(No Model.) 7 Sheets—Sheet 1.

G. WESTINGHOUSE, Jr.

PIPE COUPLING.

No. 454,129. Patented June 16, 1891.

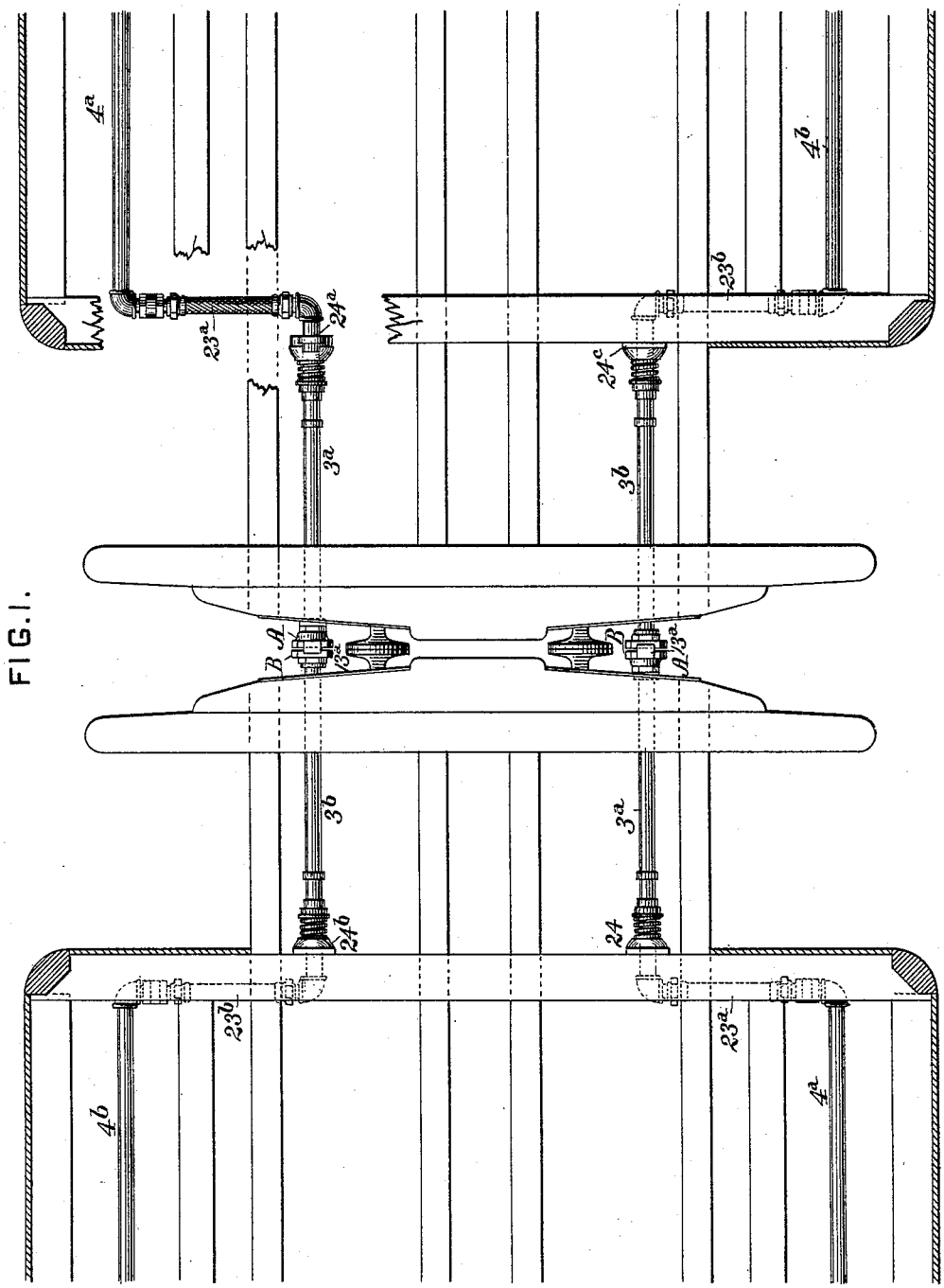


FIG. 1.

WITNESSES.

C. M. Clarke

Damon S. Wolcott

INVENTOR.

George Westinghouse Jr.
by George H. Christy
atty

(No Model.) 7 Sheets—Sheet 2.

G. WESTINGHOUSE, Jr.

PIPE COUPLING.

No. 454,129. Patented June 16, 1891.

FIG. 2.

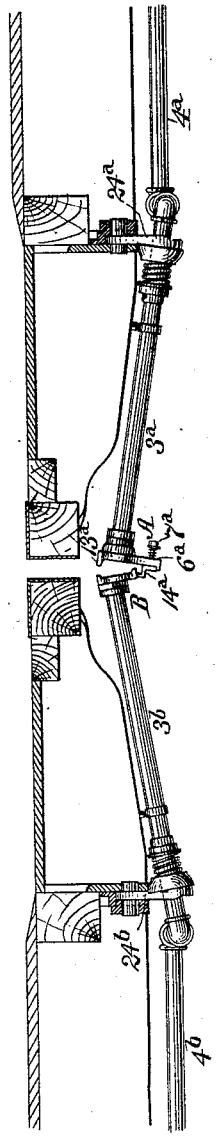


FIG. 3.

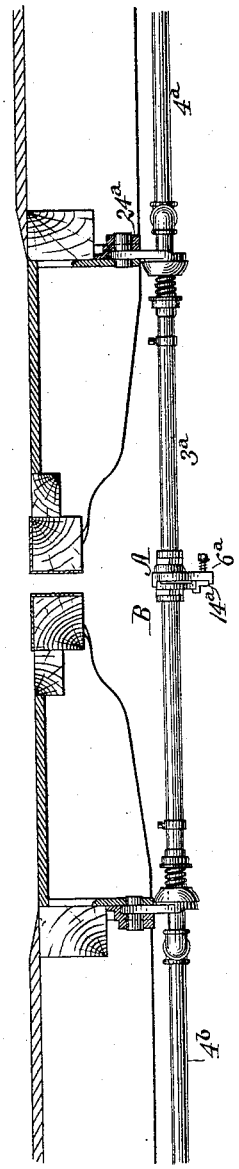
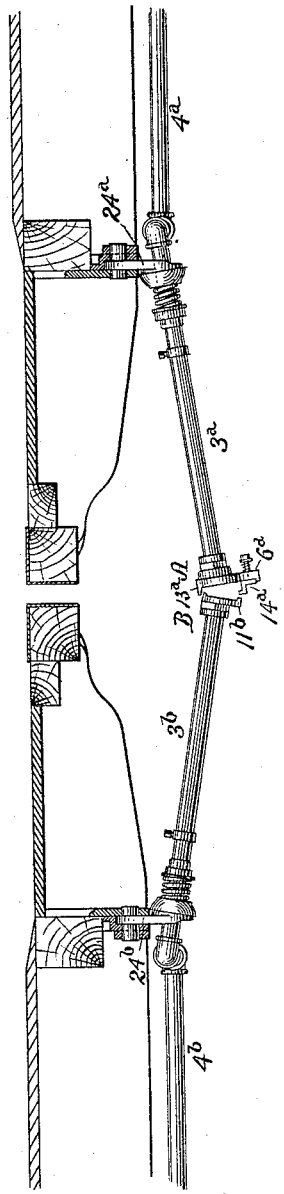


FIG. 4.



WITNESSES.

C. M. Clarke

Dannie S. Wolcott

INVENTOR.

George Westinghouse Jr.
by George N. Christy
atty

(No Model.) 7 Sheets—Sheet 3.

G. WESTINGHOUSE, Jr.

PIPE COUPLING.

No. 454,129. Patented June 16, 1891.

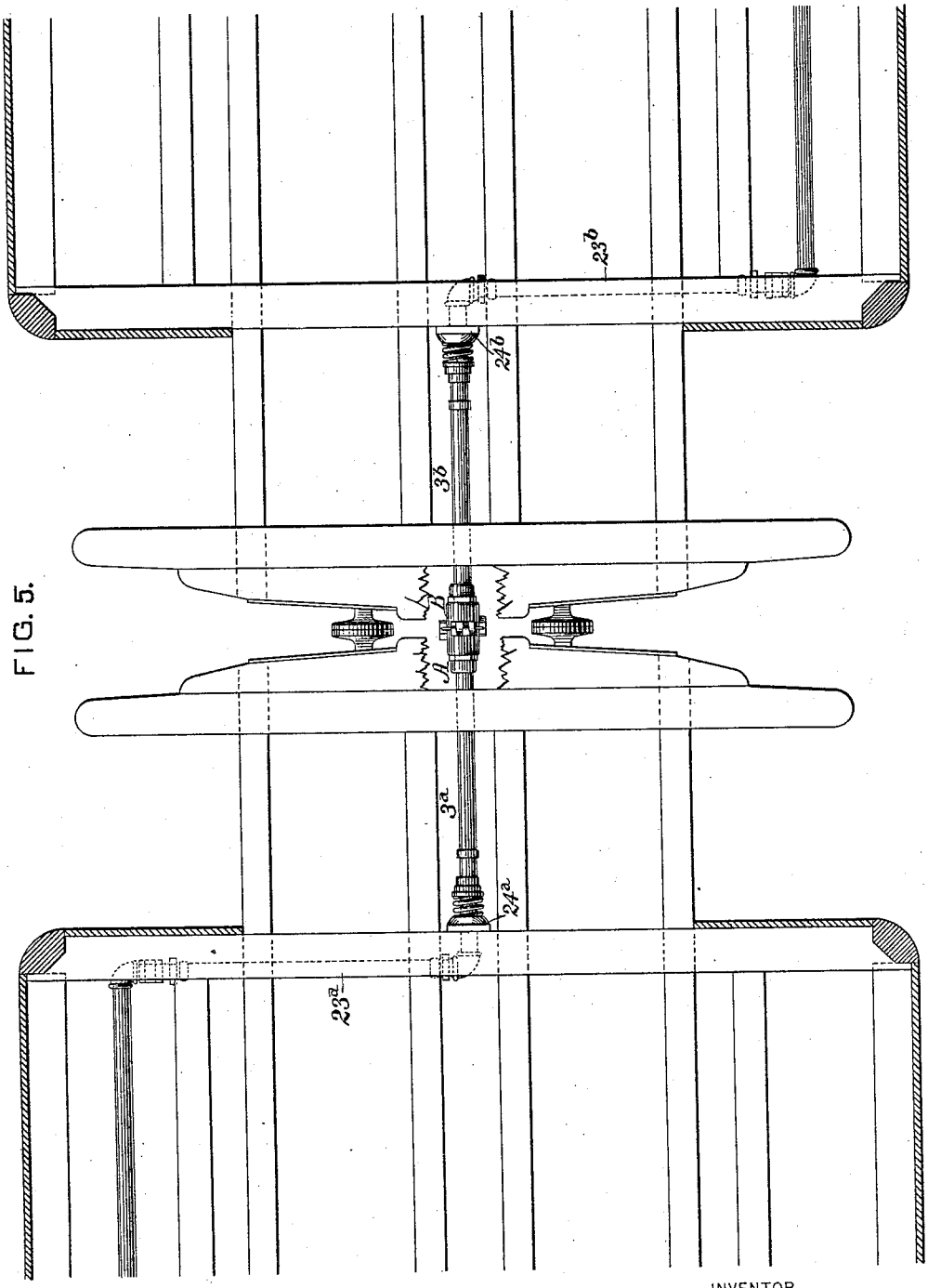


FIG. 5.

WITNESSES.

C. M. Clarke

Dawin S. Wolcott

INVENTOR.

George Westinghouse Jr.
by George H. Christy
atty

(No Model.) 7 Sheets—Sheet 4.

G. WESTINGHOUSE, Jr.

PIPE COUPLING.

No. 454,129 Patented June 16, 1891.

FIG. 6.

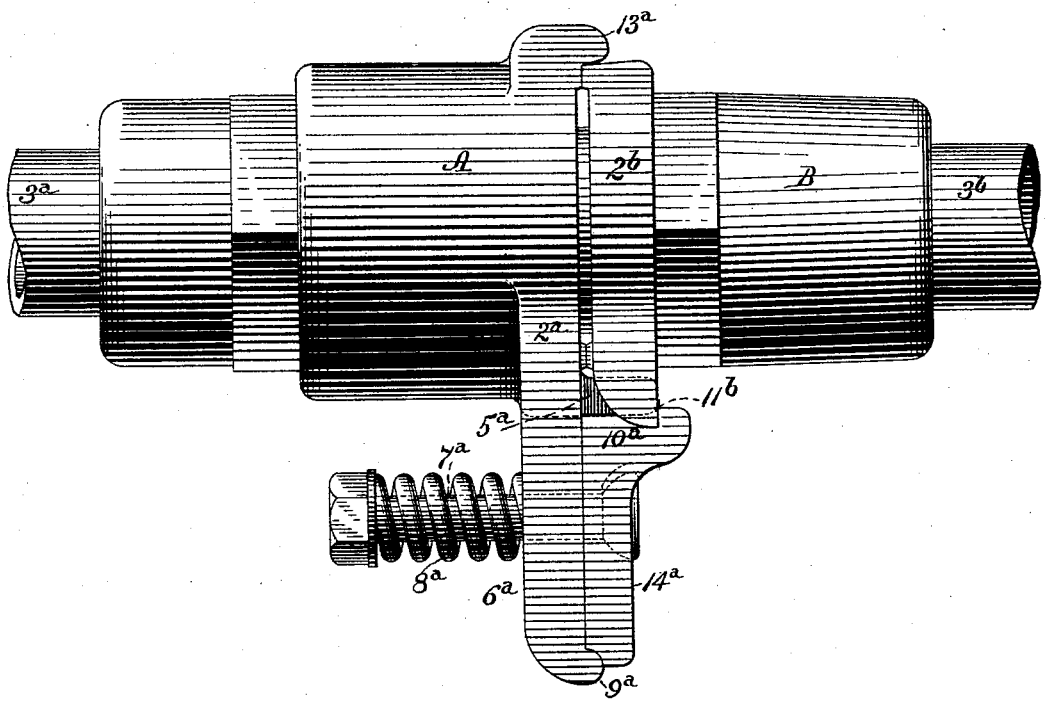
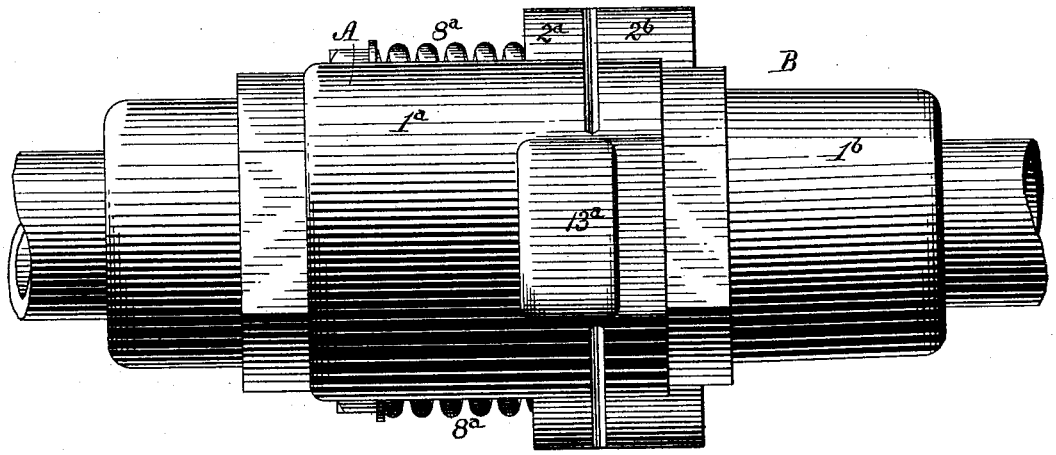


FIG. 7.



WITNESSES.

C. M. Clarke

Darwin S. Wolcott

INVENTOR.

George Westinghouse Jr
by George N. Christy
Atty

(No Model.) 7 Sheets—Sheet 5.

G. WESTINGHOUSE, Jr.

PIPE COUPLING.

No. 454,129. Patented June 16, 1891.

FIG. 10.

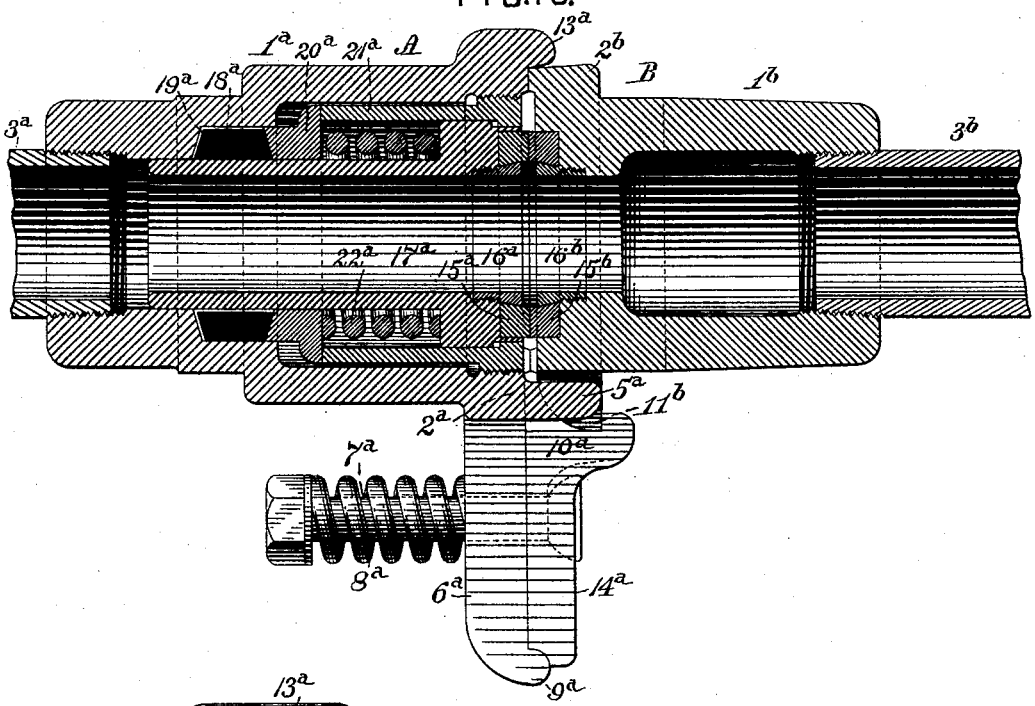


FIG. 8.

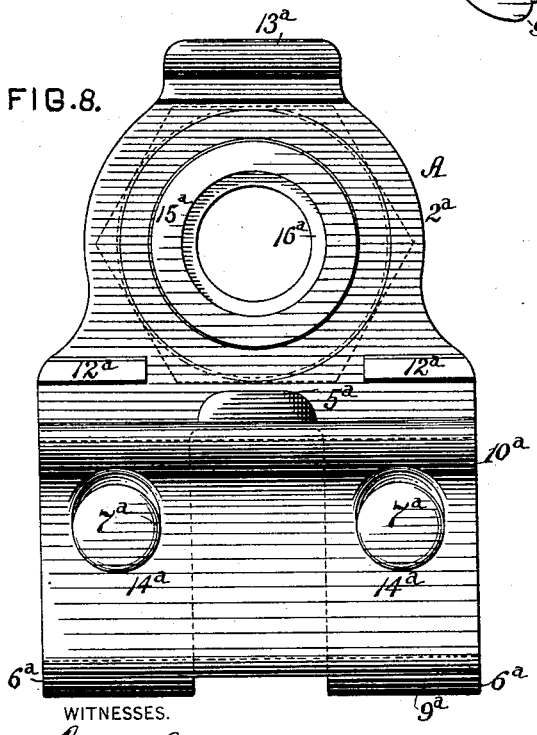
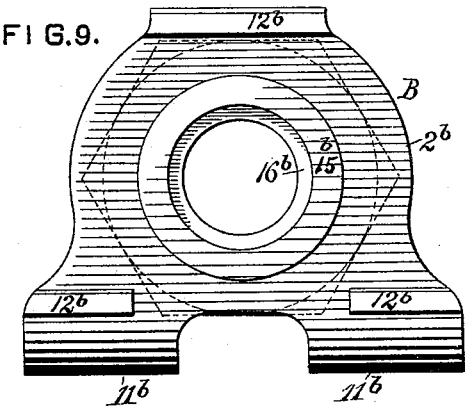


FIG. 9.



WITNESSES.

C. M. Clarke

Dennis S. Wolcott

INVENTOR.

George Westinghouse Jr.
by George H. Christy
Atty

(No Model.) 7 Sheets—Sheet 6.

G. WESTINGHOUSE, Jr.

PIPE COUPLING.

No. 454,129. Patented June 16, 1891.

FIG. 11.

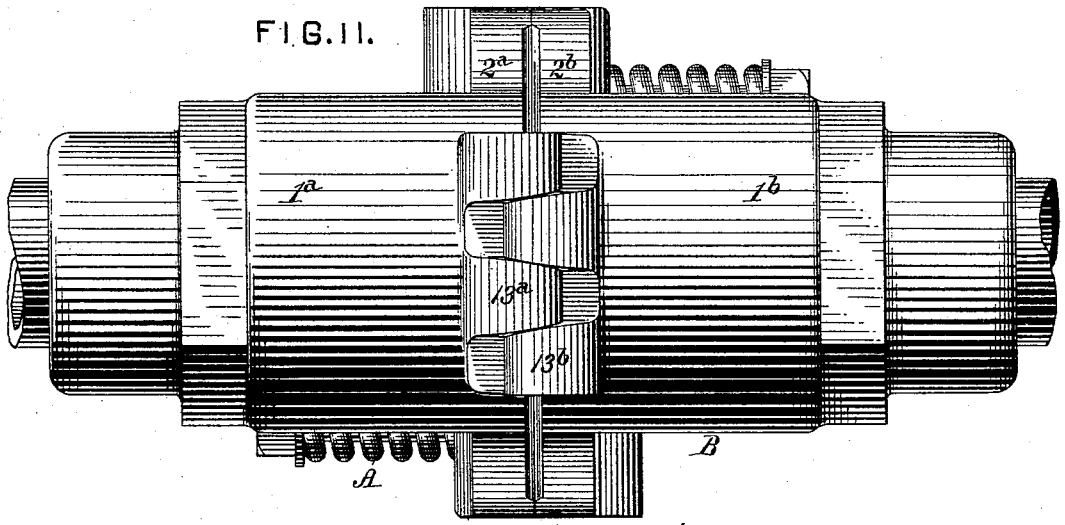
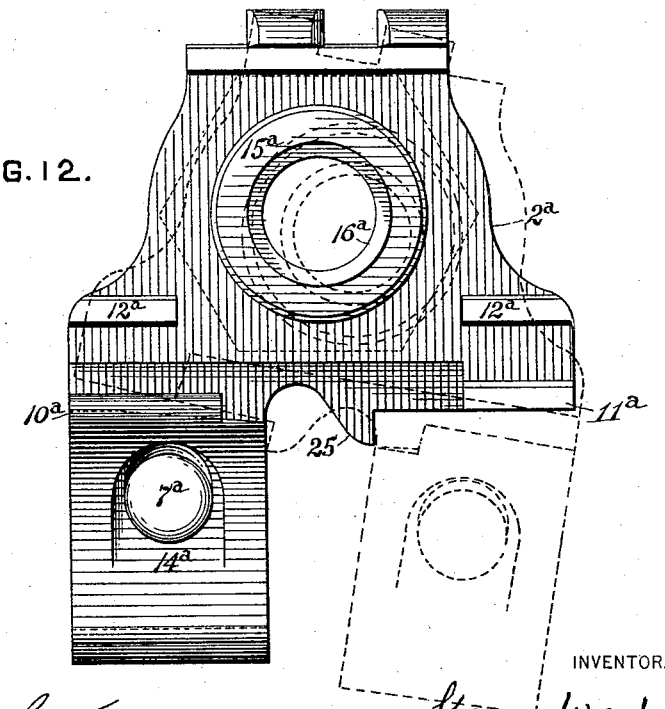


FIG. 12.



WITNESSES.

C. M. Clarke

Darwin S. Wolcott

INVENTOR.

George Westinghouse Jr.

by George H. Christy

Atty

(No Model.) 7 Sheets—Sheet 7.

G. WESTINGHOUSE, Jr.

PIPE COUPLING.

No. 454,129. Patented June 16, 1891.

FIG. 13.

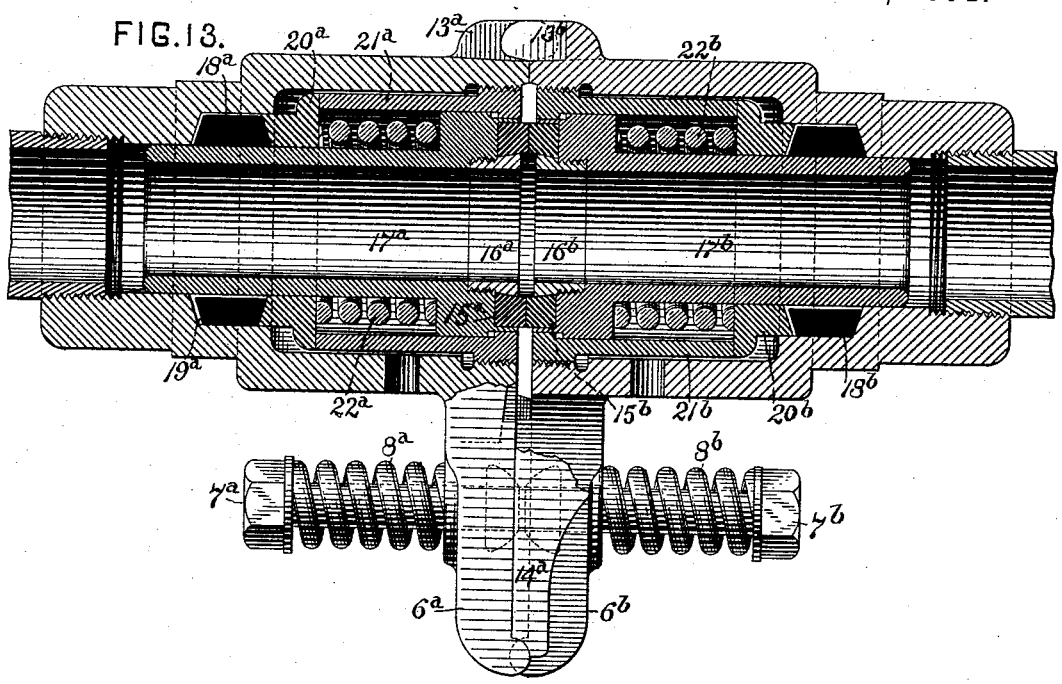
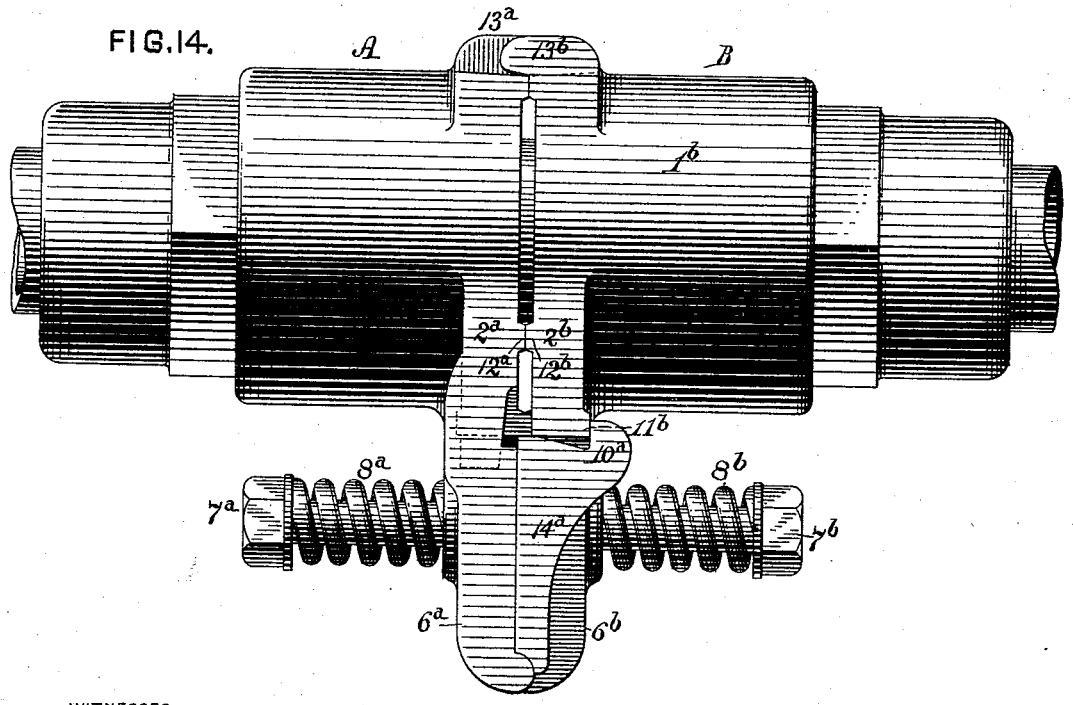


FIG. 14.



WITNESSES.

C. M. Clarke

Darwin S. Wolcott

INVENTOR.

George Westinghouse Jr.
by George N. Christy
atty

UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA,

PIPE-COUPLING.

SPECIFICATION forming part of Letters Patent No. 454,129, dated June 16, 1891.

Application filed May 16, 1890. Serial No. 352,045. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Pipe-Couplings, of which improvements the following is a specification.

The invention described herein relates to certain improvements in couplers for connecting the adjacent ends of fluid-conducting pipes arranged along or under railway-cars, and has for its object a construction of couplers such that the parts or members thereof may be quickly and easily connected or disconnected when the cars are coupled or uncoupled, will remain firmly united under all ordinary lateral and longitudinal movements of the cars in running over the road, and will uncouple automatically and without injury in case of an accidental separation of the cars.

In general terms the invention consists in the construction and combination of mechanical devices or elements, all as more fully hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1, Sheet 1, is a top plan view of the adjacent ends of two cars having two lines of pipe connected by my improved coupling. Figs. 2, 3, and 4, Sheet 2, are views of the car ends in section and the coupling in elevation, and show, respectively, the position of the members of the coupling when the connection is being made, when firmly coupled, and when automatically separated. Fig. 5, Sheet 3, is a view similar to Fig. 1, illustrating the form of coupling employed in uniting single lines of pipe. Figs. 6 and 7 are views in side elevation and plan, respectively, of the coupling employed for two lines of pipe. Figs. 8 and 9, Sheet 5, are end elevations of the two parts or members of the coupling. Fig. 10, Sheet 5, is a sectional elevation, the plane of section coinciding with the axis of the coupling. Fig. 11, Sheet 6, is a plan view, on an enlarged scale, of the form of coupling employed for uniting the ends of a single line of pipe, as shown in Fig. 5. Fig. 12, Sheet 6, is an end elevation of one member of the coupling shown in Fig. 11; and Figs. 13 and 14, Sheet 7, are sectional and side elevations, respectively, of the same coupling.

My improved coupling consists of two parts or members A and B, consisting of sockets or nipples 1^a and 1^b and face-plates 2^a and 2^b, the rear ends of the sockets being internally threaded, as shown in Fig. 10, for the reception of the front ends of the movable sections 3^a and 3^b of the fluid-conducting pipes 4^a and 4^b, extending under the cars. When two lines of pipe are arranged under a car, the two parts or members of the coupling are not duplicates of each other and have only the parts hereinbefore mentioned in common. The lower edge of the face-plate of the part or member A is provided with tail-pieces 6^a, against which a clamping-plate 14^a is yieldingly held by means of bolts 7^a, passing through the tail-pieces, and springs 8^a, surrounding the bolts and interposed between the nuts thereon and the tail-pieces or plate, dependent upon which side it is desired that the bolts should project. The tail-pieces 6^a are provided at their lower ends with rounded knuckles 9^a, adapted to fit in a correspondingly-shaped groove formed in the lower edge of the plate and serving as a support and fulcrum for the clamping-plate when the upper edge is forced outwardly, as hereinafter described. The clamping-plate is provided along its upper edge with an outwardly and upwardly projecting lip 10^a, behind which in forming a coupling the toes 11^b on the lower edge of the face-plate 2^b of the member B are placed, as shown in Figs. 2, 3, 6, and 10, the members A and B being cocked up, as shown in Fig. 2, in order that the toes may be placed behind the lips. The members A and B having been adjusted, as shown in Fig. 2, they are depressed or allowed to move down of their own weight until their axes coincide, thereby bringing their faces or bearing-strips 12^a and 12^b into contact and causing the upper edge of the face-plate 2^b to pass under the lug 13^a on the upper edge of the face-plate 2^a. Under normal conditions the members A and B are held with their axes in line by the clamping-plate 14^a and springs 8^a, it being necessary to force the clamping-plate outwardly in moving the members A and B down beyond a horizontal position, as in such move-

ment the upper portions of the members become the fulcrums, and the lower portions tend to move away from each other, as shown in Fig. 4. The members are held from independent vertical movements by the clamping-plate 14^a and the lug 13^a and from independent lateral movement by a tongue 5^a on the member A passing between the toes 11^b on the member B. A packing-ring 15^b, of any suitable material, is held in a recess formed in the face-plate 2 around the longitudinal opening therethrough by a threaded ring 16^b, provided with a wedge-like outer end, as shown in Fig. 10. This packing 15^b projects a short distance beyond the face-plate 2^b and is adapted to have a bearing against a similar ring 15^a, secured in a similar manner in a recess formed in the enlarged outer end of a tube 17^a, passing through the chamber in the socket and having a bearing within the contracted inner end thereof, as shown in Fig. 10. In order to prevent the leakage of fluid around outside of the tube, a packing-ring 18^a is placed in a recess 19^a in the socket and is expanded against the tube by a follower-ring 20^a, which is moved by a sleeve 21^a, surrounding the tube 17^a, and provided with threads at its outer end engaging female threads on the socket, its inner wall serving as a guide for the head of the tube 17^a. A spring 22^a is interposed between the head in the tube 17^a and the follower-ring 20^a and serves to cause the ring 15^a to normally project a short distance beyond the face of the plate 2^a or the contact-strips 12^a, so that when the members of the coupling are adjusted together, as hereinbefore described, the packing-rings 15^a and 15^b will be held in contact with each other, the ring 15^b preferably projecting beyond the face of the plate 2^b a distance approximately equal to the thickness of the contact-strips 12^b. It will be observed that the spring 22^a is entirely protected from the steam or water, and is therefore not liable to rapid deterioration through oxidation. It will be readily understood that a single tail-piece 6^a, extending uninterruptedly along the lower edge of the face-plate, may be employed; but it is preferred to employ two, as shown and described, thereby reducing the weight of the coupler, and, further, the toes 11^b may be united into one extending continuously along the lower edge of the face-plate 2^b. Where two lines of pipe are employed, the ends of the pipe-lines are provided at each end of the car with one member of the coupling—that is to say, the member A is applied to one end of each line and the member B to the opposite end, so that one line has the member A and the other line the member B at each end of the car.

As shown in Figs. 1 and 5, the movable pipe-sections 3^a and 3^b are arranged out of line with the main portion of the pipe-lines and are connected thereto by short sections of hose or other flexible connections 23^a and 23^b. The pipe-lines and movable sections 3^a 3^b are preferably so arranged that the connections 23^a and 23^b will form an angle (preferably a right angle) thereto. This construction permits of the free longitudinal movements of the cars without injury to or separation of the members of the coupling. The movable sections are supported by hangers 24^a in such a manner as to permit of the vertical movement of the sections and the members of the couplers necessary, as hereinbefore stated, for uniting such members, and also to permit of the longitudinal and lateral movements of the car without affecting the integrity of the coupling. Other suitable flexible connections may be interposed between the members of the coupler and the pipes secured to the car, so as to render the movements of the coupler independent of the cars, and vice versa; or in case the main lines of pipe are of such a length and are so arranged as to permit of their being sprung sufficiently to allow of the coupling of the members A and B, as hereinbefore described, said members may be attached directly to the main lines without the interposition of the flexible connections.

When only one line of pipe is employed, the construction of the coupler is so far modified that the members A and B are duplicates of each other, as shown in Figs. 5, 11, 12, 13, and 14. In such modified structure each member is provided with a tail-piece 6^a 6^b, which is located at one side of a plane passing through the axis of the socket, and with a toe 11^a 11^b on the opposite side of said plane. The tail-piece of each member is provided with a clamping-plate 14^a 14^b, held in place by bolts 7^a 7^b and springs 8^a 8^b. The members of the coupler are held from independent vertical and lateral movements by lugs 13^a and 13^b, formed on the upper edges of the face-plates, the lugs on one member being adapted when the members are coupled to pass over the upper edge of the other member and to interlock with the lugs thereon, as shown in Figs. 5 and 11.

In uniting the members of the coupling shown in Figs. 5, 11, 12, 13, and 14 they are held so that their axes form an angle with each other and so that the axis of one member is a little to one side and below the axis of the other, as represented by full and dotted lines in Fig. 12, so as to permit of the toes of each member being moved inwardly beyond the lips of the clamping-plate of the other member. The members are then turned so as to cause the toes to pass in behind the lips of the clamping-plates and bring their axes into a common vertical plane. Both members are then depressed or allowed to move down, in which movement the members turn toward each other, the lower edges of the toes forming the center of movement until the face-plates or their bearing-strips 12^a and 12^b come into contact, as described in connection with the form of coupler shown in Fig. 2.

As a guide for the proper adjustment of the

members together and to insure the alignment of the axes of the members after the first coupling movement above mentioned, a projection or stop 25 is formed on each of the members, the stop on one member being arranged to engage the lip 10 of the other member, as shown in Fig. 12.

Each member of the form of coupling shown in Figs. 5, 11, 12, 13, and 14 has its packing-ring 15 secured in a yielding tube 17, which is mounted in said members, as shown in Fig. 13, in the manner described and shown in connection with the member A of the coupling for the double line of pipe. The members A and B are attached, respectively, to opposite ends of the single line of pipe extending under the car by means of a suitable flexible connection, as hereinbefore described.

The flexible connections between the members of the coupler and the fixed lines of pipe under the cars permit of the independent movements of adjacent cars without in any way affecting the coupling, which is so constructed that in case of the accidental separation of the cars the members will be easily pulled apart without injury to either.

While the form of coupler shown in Figs. 5, 11, 12, 13, and 14 is described as more especially applicable where single lines of pipe are employed, they are as readily applicable for connecting the ends of the double lines of pipe.

The devices herein described depend very largely for their efficiency on the fact that one of the interlocking devices shown and described is supported in normal working position by a spring and in such manner that the interlocking devices while under normal strains will hold; but when they are subjected to dangerous abnormal strains the spring will yield sufficiently to permit one of the interlocking members to pass the other, so that the half-couplings may thus separate without danger of breakage, and for this purpose I do not limit myself to the particular form or arrangement of yielding spring connection shown, but claim as regards the feature or part thus referred to the fullest admissible benefit of the doctrine of mechanical equivalents.

I claim herein as my invention—

1. In a pipe-coupling, the combination of two separable members having flexible connections to the main lines of pipe, one member being provided with an open-top spring-actuated yielding lip or hook and the other member with a toe adapted to engage said lip or hook and thereby hold the faces of the members together when free to move under the force of gravity and are automatically detachable under unusual strains, substantially as set forth.

2. In a pipe-coupling, the combination of two separable members having flexible connections to the main lines of pipe and provided on their lower sides with interlocking devices constructed to hold under normal strains and to separate by a yielding spring action under unusual strains, whereby the faces of the members are held together when free to move under the force of gravity and automatically detachable under unusual strains, substantially as set forth.

3. In a pipe-coupling, the combination of two separable members having flexible connections to the main lines of pipe and provided on their lower sides with interlocking devices constructed to hold under normal strains and to separate by a yielding spring action under unusual strains and on their upper sides with stops to prevent independent vertical movement of the members, substantially as set forth.

4. In a pipe-coupling, the combination of two separable members having flexible connections to the main lines of pipe, one member being provided with an open-top spring-actuated yielding lip or hook and the other member with a toe adapted to engage said lip or hook, and interengaging lugs and recesses or openings on said members adapted to prevent independent lateral movement thereof, substantially as set forth.

5. In a pipe-coupling, the combination of two separable members having flexible connections to the main lines of pipe, each member being provided on its lower side with a spring-actuated yielding lip or hook, and also with a toe adapted, respectively, to engage the toe and lip or hook of the other member, substantially as set forth.

6. In combination with the outer shell of a pipe-coupling, a movable tube provided with a packing-ring in its outer end and extending through the coupling, a packing-ring surrounding the tube near its inner end, a follower-ring, a sleeve for operating the follower-ring, and a spring arranged between the tube and sleeve and adapted under normal tension to so hold the tube that the packing-ring will project beyond the face of the coupling, substantially as set forth.

7. As a mechanism for use in couplings where automatic detachability under unusual strains is desired, a hook on the one half of the coupling and a toe on the other arranged so that their meeting faces when engaged shall be at right angles, or substantially so, to the axial line of strain, and a spring for holding one of such interlocking members in working position under normal conditions of use, but suitably arranged to yield or give way under abnormal strains, so as to permit of the separation of the members of the coupling, substantially as set forth.

In witness whereof I have hereunto set my hand.

GEO. WESTINGHOUSE, JR.

Witnesses:
W. D. UPDEGRAFF,
DARWIN S. WOLCOTT.