

No. 775,286.

PATENTED NOV. 15, 1904.

H. O. BEALE.
AUTOMATIC AIR BRAKE COUPLING.

APPLICATION FILED APR. 7, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

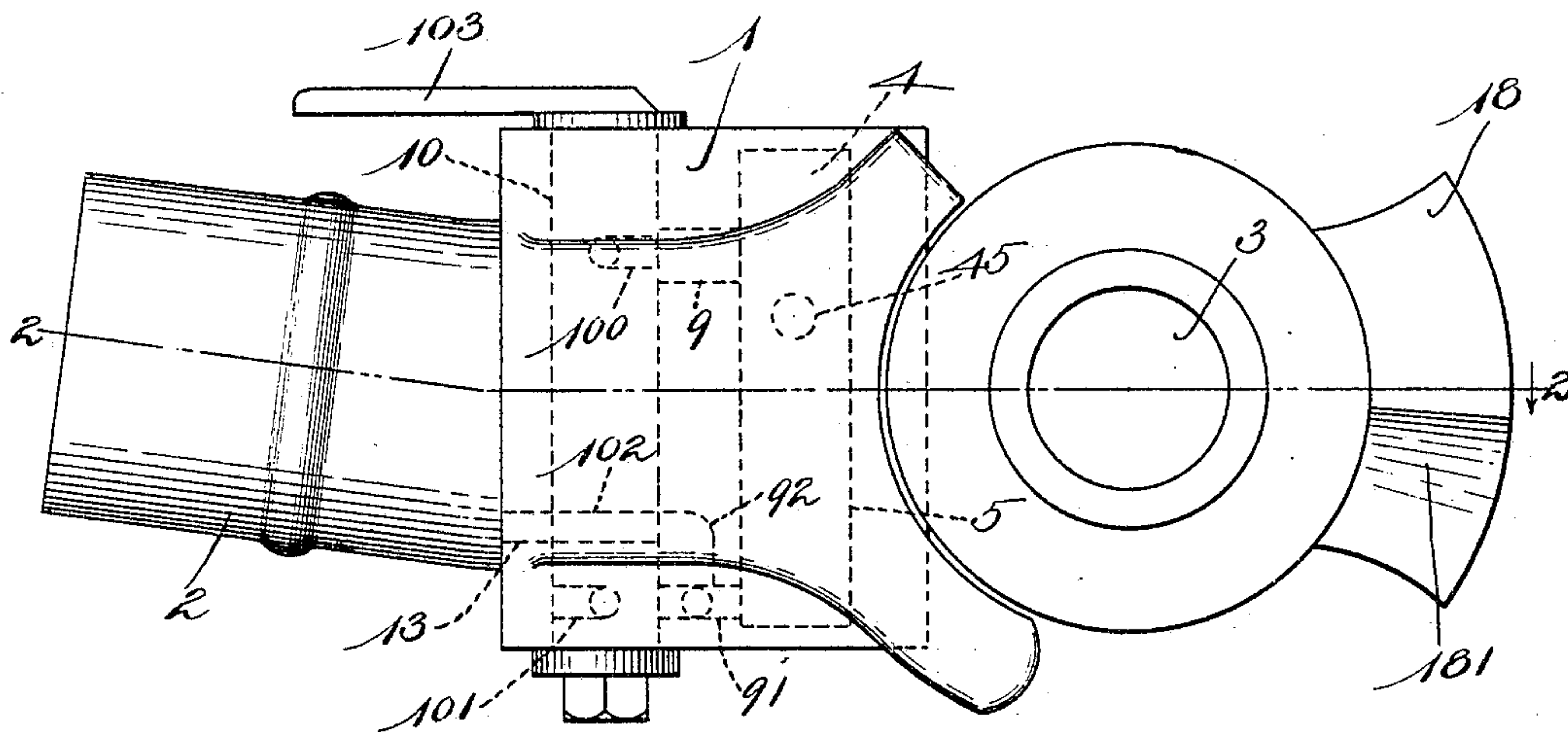


FIG. 1-

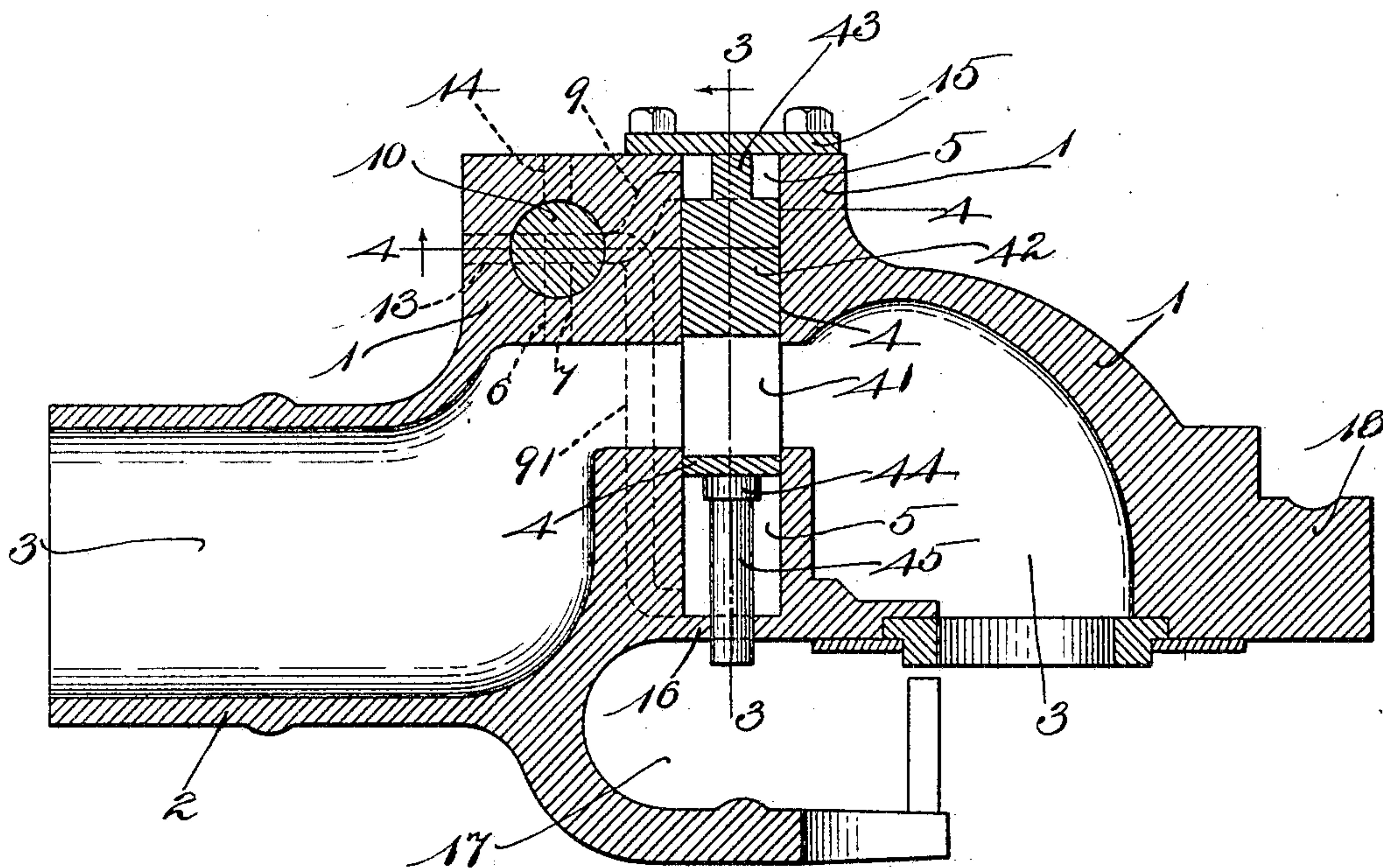


FIG. 2-

WITNESSES:

Franklin E. Low.

Oscar F. Hill

INVENTOR:

Harry O. Beale
by Maceod Calver & Randall
his Attorneys

No. 775,286.

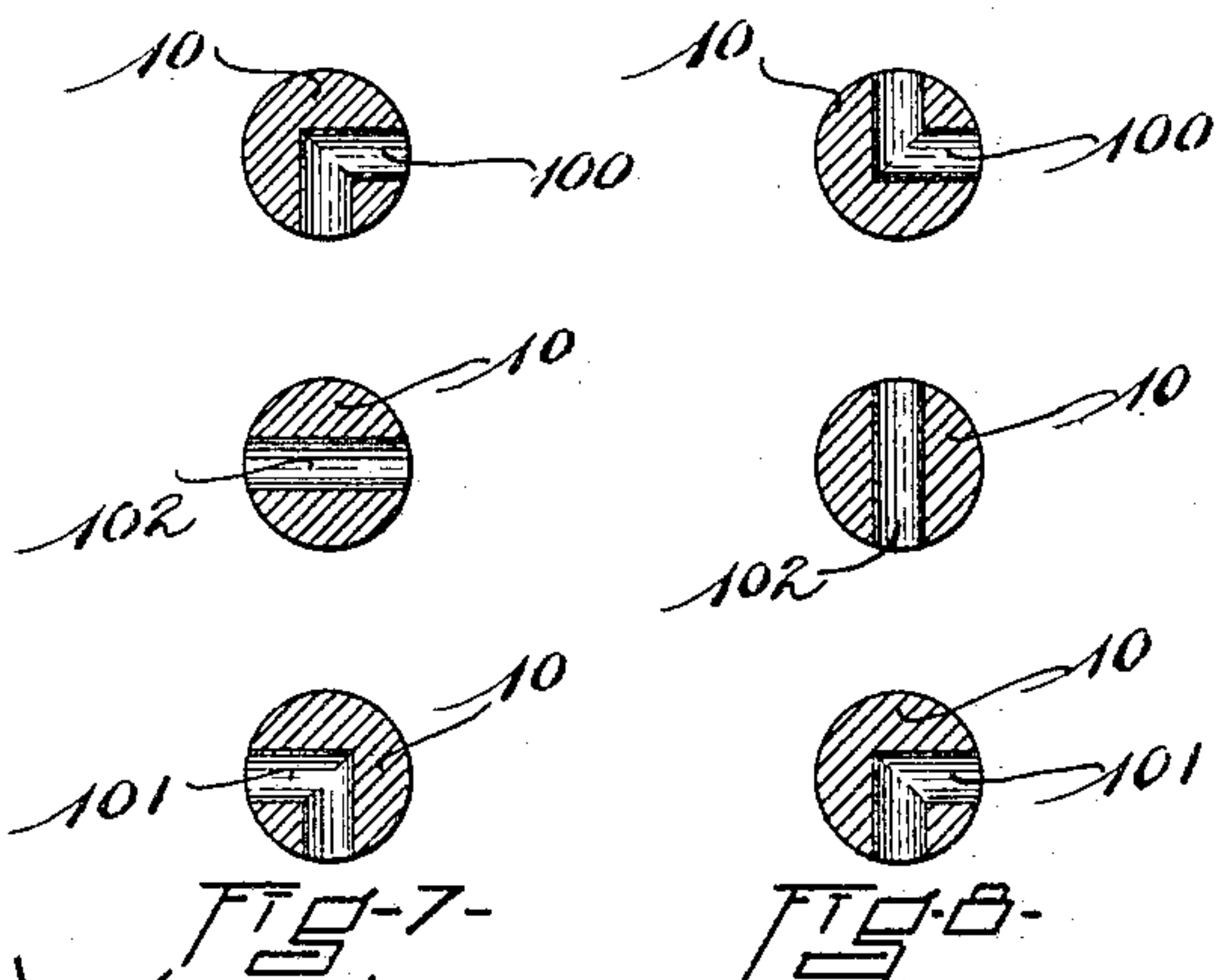
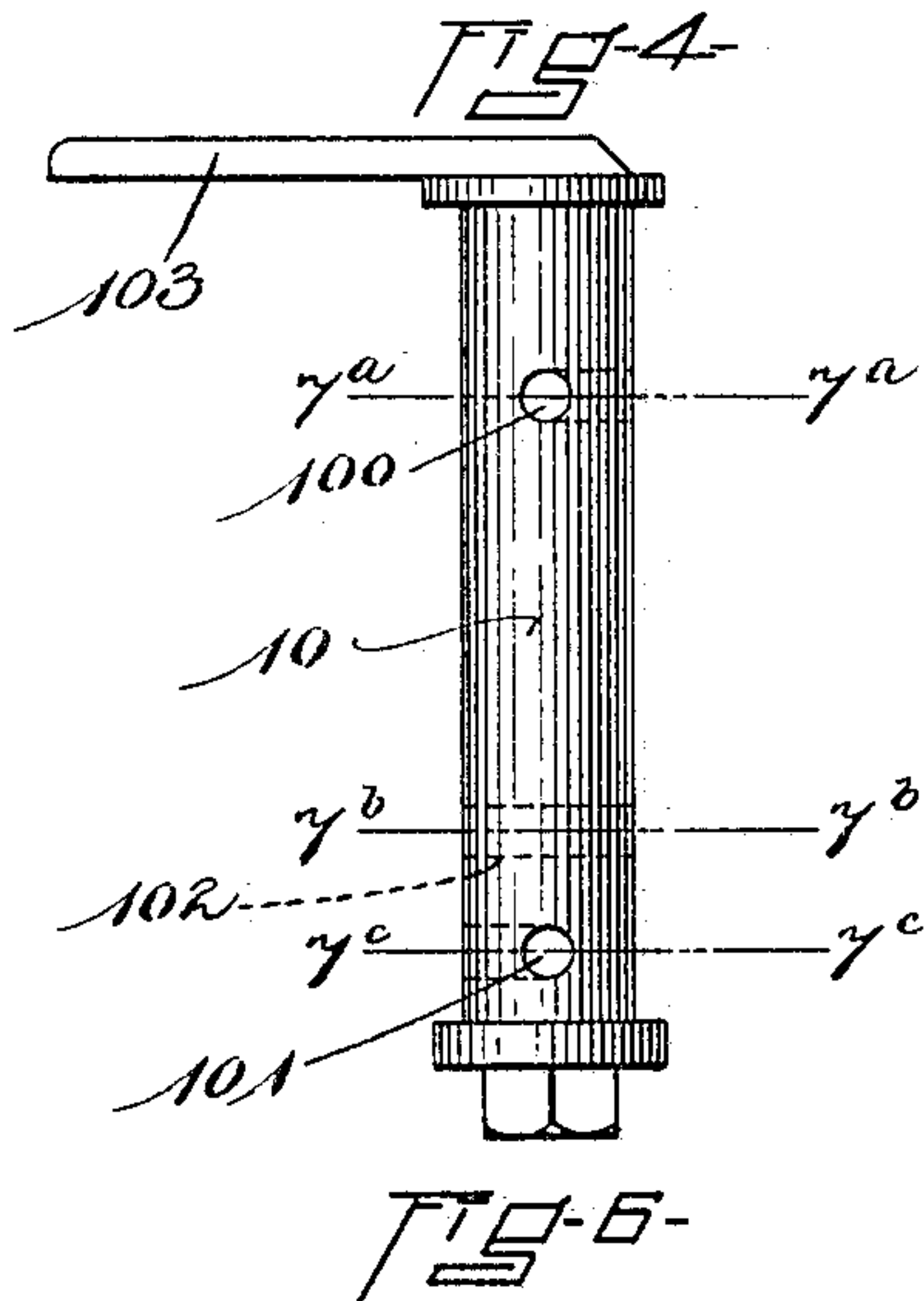
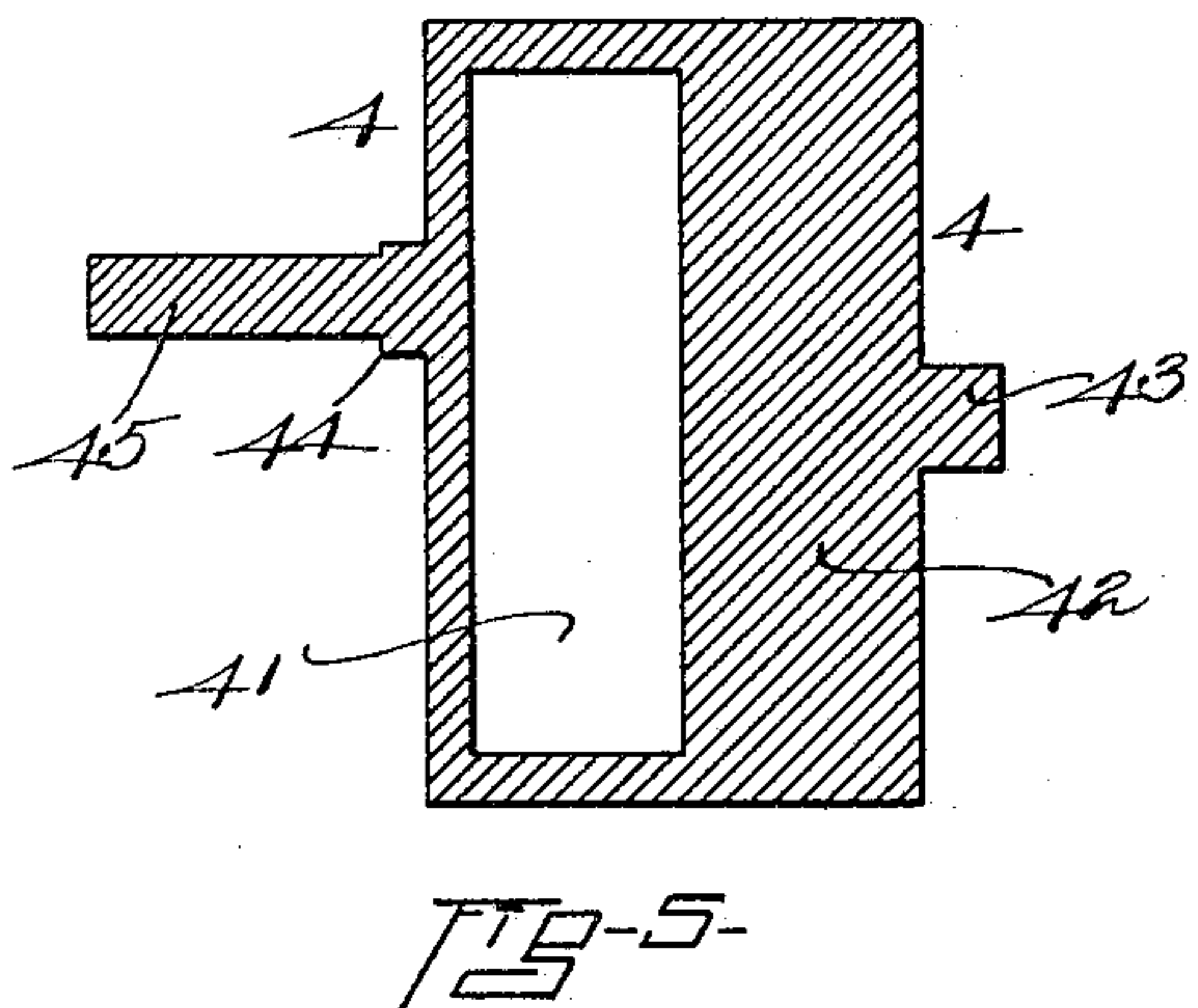
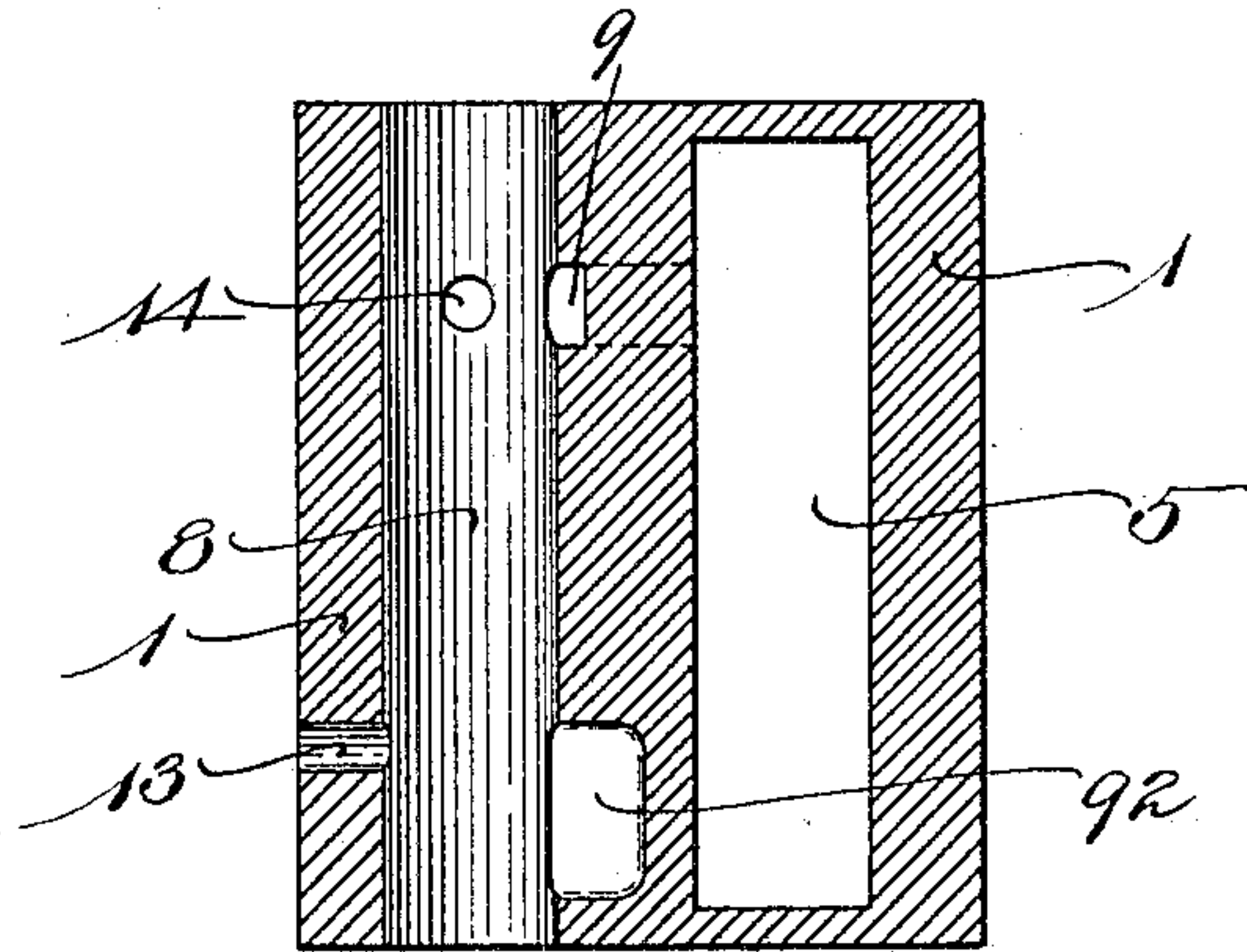
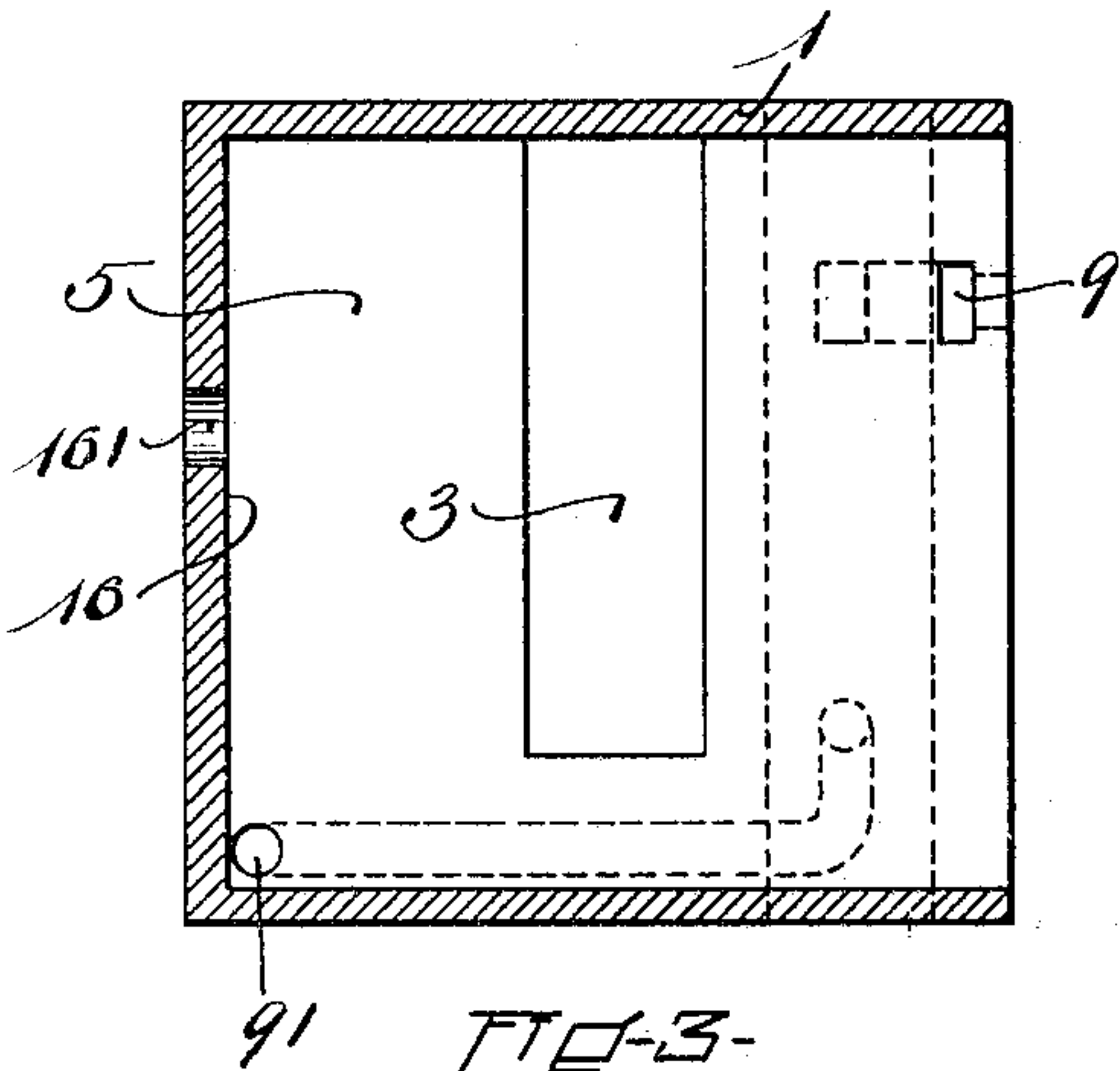
PATENTED NOV. 15, 1904.

H. O. BEALE.
AUTOMATIC AIR BRAKE COUPLING.

APPLICATION FILED APR. 7, 1904.

NO MODEL.

2 SHEETS—SHEET 2.



WITNESSES:
Franklin E. Low
Oscar F. Hill

INVENTOR:
Harry O. Beale
by Macleod Calver & Randall
his Attorneys

UNITED STATES PATENT OFFICE.

HARRY ORLANDO BEALE, OF ORONO, MAINE, ASSIGNOR OF ONE-HALF TO
WILLIAM M. AYER, OF OAKLAND, MAINE.

AUTOMATIC AIR-BRAKE COUPLING.

SPECIFICATION forming part of Letters Patent No. 775,286, dated November 15, 1904

Application filed April 7, 1904. Serial No. 201,982. (No model.)

To all whom it may concern:

Be it known that I, HARRY ORLANDO BEALE, a citizen of the United States, residing at Orono, in the county of Penobscot, State of Maine, have invented a certain new and useful Improvement in Automatic Air-Brake Couplings, of which the following is a specification, reference being had therein to the accompanying drawings.

Certain known forms of automatic air-brake mechanism are constructed and arranged to operate in such manner that in case a railway-train equipped with such mechanism should break apart at some point in its length the brakes of both of the sections into which the train would separate would be applied automatically, and thereby be caused to arrest the motion of the said sections. When the break or disconnection takes place in advance of the middle of the length of the train, the rear one of the separated sections usually is heavier than the forward one, and if the point of disconnection is near the forward end of the train, as often occurs, the rear section may have considerably greater weight than the leading section. By reason of the greater momentum possessed by the rear section in such cases the said section will keep up its speed longer after the application of the brakes than the lighter leading section and will run farther than the latter before the brakes bring it to rest. Hence it happens frequently that the rear section, either through overtaking the front section or through keeping under headway after the front section has been stopped, collides with the front section, occasioning injury and loss.

The object of the invention is to obviate the occurrence of accidents of the character just referred to; and to this end the invention consists in improvements in air-brake couplings which, while enabling the brake mechanism of the rear section of a train to act automatically, as heretofore, to stop the said section in case the train should break in two while in motion, shall enable the rear air-brake coupling of the front section when desired to be arranged to operate to prevent the brake mechanism of the said front section from act-

ing automatically upon the breaking in two, leaving the said brake mechanism of the front section fully under the control of the engineer of the train and permitting the front section to continue in full motion until an intentional change in such motion is brought about.

I have illustrated in the accompanying drawings an air-brake coupling embodying my improvements in the best form thereof which has yet been devised by me.

In the drawings, Figure 1 represents the said coupling in side elevation. Fig. 2 is a view of the said coupling in horizontal section mainly on the plane indicated by the dotted line 2 2 of Fig. 1. Fig. 3 is a view in transverse vertical section on the plane indicated by the dotted line 3 3 in Fig. 2 with the slide-valve and the cover of the chamber therefor removed. Fig. 4 is a view in longitudinal vertical section on the plane indicated by the dotted line 4 4 in Fig. 2 with the valves removed. Fig. 5 is a view showing the slide-valve in vertical section on the plane of the dotted line 3 3 of Fig. 2. Fig. 6 shows the rotary valve in elevation detached. Fig. 7 shows views of the rotary valve in cross-section on the planes which are indicated by the dotted lines 7^a 7^a, 7^b 7^b, and 7^c 7^c, respectively, in Fig. 6. In Fig. 7 the sectional views show the ports of the rotary valve in the position which the said rotary valve occupies in Figs. 1, 2, and 6. Fig. 8 shows views in section similar to those of Fig. 7, but represents the ports in the positions which they occupy when the rotary valve is turned through an arc of ninety degrees.

Having reference to the drawings, the body of the coupling is designated 1. It is provided, as usual, with the tubular extension 2, Figs. 1 and 2, to which extension is applied or connected in practice one end of the usual flexible tubing to which the coupling is attached. The passage through the coupling is designated 3 3. As shown, the coupling is constructed for engagement and connection with a similar coöperating coupling, essentially as in the case of couplings at present in use, and, in fact, the coupling shown in the drawings is fitted to be operatively connected and com-

bined in use with one of the said couplings. Inasmuch as in this respect the construction is or may be as usual and is not involved in my invention, a detailed description of the
5 features of the same will be unnecessary.

In conformity with my invention I provide the coupling with a closure-valve whereby the flow of air through the passage 3 3 of the coupling may be controlled, and I provide
10 means for automatically operating the said closure-valve through the agency of the air-pressure within the air-passages of the brake mechanism. I also provide means whereby while two coöperating couplings of adjoining
15 cars of a train are in regular engagement with each other the closure-valves of both of the said couplings shall be caused to occupy their open position, thereby maintaining the brake mechanism in normal working condition. The
20 construction and mode of operation are such that in the event of the disconnection of the said couplings from each other in consequence of a breaking apart of the said cars while the train is in motion the closure-valve of that
25 one of the said couplings which pertains to the rear end of the leading section of the train will be actuated automatically by the internal air-pressure to close the air-passage through the said coupling, thus preventing the escape
30 of air and keeping the brake mechanism of such section from applying the brakes thereof automatically. In the case of the remaining one of the said couplings—namely, that at the forward end of the hind section of the train—
35 the closure-valve will be caused by the internal air-pressure to remain open, so as to permit the escape of air from the air-passages of the brake mechanism pertaining to such section, and thereby bring about the applica-
40 tion of the brakes of the rear section.

In the illustrated embodiment of the invention the closure-valve is constituted by a slide-valve 4, which is formed with a port 41, extending through the thickness thereof from
45 one surface to the other, and with an unperforated portion 42 at one side of such port. A valve-chamber 5 is formed in the body 1 of the coupling for the reception of the said closure-valve. This valve-chamber extends
50 transversely of the body, it intersecting and crossing the middle portion of the air-passage 3. In the outer position of the slide-valve the port 41 thereof registers with the air-passage 3, leaving the latter unobstructed. When
55 the slide-valve occupies its inner position, the unperforated portion thereof registers with the said air-passage, closing the latter.

In carrying the invention into effect provision is made in connection with the closure-
60 valve 4 for automatically operating the same by the air-pressure within the air-passages of the brake mechanism, and means is also provided whereby when two of the couplings are united or joined together in the usual manner
65 for use the closure-valves of both of such

couplings shall be moved by positive force into their open positions and held locked in such positions against any tendency of the air-pressure to move either closure-valve into the closed position.

For the purpose of enabling the closure-valve of the coupling to be actuated by the air-pressure within the air-passages of the brake mechanism, as indicated above, air-ports 6 and 7 and a supplemental valve-chamber 8, to which the said ports 6 and 7 lead from the passage 3, are formed in the body 1 of the coupling, and from the said supplemental valve-chamber other ports 9 and 91
75 lead, respectively, to the outer and inner ends, respectively, of the closure-valve chamber 5. Within the said supplemental valve-chamber 8 is located a controlling-valve 10, which is formed with ports or passages 100, 101, and 102 extending through the same. The top
80 port 100 of the controlling-valve 10 coöperates with the upper port 6, leading from air-passage 3, and with the port 9, leading from the supplemental valve-chamber to the outer end of the closure-valve chamber. The bot-
85 tom port 101 of controlling-valve 10 coöperates with the lower port 7, leading from the air-passage 3, and also with the port 91, leading to the inner end of the closure-valve chamber. The port 102 of the controlling-valve
90 10 is an exhaust-port and coöperates with the outer end of port 91 and also with the lower exhaust-port 13, which is formed in the body of the coupling. Ports 101 102 extend through the body of the controlling-valve at different
95 heights, and in order that the outer end of port 91 may be enabled to have working relations with said ports 101 102 alternately the said outer end is enlarged vertically, as shown at 92 in Fig. 4, so as to extend to the
100 levels of both ports 101 102. At the level of the upper port 100 of the controlling-valve 10 an upper exhaust-port 14 is formed in the body of the coupling. The two exhaust-ports 13 and 14 communicate with the external at-
105 mosphere. The ports 100 and 101 are constituted by right-angled passages through the body of the controlling-valve, the opposite ends of each of the said passages opening at the exterior of the body of such valve at
110 ninety degrees apart and the two ports being set at angles of ninety degrees apart with respect to each other. The port 102 is constituted by a straight passage extending diametrically through the said body. The con-
115 trolling-valve is furnished with a handle 103, by means of which the valve may be turned by hand. The said controlling-valve is intended to occupy positions at ninety degrees apart, in one of which the handle 103 shall extend
120 in the direction lengthwise of the train and in the other thereof shall extend transversely at right angles to the said direction. In the former position (indicated in Figs. 1, 2, 6, and 7) the port 100 will connect the upper
125 130

port 6 (communicating with air-passage 3) with port 9, leading to the outer end of the closure-valve chamber, while port 101 will occupy its closed position and exhaust-port 102 will connect port 91 (leading to the inner end of the closure-valve chamber) with exhaust-port 13. In this position the air-pressure will act at the outer end of the closure-valve chamber with a tendency to move the closure-valve inward, so as to present its unperforated portion in line with passage 3 and close the latter. When the controlling-valve is moved so that its handle stands at right angles to the former position, the port 100 will no longer connect ports 6 and 9, but will occupy a position in which it will connect port 9 with exhaust-port 14. Port 101 will connect port 7 with the port 91, leading to the inner end of the closure-valve chamber, and exhaust-port 102 will no longer connect the port 91 with the exhaust-port 13. Consequently the air-pressure will act at the inner end of the closure-valve chamber with a tendency to move the closure-valve outward into its position shown in Fig. 2, in which its port 41 registers with the passage 3 and leaves the latter unobstructed.

For the purpose of limiting the extent of the movements of the closure slide-valve so that it shall be prevented from passing too far with relation to the openings of the ports 9 and 91 the said valve is furnished with stops, which are constituted, respectively, by a projection 43 at the outer end of the valve and by a shoulder 44 on the pin 45, which projects horizontally from the inner end of the valve. The projection 43 encounters the inner surface of the cover 15 of the closure-valve chamber in the movement of the closure-valve outward, thereby determining the extent of such movement, and the shoulder 44 encounters the inner surface of the wall 16 at the inner end of the closure-valve chamber in the movement of the closure-valve inward, and thereby determines the extent of such movement. The pin 45 occupies a hole 161 in the said wall and projects into the space at 17, into which the flange 18 of the cooperating coupling is entered when the two couplings are joined together for use. The flange 18 of each coupling is beveled, as at 181, on the side thereof which is turned toward the wall 16 of the coupling, with which it is thus joined, in order that as the said flange is swung into position in the said space in the operation of uniting the two couplings to each other the beveled portion may act against the end of the pin 45 to move the closure-valve positively into its outer (open) position. It is by this engagement of the flange of each coupling with the pin of the closure-valve of the opposing coupling when the two couplings are joined together for operation that the closure-valves of the two couplings are

automatically moved into their open position as the couplings are joined together and held locked in such position.

In the use of couplings embodying my invention the controlling-valve of the coupling at the rear end of a car is set so that its handle shall extend lengthwise of the train, so as to cause the air-pressure to act at the outer end of the closure slide-valve with a tendency to move the latter into its closed position, while the controlling-valve of the coupling at the front end of a car is set so that its handle shall extend at right angles to the length of the train, so as to cause the air-pressure to act at the inner end of the closure slide-valve with a tendency to move the latter into its open position. So long as a rear coupling and front coupling remain properly joined to each other the flanges 18 of the same will hold both of the closure-valves positively locked in their open position. Should the couplings be pulled apart, as in consequence of the breaking of the train in two, the withdrawal of the flanges will leave the respective closure-valves free to the control of the internal air-pressure of the brake mechanism of the respective sections of the train. Consequently the closure-valve of the rear coupling of the front section of the train will assume its closed condition, thereby operating to obviate calling the brake mechanism of such section automatically into action. The closure-valve of the front coupling of the rear section will remain open, permitting the brake mechanism of such section to act automatically.

I have been particular in describing the exact construction, &c., of the illustrated embodiment of the invention; but it is to be understood that the invention may be otherwise embodied than in the form, arrangement, &c., shown in the drawings without necessarily involving a departure from the principles of the invention. Therefore I wish it to be understood that I do not, save as indicated by limitations expressed in the respective clauses of claim, limit myself to the exact construction and arrangement which I have shown and described herein.

It will be observed that if the handle of the rotary controlling-valve of the rear coupling of a car is caused to assume a position at right angles to the length of the train then in case the train breaks in two such coupling will act in the usual manner after being disconnected from the coupling to which it was previously joined belonging to the next car and will permit of the automatic application of the brakes in the front section of the parted train in the manner usual heretofore. It will be obvious, therefore, that according to the adjustment of the rotary controlling-valve the coupling may be enabled to operate either to bring about the automatic application of the brakes to the front section of a train which parts in two or

to prevent such brakes from being automatically applied as a result of the parting of the train.

I claim as my invention—

- 5 1. In an air-brake coupling, in combination, the body having the main air-passage, a closure-valve for the said air-passage, and a controlling-valve by which air-pressure is applied to open and close the closure-valve.
- 10 2. In an air-brake coupling, in combination, the body having the main air-passage, the closure slide-valve for the said air-passage, and a controlling-valve to control the application of air-pressure to the said closure slide-valve
- 15 to actuate the latter to open and close the said main air-passage.
3. In an air-brake coupling, in combination, the body having the main air-passage, a closure-valve for the said air-passage, and a rotary
- 20 controlling-valve by which the application of air-pressure to open and close the said closure-valve is controlled.
4. In an air-brake coupling, in combination, the body having the main air-passage, main
- 25 and auxiliary valve-chambers, ports connecting the said valve-chambers with each other, and ports connecting the auxiliary valve-chamber with the said main air-passage, of a closure-valve in said main valve-chamber, and
- 30 a controlling-valve in said auxiliary valve-chamber.
5. In an air-brake coupling, in combination, the body having the main air-passage, main
- 35 and auxiliary valve-chambers, ports connecting the said valve-chambers with each other, and ports connecting the said auxiliary valve-

chamber with the main air-passage, of the slide closure-valve in said main valve-chamber, and the rotary controlling-valve in said auxiliary valve-chamber.

6. In an air-brake coupling, in combination, the body having the main air-passage, a closure-valve for said air-passage, a controlling-valve by which air-pressure is applied to open and close the closure-valve, and means to positively open the closure-valve when two couplings are placed in operative connection with each other.

7. In an air-brake coupling, in combination, the body having the main air-passage, the closure slide-valve for the said air-passage, a controlling-valve to control the application of air-pressure to actuate the said closure slide-valve to open and close the said main air-passage, and means to positively open the closure slide-valve when two couplings are operatively joined with each other.

8. In an air-brake coupling, in combination, the body having the main air-passage, a closure-valve for the said air-passage, a rotary controlling-valve by which the application of air-pressure to open and close the said closure-valve is controlled, and means to positively open the closure-valve when two couplings are operatively joined with each other.

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

HARRY ORLANDO BEALE.

Witnesses:

CHAS. F. RANDALL,
WILLIAM A. COPELAND.