No. 637,888. Patented Nov. 28, 1899.

H. F. NOYES.

PIPE COUPLING.

(Application filed Oct. 22, 1897.)

(No Model.)

3 Sheets—Sheet 1.

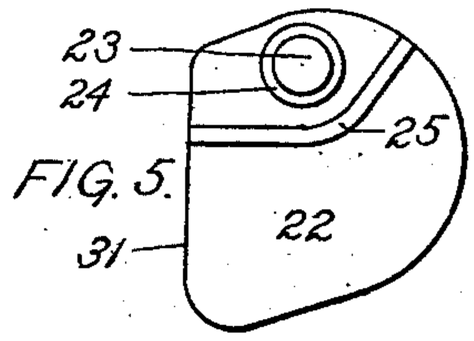

FIG. 5.

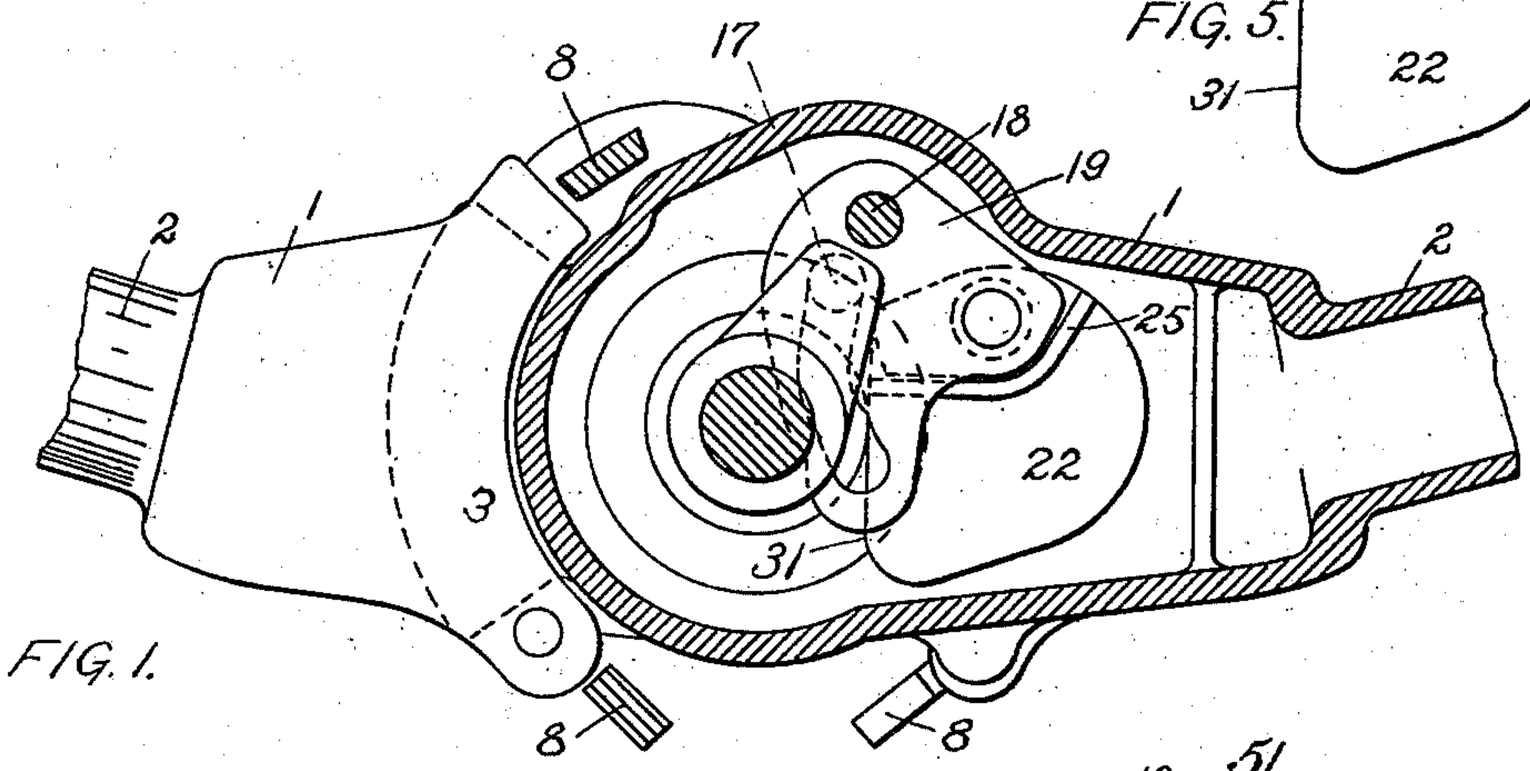

FIG. 1.

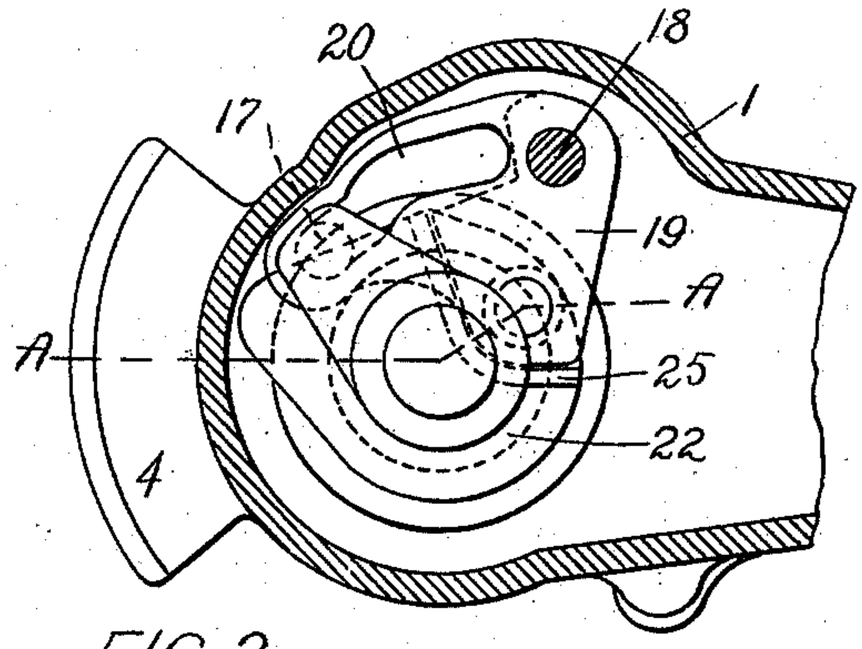

FIG. 2.

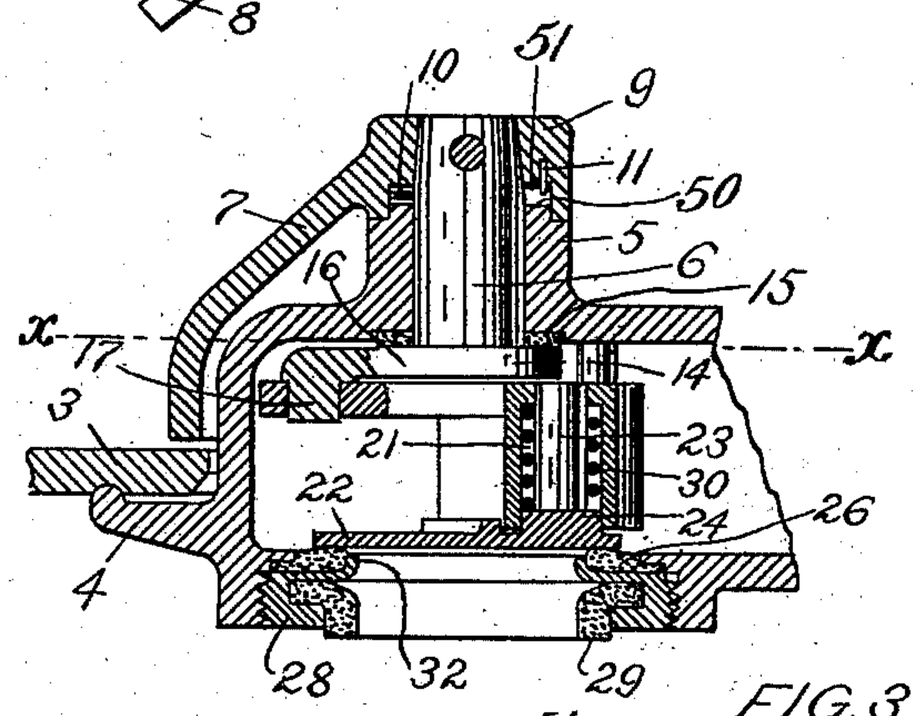

FIG. 3

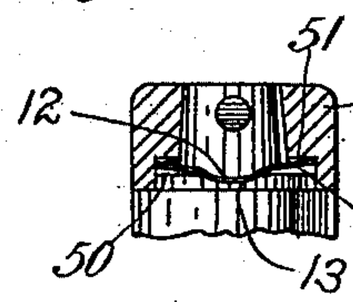

FIG. 6.

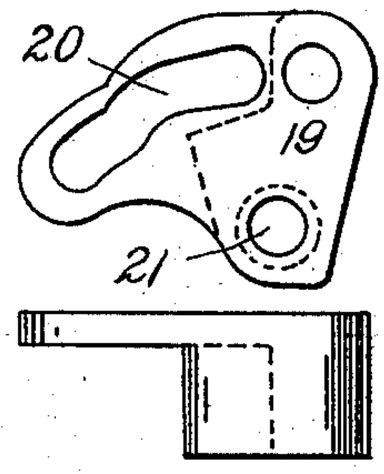

FIG. 4.

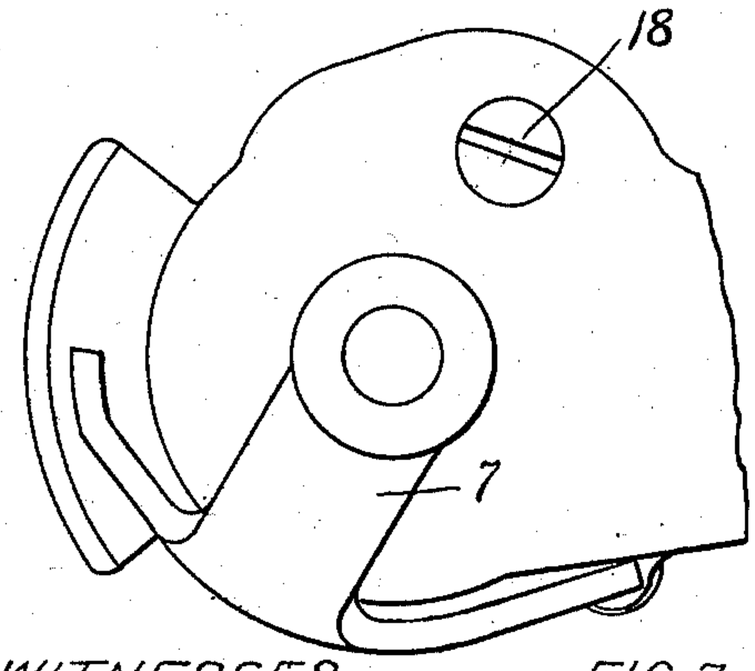

FIG. 7.

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(Application filed Oct. 22, 1897.)

(No Model.) 3 Sheets—Sheet 2.

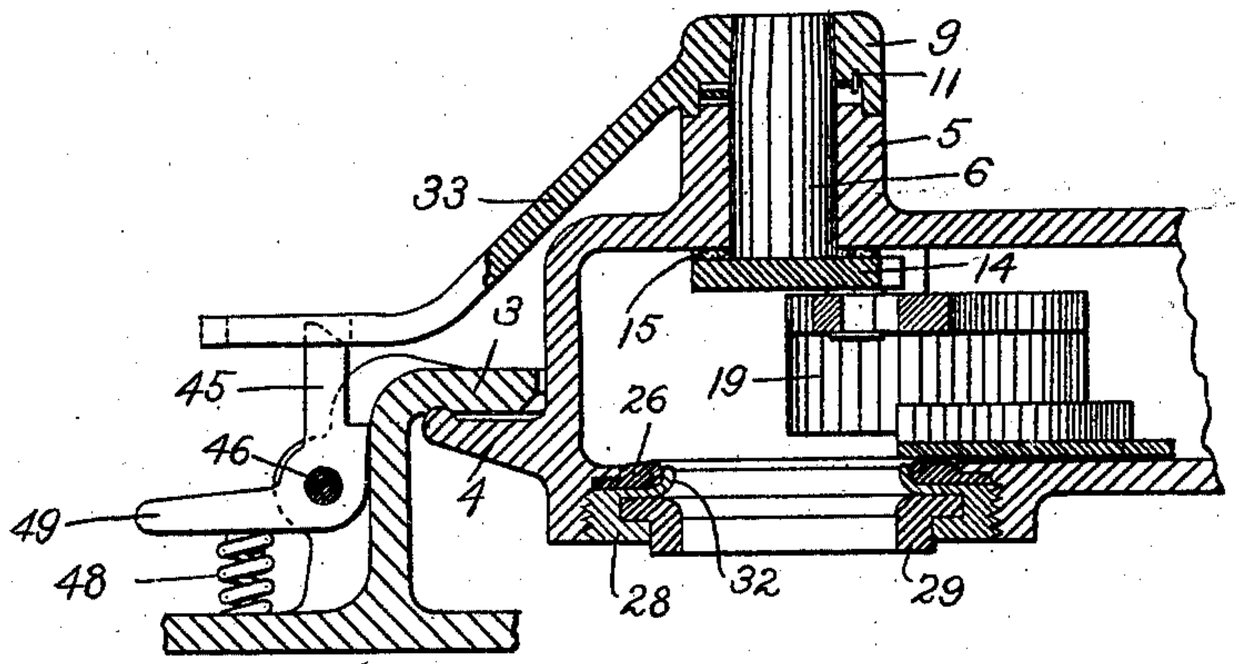

FIG. 8.

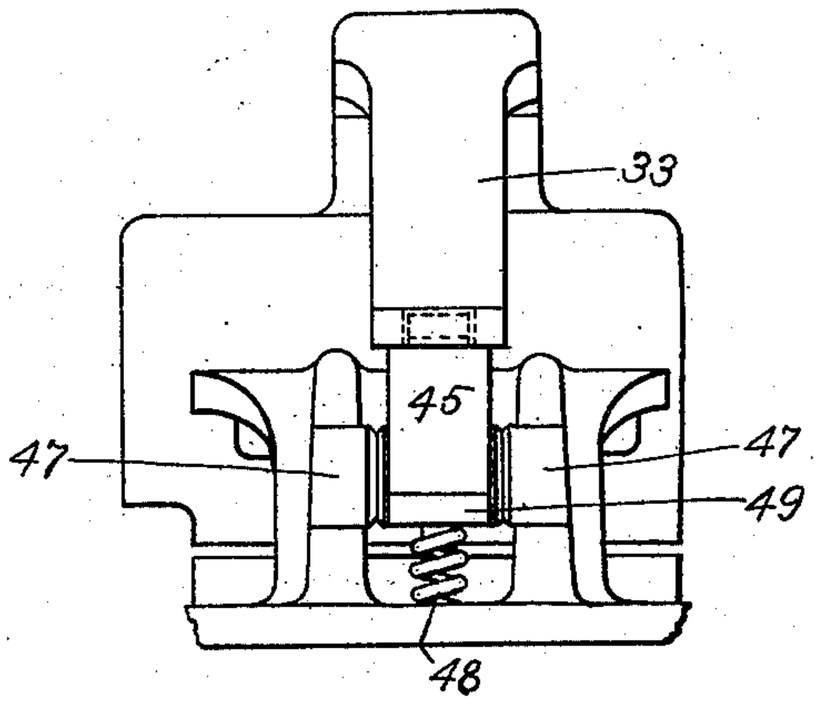

FIG. 9

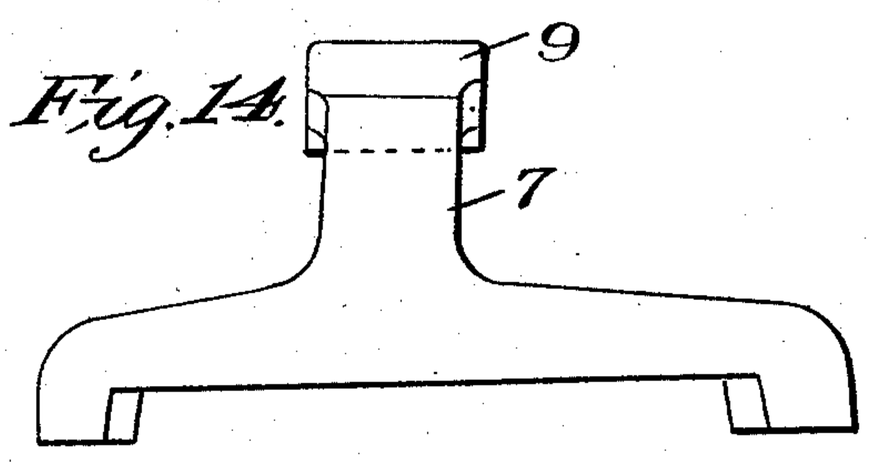

Fig. 14.

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PIPE COUPLING.

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(No Model.) 3 Sheets—Sheet 3.

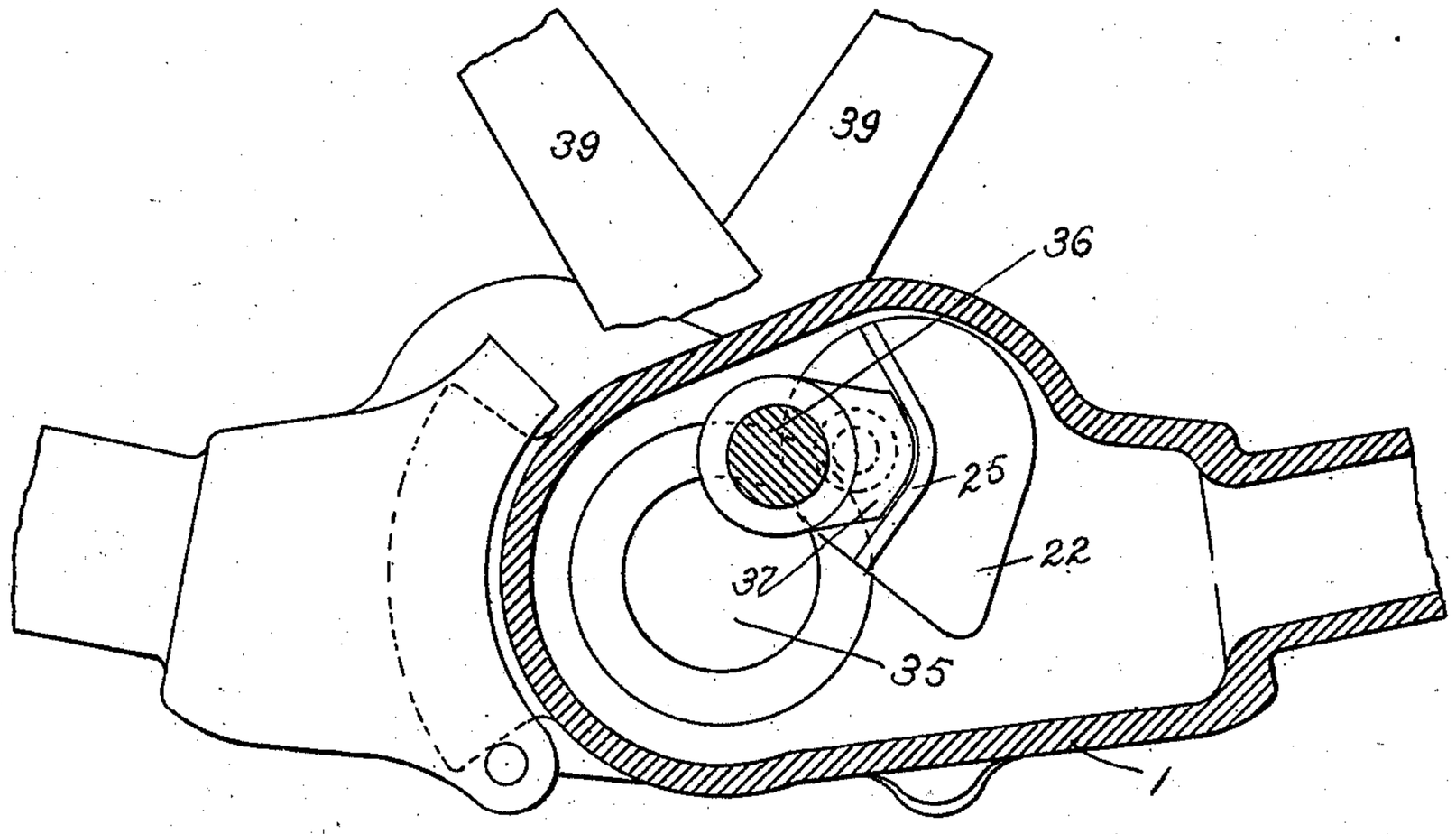

FIG 10.

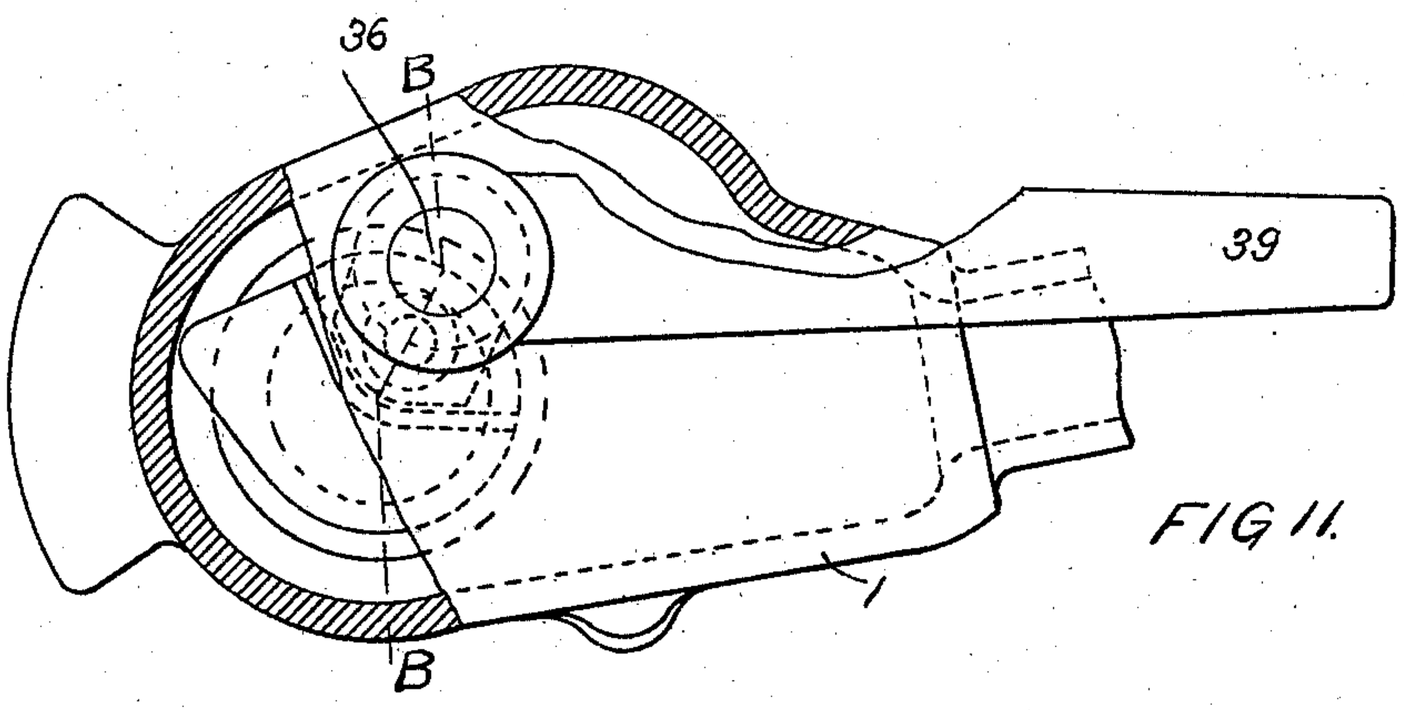

FIG 11.

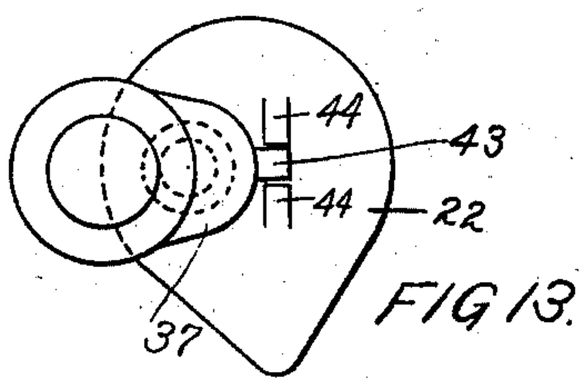

FIG 13.

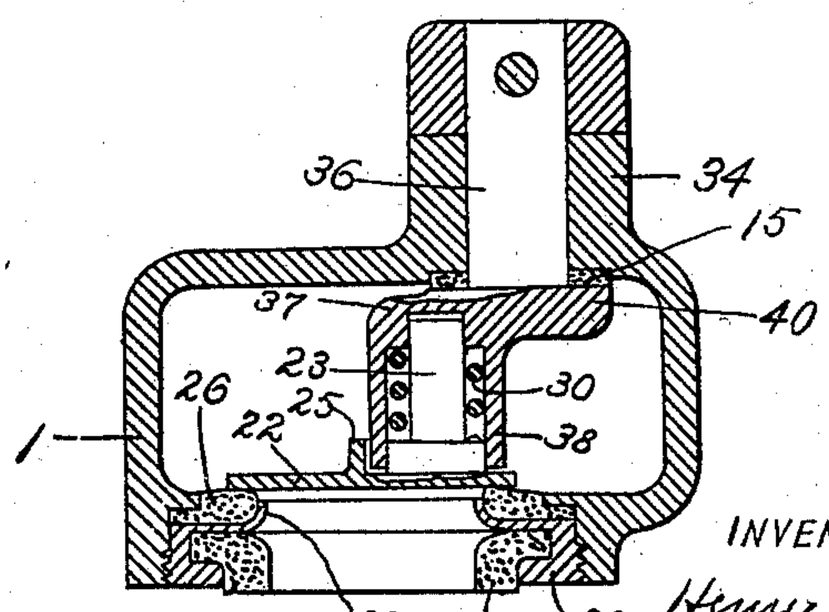

FIG 12

WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY F. NOYES, OF MOUNT VERNON, NEW YORK.

PIPE-COUPLING.

SPECIFICATION forming part of Letters Patent No. 637,888, dated November 28, 1899.

Application filed October 22, 1897. Serial No. 656,078. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. NOYES, of Mount Vernon, Westchester county, and State of New York, have invented certain new and useful Improvements in Pipe-Couplings, of which the following is a specification.

This invention relates in particular to that class of pipe-couplings which are used for connecting air-brake mechanisms of railroad rolling-stock.

As usually constructed, the means for effecting a connection between the air-brake pipes of two adjoining cars consists of two manually-interlocking shells or couplings, each firmly attached to the lower end of a rubber hose. The upper end of this hose is joined to an "angle-cock," which is fastened to the air-brake or train-pipe. The angle-cock furnishes a means for opening or closing the train-pipe connections at each end of each car. When a coupling is disengaged, it usually hangs downward, and as the mouth of the coupling is unprotected it becomes a lodging-place for cinders and dirt. When the coupling is again connected with the coupling of an adjoining car and the air passes through the pipes in either direction, it sucks this foreign matter along with it and frequently deposits a portion of it in the delicate mechanism of the triple valve and often seriously affects the operation of the latter mechanism. The function of the angle-cock is to control the train-pipe opening at each end of a car. It is a valve operated by hand usually after an engagement of the couplings when a connection between two cars is to be made, so that such a connection involves two operations—the engagement of the couplings and the opening of two angle-cocks. In case any angle-cock should be closed the air-brake system is inoperative from that point to the end of the train and the possibility of accident is incurred, and this possibility is greatly increased if it is not known that the angle-cock is closed.

The object of this invention is to provide such a disposal of mechanisms as to obviate the use of angle-cocks, and to this end to provide a valve in the mouth of the coupling, which shall be controlled by the operation of engaging and disengaging the couplings, and to provide a valve which will also be adapted to prevent the entrance of any foreign matter; and a further object of this invention is to provide an easy means of operating this valve and of guiding it to and from its seat. One of the conditions attendant upon its operation, which practice makes necessary, being that when open the valve shall leave a free and unobstructed passage-way through the coupling of the full area of the train-pipe.

Further objects of this invention will be hereinafter mentioned.

In the embodiment of this invention several variations in the details of construction have been shown, and in the preferred form thereof the controlling-valve is automatically moved by the adjacent coupling during the operation of engaging or disengaging the couplings. In the use of couplings of this form the engagement or connection is frequently made with one or both valves under an air-pressure of seventy pounds. In order that at such times the operation may be rendered easy, a means of varying the leverage with which the valve is moved is introduced, whereby the greatest leverage is obtained at the point where the valve is most difficult to move. Such a form of construction is illustrated in Figures 1 to 7, inclusive, in which—

Fig. 1 is an elevation of two couplings in their engaged position, one of the couplings being shown in section, the valve being shown open, taken on line $x\,x$ of Fig. 3. Fig. 2 is a sectional elevation of one coupling, the valve being shown in its closed position. Fig. 3 is a sectional plan taken on line A A of Fig. 2, also showing the operating-lip of the other coupling as it would appear if the couplings were in their engaged position, although for convenience the controlling-valve is shown in its closed position. Fig. 4 is a detail of the slotted plate. Fig. 5 is a detail plan of the valve. Fig. 6 is a detail of one construction for holding the valve in its closed position. Fig. 7 is an elevation showing the position of the lever when the valve is in its closed position. Fig. 8 is a horizontal section of a construction embodying another form of this invention. Fig. 9 is an end elevation of the same.

A further embodiment of this invention is illustrated in Fig. 10, which is an elevation of two couplings in their engaged position,

one being shown in vertical section with the controlling-valve in its open position. Fig. 11 is an elevation of the same, showing the valve in its closed position. Fig. 12 is a sectional elevation taken on line B B, and Fig. 13 illustrates a modification in the construction of the valve. Fig. 14 is a detail view of the operating-lever.

Referring to such an embodiment of this invention as is illustrated in Figs. 1 to 7, inclusive, the main casing 1 is provided with a neck or hose end 2, to which is clamped one end of a rubber hose. The casing is provided with a grooved operating-lip 3 and a beaded flange 4, each of the same form as is found in couplings in general use, whereby this improved coupling is made interchangeable with those now in service. The casing is provided with a neck 5, furnishing a suitable bearing for the stem 6, which projects through an opening in such neck. Upon the outer end of such stem is pinned an operating-lever 7, having its lower extremity provided with two projections 8, adapted to straddle and to be engaged by the lip 3 of the adjacent coupling. Within the shell the stem 6 is provided with a shoulder 14, and between this shoulder and the shell is placed a suitable gasket 15 to establish the joint at this opening. Extending from the stem approximately at right angles to it is the arm 16, the end of which is provided with a pin or projection 17. The stud 18 is screwed through the shell from the outside and forms a support within the shell for the arm 19. This arm has a slot 20 of peculiar shape, in which works the pin 17, and to which reference will be made farther on. A countersunk hole 21 is provided in this arm, and the valve 22 has a projecting pin 23, with a shoulder 24, adapted to fit the hole 21, the spring 30 being interposed between the shoulder 24 and the shoulder formed by countersinking the hole 21, and travel of the arm 19 is transmitted to the valve through the pin 23. The valve is also provided on its upper face with the rib 25, to which reference will be made farther on. The valve has a peculiar shape, being designed to oscillate to and from its seat by passing across the mouth of the shell, the side which crosses the opening being approximately straight or having a curve of a large radius, so that the points upon the valve-seat at which the valve is supported in closing are nearly in line with its advancing edge. The object of this construction will be referred to farther on.

In the mouth of the coupling is provided for the valve a seat 26, preferably of rubber. The ring 28, having the circular flange 32, supports this seat, this flange being necessary to afford the valve-seat sufficient strength to support the valve when under pressure and is firmly screwed against the seat. This ring has a recess in which to receive the gasket 29, which is of the usual construction.

The lever 7 is provided with a neck 9, and between this neck and the neck 5 of the coupling, in a recess or counterbored portion of the neck 9, is situated a flat annular spring 10, fastened to the lever by the pin 11 and having a transversely-bowed portion 12, which is disproportionately exaggerated in the drawings and adapted to fit into a correspondingly-shaped depression 13 in the neck 5, and this depression is so disposed and the spring 10 pinned to the neck 9 at such a position with relation to the lever 7 that the bowed portion of the spring is received in the depression 13 when the lever is in the position shown in Fig. 7, the position it takes when the valve is fully closed, it being evident that when the lever 7 is rocked to open the valve the bowed portion of the spring will travel out of the depression 13 and, passing between the face 50 of the neck 5 and the shoulder 51, formed by counterboring the neck 9, will be flattened out of its normal shape, so that this bowed portion does not freely move out of this depression, and therefore acts to prevent any undesired movement of the lever, and hence of the valve.

It is evident that other ways of holding the valve in a closed position may be devised. For instance, one coil of a spring interposed between the neck of the lever and the neck 5 of the coupling, so as to afford considerable friction when the lever is moved, would operate to constrain the lever from being moved accidentally. Therefore I do not desire to be limited to the precise construction illustrated.

From the above description it will be readily understood that when an engagement of a pair of adjacent couplings is effected the lever 7 and stem 6 are given, by the contact of the projections 8 of the lever with the lip 3 of the opposite coupling, a semirotary movement with respect to the neck 5, and this movement is transmitted through the stem 6 and arm 16 to the pin 17. This motion of the pin 17 will evidently impart a rotary movement to the slotted plate 19 and valve 22 about the stud 18 as a center. By means of the peculiar construction of the slotted plate 19 and by means of the relative disposal of the centers of rotation of this plate and the pin 17 and by means of the oppositely rotary movements of the pin and plate the position of the point at which this pin 17 transmits its motion to the arm 19 continually changes from a point at a relatively considerable distance from the center of rotation of said plate to a point very close to said center, thereby continually changing the leverage with which this pin acts upon the arm and decreasing from the beginning to the end of the stroke in the direction to open the valve, and thereby continually changing the rapidity of movement of the valve from a slow initial to a rapid final movement. The object of this construction is apparent, since during the first portion of this movement of the plate and valve the latter is sometimes held to its seat by air-pressure of sixty or

seventy pounds, creating considerable friction and requiring an effective leverage to make the operation of opening easy. After the valve has moved a short distance and partially opened the mouth the pressure upon the two sides of the valve becomes nearly equalized, and from this point on it is evident that the valve can be moved with much less friction, and the leverage with which the operating-pin is applied can be much decreased. A form of construction such as this is of greatest importance, since without some method of obtaining a powerful leverage at the start it is difficult to engage two couplings, and, moreover, the amount of oscillation of the lever 7, and hence the travel of the pin 17, is limited by the construction of the couplings in general service, as it must be operated with them, and this travel must be so disposed as to effect the full opening of the valve. In disengaging the half-blocks these operations take place in the reverse order, the leverage increasing as the friction of the valve upon its seat increases. The end of the slot farthest away from the stud 18 is made of such a shape that the pin 17 may be given a certain amount of travel without moving the valve, and it is evident that this motion would occur at the beginning of a stroke of the pin 17 in the direction to open the valve and at the end of its stroke to close the valve. It is evident that this motion is obtained by giving the slot for a short distance and when in position with the valve closed a curve of a radius equal to the distance of the pin 17 from its center of revolution.

It will be noted that the rib 25, fitting the arm 19, prevents the valve from turning upon the pin 23, and at the same time leaves the valve free to adjust itself to its seat. It will also be remembered that the side of the valve 31 which travels completely across the mouth of the opening as the valve is closing is made approximately straight. The object of this construction is now apparent. In order to establish an air-tight joint with the valve-seat, the valve is adapted to adjust itself vertically to and from its seat without hindrance from the arm 19, and to provide against the yielding nature of the rubber seat the valve is given a large bearing-surface to rest upon. When closing under pressure, the advancing edge of the valve, being approximately straight, is supported at each end in line with the foremost portion of the valve; otherwise the foremost portion of the edge might dig into and destroy the seat as the valve closed. In order that this edge may always retain the same position relative to the arm 19, thereby preventing the valve from any rotary motion upon the pin 23, this rib is provided.

Referring now to Figs. 8 and 9, the interior organization of the coupling is the same as that illustrated in Figs. 1 to 7, inclusive. The lever 33, which corresponds in function with the lever 7 of the previously-described construction, projects beyond the lip 3, where its end is provided with a slot to receive the tongue 45. This tongue is provided with an arm 49 and is adapted to rock upon the pin 46, which is suitably supported by two lugs 47. A spring 48 is provided to normally hold the tongue in position to receive the lever. In the operation of the device it will be readily understood that when the lever 33 of one half-block is placed in contact with the tongue of the adjacent half-block and the two half-blocks given their usual rotary motion to bring them into engagement the levers 33 are actuated to open their valves, as in the previously-described construction. If at any time it should be desired to close one of the valves without disturbing the engagement of the half-blocks by pressing down the arm 49 of the tongue 45, the latter is thrown out of engagement with its adjacent lever and the latter may be freely moved. As it is evident that other constructions could be provided for throwing the lever out of engagement with the adjacent half-block I do not desire to be limited to this particular arrangement.

Referring now to Figs. 10, 11, 12, and 13, I provide a shell 1, valve 22, valve-seat 26, and means of holding the latter in place similar to and having the same function as those illustrated in Figs. 1 to 7, inclusive. Working in the neck 34 and out of line with the center of the opening through the mouth of the half-block 35 is the stem 36, having a shoulder 40, seated against the gasket 15, and having at the end of a short arm 37 a socket 38, adapted to receive the pin 23 and spring 30, whereby the valve 22 is operated. This valve is of approximately the same shape as the valve 22 described in the previously-mentioned construction, having the same functions and operated under the same conditions. In this organization of mechanisms the center of its oscillatory movement is the center of its operating-lever. The rib 25 is also fitted to the contour of the arm 37 to prevent any rotary motion of the valve with reference to its operating-arm 37, whereby the valve is constrained to operate with this arm and yet is free to adjust itself vertically to its seat. It will also be noted that the spring 30 has here two functions, one to hold the valve 22 to its seat when this is not effected by air-pressure—for instance, when the ear is not connected—and the other to hold the shoulder 40 against its gasket 15, thereby affording sufficient friction to prevent the hand-lever 39, which is suitably pinned to the stem 36 and affords a convenient means of operating the valve, from accidentally moving to open the valve.

In Fig. 13 I have shown a slightly-different way in which the valve 22 may be prevented from turning upon the pin 23. In this case the arm 37 has a toe 43, which rests between two projections 44 on the valve. As it is evident that various ways might be devised for imparting to the valve the movement of the arm while allowing it vertical freedom, I do

not wish to be limited to the precise construction shown.

From the foregoing description will be seen the advantages of this invention. It eliminates the use of angle-cocks. It provides a valve close to the mouth of the coupling, thereby preventing the entrance of any foreign matter. It provides an easy means of operating the valve. It provides an efficient way of guiding the valve and of holding it to its seat and of preventing it from accidentally moving from its seat. It provides a means of operating the valve independently or automatically.

While I have described this invention with more or less completeness as regards the details thereof, I do not wish to be confined thereto unduly, as I contemplate all proper changes of form, omission of parts, and the substitution of equivalents as circumstances may suggest or necessity render expedient.

I claim—

1. In combination with a hose-coupling provided with a mouth, and having a valve-seat disposed around said mouth, of a valve adapted for oscillatory movement upon said seat; a lever; and a plate connecting said valve and lever, whereby any movement of said lever takes place in a rotatively opposite direction to a coincident movement of said valve, whereby said lever is adapted to operate said valve with a varying leverage.

2. In combination with a hose-coupling provided with a mouth, having a valve-seat disposed around said mouth, of an oscillating valve adapted for movement upon said seat, and about a support out of line with said mouth; a lever; and a plate connecting said lever and valve, whereby any movement of said lever takes place in a direction rotatively opposite to a coincident movement of said valve, whereby said lever is adapted to operate said valve with a varying leverage.

3. In a hose-coupling, a casing provided with a mouth, a valve and pivot for said valve arranged out of line with said mouth, a stem mounted in said casing, link connections between said stem and valve, and means for rocking said stem, as and for the purpose set forth.

4. In a hose-coupling, a casing provided with a mouth and valve-seat arranged to surround said mouth, a stem mounted in said casing, a pivotally-mounted valve, link connections between said valve and stem adapted to swing said valve about its pivot when said stem is rocked, and a means for automatically rocking said stem during the operation of coupling or uncoupling, as and for the purpose set forth.

5. In a hose-coupling, a casing provided with a mouth, a valve-seat arranged to surround said mouth, a pin mounted in said casing and arranged out of line with said mouth, a valve loosely mounted on said pin, a stem mounted in said casing, connections between said stem and valve for operating the latter, and means for automatically rocking said stem during the coupling or uncoupling process, as and for the purpose set forth.

6. In a hose-coupling, a casing provided with a mouth, a pin mounted in said casing, a valve connected with a slotted plate and adapted to oscillate upon said pin, a stem mounted in said casing, connections between said stem and plate, and means for automatically rocking said stem during the coupling process, as and for the purpose set forth.

7. In a hose-coupling, a casing provided with a mouth, a valve mounted therein and arranged to control the mouth thereof, means for actuating said valve, and a means of varying the leverage of said valve-actuating means during the opening movement thereof, as and for the purpose set forth.

8. In a hose-coupling, a casing provided with a mouth, a valve mounted therein and adapted to control the mouth thereof, a means of unseating said valve, said means adapted to impart to said valve a slow initial and a rapid final movement, as and for the purpose set forth.

9. In a hose-coupling, a casing provided with a mouth, a valve mounted therein and arranged to control the mouth thereof, means for unseating said valve, and means of changing the leverage of said valve-opening means, whereby a slow initial and a rapid final movement is imparted to said valve during the operation of unseating the same, as and for the purpose set forth.

10. In a hose-coupling, a casing provided with a mouth; a valve adapted for oscillatory movement to and from said mouth; a plate provided with a slot and connected with said valve for oscillating movement therewith; and a stem provided with a pin working in said slot, for imparting movement thereto; and a means of rocking said pin.

11. In a hose-coupling, a casing; a stem mounted therein and provided with an arm; a plate adapted to be engaged by said arm and adapted for oscillatory movement; a support for said plate; a valve connected with said plate, and means for rocking said stem and thereby imparting movement to said valve.

12. In a hose-coupling, the combination of a casing provided with a mouth; a valve adapted for oscillatory movement to and from said mouth; a slotted plate connected with said valve for oscillatory movement therewith and yielding means interposed between said plate and valve whereby they are adapted to have a comparatively slight vertical movement to and from one another; and a means of operating said plate.

13. In a hose-coupling, a casing provided with a mouth, a valve arranged to control such mouth, a lever suitably connected to such valve, and a means adapted to constrain said lever from being moved from a predetermined

closed position, as and for the purpose set forth.

14. In a hose-coupling, a casing provided with a mouth, a valve arranged to control such mouth, a lever suitably connected with said valve, and a spring adapted to constrain said lever from moving said valve from a predetermined closed position, as and for the purpose set forth.

15. In a hose-coupling, a casing provided with a mouth, a valve arranged to control such mouth, a plate directly connected with such valve, and provided with an elongated slot, a stem provided with an arm which has a projection working in such slot, and a lever attached to such stem, as and for the purpose set forth.

16. In a pipe-coupling, a casing provided with a mouth, a valve arranged to control such mouth, an arm vibrating with said valve, connections between said arm and said valve which allow the latter vertical freedom with relation to said arm, but which restrain said valve from any movement relative to said arm and in its line of travel, and an operating-lever suitably connected with said arm, as and for the purpose set forth.

17. In a pipe-coupling, a casing provided with a mouth, a valve adapted to control such mouth, an arm loosely connected with said valve, a projection upon said valve adapted to contact a portion of said arm, and to prevent any movement of said valve relative to said arm and in its line of travel, and an operating-lever suitably connected with said arm, as and for the purpose set forth.

18. In a pipe-coupling, a casing provided with a mouth, a valve arranged to control such mouth, and provided with a suitable seat, an arm pivotally connected with said valve, a projection upon said valve adapted to contact a portion of said arm, and to prevent any travel of said valve relative to said arm, and an operating-lever suitably connected with said arm, as and for the purpose set forth.

19. In a pipe-coupling, a pair of engaging casings provided with mouths, a valve arranged to control each mouth, a lever connected with each valve and adapted to contact and engage the adjacent half-block, and a means of disengaging said lever from its actuating half-block while said half-blocks are engaged, as and for the purpose set forth.

20. In a pipe-coupling, a pair of engaging casings provided with mouths; a valve disposed to control each mouth; a lever connected with each valve; a projection carried by the adjacent coupling and adapted to engage said lever; and a means of disengaging said projection from said lever while the couplings are engaged.

21. In a pipe-coupling, a casing provided with a mouth, a valve-seat surrounding said mouth and a reciprocating valve adapted for sliding movement thereon, a stem projecting through the back of said casing and having a shoulder provided with a suitable seat, and yielding connections between said stem and valve whereby each is allowed a free vertical movement to its seat, and an operating-lever connected with said stem, as and for the purpose set forth.

22. In a pipe-coupling, a casing provided with a mouth; a valve-seat surrounding said mouth; a reciprocating valve adapted for sliding movement upon said seat; an arm adapted for oscillatory movement; yielding connections between said arm and valve whereby the latter is allowed movement vertically to and from its seat; and a means for rocking said arm and thereby imparting to said valve a reciprocating movement.

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Witnesses:
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