No. 685,267. Patented Oct. 29, 1901.

J. E. FORSYTH.

AUTOMATIC PIPE COUPLING.

(Application filed Sept. 21, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

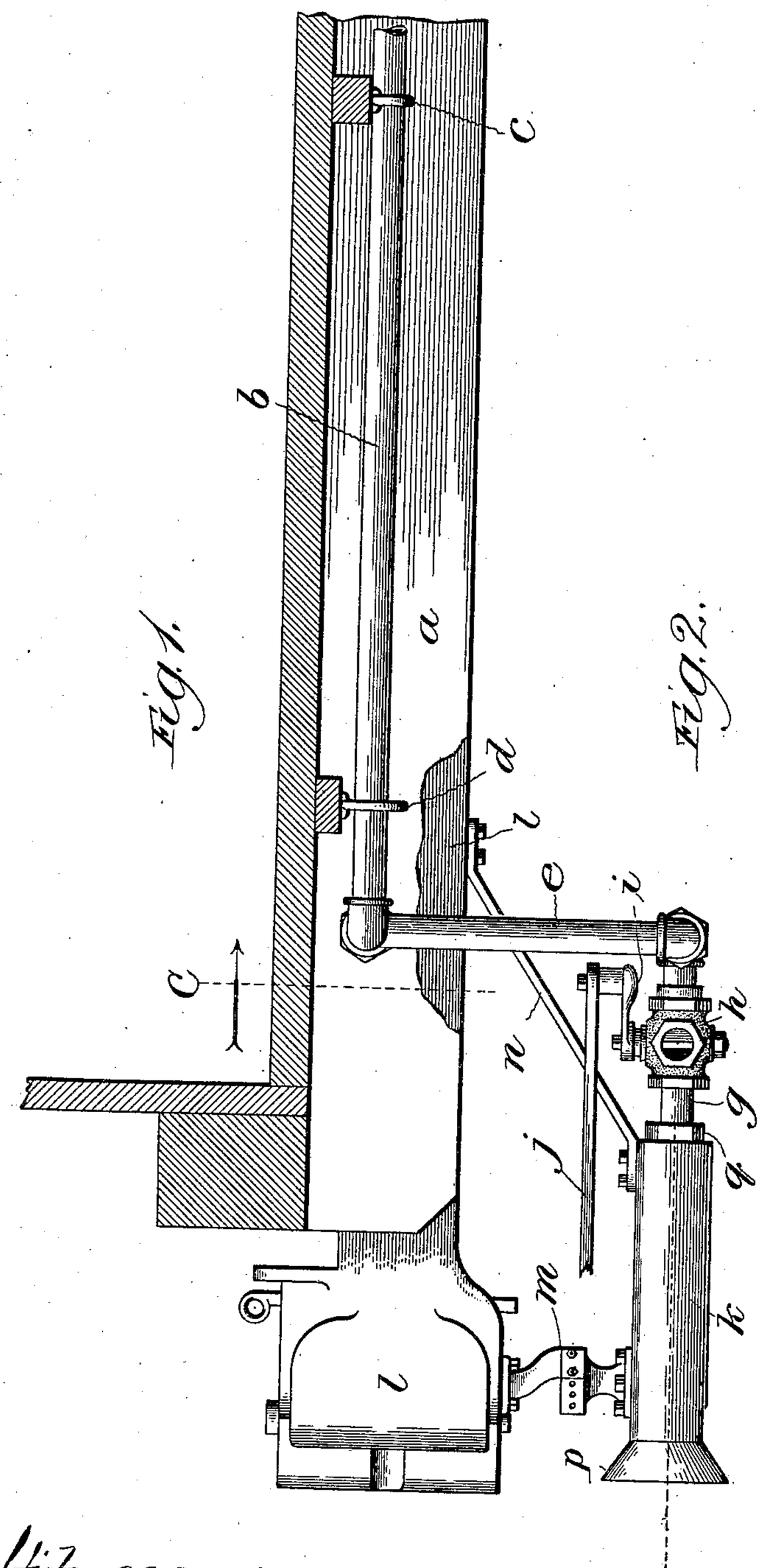
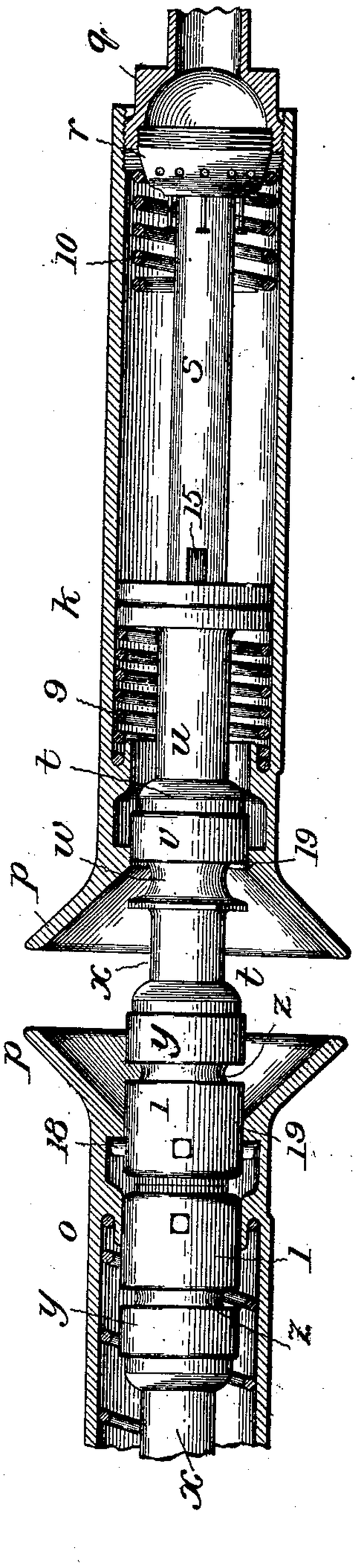


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

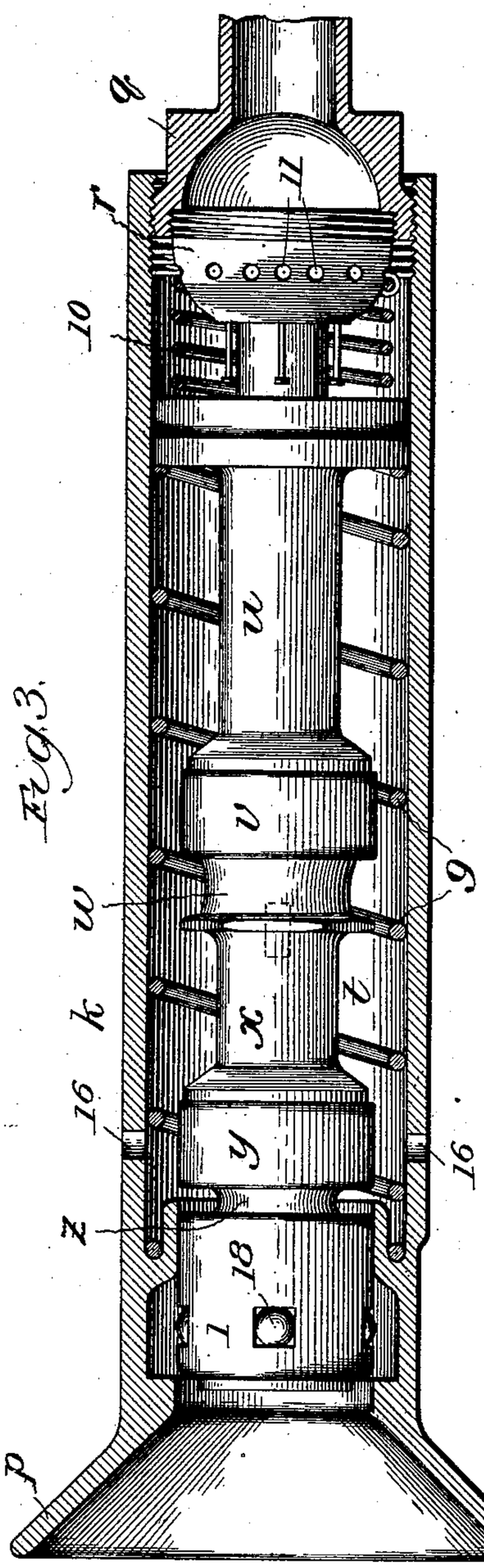

Fig. 3.

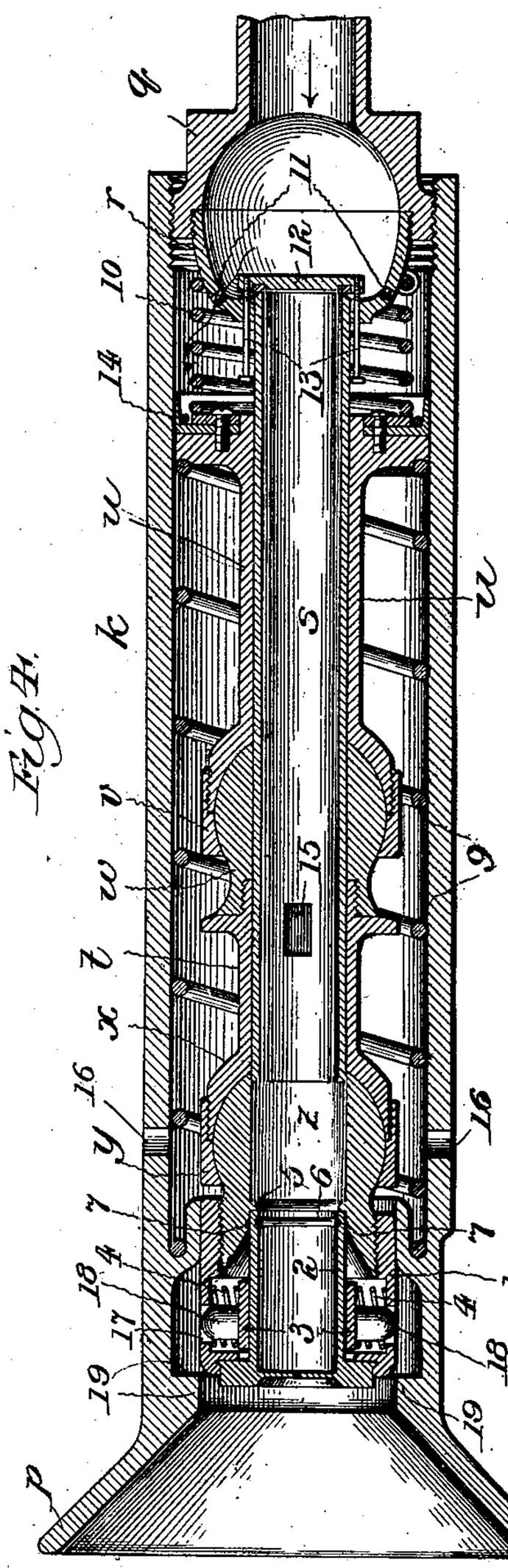

Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 5.

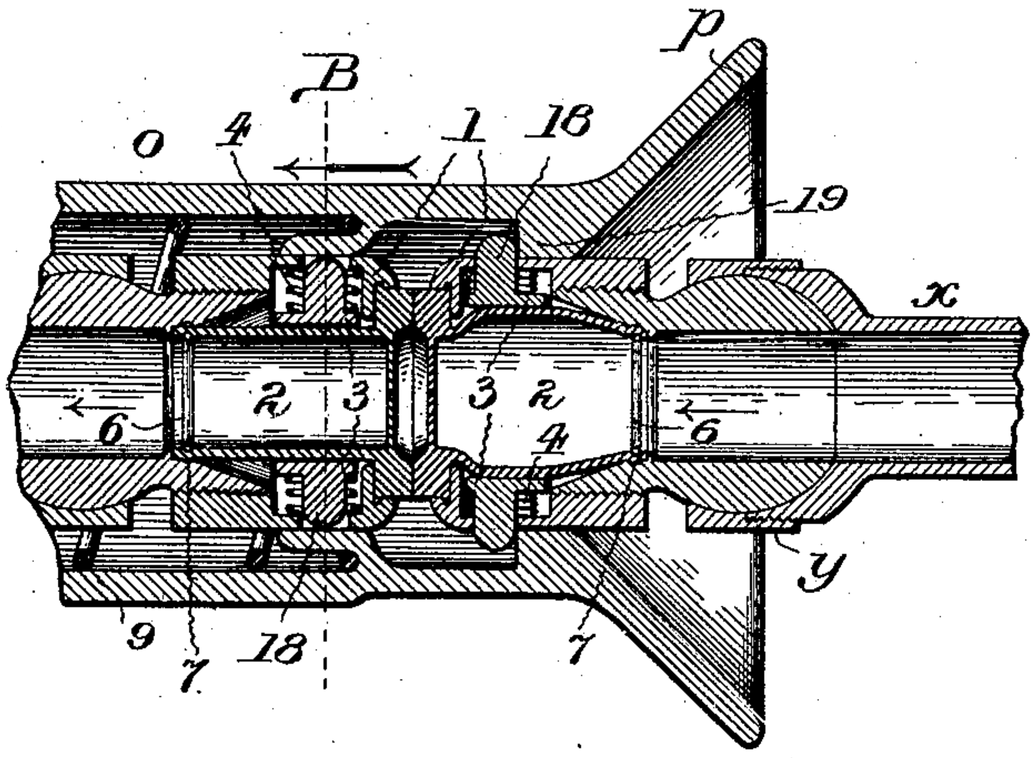


Fig. 6.

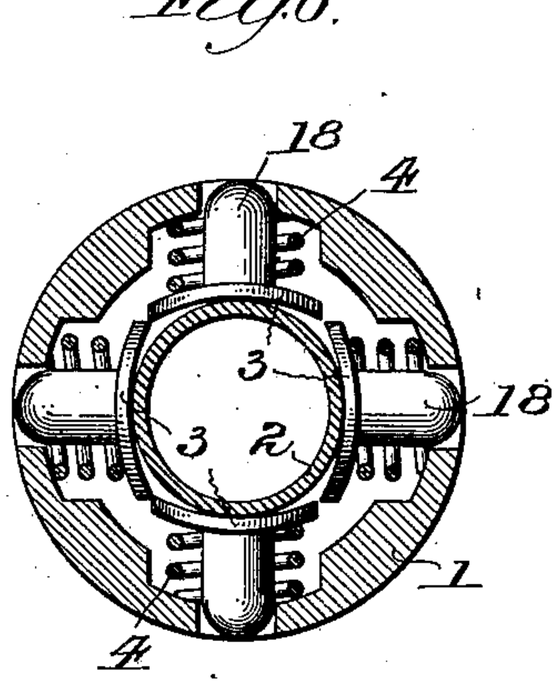


Fig. 7.

Fig. 9.

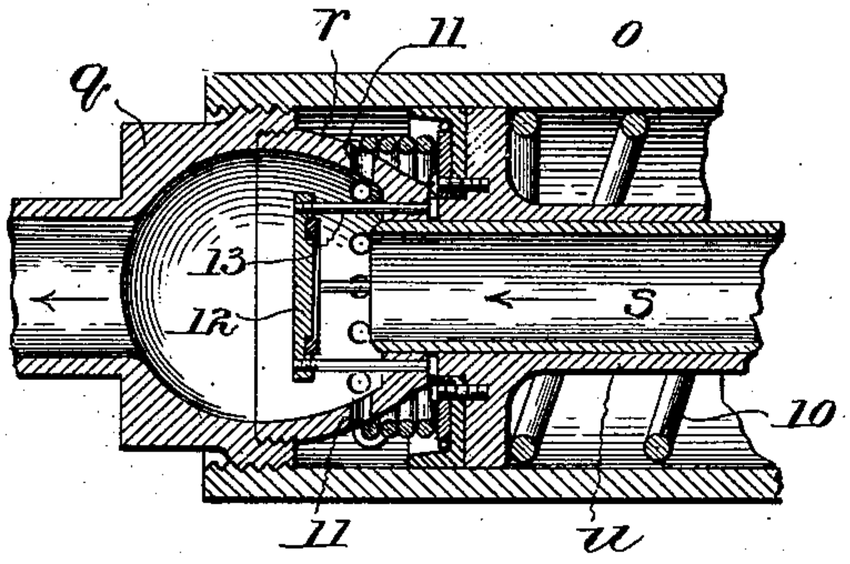
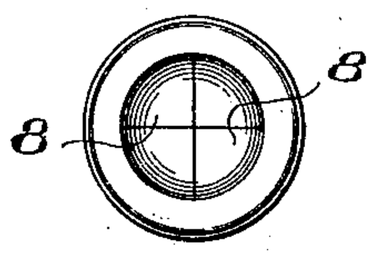
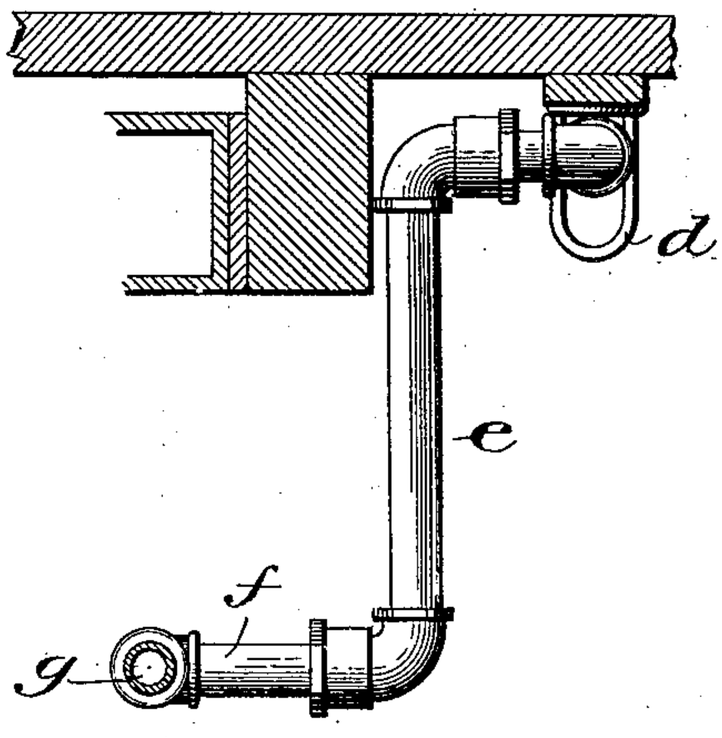


Fig. 8.





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UNITED STATES PATENT OFFICE.

JOSEPH E. FORSYTH, OF CHICAGO, ILLINOIS.

AUTOMATIC PIPE-COUPLING.

SPECIFICATION forming part of Letters Patent No. 685,267, dated October 29, 1901.

Application filed September 21, 1900. Serial No. 30,846. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. FORSYTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Automatic Pipe-Couplings, of which the following is a specification.

My invention relates particularly to the class of couplings employed between cars for automatically coupling the train-pipe whether air-brake pipe, signal-pipe, or steam-pipe, or any two or all of them.

My primary object is to provide a coupling of this nature which is completely under the will of the operator and which is not subjected to useless wear at times when it is not desired to connect the train-pipes—as, for instance, during switching.

To this end my invention consists in an automatic train-pipe coupler which depends for its action upon some force or agency other than that of the impact of the cars. In the preferred construction there are employed tubular holders suspended from the draw-bars of the cars and air-operated coupling members normally confined within said holders, either one of said coupling members (according to the direction of air-current) being caused to move or shoot out from its holder and engage the member in the other holder.

The preferred construction is illustrated in the accompanying drawings, in which—

Figure 1 is a broken longitudinal section of a car-frame equipped with a train-pipe and my improved coupling device; Fig. 2, an enlarged broken section taken as indicated at line A of Fig. 1 and showing two adjacent holders or cylinders supposed to belong to different cars and showing the coupling member of the right-hand holder as having been forced over into engagement with the coupling member of the other holder; Fig. 3, a still further enlarged section showing the right-hand holder of Fig. 2 with its contained coupling member in the normal position at rest; Fig. 4, a section similar to Fig. 3, but showing the coupling member thereof also in section; Fig. 5, an enlarged section showing the left-hand holder of Fig. 2 and showing the connected coupling members in section; Fig. 6, a section taken as indicated at line B of Fig. 5; Fig. 7, an enlarged broken section showing the left-hand end of the left-hand holder shown in Fig. 2; Fig. 8, an end view of a hollow expansible member employed for causing certain parts to interlock when the coupling members come together, and Fig. 9 a section taken as indicated at line C of Fig. 1.

In the preferred construction *a* represents an intermediate sill of a car; *b*, a train-pipe extending parallel thereto and supported by hangers *c d*, the latter of which is in the form of an elongated loop to permit a certain vertical movement to the front end of the train-pipe; *e*, a swinging pipe-section connected with the pipe *b*; *f*, a short offset pipe-section pivotally connected with the section *e*; *g*, a short pipe-section pivotally connected with the section *f*; *h*, a valve interposed in the course of the section *g* and provided with an operating-handle *i* and a link *j'*, leading to any convenient point from whence the valve *h* may be operated; *k*, a tubular holder or cylinder suspended, preferably, from the movable draw-bar *l* by rigid members *m* and *n*, and *o* a holder similar to the holder *k* and which is to be supported from the draw-bar of an adjacent car in exactly the same manner as the holder *k* is supported.

Fig. 2 represents the relative position of the cylinders *k* and *o* when the cars are coupled, and from this view it will be understood that the holders do not come into contact when the cars are coupled, a space of about two inches being preserved at such time. The holders are provided with adjacent bell-shaped ends *p*, as shown. At the inner end of each holder there is provided a pipe-coupling *q*, which connects with the section *g* of the train-pipe and an opposed bell-shaped member *r*, which supports a rigidly-connected guide-tube or relatively stationary coupling member section *s*, disposed centrally of and parallel to the holder. Slidably connected with the guide-tube *s* is a sectionally-constructed tubular member *t*, affording a relatively movable coupling member section comprising metallic sections *u v w x y z* 1, an expansible tubular member 2, and locking members 3, held normally sheathed by springs 4. The inner end of the member 2 abuts against a shoulder 5, with which the section *z* is provided, and is secured in place by means of a spring-metal

ring 6, which forces the rubber of the member 2 into an annular groove 7 in the section *z*. The outer end of the member 2 is closed by flexible flaps 8, which meet, as shown in Fig. 8, and serve to exclude the dust. A ball-and-socket joint is afforded at the junction of the sections *u v w*, and a second ball-and-socket joint is afforded at the junction of the sections *x y z*. When the coupling member of the holder *k* is in the position of Fig. 4, a certain flexibility is allowed in the outer joint mentioned, and when said coupling member is extended, as in the position of Fig. 2, flexibility is allowed also at the inner joint. The coupling members are held balanced within their holders under the tension of outer springs 9 and inner springs 10. Each bell-shaped member *r* is provided with perforations 11, through which air may pass from the train-pipe into the cylinder or holder and exterior to the guide-tube *s*. A longitudinally-movable automatically-actuated valve 12 is provided at the inner end of each tube *s*, and these valves are provided with studs or bolts 13, which project through guide-perforations in the member *r*, as clearly shown in Fig. 4. At the inner end of each tubular member *t* is an annular piston-head 14, which fills the space between the guide-tube *s* and the internal surface of the holder. Each guide-tube *s* is provided on its cylindrical surface with inlet air-passages 15, and each tubular holder is provided with air-vents 16. The outer section 1 of each sectionally-constructed member *t* is provided with radial perforations 17, into which normally project lugs 18 on the locking members 3. Each holder is provided adjacent to its bell-shaped end with an annular shoulder 19, with which the lugs 18 of the opposing coupling member engage when said opposing member is extended. The valve *h* is preferably a three-way valve, which when it is in position to close the train-pipe affords a vent for the rear end of the adjacent holder.

In operation, assuming the cars to be coupled and that it is desired to couple the train-pipes, the valve *h* of that car which is nearest to the air-supply is opened. Assuming the valve *h* adjacent to the holder *k* to be opened, air will pass in the direction indicated by the arrows in Fig. 4. Should the valve 12 not be closed, the first effect of the air-blast would be to close said valve, after which air would pass through the passages 11 to the rear or inner face of the piston 14. The pressure in the rear of said piston will cause the tubular member *t* to move forward till the perforations 15 of the tube *s* are exposed. By this time the outer end of the member *t* will have passed within the bell-shaped end of the adjacent holder *o*, and as the pressure enters the interior of the member 2 through the perforations 15 and that portion of the guide-tube which supports the member *t* in its extended position the member 2, which preferably is of rubber, is caused to expand, thereby forcing the members 3 radially outward and causing the lugs 18 to become locked behind the annular internal shoulder 19 of the opposed holder. At such time the coupling members abut at their meeting ends, and the air will pass as soon as the adjacent valve *h* of the next train-pipe is opened into said train-pipe, where it can be employed in effecting the next coupling operation. It is to be noted that the valve 12 of each holder is normally open, as indicated in Fig. 7, so that air is always free to pass to the train-pipe of the car which is farthest from the source of supply. As indicated in Fig. 2, the outer end of the extended coupling member engages the adjacent end of the companion coupling member and forces the companion coupling member backward some distance before the lugs 18 are caused to interlock with the internal shoulder 19. This movement is permitted by the spring 10 and insures a close contact between the meeting surfaces of the coupling members. When the air-supply to the holder *k* is cut off, the holder is at the same time vented and the member 2 collapsing allows the coupling-section *t* to become unlocked from the holder *o*, after which the spring 9 retracts the section *t*.

It is clear that the coupling member in the holder *o* would be extended so that the coupling would be effected within the holder *k* should the air-supply come from a direction opposite that from which it has just been assumed to proceed. It therefore appears that it is necessary to supply but a single holder and a single coupling member for each end of each car, with the result that the adjacent coupling members of any two meeting cars are opposed duplicates.

If desired, an emergency branch coupling of a well-known type may be provided for connecting with the train-pipe of any car not supplied with the improved automatic coupling, as illustrated in Patent No. 618,081, granted to me January 24, 1899.

It is obvious that the mechanism herein described may be employed in connection with a train-pipe for any suitable fluid, whatever the purpose.

The broad idea of my invention is that of a coupler which is not operated by impact of the cars, but which is under the will of the operator and which is automatic in its action only upon exercise of the will. Such a coupler is free from the enormous wear and tear coming from useless operation of the coupler during the switching of the cars.

The foregoing detailed description is employed to enable an easy understanding of the construction, and no limitation is to be understood therefrom except as shall appear from the appended claims.

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

1. In a train-pipe coupling, the combination of a suitably-suspended holder, and a power-actuated coupling member connected therewith, said holder and coupling member

being located so as to be free from operative contact with the opposing coupling member of an adjacent car during coupling of the cars, substantially as described.

2. In a train-pipe coupling, the combination of a suitably-supported holder, a normally-retracted extensible coupling member connected therewith, and power-actuated means for extending said coupling member to cause it to engage a companion member of an adjacent car with which it is normally out of contact when the cars are being coupled, substantially as described.

3. In a train-pipe coupling, the combination of a suitably-supported holder, an extensible coupling member connected therewith, means for yieldingly holding said coupling member normally retracted during coupling of the cars, and power-actuated means for extending the coupling member, at will, substantially as described.

4. In a train-pipe coupling, the combination with the train-pipe of a car, of a normally-retracted extensible coupling member, and means for directing the pressure from the train-pipe to produce an extension of said coupling member and thereafter to allow passage through the coupling, substantially as described.

5. In a train-pipe coupling, the combination with a suitable holder, of a fluid-operated normally-retracted extensible coupling member, substantially as described.

6. In a train-pipe coupling, the combination with a suitably-supported holder, of an extensible coupling member comprising a relatively stationary section, a spring-held movable section provided with a fluid-actuated piston, and a valve for directing the pressure from the train-pipe to said piston, substantially as described.

7. In a train-pipe coupling, the combination with a suitably-supported holder, of an extensible coupling member comprising a relatively stationary section, a spring-held movable section provided with a piston, and an automatically-operating valve for directing the pressure from the train-pipe to said piston, where it serves to actuate said movable section and effect a coupling, substantially as described.

8. In a train-pipe coupling, the combination of a suitably-supported tubular holder, a relatively stationary tubular coupling member section therein, a normally-retracted spring-held tubular coupling member section telescoping with said first-named section and provided with a piston, and a valve for directing the train-pipe pressure to said piston, said first-named coupling-section being provided with an inlet permitting escape of air into the coupling member after said spring-held section has been moved a certain distance, substantially as described.

9. In a train-pipe coupling, the combination with a suitable holder, of an extensible coupling member comprising a relatively stationary section and a relatively movable automatically-actuated flexible section connected therewith, substantially as described.

10. In a train-pipe coupling, the combination of a suitably-supported tubular holder connected at its inner end with the train-pipe, a tubular coupling member section supported within said holder and provided some distance from its rear end with an air-inlet, a movable tubular coupling member section telescoping with said first-named section and provided with a piston contacting with the internal surface of said holder, and an automatically-operating valve for directing the train-pipe pressure to said piston, substantially as described.

11. In a train-pipe coupling, the combination with a train-pipe, of an extensible coupling member connected therewith, means for extending said coupling member to cause it to engage a companion member of an adjacent car, and automatically-operating locking mechanism for holding the coupling member extended, substantially as described.

12. In a train-pipe coupling, the combination of two opposed holders supported from adjacent ends of two cars, said holders being provided near their adjacent ends with internal shoulders, a normally-retracted extensible coupling member within each of said holders, and an automatically-operated locking member connected with the outer end of each coupling member and serving to engage the internal shoulder of the opposed holder, substantially as and for the purpose set forth.

13. In a train-pipe coupling, the combination with the train-pipes of two cars, of holders supported at the adjacent ends of said cars, said holders being provided at their adjacent ends with internal shoulders, relatively stationary coupling member sections within said holders, relatively movable coupling member sections connected with the stationary sections, springs confining said movable sections in both directions, means for causing either movable section to move outwardly and engage and retract the movable section of the companion coupling member, and automatically-acting locking means connected with the outer end of each movable section and serving in proper turn to engage the internal shoulder of the opposing holder after the movable section in the opposing holder has been forced inwardly, substantially as described.

14. In a train-pipe coupling, the combination with a suitably-supported tubular holder provided at its outer end with an internal shoulder, of an extensible coupling member confined within said holder, an expansible member 2 at the outer end of the coupling member, a spring-held locking member operated by said expansible member, and means for extending said coupling member to bring its outer end into engagement with the adjacent end of a companion coupling member, whereby when air is admitted into the coup-

ling member the member 2 is caused to expand and move said locking member, substantially as described.

15. In a train-pipe coupling, the combination of a suitably-supported holder, a relatively stationary tubular coupling member section, a normally-retracted relatively movable tubular coupling member section telescoping therewith and comprising jointed sections, and means for operating said movable section, substantially as and for the purpose set forth.

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In presence of—
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ALBERT D. BACCI.