmed. The foremost end of each of said pipes is secured in the head A in such manner that each of said pipes will only communicate with the particular chamber 1 to which it is specially appropriated, and in this manner the several systems of pipes through the train will be kept separate and distinct from each other at all times and under every condition. The pipes in the casing C diverge and their rearmost ends pass through a cap-plate D, which forms a closure for the end of the casing C. The cap-plate D is preferably screwed onto the casing C, and for the purpose of preventing an accidental separation of the cap-plate and casing a tap-bolt 19 is screwed through said cap-plate into the casing C. The ends of the several pipes contained in the casing C protrude from the cap-plate D, and each pipe is separately connected by means of flexible tubes 20 to the particular system of pipes to which it relates. The casing C has near the inner end of its lower side a slotted opening 21, in which is secured a correspondingly-formed reinforcing-frame 22, that is provided with a like slotted opening 23 for a purpose that will be explained hereinafter.

The outer end of my coupler is carried by a pair of flexible suspenders E, which will allow the coupler to sway laterally and to receive a slight movement in a vertical direction. Each of said suspenders consists of a coiled spring 24, connected to a turnbuckle 25, by which the head of the coupler can be adjusted vertically, the hooked end of the turnbuckle being fitted to engage in openings 26 in the side rib of the head A. The opposite end of said turnbuckle is adapted to engage either directly or indirectly with an eye or staple 26, fixed in the bottom of the car, as shown in Fig. 1.

F designates brackets attached to the bottom of the car for the purpose of supporting the inner end of my coupler, and each bracket is formed, as shown in the drawings, of two side plates 27, which are connected together

by cross-ties 28, that maintain the side plates at a proper distance from each other in parallel position. Each of said side plates has a hanger 29 secured to it and to the bottom of the car, and each side plate is also attached to a rearwardly-extending thrust-brace 30, which is also secured to the bottom of the car in such manner that it will resist a thrusting strain on the coupler. Each side plate is provided with an opening that forms a journal-bearing for a trunnion 31 on a gimbal or ring 32, that forms a member of a universal joint which will allow my coupler to sway in any direction. The ring 32 encircles a ring 33, which forms a second member of the universal joint above referred to, and the ring 33, which loosely encircles the tubular casing C, so that the latter will be free to slide endwise in said ring, is provided with pivot-screws 34, arranged at the upper and lower sides thereof, so as to be at right angles to the trunnions 31. The lower pivot-screw is provided with a pin 35 on its inner end, and said pin is fitted to engage in the slotted opening 23 of the casing C in such manner that it will permit said casing to acquire a slight endwise movement, but will prevent any rocking movement of the casing. The ring 33 forms an abutment for one end of a coiled spring G, that encircles the casing C, the opposite end of said spring having a bearing against an annular flange 36 on the inner end of the head A, so as to push the coupler outwardly in such manner that the faces of the joint-pieces 4 of connected couplers will be held in positive contact during the time the cars are connected together.

It should be understood that when the cars are disconnected the plane of the outer face of the head A is required to be slightly in advance of the plane of the contacting faces of the car-couplers by which the cars are to be connected together, so that when the cars are coupled the ends of the joint-pieces 4 will be forcibly held in contact by the springs 8 in addition to the pressure exerted by the spring C, which are compressed by coupling the cars, and thereby the faces of the conjoining ends of said joint-pieces will be retained in perfect contact to form steam and air tight joints between them, so that a continuous system of steam and air pipes will be formed from one end of the train of cars to the other end of the same.

By lining the chambers of the head A, which is made of cast-iron and is subject to corrosion and rust, with non-corrodible sleeves 2 and arranging the joint-pieces 4 in said sleeves so that their movement will be in the sleeves and where they cannot come in contact with the corroded wall of a chamber, I avoid the danger of obstructing the free movement of the joint-pieces in the head A, and thereby leave the joint-pieces under the control of the springs 8 to obtain a perfectly-tight joint between the contacting ends of

these several joint-pieces. By forming the slotted opening in the tubular casing C instead of in the brackets for supporting the inner end of my coupler, as in my former invention, I provide for a necessary sliding movement of the coupler without subjecting the parts to destructive friction and wear.

By forming the expander B with a flat circumferential flange 6 and making the inner end of the joint-piece 4 to correspond thereto I am enabled to remedy a defect found in said joint-piece when made with a sharp edge at its inner end, which defect was found in the liability of the sharp edge when the joint-piece became slightly softened by heat to enter between the periphery of the expander and the bore of the sleeve 2 or the bore of the chamber 1 when said sleeve was omitted, and thereby the movement of the joint-piece 4 would be interfered with.

While I have shown and described the coupler-head A as provided with three longitudinal chambers 1, it is obvious that the number of such chambers can be either increased or diminished to suit circumstances, and it should be understood that my invention is not limited to any number of said chambers.

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

1. In a coupler for automatically connecting the steam and air pipes of railway-cars, the combination of a coupler-head provided with a chamber or chambers arranged longitudinally therein and opening through the outer face of said head; the inner end of each chamber having an abutment that is integral with said head, a non-corrodible sleeve removably secured in a fixed position in each of said chambers and having a stop or shoulder in or near the outer end of its bore, a tubular joint-piece of a single piece of rubber or other similar material adapted to form a fluid-tight joint with a like joint-piece; said joint-piece being fitted to slide telescopically in said sleeve exclusively, and is provided with a peripheral shoulder which—by taking against the shoulder of the sleeve—will limit the outward movement of the joint-piece, and a spring arranged to force said joint-piece outwardly, as and for the purpose specified.

2. In an automatic coupler for steam or air pipes of railway-cars, the combination, with a coupler-head provided with one or more chambers opening through the outer face of said head; each of said chambers having a steam or air pipe leading rearwardly therefrom, and a tubular casing secured to said head to form an inclosure for said pipes and provided with a longitudinally-slotted opening, of a universal joint composed of two rings so arranged that one of said rings will encircle the other; the outer ring being provided with trunnions which are journaled in brackets suspended from the bottom of a car, and the inner ring being pivoted to the outer ring so that the axes of the two rings will be

at right angles and the inner ring being provided with a guide which enters the slotted opening of the tubular casing and guides the latter in its movement in the universal joint,
5 and a spring encircling said casing; one end of said spring abutting against the foremost face of the inner ring and the opposite end

being arranged to bear against the coupler-head, as and for the purpose specified.

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Witnesses:

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